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## Clinical Pharmacists in Chronic Care

By Abdul Kader Mohiuddin

*Abstract-* Pharmacy practice has changed significantly lately. The professionals have the chance to contribute straightforwardly to patient consideration so as to lessen morbimortality identified with medication use, promoting wellbeing and preventing diseases. Healthcare organizations worldwide are under substantial pressure from increasing patient demand. Unfortunately, a cure is not always possible particularly in this era of chronic complications, and the role of physicians has become limited to controlling and palliating symptoms. The increasing population of patients with long-term conditions are associated with high levels of morbidity, healthcare costs and GP workloads.

*Keywords:* chronic care; pharmacy intervention; diabetes care; CVD prevention; inflammatory bowel disease.

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# Clinical Pharmacists in Chronic Care

Abdul Kader Mohiuddin

**Abstract-** Pharmacy practice has changed significantly lately. The professionals have the chance to contribute straightforwardly to patient consideration so as to lessen morbimortality identified with medication use, promoting wellbeing and preventing diseases. Healthcare organizations worldwide are under substantial pressure from increasing patient demand. Unfortunately, a cure is not always possible particularly in this era of chronic complications, and the role of physicians has become limited to controlling and palliating symptoms. The increasing population of patients with long-term conditions are associated with high levels of morbidity, healthcare costs and GP workloads. Clinical pharmacy took over an aspect of medical care that had been partially

abandoned by physicians. Overburdened by patient loads and the explosion of new drugs, physicians turned to pharmacists more and more for drug information, especially within institutional settings. Once relegated to counting and pouring, pharmacists headed institutional reviews of drug utilization and served as consultants to all types of health-care facilities. In addition, when clinical pharmacists are active members of the care team, they enhance proficiency by: Providing critical input on medicine use and dosing. Working with patients to solve problems with their medications and improve compliance.

**Keywords:** chronic care; pharmacy intervention; diabetes care; CVD prevention; inflammatory bowel disease.



**Figure 1:** Clinical pharmacy offers chronic care services like asthma, diabetes, nutritional supplement counseling, smoking cessation, weight reduction, geriatric care, hyperlipidaemia, hypertension, naturopathy and wound care. The integration of clinical pharmacists into primary care clinics could have positive effects on the clinical outcomes of patients in glycemic control, blood pressure, lipid profile, in accordance with current guidelines.

## I. BACKGROUND

Clinical pharmacology is a professional discipline that combines basic pharmacology and clinical medicine. A clinical pharmacist offers invaluable support in the development of a final prescription with better patient management and enhanced safety [1]. Its development began in the early 1950s, primarily as a result of the efforts of Harry Gold. Pharmacist rounding with inpatient hospital services has been traced to the University of Kentucky in 1957 [1,2]. Drug therapy was becoming much more complex. Graham Calder

pioneered a new role for pharmacists on hospital wards in Aberdeen [3]. The role of clinical pharmacists underwent significant changes from the 1960s through 1990s as their participation in direct patient care enhanced. In the early 1970s, federal funding assisted with greatly expanding clinical pharmacy faculty in Colleges of Pharmacy [4]. Pharmacy education debated where clinical pharmacy fit within pharmacy training. The AACP spearheaded an effort to examine this issue. Till then, two full generations of pharmacists have been educated and trained after the general adoption of the aims of clinical pharmacy [4,5]. ACPE has revised the standards for colleges and schools of pharmacy several times since 2000. ACPE Standards 2016 go into effect

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July 1, 2016. To some extent, pharmacy took over an aspect of medical care that had been partially abandoned by physicians [6]. Overburdened by patient loads and the explosion of new drugs, physicians turned to pharmacists more and more for drug information, especially within institutional settings. A clinical pharmacist often has a somewhat different approach to the use of drugs and may give valuable supplementary information about for example interactions, during the physician's decision-making process concerning potential changes of and the follow-up of the medication [7,8]. The concept of pharmaceutical care accentuates the pharmacists' responsibility to pursue the best possible patient outcomes of therapeutic regimen [9]. They possess in-depth knowledge of medications that is integrated with a foundational understanding of the biomedical, pharmaceutical, socio-behavioral, and clinical sciences [10]. To achieve desired therapeutic goals, the clinical pharmacists follow evidence-based therapeutic guidelines, evolving sciences, emerging technologies, and relevant legal, ethical, social, cultural, economic, and professional precept [11-13]. In accordance, clinical pharmacists assume responsibility and accountability for managing medication therapy in direct patient care settings, whether practicing independently or in consultation or collaboration with other health care professionals [14,15]. Their functions encompass comprehensive medication management (ie, prescribing, monitoring, and adjustment of medications), nonpharmacologic guidance, and coordination of care. Interdisciplinary collaboration allows pharmacists opportunities to provide direct patient care or consultations by telecommunication in many different clinical environments, including disease management, primary care, or specialty care [16-19]. Pharmacists may manage chronic or acute illnesses associated with endocrine, cardiovascular, respiratory, gastrointestinal, or other systems [20]. Clinical pharmacist researchers generate, disseminate, and apply new knowledge that contributes to improve HRQoL [21-24]. Within the system of health care, clinical pharmacists are experts in the therapeutic use of medications. They consistently provide medication therapy evaluations and endorsements to patients and allied health professionals (AHPs) [25,26]. Clinical pharmacists are a primary source of scientifically accurate/logical information and advice regarding the safe, appropriate, and cost-effective use of medications [27,28]. They obtain medical and medication history, check medication errors including prescription, dispensing and administration errors, identify drug interactions, monitor ADR, suggest individualization of dosage regimen, provide patient counseling, etc. [29-35]. They also provide information about the use of drugs and medical devices like inhaler, insulin pen, eye drops, nasal sprays, etc. [36]. Participation of a clinical pharmacist in ward/ICU rounds and clinical discussions

helps to identify, prevent or reduce drug interaction and ADR [29], [37-39].

## II. INTRODUCTION

Population aging has increased the burden of chronic diseases globally. There are both ethical and practical imperatives to address health inequity issues related to chronic disease management for persons with social complexity, existing programs often do not appropriately address the needs of these individuals. This leads to low levels of participation in programs, suboptimal chronic disease management, and higher health-care utilization [40]. Unlike acute conditions, chronic diseases require consistent care and management outside of the healthcare setting, in the community or primary care setting, in terms of medication, lifestyle management, and health behavior modification [41-45]. It is typically a multi-component intervention that includes medication therapy review, patient medication education, medication monitoring, immunizations, disease self-care and support, and/or prescribing authority. Patients who take voluminous medications due to chronic disease have a high risk of drug duplication, interaction, or ADRS, which could result in extended hospital stays and higher costs [46]. To increase the safety and effectiveness of therapeutics, these patients must have specific needs met, with regards to appropriate medication use [47]. Studies have shown that integrating pharmacists into ambulatory clinics can improve chronic disease management and optimal use of medications [48]. Furthermore, pharmacist involvement in patient care may help to curtail inappropriate drug use, specifically in the elderly. A study in Canada saw the proportion of patients receiving an inappropriate medication drop significantly after medication review and optimization by a team that included a pharmacist [49]. Compared to usual care, pharmacist-led care was associated with similar incidences or rates of office, urgent care or ED visits, and hospitalizations and medication adherence, increased the number or dose of medications received and improved study-selected glycemic, blood pressure, and lipid goal attainment [50]. Another recent study shows telehealth-based chronic disease management program including clinical pharmacy specialists imparted statistically significant improvements in diabetes and hypertension outcomes along with clinically significant improvements in the areas of lipid management and tobacco cessation [51].

## III. DIABETES CARE

As the seventh-leading cause of death in the US, diabetes can lead to various health complications such as blindness, kidney disease, amputations, and heart disease. The worldwide existing prevalence of DM is about 425 million people, of whom 279 million are in

urban areas and 146 million are in rural zones [52]. The IDF estimates that by 2040, one in 10 adults (642 million) will have diabetes. Around 50% (212.4 million) of patients are unaware of their diabetes. More than 12% of total global health expenditure goes to diabetes, according to IDF [53]. Annual worldwide economic cost of diabetic care was calculated at \$727 billion in year 2017 which is predicted to be \$776 billion for year 2045 respectively [54]. Currently, more than 230 million Asian individuals are living with diabetes, accounting for approximately 55% of the world's diabetic population. China and India collectively are home of nearly 110 million diabetic patients [55]. It is a risk factor for CVD and has been associated with 2- to 4-fold higher mortality [56] and another study says that half of all diabetic death was due to CVD [57]. The number of deaths caused by diabetes in the age range of 60–99 years in 2017 was 3,200,000 [58]. About half of diabetes-related mortality (48%) occurs in people younger than 60 years and it continues to reduce life expectancy by 6–8 years in people diagnosed at the age of 50 years [59]. More than 35% patients did not receive any diabetes education, while 30% diabetic patients were compliant with drug regimens and thenon-compliance was higher among the lower socioeconomic groups [60]. Pharmacist may provide a face-to-face counseling regarding knowledge on diabetes, self-monitoring of blood glucose, regular checkup of systolic blood pressure, body weight, and serum cholesterol levels. The pharmacist may also counsel regarding non-pharmacological management strategies such as diet control, exercise therapy, and early identification of symptoms of hypoglycemia (blurred vision, rapid heartbeat, sweating, fatigue, headache, dizziness, trouble thinking, seizures, and coma) and its management. In a satisfaction survey of 24 providers or clinical pharmacists, nearly 90% had favorable responses toward the protocol and its effect on access to and quality of care [61]. Management of DM remains a significant challenge in the US, as estimates indicate that greater than 40% of diabetes patients are uncontrolled with a HbA1c. Diabetic patients who received care from the collaborative team, including a clinical pharmacist, had improvement in most key indicators of diabetes like HbA1c, in both high- and low- income countries and in both urban and rural areas [62-71]. Emphasizing medication adherence, particularly for patients with longer duration of diabetes and those with multiple comorbid diseases should be strongly considered in future diabetes management programs implemented to improve glycemic control in patients with type 2 diabetes [72]. A mobile phone text message can serve as a simple and cost-effective option in improving medication adherence and clinical outcomes by providing information between clinic visits has been reported [73,74]. A report from the National Diabetes Commission suggested that an inappropriate

attitude of health care professionals toward diabetes could lead to poor patient outcomes [75]. In educational program, a clinical or community pharmacist can improve adherence by providing medication consultation service, creating an individualized patient schedule on administration times and dosage of each medication, educating the patient on the importance of medication adherence, dietary adherence and exercise on better glycemic control, giving advice on how to reduce adverse effects of medications, and also by teaching how to take medications in the holy month of Ramadan or other religious fasting, and how to use pill boxes and diary logs to reduce forgetfulness. Literature indicates a number of interventional studies involving pharmacist-based educational interventions, showing clinically significant improvements in the clinical outcomes of the diabetes patients [76].

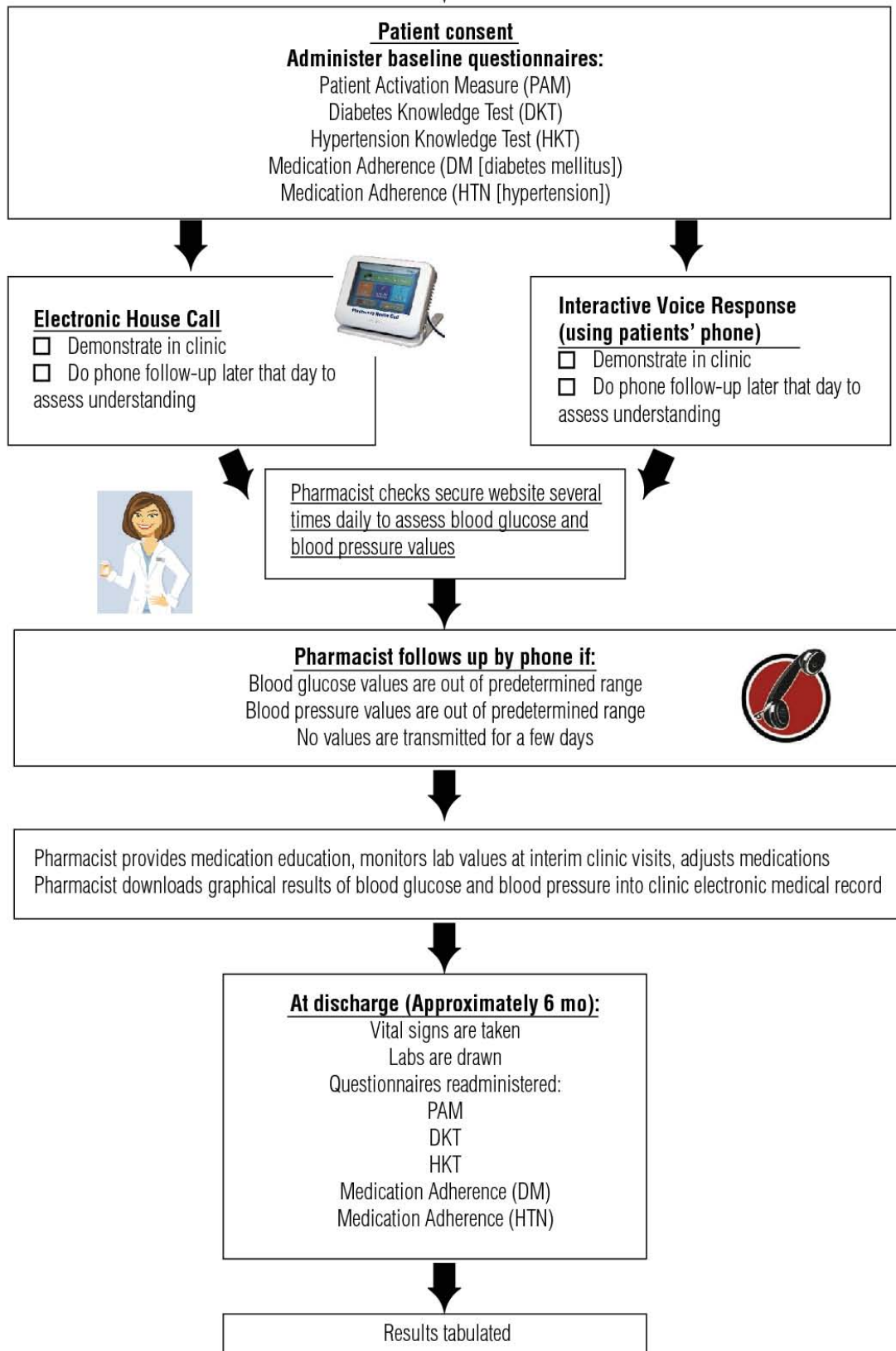


Figure 2: Telemonitoring model for providing clinical pharmacy services to patients with diabetes [62].

#### IV. CVD PREVENTION

Hypertension affects 26.4% of the global adult population and a key driver of global disease burden [77]. It is a major risk factor for CHD, stroke, retinopathies, and renal dysfunction. 18 million people die each year from CVDs, an estimated 31% of all deaths worldwide [78]. Of these deaths, 85% are due to MI and stroke [79]. CVD is currently the leading cause of morbidity and mortality and over 80% occur in LMICs [80]. Nearly 50% patients with chest pain related to exercise have obstructive coronary artery disease [81]. Coronary artery spasm plays an important role in the pathogenesis of IHD, including angina pectoris, MI, and sudden death, occurring most often from midnight to early morning [82]. A study of 1,015 patients with stable coronary artery disease (CAD) showed a 4.4-fold escalation in the risk of stroke and a 3.8-fold escalation in the risk of death among patients who self-reported as non-compliant [83]. IHD has topped the list of causes of years of life lost for more than a decade, highlighting the shift in the global burden of disease from communicable to chronic disease. Risk factors for CVD, including raised blood pressure, hypercholesterolaemia and high BMI, are among the most important contributors to DALYs [84]. CVD claimed death of some 900,000 death in US in 2016 [85]. BP is still uncontrolled in 50% of the US population with hypertension. Additionally, BP can remain poorly controlled despite up to six physician visits per year [86]. Across South Asia, overall hypertension prevalence is estimated to be 27%. Prospective Urban Rural Epidemiology study has shown more than 50% are unaware of it and up to 80% of hypertensive patients have low adherence to medication. Uncontrolled BP was found more than 50% in Bangladesh, 70% in Pakistan and almost 60% in Sri Lanka [87]. The goals of treatment of hypertension are to limit target organ damage, thereby reducing the morbidity and mortality associated with the disease [88]. Many factors including socioeconomic status, belief about medications, comorbidity, availability of medications, access to healthcare, level of health literacy, number of medications, duration of therapy, age, gender, culture, educational status, and knowledge of the disease and treatment have been associated with the rate of adherence. Lack of medication availability, low level of awareness about the disease and treatment, inability to afford medicines, mistrust in western medicine, and more trust on traditional and spiritual healers are very common in the rural population [89]. Non-drug therapies have been shown to lower BP, enhance antihypertensive drug efficacy, and decrease cardiovascular risk. All patients with hypertension and those in the prehypertensive category should be advised to make life-style modifications in addition to any pharmacologic treatment that they receive [90].

Surprisingly, 60%- 80% of the population around the world (according to WHO) are partially or fully dependent upon herbal drugs for primary healthcare [91]. Interactions of some ingredients in supplements with other anti-hypertensive and cardiovascular preparations are well-documented [92]. Green tea showed 85% decrease in plasma concentration of nadolol, for example [93]. The pharmacist may play a relevant role in primary and secondary prevention of CVDs, mainly through patient education and advocacy, drug safety management, medication review (review of both drug-food and drug-drug interaction), monitoring and reconciliation, detection and control of specific cardiovascular risk factors (e.g., blood pressure, blood glucose, serum lipids) and clinical events [94].

Pharmacist intervention can increase patients' knowledge about their condition in a way that positively modifies their beliefs about medicines, increased medication intensification without significant change in medication adherence, modify factors affecting adherence, improve adherence and patient QoL by reducing BP levels in patients treated with antihypertensive agents, increased referral acceptance [86], [95-99]. Interventions that were most effective included combinations of more convenient care, information, reminders, self-monitoring, reinforcement, advocacy, family therapy, psychotherapy, crisis intercession, regular telephone follow-up, and supportive care [83]. Weight loss has been noted to modify risk factors via improving insulin sensitivity, reducing inflammation, decreasing BP and modifying the lipid profile [100]. It is astonishing that 7-28% of patients with coronary heart disease still smoke, but around half of smokers are planning to quit [101]. The World Bank suggests that around 180 million tobacco related deaths could be prevented between now and 2050 if adult tobacco consumption abate by 50% by 2020 [102]. A clinical pharmacist trained for smoking cessation counselling can play a key role in providing such intercessions, including the assessment of pharmacotherapy interactions with tobacco use [103]. Prescription smoking cessation medications include bupropion and varenicline [104]. A recent Canadian survey shows that pharmacist-led intervention resulted in more than 70% of patients using nicotine replacement therapy for smoking cessation [105].

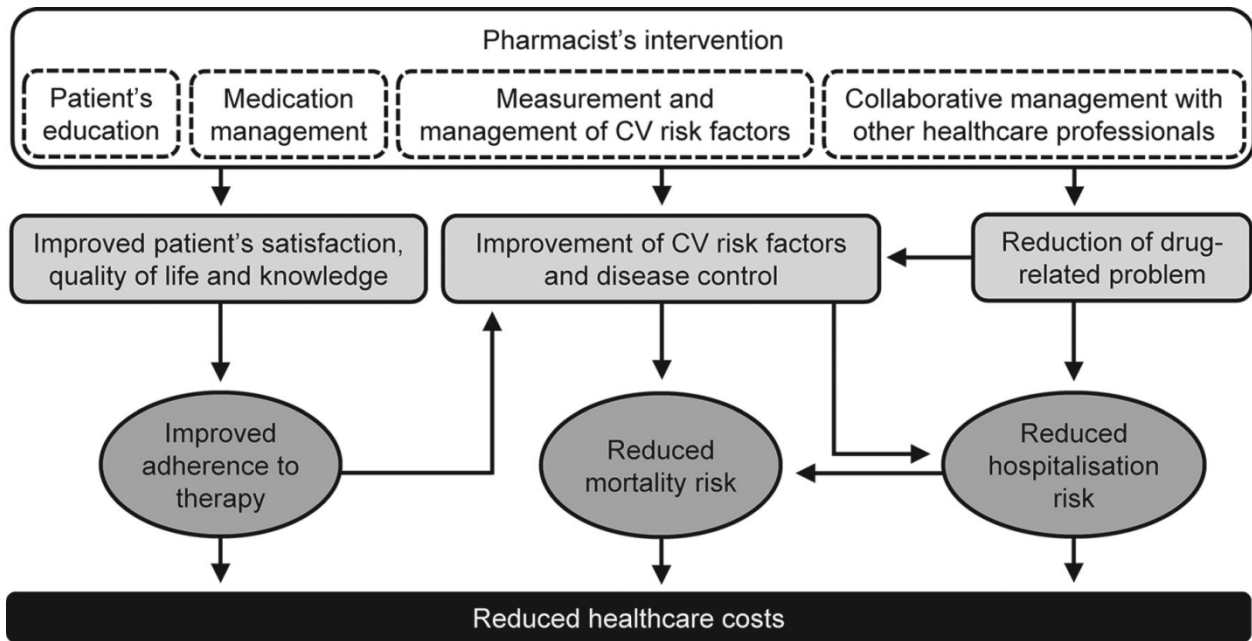


Figure 3: Effects of pharmacist's intervention on humanistic, clinical and economic outcomes in patients with CVD [94].

## V. OBESITY MANAGEMENT

In every single country in the world, the incidence of obesity is rising continuously with coronary artery disease, hypertension, type 2 diabetes mellitus, respiratory disorders and dyslipidemia [106]. The WHO estimated that in 2016 more than 1.9 billion adults were overweight (nearly 40% of the population) and over 650 million (13% of the population) were people with obesity [107]. Globally, the annual cost of obesity-related diseases has reached \$2 trillion according to a recent report by McKinsey Global Institute [108]. Obesity increases cardiovascular risk through risk factors such as increased fasting plasma triglycerides, high LDL cholesterol, low HDL cholesterol, elevated blood glucose and insulin levels and high blood pressure [109,110]. Also, obesity causes cerebral vasculopathy, gallbladder lithiasis, arthropathy, ovarian polycystosis, sleep apnea syndrome, and some neoplasms [111]. Successful obesity treatment plans incorporate diet, exercise, behavior modification (with or without drug treatment), and/or surgical intervention [112]. Prior to recommending any treatment, the clinician must evaluate the patient for the presence of secondary causes of obesity, such as thyroid dysfunction [113,114]. If secondary causes are suspected, then a more complete diagnostic workup and appropriate therapy is important. The clinician should then evaluate the patient for the presence and severity of other obesity-related diseases, evaluating appropriate lab tests as indicated. Based on the outcome of this medical evaluation, the patient should be counseled on the risks and benefits of available treatment options (along with obesity-related comorbidities, including T2D

prevention, and improvements in dyslipidemia, hyperglycemia, osteoarthritis, stress incontinence, GERD, hypertension, and PCOS [115,116]. If obesity is present without other comorbid conditions, then the goal would be absolute weight loss. In the presence of comorbid conditions, relatively small reductions in total body weight can have significant effects on comorbidity [117].

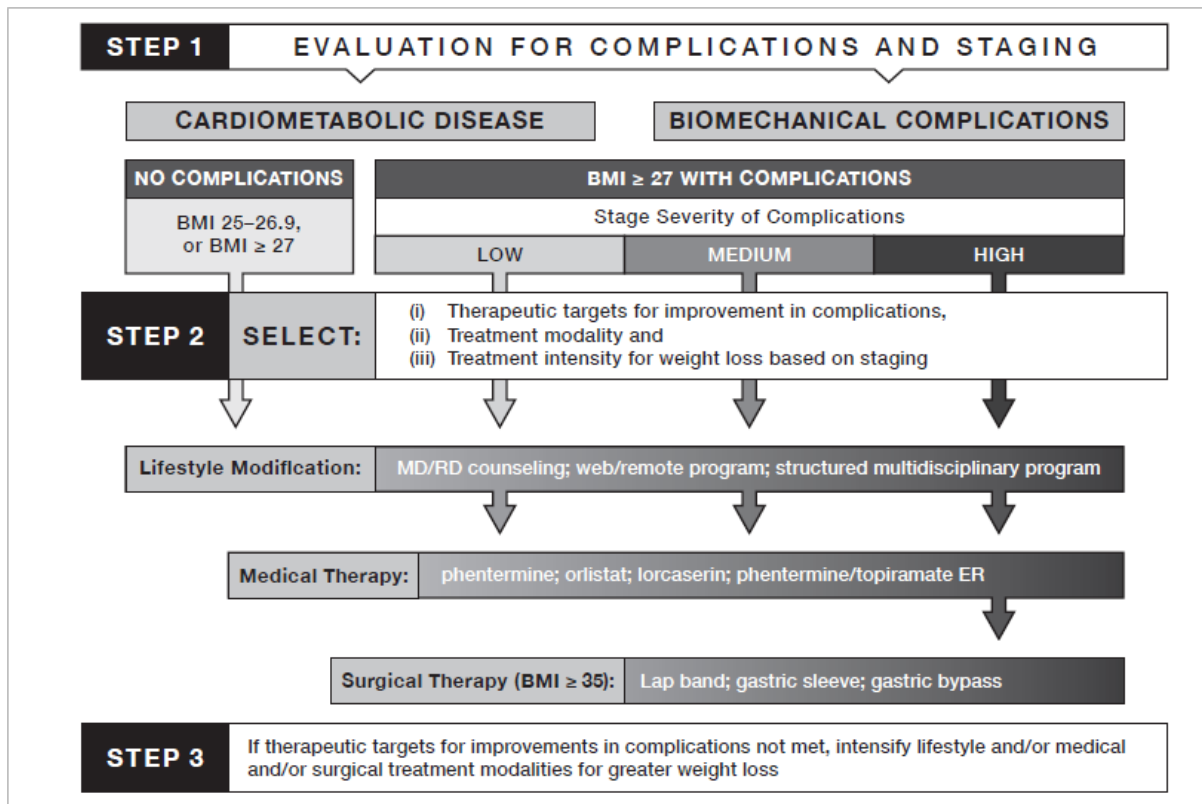


Figure 4: 2013 ACE Obesity Treatment Algorithm [118].

Pharmacists, commonly considered one of the most trust worthy and accessible health care professionals, are ideally situated to provide counseling for weight and lifestyle management. 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 [108], [119,120]. As pharmacists currently do not have a well-identified role in obesity management, but study results display that pharmacist intervention was beneficial [121]. According to Canadian Pharmacists Journal, 2016 pharmacist prescribing resulted in >3-fold more patients achieving target LDL-c levels [122]. Pharmacists who identify and treat patients with dyslipidemia, including those with inadequately controlled LDL cholesterol levels, are better than physicians at attaining therapeutic goals [123]. Studies have demonstrated that pharmacist-led interventions, including lipid clinics, can help patients achieve these more aggressive goals [124,125].

## VI. ASTHMA & COPD MANAGEMENT

Asthma and COPD are common chronic conditions that comprise nearly 80% of direct health care costs associated with respiratory diseases in the EU [126]. In the UK alone, 5.4 million patients are currently receiving therapeutics for asthma; of these,

1.1 million are minor. Over three million people expire due to COPD worldwide every year, an estimated 6% of all demises worldwide [127]. It is the second most common reason for emergency hospital admission. According to WHO, COPD has become the fourth leading cause of mortality in the US. It is estimated to become the fifth leading cause of disease burden in 2020 [128]. In 2015 alone, the death toll due to asthma was 383,000 globally [129]. One in five individuals with a diagnosis of COPD, asthma, or both asthma and COPD in primary care settings have asthma-COPD overlap [130]. In COPD, the outpatient therapeutic and management goals are to reduce symptoms and risks from exacerbations, and to maintain drug therapy. In contrast with asthma, COPD is a disease caused by chronic and often daily exposure to noxious particles or gases. The small airways in COPD are gradually destroyed leading to chronic bronchitis and emphysema [131]. Optimal pharmacological treatment including rapid treatment of exacerbations, can improve symptoms, reduce exacerbation frequency, and improve exercise tolerance, while poor medication adherence and suboptimal inhaler technique negatively impact outcomes [132]. Adherence to inhaled medication is poor in the real world and shows great variability, ranging from as low as 20% to over 60% [133]. To improve adherence, the therapeutic decisions should be discussed with the patient and should take into consideration their lifestyle factors, demographic characteristics (age, co-morbidities, physical limitations,



psychological and cognitive status), and pharmacological factors (polypharmacy regimens) to choose the best inhaler device for that patient [134]. Pharmacist-led comprehensive therapeutic interchange program of COPD inhalers may provide 30% pharmacy cost savings, improved medication adherence, knowledge of disease, decrease the number of prescriptions for exacerbations for these patients and reduces 30-day readmission rate [135-138]. A pharmacist-driven spirometry service was associated with quality testing results, identified respiratory disease abnormalities, and helped modifications of pulmonary drug regimens based on evidence-based guidelines [137]. Despite advances in inhaler device technology, estimates of those making inhaler errors range up to 90% of patients irrespective of the device type used. Poor inhaler technique accounted for over €750 million in direct and indirect costs in 2015 in the UK, Spain and Sweden [139]. By providing pharmaceutical care to patients with asthma, the pharmacist can help them to achieve treatment goals, e.g. improvement of disease control and reduction of asthma symptoms, exacerbations and medication-related side effects [140]. Step up of therapy comprised increasing or starting corticosteroid/long-acting beta agonist combination

inhaler; corticosteroid inhaler; short-acting muscarinic antagonist inhaler; oral corticosteroid; oral montelukast; or long-acting muscarinic antagonist inhaler. Step down of therapy comprised reducing or stopping corticosteroid/long-acting beta agonist combination inhaler; corticosteroid inhaler; or long-acting muscarinic antagonist inhaler. The pharmacist conducted activities such as issuing asthma action plans, educating patients, recommending to step up/down therapy, reviewing inhaler technique and making other relevant recommendations such as device changes (e.g., dry-powder to metered-dose inhaler) [141]. Polypharmacy is burdensome and associated with patients hospitalized with acute exacerbations. It is plausible that repeated pharmacist intervention to ensure optimal pharmacotherapy and minimize adverse effects, with a direct link to a consultant respiratory physician, and the patient's GP, may lead to improved outcomes [142]. The interventions identified focused on key areas of asthma and COPD management and support including: assessment of current symptoms; assessment and rectification of inhaler technique; identification of medication-related problems; medication adherence; provision of written and oral education materials; smoking cessation [143].

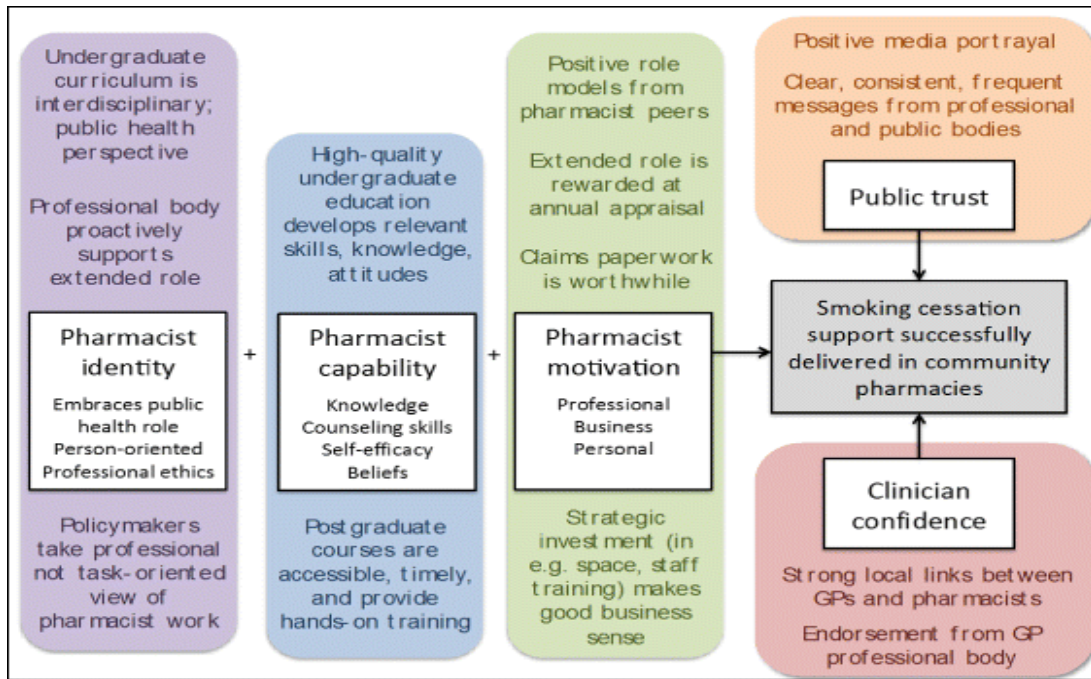


Figure 5: Unifying model showing key influences on successful delivery of smoking cessation support by pharmacists [144].

## VII. OSTEOPOROSIS

Worldwide, it is estimated that 1 in 3 women above the age of 50 will experience osteoporotic fractures, as well as 1 in 5 men [145]. The pervasiveness of osteoporosis is expected to rise in the US from approximately 10 million people to more than

14 million people by 2020 [146]. In 2015, direct medical costs totaled \$637.5 million for fatal fall injuries and \$31.3 billion for nonfatal fall injuries. During the same year, hospitalizations cost an average of \$30,550 per fall admission, totaling \$17.8 billion. By 2025, the cost of fractures in the US is expected to exceed \$25 billion

each year to treat more than three million predicted fractures [147]. Similar to other chronic diseases, osteoporosis has struggled with suboptimal medication adherence, resulting in an increased risk of fractures and all-cause mortality. Two gaps in osteoporosis management are well documented: (a) most patients at high risk for fracture are not identified for treatment, and (b) adherence to osteoporosis pharmacotherapy is suboptimal [148]. Nearly 50% osteoporosis patients

are non-adherent to medications. Furthermore, approximately 50–70% of the patients discontinue their osteoporosis medications within the first year of initiation, which results in increased morbidity and mortality [149]. In October 2010, the US FDA issued a safety communication regarding the risks of atypical fractures of the femur, with bisphosphonates drugs, the safety communication appeared to have influenced osteoporosis utilization in Medicaid recipients [150].

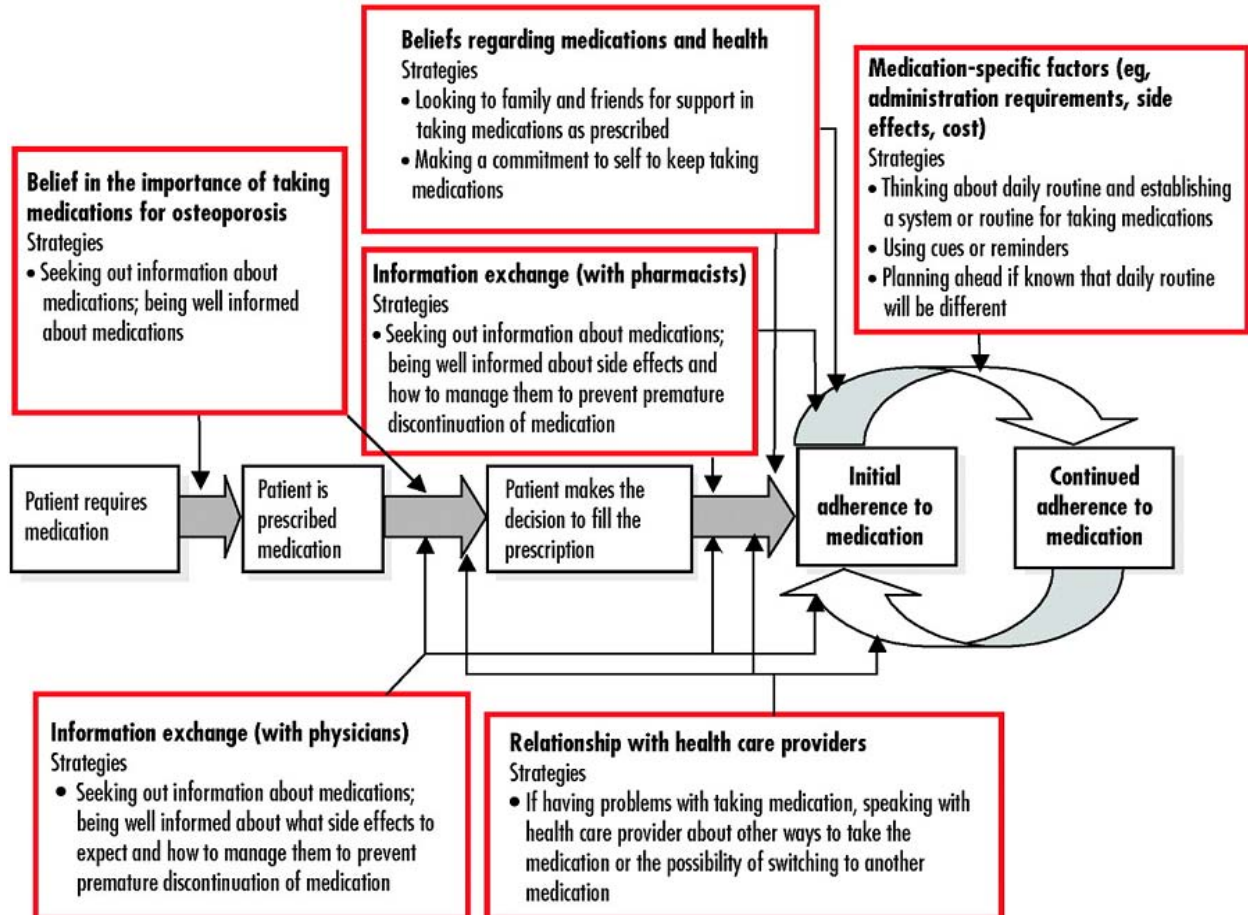


Figure 6: Mapping the factors influencing adherence and adherence strategies onto the medication-taking process in patients with osteoporosis [151].

High patient cost and safety concerns are barriers for nearly 60% patients [152]. Improved osteoporosis medication adherence can reduce osteoporosis-related health care costs by preventing fractures. Persistent pharmacotherapy for osteoporosis is necessary to prevent osteoporotic fractures and to reduce osteoporosis-related health care costs [153]. Treatment strategies of osteoporosis include non-pharmacological treatment - diet rich of calcium and vitamin D, healthy lifestyle, proper exercise plan, and pharmacological therapy [154]. BMD monitoring after initiating anti-osteoporosis therapy in the routine clinical practice setting [155].

Hypercalciuria, calcium malabsorption, hyperparathyroidism, hyperthyroidism, vitamin D lack,

Cushing's syndrome, and hypocalciuric hypercalcemia attributed to secondary causes to more than 30% women. Disorders of calcium metabolism and hyperparathyroidism contributed to nearly 80% of the secondary causes [156]. Hormone replacement therapy (HRT) is not first-line therapy position for osteoporosis, but is best for prevention of osteoporosis [157]. However, different types of estrogen or progestogen, as well as different formulations, doses, timing of initiation, durations of therapy, and patient characteristics, may play different roles in the effects of HRT [158]. Pharmacist-physician collaboration is associated with higher treatment rates of osteoporosis [159]. Physicians and pharmacist should invest time to educate patients about the potential side effects and box warnings of

estrogen use. Routine women wellness exams should also be focused on the development of any malignancies or adverse effects of hormone replacement therapy given a positive history. The pharmacist can play an important role at multiple levels: supporting patients in treatment, by providing information on the disease, its treatment, proper use of medication, adherence and persistence, as well as raising awareness for the prevention of osteoporosis and identifying patients at risk [160]. The counseling should include educating and assessing the patient for proper use of estrogen medication therapies as they may be prescribed in many various preparations of oral, transdermal, vaginal insert, and topic vaginal creams for positive patient compliance and adherence to therapy [147].

### VIII. INFLAMMATORY BOWEL DISEASE (IBD)

Inflammatory bowel disease (IBD) is a group of inflammatory conditions of the colon and small intestine. The two most common diseases are ulcerative colitis and Crohn's disease (CD). Crohn's disease can cause inflammation in any part of the GIT. Ulcerative colitis (UC) is an idiopathic inflammatory condition of the colon which results in diffuse friability and superficial erosions

on the colonic wall associated with bleeding [161]. Although these diseases have undetermined etiology, research advances have outlined some of the pathways by which they occur: a) genetic predisposition associated with the environment induces a disruption of the intestinal microbial flora, b) the epithelial cells and the immune system of the intestine itself determine the risk of developing the disease [162]. Treatment of both, IBD and IBD related pain is challenging. The upholder of IBD therapy includes systemic immunosuppressive drugs, such as corticosteroids, anti-tumor TNF antibodies or immunomodulators. Furthermore, the management of an acute flare differs from the strategies for maintenance of remission [163]. A total of about 66,000 US residents with a new IBD diagnosis each year, since 2015 [164]. Direct costs (including consultations, drugs, hospitalization and surgery) of UC amount to \$3.4 to \$8.6 billion in the US and €5.4 to €12.6 billion in EU [165]. The prevalent populations of patients with CD or UC in the UC in 2016 are expected to incur lifetime total costs of \$498 billion and \$377 billion, respectively [166]. IBD is a relapsing-remitting condition that causes inflammation and ulceration in the bowels, affecting approximately 500,000 people in the UK [167].

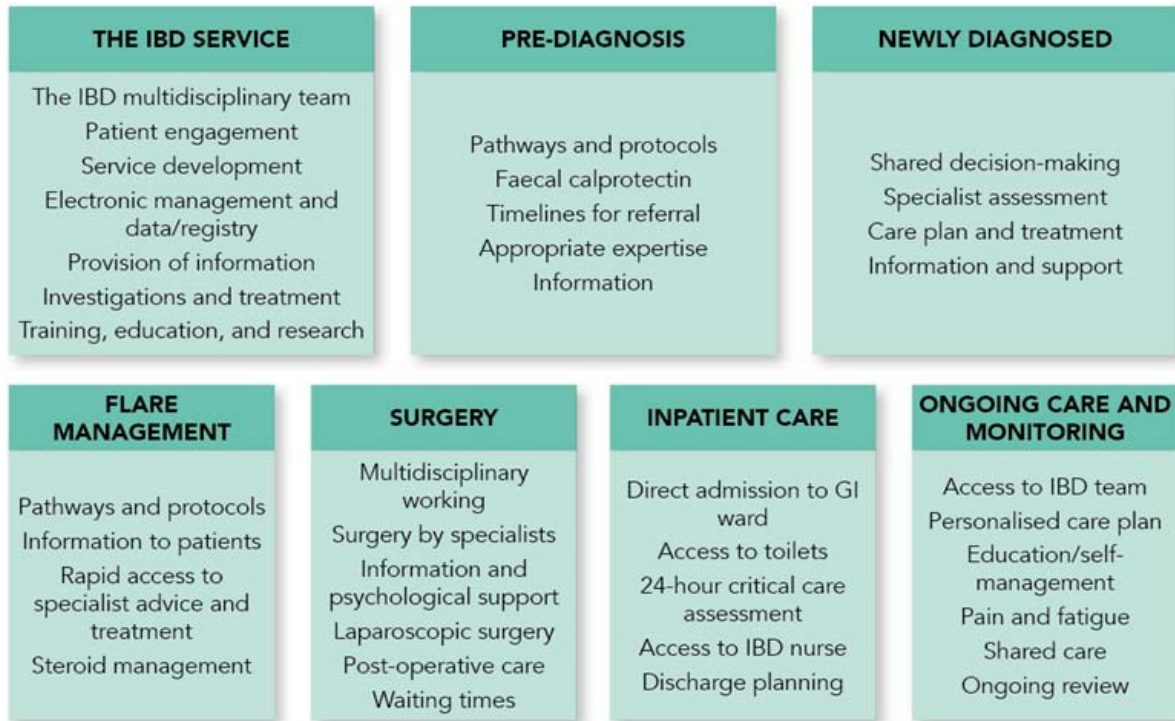


Figure 7: The seven sections of the 2019 IBD Standards [167].

The increasing incidence of IBD in developing countries parallels the westernization of diet, which includes higher calorie intake, especially from sugar, refined carbohydrates, animal proteins and ultra-processed foods and a lesser intake of fiber and fruits [168,169]. Incidence rate of IBD is stabilizing in some

developed countries; however, the incidence rate is increasing in developing countries such as Asia and Eastern Europe [170]. Anxiety and depression are the most common psychological disorders in patients with IBD [171]. IBD is associated with significantly increased MI compared with non-IBD patients [172]. Patients with

IBD are also at risk for asthma or COPD and bronchiectasis [173,174]. Sacroiliitis, an inflammatory arthropathy associated with ankylosing spondylitis, is found in patients with IBD but may go undiagnosed [175]. IBD patients showed increased risk for lymphoma and biliary cancer [176]. The general goals of treatment are to induce and maintain remission, minimize complications and disease manifestations, and improve overall QoL. Personalized IBD pharmacist adherence counselling, based on the Health Beliefs Model of medication perception, may increase medication adherence. Education using pamphlets and ad hoc physician education improved knowledge but not adherence [177]. IBD patients, mainly those having UC, need medications throughout their life with periodic dosing and occasionally, enemas and infusions may also be required. Treatment without adherence is highly regarded as the significant factor for relapse occurrence [178]. Medication nonadherence in IBD can be improved through a single personalized counseling session by IBD pharmacist adherence counselling (IPAC) intervention, and the benefit was durable for 2 years [179]. In addition to the disease, these patients are also managed with potent medications like steroids and biological agents, which have a host of adverse effects. Thus, the importance of the pharmacist who should be alert for any adverse reaction [180]. Pharmacist-led drug monitoring clinics measure thioguanine nucleotides and thiopurine methyltransferase levels four weeks after treatment with thiopurines is started to optimize outcomes [181]. In the event that insurance coverage cannot be obtained for the selected biologic response modifiers, the pharmacist identifies and discusses alternative options with the GI team; some of these options may include switching to another formulary agent or enrolling patients in medication assistance programs. Once insurance coverage of the medication is secured, the pharmacist educates the patient on self-administration, stability and storage requirements, and potential adverse effects. Additionally, the pharmacist highlights the significance of compliance with laboratory monitoring and reviews the importance of communicating with the GI team in the event of potential infection, worsening disease control, or issues obtaining or using the medication. The IBD pharmacist has a key role in the management of IBD patients contributing not only to medication monitoring, prescribing, and safety but also allowing greater capacity in the physician's, often highly stretched IBD clinics [182]. Beyond medication therapy coordination from beginning to end, the pharmacist plays an active role in assisting with medication reconciliation and ensuring patients are current on necessary immunizations [183]. 40% of patients with CD do not respond to treatment with biologics, 30% to 50% achieve complete remission after six months and 30% of patients maintain the response for 12 months with

continual treatment. Current strategies to overcome loss of response involve increasing the dose, decreasing the interval between administrations or switching to an alternative agent [181].

## IX. THYROID DISORDERS

Primary hypothyroidism (due to thyroid gland dysfunction) is the most common, with typical causes being Hashimoto's disease, or iatrogenic (due to exposure to radiation or thyroid surgery). Secondary hypothyroidism occurs as a result of diseases of the pituitary or hypothalamus. Common symptoms in hypothyroidism include fatigue, weight gain, cold intolerance, bradycardia, constipation, depression, and skin and hair dryness [184]. Hyperthyroidism, on the other hand, presents with symptoms nearly opposite, including weight loss, heat intolerance, tachycardias or palpitations, hyper-defecation, nervousness, and hyperhidrosis [185]. Iodine nutrition is a key determinant of thyroid disease risk; however, other factors, such as ageing, smoking status, genetic susceptibility, ethnicity, endocrine disruptors and the advent of novel therapeutics, including immune checkpoint inhibitors, also influence thyroid disease epidemiology [186]. The global prevalence of hypothyroidism is 4.6%, with prevalence being more common in women and in older individuals [187,188]. In UK, the prevalence is around 3.5–5% and in USA, 0.2–3.7% [187]. The prevalence of thyrotoxicosis is 10-fold higher in women. Elevated diastolic blood pressure is present in ~30% of patients with overt hypothyroidism and heart failure develops in 6–16% of patients with hyperthyroidism [77]. There is a high (>20%) prevalence of hypothyroidism in patients with T2DM, hypertension, and patients having both [189]. Hypothyroidism can directly cause obstructive sleep apnea (OSA) [190,191], Bruyneel et.al, 2019 reported 16% of OSA patients had a thyroid problem and 8% of these were newly diagnosed with subclinical hypothyroidism (SCH) [192], over 50% of the patients studied did not receive any treatment, found in a recent Egyptian study [193]. Both hypothyroidism and hyperthyroidism were strongly associated with erectile and ejaculatory dysfunction: hypothyroidism with delayed ejaculation, hyperthyroidism with pre-mature ejaculation [194]. Yuan et.al, 2019 reported highest prevalence of vitiligo in subclinical hypothyroidism, among 6 types of thyroid disorders [195]. Subclinical hypothyroidism is most often caused by autoimmune (Hashimoto) thyroiditis [196], who are at higher risk of developing audiological abnormalities as compared to the healthy individuals [197]. Hypothyroidism may also cause alveolar hypoventilation, decreased lung volumes, upper airway obstruction, depression in respiratory stimulus, and respiratory failure [198]. Thyroid dysfunction is a common extrapulmonary manifestation in COPD patients [199]. The American College of

Physicians and the American Society of Internal Medicine (ASIM) recommend screening women older than 50 years of age for unsuspected but symptomatic thyroid disease [200]. However, the American Thyroid

Association recommends that adults begin screening at the age of 35 years, and repeat screening every 5 years thereafter [201].

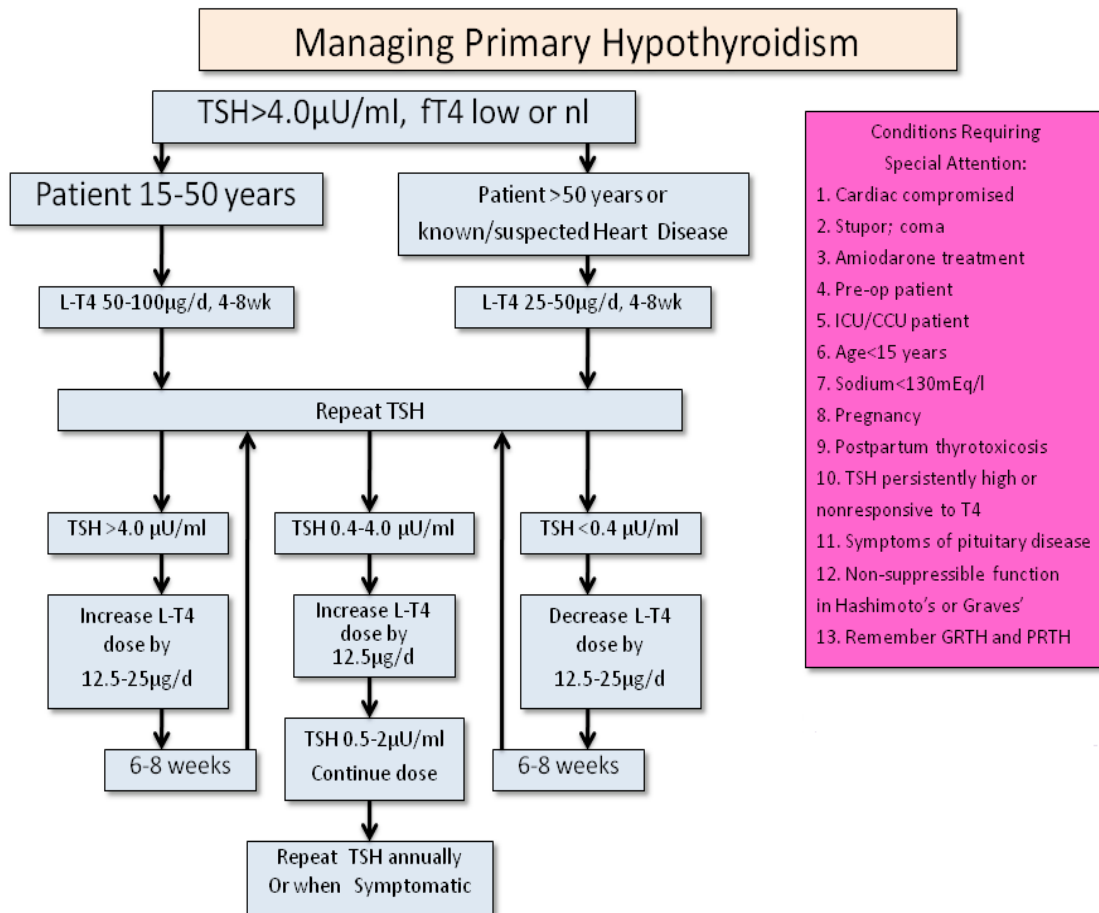


Figure 8: Managing Primary Hypothyroidism (Adapted from DeGroot LJ, 2016) [202].

Clinical pharmacist improves treatment outcome in term of knowledge, attitude and practice scores of the patients after advocacy [203]. Thyroid medications demand careful, patient-specific dosing. Once a physician has changed the dosage of medication to achieve the desired levels of thyroid hormone in a patient, it is decisive to maintain that particular dose and medication until otherwise directed. This is an important counseling point and one that many patients may not be aware of the degree of significance. While there are only a few medicines currently used to treat thyroid disorders, pharmacists can provide education on new or existing medications. Patients should have their thyroid function monitored annually once their treatment is established. It should be noted that pregnant women and patients with nephrotic syndrome or with diseases causing chronic malabsorption may require higher doses of levothyroxine. Pharmacists play an important role in ensuring patients with hypothyroidism are managed appropriately. This can include:

- Counselling patients about the timing of levothyroxine dosing and administration with other medicines;
- Discussing with patients the appropriateness of combined T4/T3 therapies in light of the large amount of debate on patient forums;
- Ensuring thyroid function tests are monitored adequately — tests should be assessed four to six weeks after a dose change and at least annually when replacement therapy is stabilized; thyroid stimulating hormone values change slowly, so frequent testing is unnecessary;
- Ensuring adequate titration of levothyroxine dose after test results are known [204].

Whether stopping by in person or picking up the phone to call, patients should be inspired to reach out to their pharmacists—the most accessible healthcare provider—the next time a question arises about any medication, as it is both the duty and the joy of a pharmacist to provide this service.

## X. PSYCHIATRIC DISORDERS

Almost 1 in 5 adults (44 million) in the US exposed to psychiatric illness and distress in a given year, according to the NAMI. A nearly 10 million people suffer a debilitating mental illness that substantially hampers with their QoL [205,206]. Mental and addictive disorders afflicted more than 1 billion people round the globe in 2016. They caused 7% of all global burden of disorder as measured in DALYs and 19% of all years lived with disability [207]. Depression was the dominant cause of disability in the world, and suicide was the 10th leading cause of death in 2015 [206]. Major depressive disorder (MDD) is the fourth cause of infirmity around the world and is estimated to be the second dominant cause of infirmity by 2020 [208]. In EU, factors that had the strongest alliance with depression were chronic diseases, pain, circumspection in daily living, grip strength and cognitive deterioration. The gap in MH service use was nearly 80% [209]. The therapeutic gap in developing countries was 76%–85%, according to WHO. According to NMHS, it is 83% in India for mental disorder and 86% for alcohol use disorders [210]. Swaminath et al, 2019 revealed that mental morbidity above the age of 18 years is 10.6% with a lifetime preponderance of 13.7%. This means that 150 million Indians need active therapeutic intervention [211]. Canadian Mental Health Association estimated that 500,000 Canadians miss work every week due to MH issues, costing the Canadian economy around \$51 billion per year, as depicted by Hayes et al, 2019 [212]. According to Australian Bureau of Statistics (ABS) National Survey of Mental Health and Wellbeing

(NSMHWB) 45% of Australians exposed to a mental disorder in their lifetime, with 20% experiencing a mental disorder in the past [213]. Shpigelman et al, 2019 reported that individuals with silent psychiatric disabilities have lower levels of self-esteem and body image compared to individuals with visible physical disabilities. Gender, family status and the acerbity level of the infirmity were found to be correlated with self-esteem and body image [214]. Mental disorders and suicide resulting from work-load or work-related stress have become major occupational health issues worldwide, particularly in Asian countries [215]. Depression and anxiety in more common chronic physical circumstances such as CHD or diabetes can be correlated with increased mortality, as reported by Uhlenbusch et al, 2019. Also, depression is associated with an escalation of about 50% in costs of chronic medical ailment [216]. Rokach et al, 2019 revealed that anxiety and depression lead to sexual dysfunction is between 30% and 70% in sexually active men and women in high-income countries [217]. Despite psychiatry's present status as the sixth largest medical specialty, the availability of clinicians has not kept up with demand [218]. For over 40 years, clinical pharmacists have handout to these care models in capacities ranging from educator to consultant to provider. Medicines are a major treatment modality of management for many mental illnesses and pharmacists are therefore well positioned to reinforce MH services with the potential to reduce the associated burden of mental disorders [219].

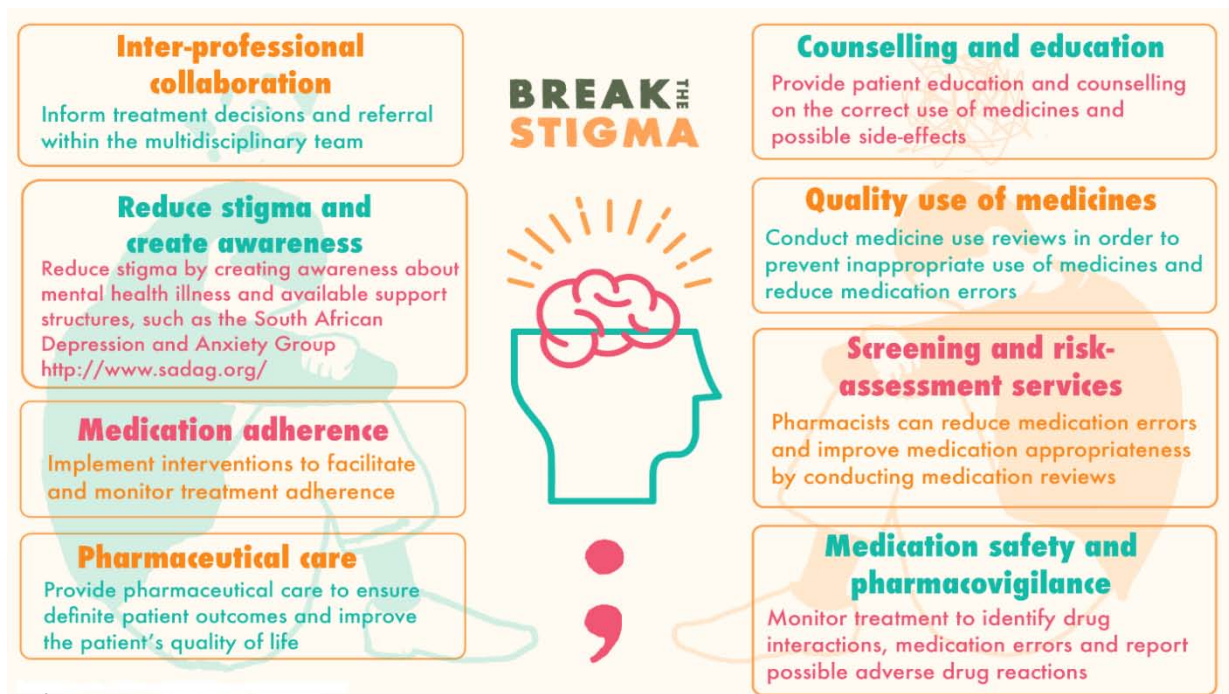


Figure 9: Role of Pharmacists in Mental health Disorders [220].

Antidepressant drug treatment (ADT), alone or in association with psychotherapy, is endorsed by the CANMAT for a minimum duration of 8 months. However, a large proportion of individuals show suboptimal attachment to ADT. In previous studies, more than 35% to 70% ceased treatment within 6 months, with up to 25% to 40% of patients having ceased their therapy within the first month [221,222]. Also, Holvast et.al, 2019 depicted non-compliance to antidepressants is high among older patients with depression in primary care settings [223]. Transitions in care have the aptitude to be destabilizing periods for many patients and is an area where pharmacist-guided medication therapy management (MTM) has been found to be propitious [224]. The pharmacist interim prescriber clinic was associated with a compelling decrease in mean number of patients seen per month in PES [218]. The clinical pharmacist can make an impact by bettering mild-to-moderate MH conditions, promoting interdisciplinary collaboration, and increasing documentation and backslasht that align with published treatment guidelines [206]. Chavez et.al, 2019 reported that pharmacists improved rate of patient interest in behavioral health counseling during the consult and recommending counseling directly to the patient or even initiating the referral themselves [225]. Bingham et.al, 2018 highlighted the value of the pharmacist's involvement, suggesting the potential for improved nutrition, physical activity, and sleep for patients with MH conditions, at least in the short term [226]. Throughout the US, pharmacists have crafted intercessions designed to prevent, identify, and manage opioid misuse and abuse [227]. Also, Eltorki et.al, 2019 reported that physicians and nurses have mostly positive perceptions and confidence from clinical pharmacists at the psychiatric hospital [228]. In Australia, The Pharmaceutical Society's Mental Healthcare Framework admits pharmacists as primary health care professionals who have a significant role to play within MH care. Globally, the International Pharmaceutical Federation has urged members to include pharmacists as part of their "human resource development policy" so that "an increase by 20% of service coverage for severe mental disorders can be achieved" [229].

## XI. NEUROLOGICAL DISORDERS

Chronic neurological diseases like Alzheimer's disease (AD), Parkinson's disease (PD), dystonia, Amyotrophic lateral sclerosis (ALS, Lou Gehrig's disease), Huntington's disease, neuromuscular disease, multiple sclerosis (MS) and epilepsy, to mention only a few — afflict millions of people worldwide and account for tremendous morbidity and mortality [230]. Contributing 11.6% of global DALYs and 16.5% of deaths from all causes, neurological disorders remain the leading group cause of DALYs and the second

leading group cause of deaths in the world [231]. Direct and indirect costs for healthcare related to AD are estimated at nearly \$500 billion annually [232]. PD is the second most prevalent neurodegenerative disease after AD, affecting approximately 4-10 million people worldwide, and is expected to double in prevalence by 2030 as the population ages [233]. The incurred medical expenses were approximately \$14 billion in 2010 [234], which is \$52 billion now, in US only [235, 236]. Approximately 350,000 individuals in the United States and 2.5 million individuals worldwide have multiple sclerosis. Almost 10% of the cases present before the age of 18 [237, 238]. The global MS drug market was valued at US\$16.3 billion in 2016, expecting to reach US\$27.8 billion by 2025 [239]. Epilepsy is another most common serious brain conditions, affecting over 70 million people worldwide [240], with an estimated cumulative value of lost economic welfare (VLW) \$647.37 billion in 2016 [241]. Clinical pharmacist's activity can enhance drug therapy's effectiveness and safety through pharmacotherapy interventions (PIs), thus minimizing DRPs and optimizing the allocation of financial resources associated with health care.

### a) *Alzheimer's disease*

Patients with AD particularly susceptible to risk of anticholinergic side effects with certain medications and should be assisted by a pharmacist in selecting safe formulation such as OTC product. Pharmacists can also counsel patients and their caregivers on the safe use of alternative medicines that high majority of caregivers had requested relaxing plants and vitamins from the pharmacy for anxiety and insomnia [242]. As AD is a progressive condition, in its early stages, individuals may present with MCI and some 40% of individuals with MCI deteriorated to dementia (estimated out-of-pocket caregiver costs more than 10 billion in 2016 in Canada alone). It is estimated that patients with dementia cost the healthcare system over 300% more than their cognitively intact peers in the same age group [243]. Patient and caregivers' education, monitoring its progression, becoming familiar with screening tools that can be used in pharmacy practice to assess cognitive function and helping to manage medications for patients in different stages of dementia are essential contribution by the pharmacists [244]. In Germany, pharmacists adapt in identifying problems related to drug administration, adherence, and drug interaction among patients with dementia. Meanwhile, in the UK, a trial targeting peoples with dementia initiated on anti-psychotics demonstrated that pharmacist-led medication review successfully limited the prescribing of anti-psychotics to people with dementia because of the increased risk of ADRs. In Japan, study involving hospital pharmacists on donepezil deliberation for patients with AD and their caregivers has heightened medication adherence though this drug could cause

insomnia and GI disturbance. In Malaysia, while medication reviews for patients with other chronic diseases have been invoked by hospital pharmacists via medication therapy adherence clinics, this has not been done for AD patients. It is crucial to ensure that the

pharmacists are equipped with proficient knowledge on AD because poor management in AD can result in side effects, inappropriate dosing, and non-compliance to medications [245].

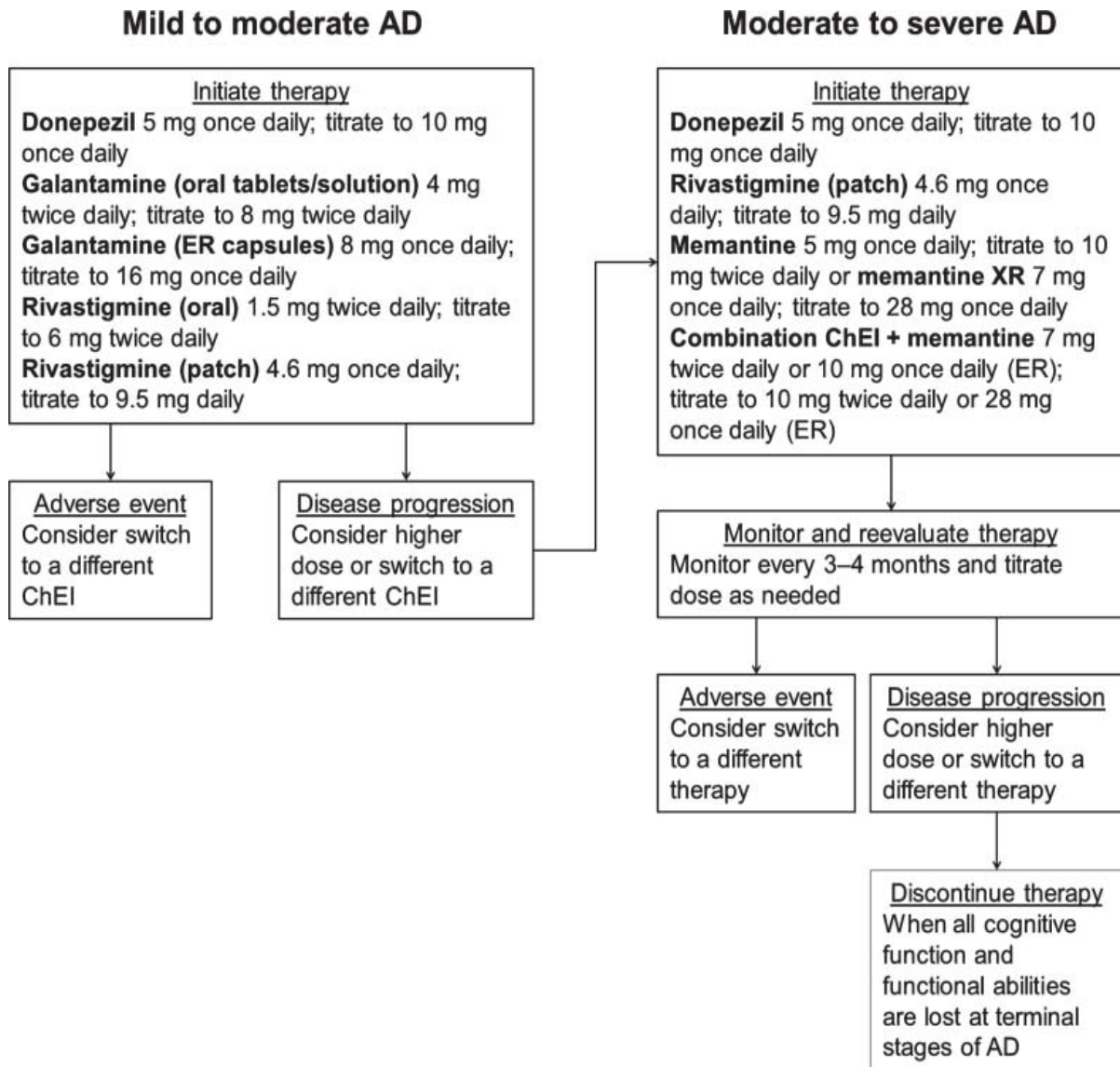


Figure 10: Treatment algorithm for Alzheimer’s disease based on severity of symptoms [242]. Abbreviations: AD, Alzheimer’s disease; ChEI, cholinesterase inhibitor; ER, extended release; XR, extended release.

b) Parkinson’s Disease

PD is a progressive, debilitating neurodegenerative disease that often requires complex pharmacologic treatment regimens. Healthy ageing, primarily when a neurodegenerative disease is present, is possible by applying the correct pharmacological therapy, along with diet and food supplementation often are critical factors for PD management [246]. Parkinson’s disease psychosis (PDP) may affect up to 60% of patients with PD over the course of their disease, and is associated with poor prognosis, including increased risks of mortality and nursing home

placement [247]. Current management strategies aim to provide symptomatic relief and to slow down the disease progression. However, no pharmacological breakthrough has been made to protect dopaminergic neurons and associated motor circuitry components [248]. To carry out MTM with PD patients, the pharmacist’s expertise needs to transcend the technical knowledge about the PD pharmacological treatment. It has been estimated that the PD patients’ adherence to the treatment is nearly 40%, compromising the benefits of the therapy. MTM aims at optimizing the pharmacological therapy results, so the pharmacist



monitors the results of the treatment prescribed by the doctor and elaborates a healthcare plan to guarantee the treatment's effectiveness, safety, and convenience, and therefore improve the patients' QoL [249]. During this time, pharmacists can serve as invaluable partners in the care of people with PD by assisting with complex medication schedules, addressing side effects, assisting with different formulations of medications,

obtaining approval for medications on emergency release, ensuring appropriate intake to maximize the absorption of medications, suggesting and monitoring diet and supplementation and guiding the choice of medication based on patient preference, other concurrent medications and medical conditions, and affordability [250].

**Exhibit 1. Pharmacists' contribution to PD detection and management [251]**

- Observe or examine patients who present with or complain of parkinsonian symptoms (tremor, rigidity, bradykinesia, postural hypotension).
- Review medications to determine possibility of drug-induced PD.
- Refer patients who present with PD symptoms to their family physician for an accurate diagnosis and further referral to neurologist.
- Provide written and verbal education to both patients and caregivers on the advantages and disadvantages of various anti-parkinsonian medications.
- Develop therapeutic goals with patients with PD, caregivers and other members of the patient's health care team.
- Actively assess anti-parkinsonian medications for appropriateness, effectiveness, tolerability, safety and affordability based on clinical and lifestyle characteristics of the patient.
- Assess patient's adherence to anti-parkinsonian medications.
- Assist patients, caregivers and other members of the health care team with adjusting doses of anti-parkinsonian medications.
- Assist patients with appropriate dosing, administration and timing of anti-parkinsonian medications.
- Recognize real and potential drug-related problems related to anti-parkinsonian medications and use full scope of practice available in your jurisdiction to facilitate resolution of drug-related problems in collaboration with patients, caregivers and other members of the health care team.

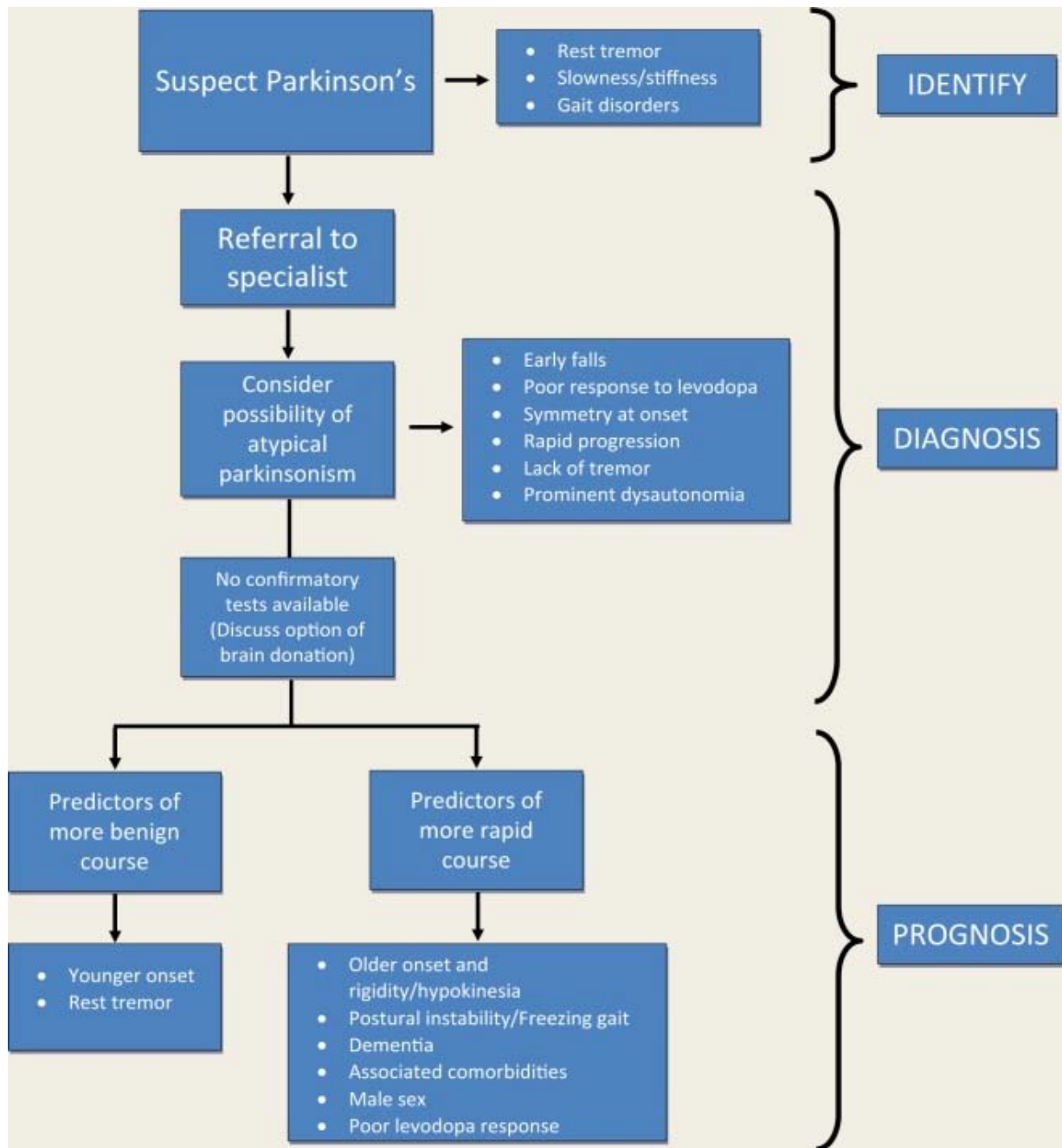


Figure 11: Summary of the identification, diagnosis and prognosis in Parkinson's disease [250].

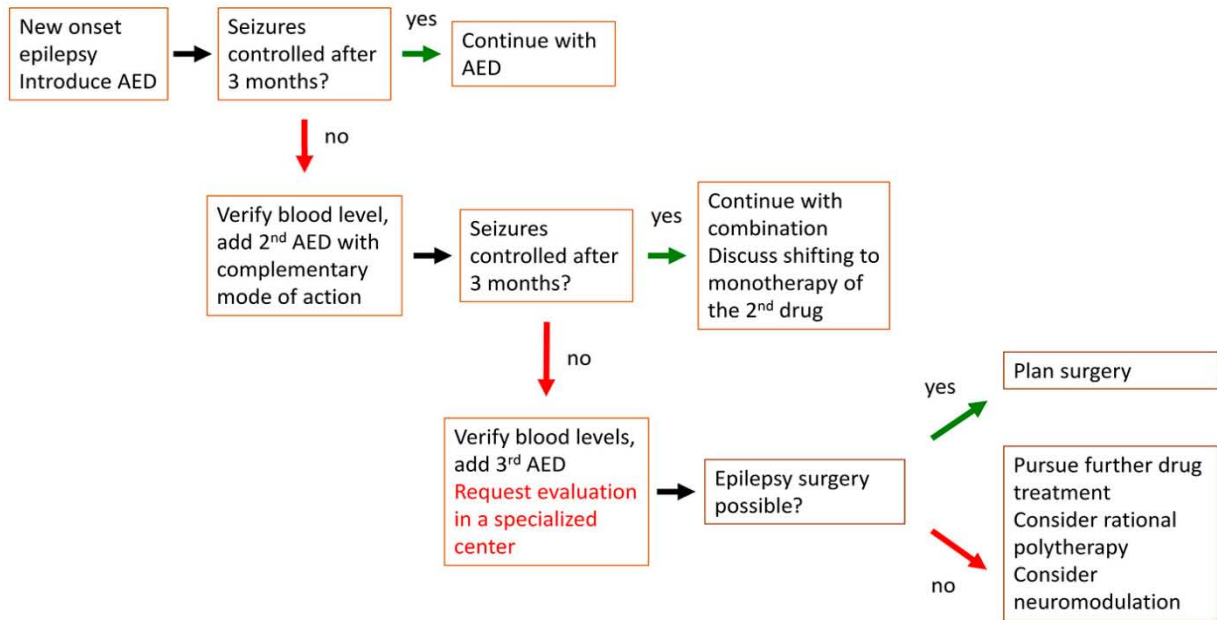
### c) Epilepsy

Medication nonadherence directly contributes to poor seizure control. A lack of emphasis on correcting poor adherence and failures in patient adherence can result in unwarranted alterations to a patient's drug regimen [252]. Timely recognition and effective early therapy with first- and second-line antiepileptic drugs (AEDs) may avert unnecessary hospitalizations. Seizures should be recognized and addressed like any other symptom that causes discomfort or reduces QoL. Use of alternative AED administration routes (buccal, intranasal, or subcutaneous) may offer possibilities for effective and individualized AED therapy, even during

the last days of life. In hospice or home care, however, also IV treatment is possible via vascular access devices for long-term use. Aggressive unlimited ICU treatment of refractory status epilepticus (SE) in palliative patients is mostly not indicated [253]. There are three types of non-compliance: (i) in medication; (ii) in dietary/exercise; and (iii) in an appointment. First, non-adherence in medication defined as a non-adherence which includes failure to have the prescription dispensed or renewed, the omission of doses, errors of dosage, incorrect administration, errors in the time or frequency of administration, and premature discontinuation of the drug regimen. Second, a non-adherence in

dietary/exercise occurs if the patient fails to follow the diet and exercise recommendations. Last, a non-adherence in an appointment occurs if the patient fails to come at clinics for the scheduled check-up [254]. Routine assessment of adherence barriers is imperative

from toddlerhood to young adulthood given that the prevalence of barriers and their relative influence on important health outcomes vary by developmental stage [255].



**Figure 12:** Practical approach to modern epilepsy care [256]. Risk of seizure recurrence can be significantly reduced by 30–40% when treatment is immediately introduced once epilepsy is diagnosed. The reduction is effective for the first 2 years. However, long-term outcome is not affected, and in the UK study around 75% were seizure-free at 2 years, no matter whether treatment was delayed until after the second or third seizure or not. Overall, if patients' relapse, 90% do so within the first 2 years.

Therapeutic drug monitoring for AEDs is commonly used to help guide and assist clinicians with optimal dosing in patients. Monitoring serum concentrations can allow clinicians to achieve seizure control while minimizing adverse effects. Established drug levels for various AEDs should be primarily viewed as reference ranges and not therapeutic levels. Pharmacists can play a significant role in optimizing therapy for patients with epilepsy. Patient counseling on the potential adverse effects of AEDs is important. Pharmacists involved in the review of prescriptions were able to prevent errors in dose and frequency of administration of AEDs. Patients and family members should be educated on expected CNS and cognitive side effects, potential skin reactions, and the risk for suicidal behavior. Patient education should also address the significance of medication adherence. Patient medication profiles should be investigated for possible drug interactions, and dosage adjustments or alternative agents should be endorsed if necessary. Additionally, pharmacists can advise clinicians on appropriate therapeutic drug monitoring. The development of instruments to guide the care of epileptic patients, such as algorithms and protocols, could assist with the exertion of relevant and effective methods of patient assessment and would also encourage the

pharmacotherapeutic monitoring of epileptic patients through pharmaceutical care [257-261].

## XII. FIBROMYALGIA

Fibromyalgia (FM) is an idiopathic chronic condition that causes comprehensive musculoskeletal pain, hyperalgesia and allodynia, afflicting 2.10% (a total of 4% female and 2-5% male) of the world's population, 2.3% of the European population, 2.4% of the Spanish population [262,263]. In France, work productivity loss accorded almost 90% of the total costs incurred by patients with FM, with an economic cost of 13000 million euros yearly which is around \$100 billion in US [262], [264,265]. Work disability was found to be 35% in US and Australia and 30% reported in Canada due to FM [266]. FM is more common in female compared to male, with a ratio of 2:1 [267] or 3:1 [268], although other studies reveal 85%-90% FM patients are middle aged women [269,270]. 30-50% of FM patients have anxiety and/or depression at the time of investigation [271], while patients have a lifetime history of depression (50-75%) [272] and depressive disorders (13%-63.8%) [273]. Physical complications of FM are indicated in Figure 13.

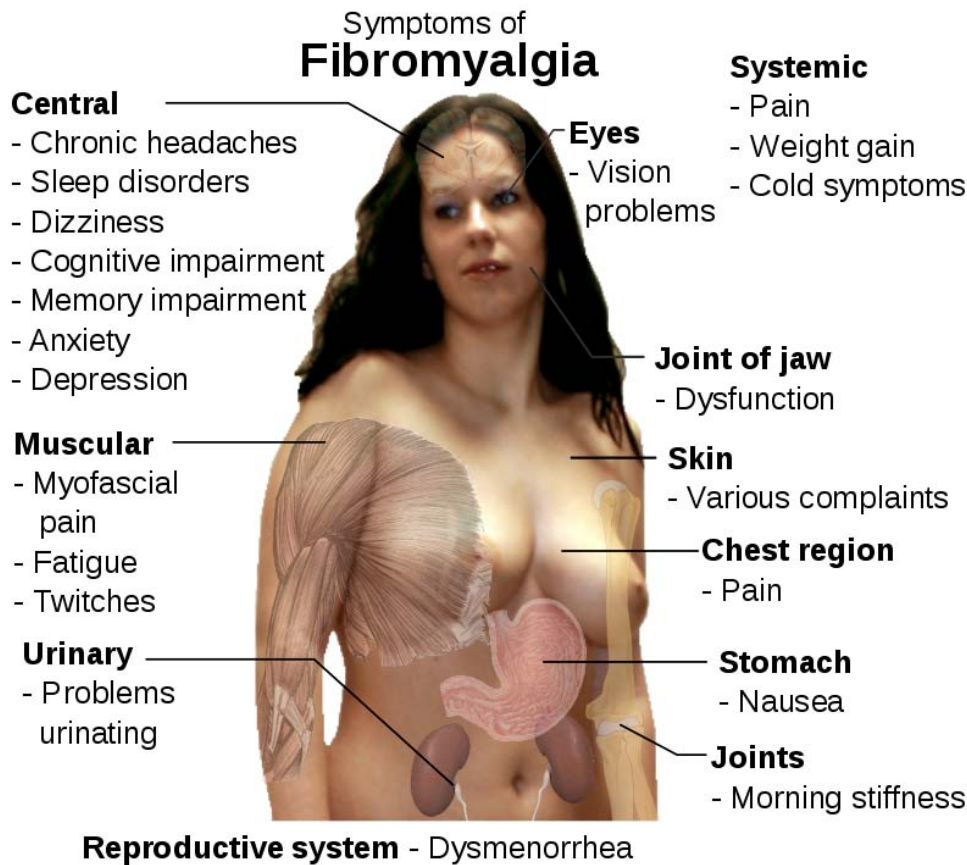


Figure 13: Physical complications of Fibromyalgia (Source: creakyjoints.org)

The APS guidelines cite strong evidence supporting the use of TCAs and moderate evidence for serotonin and norepinephrine reuptake inhibitors (SNRIs), fluoxetine, tramadol, and pregabalin [274]. A nearly 70% German FM patients used thermal baths, 35.2% use alternative therapeutics such as homeopathy, dietary supplements, and 18.4% use introspective or meditation-based exercises such as yoga or Tai chi [275]. Low FODMAP was found to be compelling in QoL, quality of sleep, anxiety and depression and inflammatory biomarkers in FM patients [276-281]. Cognitive behavioral therapy (CBT) interventions may slow or reverse cortical gray matter atrophy, diminish circulating proinflammatory cytokines (IL-6, IL-8, and TNF- $\alpha$  level) of FM patients, pain symptoms and pain perceptions, help FM patients having fear of pain, anxiety, depression and sleep disturbances [282-287]. Physiotherapy and acupuncture, both are compelling, not found to be more beneficial than each other; longer post-treatment follow-up may help arbitrate the superior treatment option [288]. Low to moderate intensity endurance and strength training are strongly suggested in FM patients. Strength training alleviates pain, fatigue, number of tender points, depression, and anxiety, with increased functional capacity and QoL. Exercise activates the endogenous opioid and adrenergic systems but does

not consistently alleviate pain in FM patients [264], [275]. Pharmacists can participate in ongoing follow-up to monitor patients' responses to both pharmacologic and nonpharmacologic intercession. The assessment should consider both the impact on symptoms of FM and on the patient's function. If patients do not achieve a satisfactory treatment response or experience intolerable adverse events, pharmacists can collaborate with other members of the healthcare team to arbitrate whether a trial of another medication would be appropriate. Because emerging evidence indicates FM has many possible root causes, lack of treatment response to one medication does not affect whether another medication will be effective. Pharmacists can assess and triage patients who present to the pharmacy with a history of symptoms that are associated with FM [289,290].

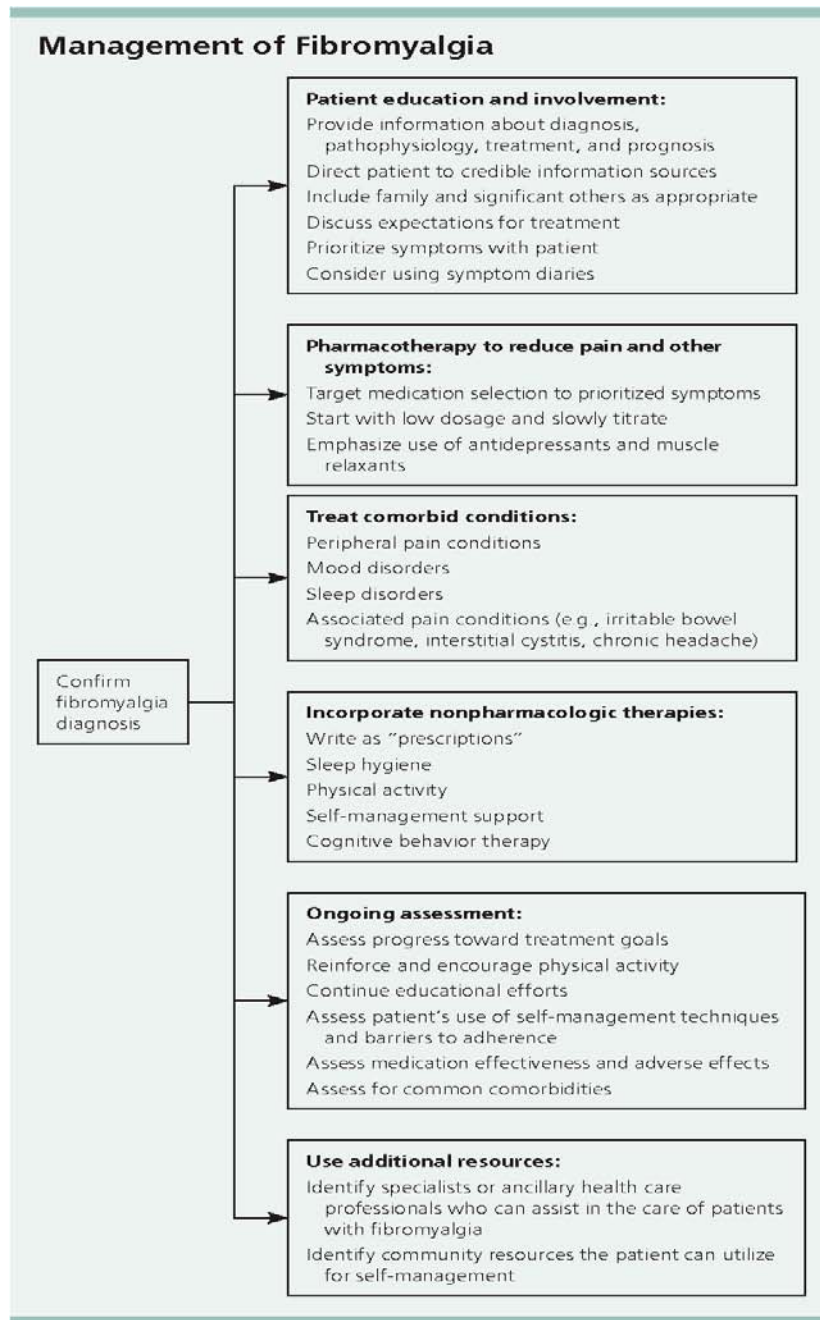


Figure 14: An integrated approach for FM management [291].

### XIII. RECURRENT URINARY TRACT INFECTIONS

Between 50% and 60% of adult women will face at least one UTI event in their life, and close to 10% of postmenopausal women indicate that they had a UTI in the previous year, according to Medina et.al, 2019 [292]. Recurrent UTIs (RUTIs) are mainly precipitated by reinfection of the same pathogen mostly caused by frequent sexual intercourse, heterosexual anal intercourse (without circumcision and a condom), different sexual partners (Each sex partner shares his/her UGT microbiota with the other), utilization of

spermicide and another sexual partner, sexual intercourse with addicted partners, sexual intercourse with sex workers, sexual intercourse with online dating friends, sexual intercourse with another sex partner for 2 months. [293-303]. Many other factors have been thought to predispose women to RUTIs, such as voiding patterns pre- and post-coitus, wiping technique, wearing tight undergarments, deferred voiding habits and vaginal douching; nevertheless, there has been no proven association [304]. Obesity was found to be associated with RUTIs in premenopausal women [305]. Several other risk factors are associated with cystitis, a prior UTI, vaginal infection, diabetes, and genetic

susceptibility [306]. Pathogens responsible most commonly are *Escherichia coli*, *Klebsiella pneumoniae*, *Proteus mirabilis*, *Enterococcus faecalis* and *Staphylococcus saprophyticus* [293], [306-310]. The role of dietary pattern in RUTI is also not clear. Increasing fluid consumption is often recommended for patients with UTI [301], [307-314] but there has been no clear clinical evidence to support this recommendation [315]. After a first episode of a UTI, 27% of women have a confirmed recurrence within the next 6 months [292]. Although there have been few studies on the determent of RUTIs without use of antibiotics within the past years, interest in probiotics has increased over the years. Reviews by Akgül et.al, 2018 concluded that evidence of probiotic application in UTIs is not yet sufficient to recommend use of probiotics [316]. Different vaccines based on the whole cells (killed or live-attenuated vaccines) and antigens (subunits, toxins and conjugated vaccines) have been evaluated against UTI pathogens, as reported by Asadi et.al, 2019 [317]. Substantial efforts have been expended in development of endogenous antimicrobial peptides (AMPs) as new therapeutic options suitable in the treatment of drug-

resistant microbial infections. For example, Wnorowska et.al, 2019 reported that combination of natural peptide LL-37 with synthetic analogs might be a potential solution to treat UTIs caused by drug-resistant bacteria [318]. UTI is one of the most prevalent diseases with diverse etiological agents annually affecting 250 million and causes death of 150 million people overall. Financial burden of UTIs exceeds \$3.5 billion in US alone, while over half of the anti-infection agents prescribed for a suspected UTI in older adults being considered unnecessary. Surprisingly, nosocomial UTIs account for nearly 40% of all hospital acquired infections and around half of UTI in children are missed. Sexual intercourse  $\geq 3$  times/week was associated with greater frequency of UTIs. Close proximity of the urethral meatus to the anus and shorter urethra, is a likely factor in women (Figure 15). Genital hygiene practices such as urination after and washing genitals after intercourse, male partner washing genitals before intercourse, taking baths, frequent replacing of underwear, controlled frequency of sexual intercourse, and washing genitals from front to back were associated with a reduced frequency of UTIs [319-322].

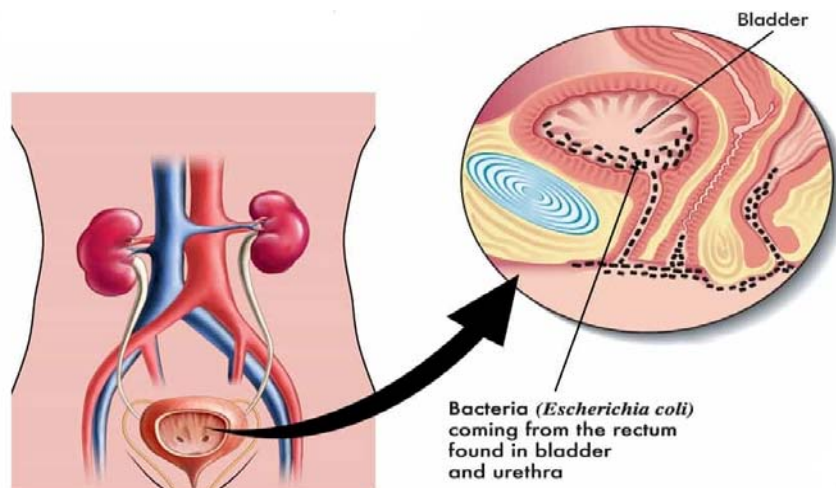


Figure 15: Bacterial spreads to the urinary bladder due to close proximity to anus, causing inflammation (Source: fabHow)

Pharmacist management of uncomplicated UTI is effective, safe, and patient satisfaction appears very high. In Quebec, pharmacists can prescribe for UTI in women if there has been an interpretation of UTI and a resulting prescription to treat it in the past year. In Saskatchewan, prescribing for UTI in women has been suggested, but is not yet approved. And in Alberta, pharmacists who have Additional Prescribing Authorization are able to prescribe for UTI if it is within their scope of practice and if, through their own estimate or collaboratively with another health professional, it is determined that treatment is appropriate. If a patient has been prescribed an antibiotic for a presumed UTI, the pharmacist should also apprise here to confirm the aptness of treatment. Patients should be asked about

symptoms such as dysuria, frequency, urgency, suprapubic pain, flank pain or tenderness, fever, or hematuria in non-catheterized patients. In catheterized patients, symptoms suggestive of UTI include fever, rigors, flank pain or tenderness, acute hematuria, purulent discharge from catheter site and new or deteriorated mental status (in the presence of leukocytosis) with no attributable alternative cause. In cases of complicated UTI or pyelonephritis, a urine culture should always be sent. Pharmacists who are unable to order urine cultures should advocate for or make advises to have them done when they are pertinent and should discourage the sending of urine cultures when they are not indicated. Pharmacists should also familiarize themselves with the local

antibiogram, as this will assist in the selection of empiric therapy. They should keep in mind, however, that resistance rates portrayed in hospital antibiograms may not be representative of the expected resistance patterns of uncomplicated infections, as these antibiograms are often heavily influenced by patients with complicated and nosocomial infections, which tend to be more resistant in nature. Medically underserved populations pose a unique challenge for providing effective patient education, compared with the general population. Patient adherence to provider

recommendations is key to achieving therapeutic success. Also, as there are many modifiable risk factors for developing UTIs, it is important to effectively communicate these factors to patients to prevent recurrence and subsequent readmissions. As pharmacists already play a key role in medication counseling prior to hospital discharge, this presents an opportunity to incorporate patient education on infection management and prevention by pharmacists as part of ASPs [323-325].

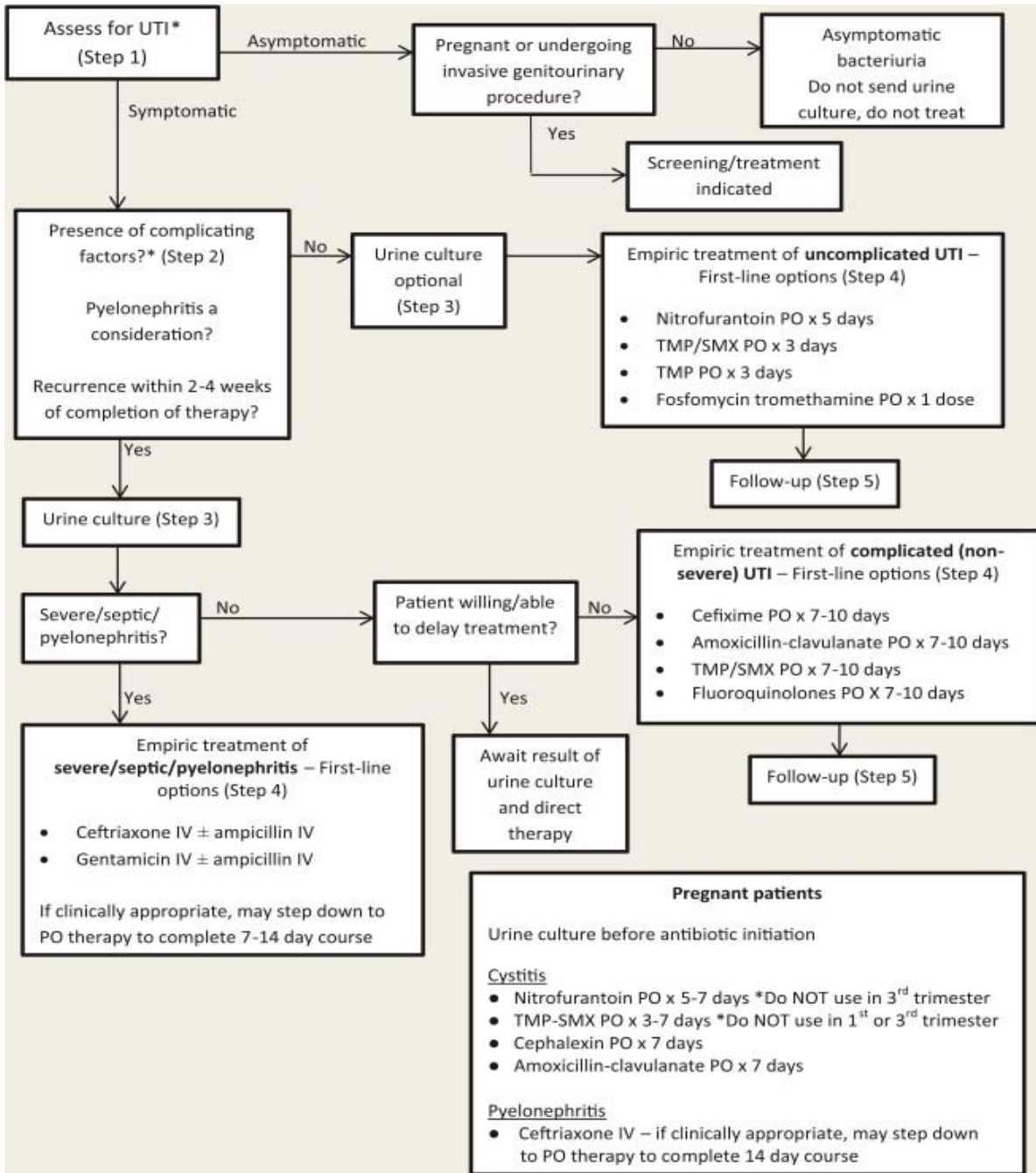


Figure 16: Proposed algorithm for assessment and management of urinary tract infection by Beahm et.al, 2017 [323].

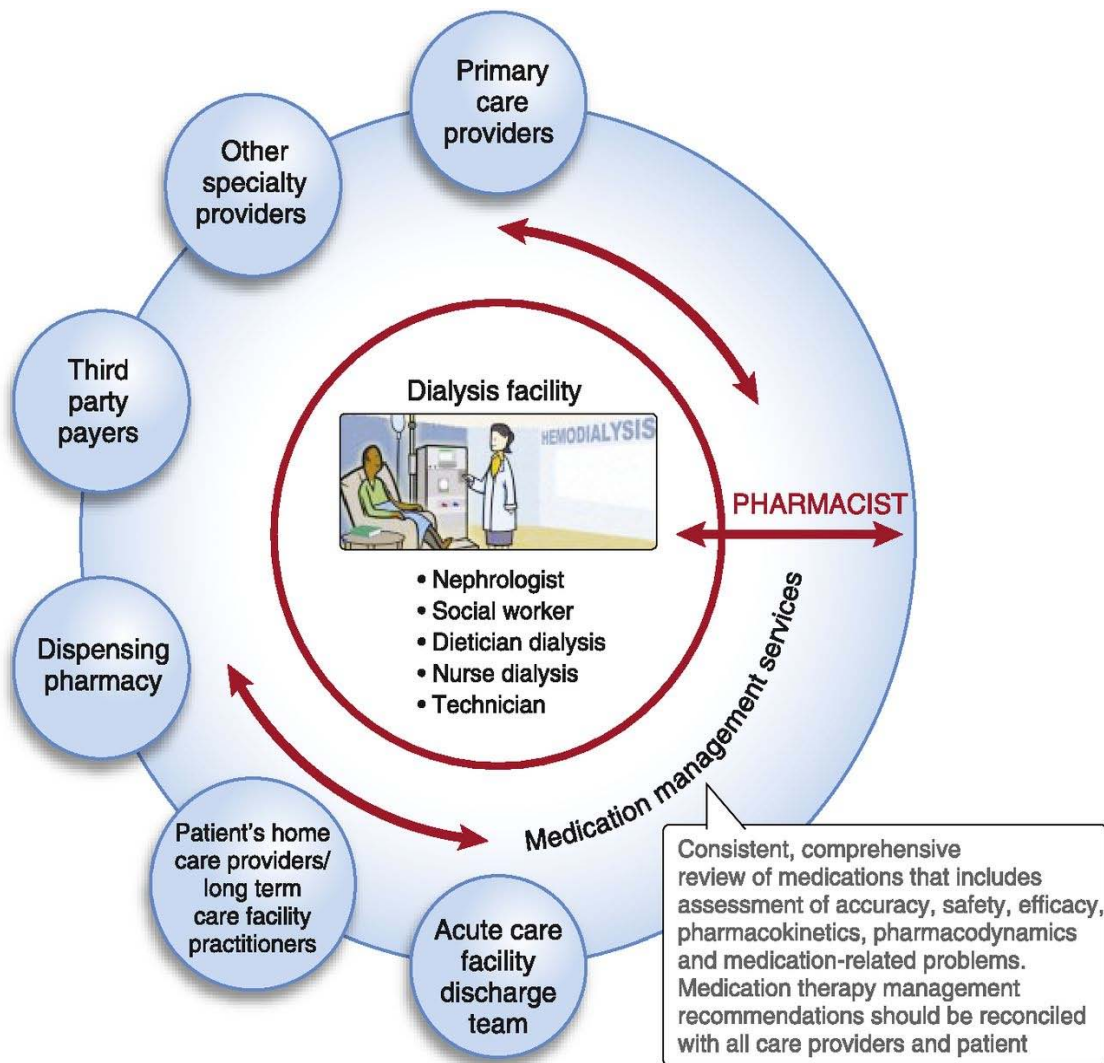
#### XIV. RENAL FAILURE

Kidney disease is a global public health problem, affecting over 750 million persons worldwide [326]. Over 30 million American adults may have CKD [327] and 1.8 million in UK [328]. The global estimated prevalence of CKD is 13.4% (11.7-15.1%), and patients with ESRD needing renal replacement therapy is estimated between 4.902 and 7.083 million [329]. In 1990, renal failure was considered as the 27<sup>th</sup> mortality factor in the world, and reached the 18<sup>th</sup> rank in 2010. According to the Centers for Disease Control and Prevention, in 2014, more than 20% of people with serious hypertension suffered from chronic kidney disease and were at risk for ESRD. On the other hand, hypertension is present in over 90% of individuals with advanced kidney disease [327], [330]. In all developed countries and in many developing countries, diabetes and hypertension are considered as the main cause of CKD. Dialysis remains the most commonly employed treatment option for patients with ESRD because not all patients are medically suitable for kidney transplantation, and the demand for kidneys far exceeds the supply. The total cost of dialysis is mostly composed of the costs of the treatment itself (including disposables, machines, accommodation, electricity, water and human resources) and the costs of medications, transportation, complications, additional hospital admissions and interventions [331]. Total annual cost of CKD far exceeds \$5 billion in Korea [332], \$114 billion in US [327] and Canada \$40 billion [333]. The prevalence of CKD and ESRD is projected to rise by up to 80% by 2020 due to ageing population and the rising prevalence of diabetes in Australia [334]. Multidisciplinary healthcare teams of physicians, nurses, dieticians, and clinical pharmacists share the goal of disease aversion progression and managing comorbid conditions in CKD and ESRD patients. At the initial appointment, the patient meets with all team members for a need estimate. The pharmacist obtains the patient's medication and allergy histories. The pharmacist also educates the patient about the importance of medication management in chronic kidney disease, adherence to drug regimens, and the potential risks of nephrotoxic medications. At subsequent visits, the patient is seen by specific team members, as appropriate to the person's laboratory results or as requested by the patient or other team members. As specialists in pharmacotherapy, clinical pharmacists are routinely involved in patient care and interact with other health care professionals, addressing multiple, often unmet needs for pharmacotherapy optimization. Ideally, this happens through a preventive, rather than a reactive, approach [335]. The pharmacist continually assesses drug therapy for efficacy and adverse effects, using laboratory results, the results of physical examinations performed during clinic visits, and

information obtained during phone conversations with the patient. The main areas of focus for the CKD pharmacist are management of anemia, monitoring for hypertension, reduction of cardiovascular risk, adjustment of doses, and recommendations relating to medications that are eliminated renally. Drug coverage and supply issues involve communication with community pharmacists and the office of the provincial health plan. The CKD pharmacist deals with drug information requests from team members and other health care providers. Management of inventory and reporting (to the public health department) of vaccinations performed in the clinic are also the pharmacist's responsibility. Other members of the team participate in the patient education classes, which are offered throughout the year to provide patients with self-management information [336]. One large cross-sectional study observed associations between uncontrolled hypertension and CKD patients with greater medication nonadherence. An earlier study reveals that clinical pharmacists' interventions reduced DRPs, gaps between clinical interventions and hospital admissions, length of hospital stays, number of transplant rejections, improved outcome of renal function and incidence of ESRD or death [337-339].







**Figure 17:** Dialysis facility-centered medication management services model [340]. In this model of care delivery, a pharmacist can provide crosscutting medication management services by communicating bidirectionally between the dialysis unit team and the patient's care providers, family, and payers, closing the loop of communication, improving medication list accuracy, and identifying and resolving MRPs. The pharmacist in this model could function like a consultant, providing medication management services to patients in several dialysis units.

## XV. HIV/AIDS

There are nearly 40 million HIV-positive people in the world, while the developing countries contain 95% of them. It is estimated that 14 thousand individuals are being infected with the HIV each day worldwide and more than 30 million people have lost their lives because of the AIDS, since the first HIV positive patient was identified. Whilst AIDS-related deaths and total new infections have fallen by 34% and 18%, respectively, since 2010, worldwide new infections in 2016 and 2017 have remained constant at 1.8 million cases, 10% of whom were children. About 2.1 million new HIV-positive cases were diagnosed in 2015 only [341,342]. South and Southeast Asia placed the third rank of the highest HIV/AIDS incidence after the states of sub-Saharan Africa and North Africa in 2012, as 3.9 million people were living with HIV and 270,000 people becoming

newly [343]. Interestingly, HIV prevalence among prisoners has been reported to vary between different countries from 0%–2% in Australia to 2% in America, 11% in Latin American countries, 10% in the Middle East, and 20% in African countries [344]. In China, men who have sex with men (MSM) transmission has surpassed both injection drug use and blood donors and has become the major HIV transmission route, rose from 44.3% in 2008 to 63.5% in 2012 and to 71.3% in 2015 in Nanjing [345]. Another study revealed that married Indian women who experience physical and sexual violence from husbands face a significantly increased risk of HIV infection as compared with women who are not thus abused [346]. However, the HIV epidemic has cost the global economy over half a trillion dollars so far in the 21<sup>st</sup> century (between 2000 and 2015), according to a new scientific study [347].

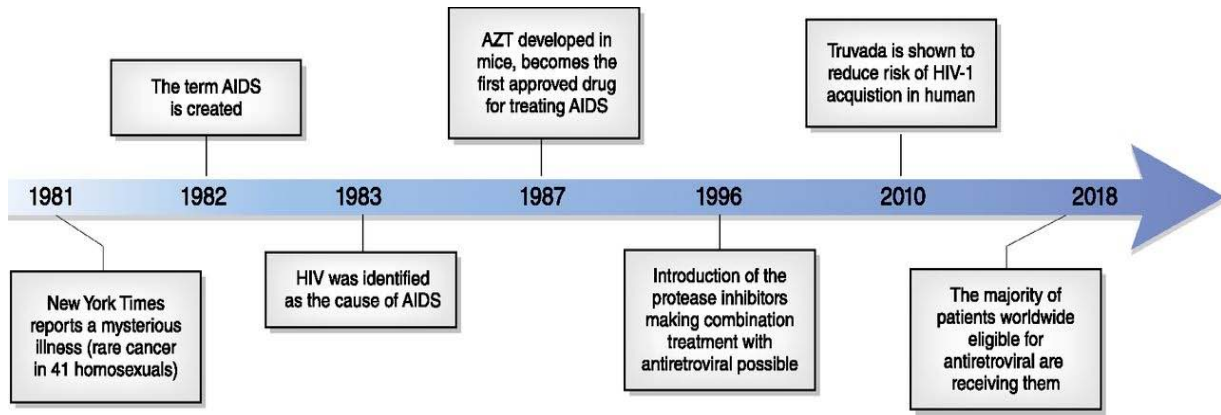


Figure 18: Diary of key sentinel timeline events from discovery to evolution of therapy of HIV-1. AZT, Zidovudine [348]. Ever since the first report by the New York Times on a mysterious illness in 1981 and the identification of HIV-1 as the cause of this illness in 1983, significant strides have been made in the treatment and management of HIV-1. Since the introduction of combination antiretroviral therapy in the mid-1990s, there have been >30 agents approved for the treatment of HIV-1–positive individuals.

**Exhibit 2. Guidelines for HIV Prevention & Treatment [485]**

HIV infection is diagnosed by tests for antibodies to HIV-1 and HIV-2. Antibody testing starts with a sensitive screening test such as enzyme-linked immunosorbent assay (ELISA). Reactive screening tests must be confirmed by a supplemental test, such as Western Blot, or by immunofluorescence assay. If confirmed by a supplemental test, a positive test indicates that a person is infected with HIV and is capable of transmitting the virus to others. HIV is detectable within 3 months after infection in at least 95% of patients. Although a negative antibody test result indicates that a patient is not infected, it cannot exclude the possibility of a recent infection. Patients with a new diagnosis should receive initial behavioral and psychosocial counseling on-site. Providers should be alert for medical or psychosocial conditions that might require immediate attention. Patients should be encouraged to notify their partners (including sex partners and needle sharing) and to refer them for counseling and testing. Needlestick injuries are fairly common occurrences in the health care field. Guidelines are available from the US Public Health Service for the management of occupational exposure to HIV, HBV, and HCV and recommendations for postexposure prophylaxis. These guidelines are updated regularly, and include such topics as implementation of a bloodborne pathogen policy, treatment recommendations after needlestick injuries, monitoring for adverse effects, and laboratory testing to monitor for seroconversion. Health care providers should be knowledgeable about the symptoms and signs of acute retroviral syndrome, characterized by fever, malaise, lymphadenopathy, and skin rash, which occur within the first few weeks after HIV infection. This presentation occurs before the antibody test results become positive. Current guidelines suggest that patients with recently acquired HIV infection might benefit from antiretroviral drugs and may be candidates for clinical drug trials. Anyone with an acute HIV infection should be referred immediately to an appropriate HIV care provider. Once detection has been confirmed, this should prompt education efforts to reduce the spread of HIV to others. This includes counseling patients on high-risk behaviors (eg, sharing of intravenous needles, unprotected sexual behavior).



The core goals of management remain maximal suppression of viral replication and promotion of immune reconstitution through combination antiretroviral therapy (ART). In both the unadjusted and the adjusted analyses, patients with pharmacist-assisted ART management achieved more rapid viral suppression than patients managed without such assistance [349,350]. Secondary goals of therapy include promoting long-term adherence, avoiding drug interactions, minimizing toxic effects, simplifying treatment regimens, decreasing drug costs, managing comorbid conditions, and preventing transmission of HIV by achieving undetectable viral load. Pharmacists' involvement in the care of HIV-positive patients has been associated with improved patient outcomes, including enhanced, reduced pill burden and dosing frequency, greater increases in CD4 cell counts, higher rates of viral suppression, and decreases in medication errors [349]. Pharmacist involvement ensured identification, prevention, and solving of DRPs [351], increased CD4+ T-lymphocyte counts [352], reduced cost associated with medicine, doctor/hospital appointments, laboratory tests, and hospitalizations [353], reduced pill burden and dosing frequency [354] and greater adherence to and persistence with ART adherence (early studies indicated 95% adherence was needed for viral suppression) [355]. In a US Department

of Veterans Affairs Medical Center adherence study, the results demonstrated a 10% increase in adherence associated with a viral load decrease [356]. Pharmacist counseling of patients with HIV includes several key aspects: an evaluation to ensure appropriate dosage, patient administration counseling, ART adherence education, medication interactions, and possible adverse effect management. If lab data are available, monitoring of CD4+ cell counts and HIV RNA viral load could also be reviewed [357]. One common reason patient cite for missing medication doses is forgetfulness. Reminder strategies such as pillboxes, calendars, or other medication planners can help improve adherence [358]. According to an analysis of the retrospective data, more than 50% of HIV-positive patients continued their regimens at home, and the remainder had provider support for not having a home regimen. A pharmacy resident or a student trained in medication reconciliation could be appointed with gathering patient information through insurance claims, outpatient pharmacies, and patient or caregiver interviews [359]. This visit gives pharmacists the opportunity to detect any problems in adherence and to suggest ways of managing adverse effects or other problems to patients before the drugs have to be discontinued.

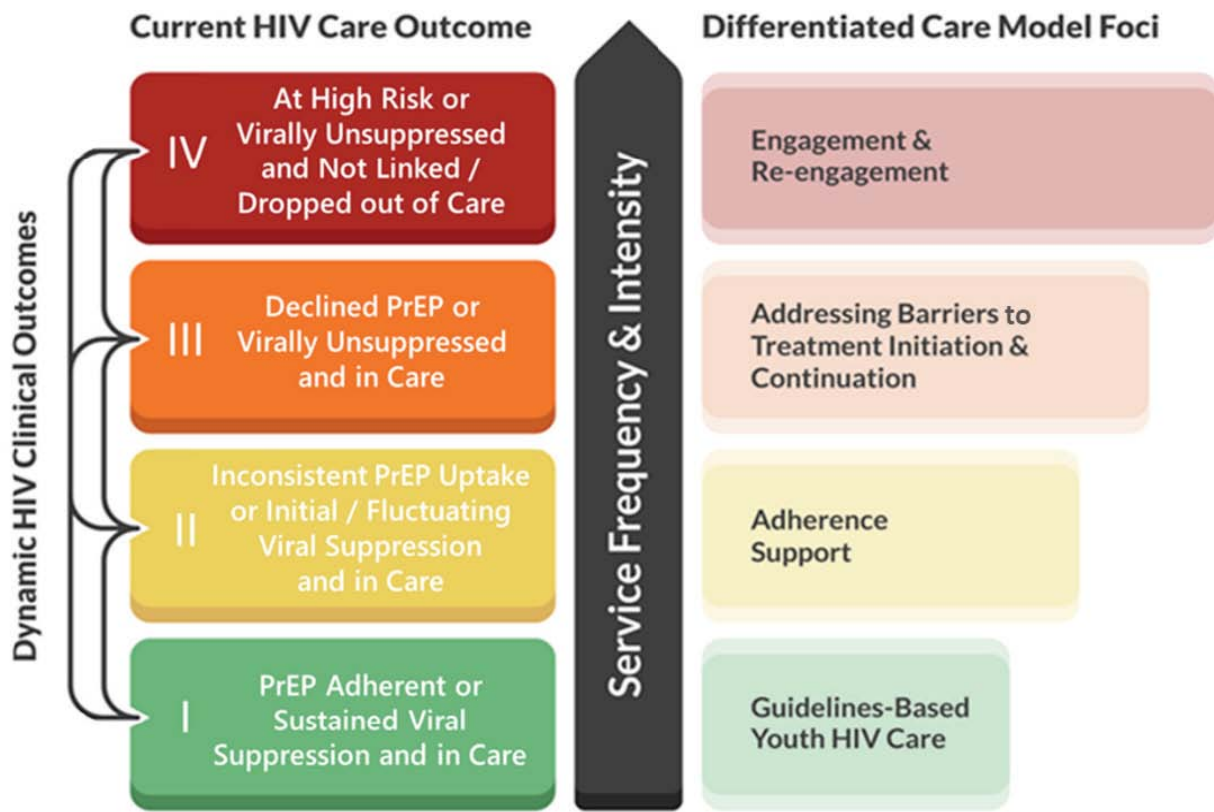


Figure 19: Integrated AYA-centered Framework for differentiated HIV prevention and Treatment Services [360]. Abbreviations: adolescents and young adults (AYA); Pre-Exposure Prophylaxis (PrEP).

## XVI. CANCER CARE

In 2019, 1,762,450 new cancer cases and 606,880 cancer deaths are projected to occur in the United States [361]. Globally, cancer is responsible for at least 20% of all mortality [362], 18.1 million new cancer, 9.5 million death in 2018 [363,364], the 5-year prevalence of 43.8 million [365], is predicted to rise by 61.4% to 27.5 million in 2040 [366]. Approximately 70% of deaths from cancer occur in LMICs [367]. Asia, Africa, and Latin America are collectively home to more than 50% of cancer patients; with more than half of global cancer-related mortalities occurring in Asia alone [368]. The 3 most prevalent cancers in 2019 are prostate, colorectal and skin melanoma among males, and breast, uterine corpus, and colorectal among females [369]. Overall cancer death rates declined faster in blacks than whites in US, although rates for cancers of the breast, uterine corpus, and pancreas are increasing in black people [370]. Also, black men have a 70% higher prostate cancer and a more than 2-fold higher mortality rate compared with white men [371]. The cost of delivering cancer treatment is estimated to rise globally with a projected total spending of \$458 billion by 2030 [372]. However, the financial burden stems from employment loss, cost of care even when patients don't require chemotherapy, out of pocket costs' opportunity costs of informal care time and can continue long after the death of the patient [373,374]. Studies say 46 billion in productivity lost in major emerging economies due to cancer [375] and economic costs of tobacco-related cancers exceed USD 200 billion each year [376]. Also, cancer causes 2.6 times more likely to file for bankruptcy than the non-cancer people [377]. Cancer trends in young adults, reflect recent changes in carcinogenic exposures, which could foreshadow the future overall disease burden [378]. Cancer cachexia (anorexia, weight loss, loss of adipose tissue and skeletal muscle) is reported in 30%-80% cancer patients and causes 20% of all cancer deaths [379]. Worldwide, some 60%-80% people depend on alternative medicines [380-382], which is also true for nearly 40% to 70% European [383,384], 50% Italian, 40% Korean, 30% British [385] and up to 87% of Australian cancer patients [386]. Use of unapproved/unlabeled/wrong herbal treatment is not uncommon [387,388] and also drug interactions reported phytotherapeutics in oncology [389]. So, proper and up-to-date knowledge is necessary in using alternative treatment options as patients who received alternative medicines had a 2.5 greater risk of dying compared to those who received conventional cancer treatment [390]. In oncology, a retrospective observational cohort study of a pharmacist-managed oral chemotherapy management clinic that provided services (including education on oral chemotherapy agents, concurrent medications, symptom management, and insurance

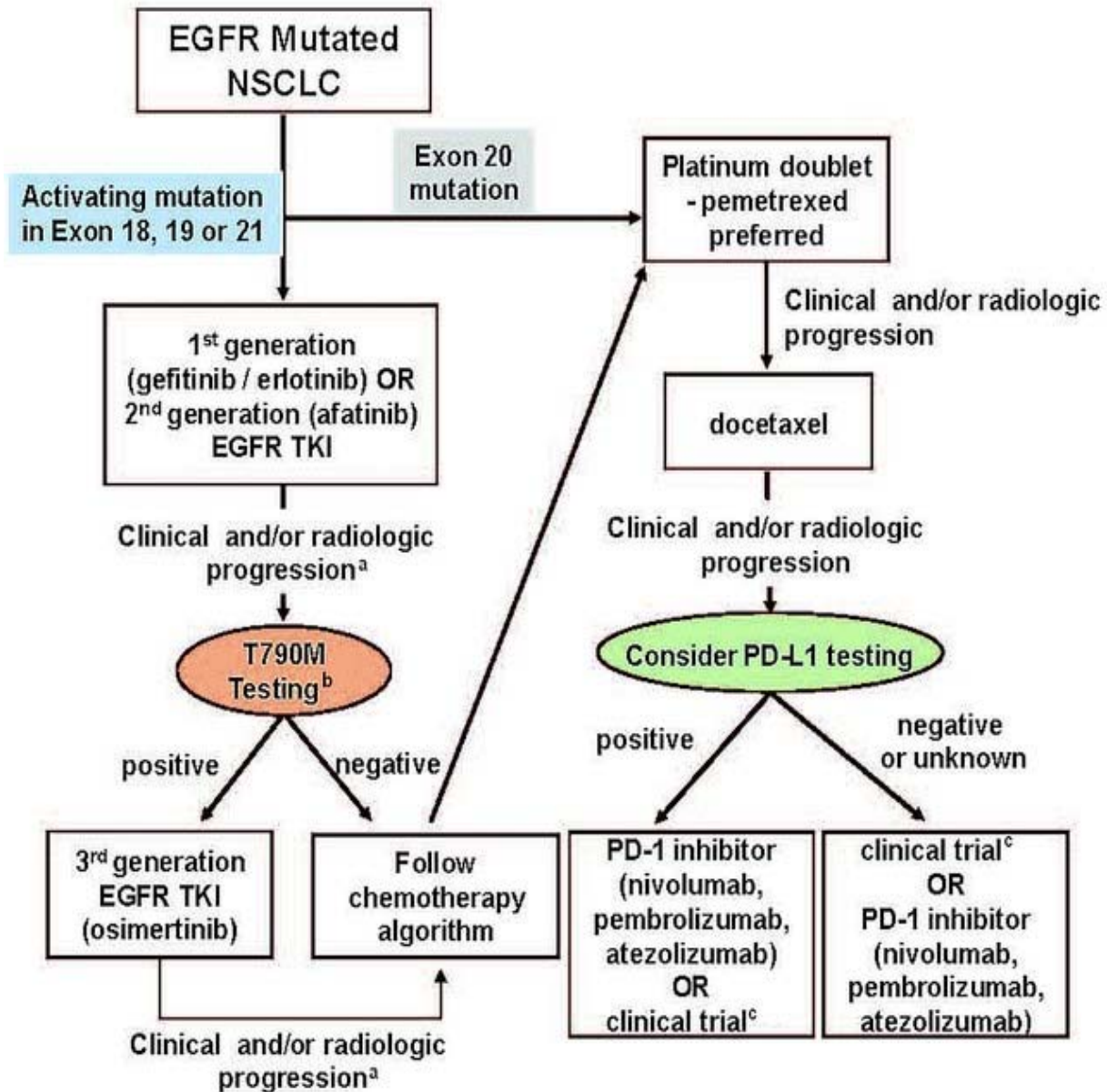
assistance) to cancer patients for up to three months found that the program led to reductions in rates of adverse effects, non-adherence, drug interactions, and medication errors over time, as well as potential cost avoidance or cost savings [391]. Patients also appear to value pharmacist-led interventions in the oncology setting. Based on a survey of outpatients, 86% felt it important to discuss their initial treatment with a pharmacist, while 76% requested pharmacy follow-up at future visits; patients were interested in visiting a pharmacist regularly while receiving chemotherapy, and may be willing to pay for pharmacy counseling services [392]. However, inpatient clinical pharmacy services positively impact on patient care. An experienced cancer pharmacist possesses the specific knowledge about the medications used in the care of cancer patients and has been shown to obtain more accurate medication histories than doctors or nurses in the hospital setting [393]. In the UK, pharmacist independent prescribers can prescribe for any condition within their clinical competence including systemic anti-cancer therapy [394]. Greater training of pharmacists may lead to greater therapeutic interventions and interactions with patients regarding their treatment regimens. Pharmacist intervention aids completion of planned chemotherapy and management of treatment-related adverse events [395]. Ambulatory care clinical pharmacists are often responsible for managing comorbid conditions of patients with cancer. There are over 100 types of cancers, located in different organs and sub-tissues and originating from different cell types. Some cancer types (e.g., colon, breast, and non-Hodgkin's lymphoma) contain even more specific classifications based on their molecular subtypes. Despite this complexity and variability, most types of cancer are treated with the same generic therapies [396].

### a) Lung Cancer

American Cancer Society estimated that in 2018 lung and bronchus cancers would be responsible for 234,030 new cases which represent 14% of all new cancer cases and 1.5 million deaths [397]. Also, Global lung cancer deaths were estimated at 1.7 million in 2015, contributing to approximately 20% of all cancer-related deaths. In 2004, lung cancer was associated with highest treatment cost at \$4.2 billion [398], which was \$268 billion in 2010 [399]. The overall economic impact of lung cancer in Europe is substantial, it was found more than €100 billion, when costs related to disability and premature mortality are considered as well [400]. Non-small-cell lung cancer (NSCLC) is the most common type of lung cancer, accounting for about 80%-85% of all cases [401,402]. More than half of the NSCLC cases are diagnosed at an advanced stage (stages III and IV) [403,404]. Smoking causes at least 80% of lung cancer deaths [405]. Lin et.al, 2019 concluded association between lung cancer incidence

and increased reliance on coal for energy generation [406]. Other possible reasons are exposure to indoor and outdoor air pollution, exposure to radiation, and occupational exposure to agents such as asbestos, nickel, chromium, and arsenic [407]. India currently produces approximately 730 million kg of dry tobacco. Its use is associated with several types of cancers which are very common in LMICs contributing

to 50% of all cancers in men and 20% in women. Globally, 90% of lung cancer deaths in men and 80% in women are attributable to smoking. By 2030, tobacco use is estimated to kill around 10 million people a year. The epicenter of this tobacco epidemic is LMICs with 70% of estimated deaths and 80% of the 1 billion smokers in the world coming from here [372].



**Figure 20:** Algorithm for the management of EGFR-mutated NSCLC [408]. Molecular testing is recommended at multiple points along the treatment pathway for this patient population. Additional challenges arise because of the known benefits of treating oligometastatic disease, especially in the brain, and treating beyond classical radiologic progression. Clinical trials should be considered at all steps along the treatment path. (a) If oligo-progression (such as isolated brain metastasis) occurs, consider local therapy and continuation of tyrosine kinase inhibitor. (b) Re-biopsy currently required. Biopsy of growing lesion is recommended if possible. Testing can be performed on histology or cytology cell block. Consider testing plasma free DNA as an alternative if clinically available. (c) Clinical trials are preferred at all treatment steps, if available. EGFR = epidermal growth factor receptor; TKI = tyrosine kinase inhibitor.

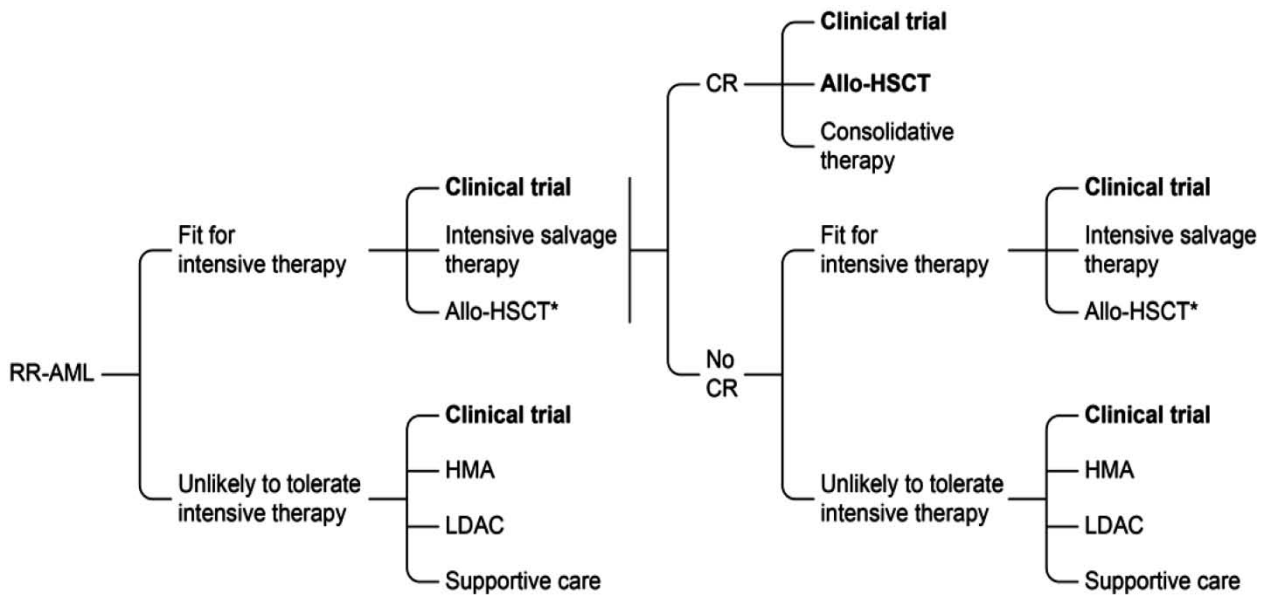
Chemotherapy remains the indispensable choice for the vast majority of patients with advanced NSCLC, including primary tumors and lung metastases. Use of the pulmonary route is a promising way to decrease the severe systemic toxicities associated with chemotherapy. Inhalation allows the administration of high drug doses directly to lung tumors without prior distribution in the organism [409]. Pharmacists are expected to assist patients with completion of adjuvant chemotherapy. A clinical trial directly comparing preoperative with postoperative chemotherapy for early-stage NSCLC demonstrated an attrition rate of 34% for postoperative chemotherapy within the protocol-defined window of 6 to 7 weeks owing to a wide range of complicating factors [410]. Pharmacist intervention aids completion of planned chemotherapy and management of treatment-related adverse events [395]. More than 80% lung cancer in UK are preventable. One-fifth of lung cancers occur in people who have never smoked. More than 90% of lung cancer cases are symptomatic at diagnosis, with a cough being most common. Pharmacists are ideally placed to detect early signs and symptoms of lung cancer, offer advice and refer people to a GP when appropriate. Pharmacists and pharmacy staff who have the opportunity to talk to patients about the signs and symptoms of lung cancer. With practical guidance, pharmacists can appropriately use immune checkpoint inhibitors for stage III NSCLC, educate patients and other clinicians about immunotherapy, and monitor and manage immune-mediated adverse events. Adding a specialist cancer pharmacist to the outpatient lung cancer team led to significant improvements in patient medication adherence. Both patients and GPs were highly satisfied with the service. Medication misadventure and clinic attendances were reduced [393], [411,412].

#### b) *Leukemia*

Hematopoietic cancers constitute a diverse group of diseases including leukemias, lymphomas, plasma cell tumors, myelodysplastic syndromes, and mastocytosis. They arise primarily from two categories of immunological cell types, myeloid and lymphoid cells [413]. AML is the most common form of acute leukemia in adults, accounting for over 80% of all diagnosed acute leukemias [414,415]. Globally, between 1990 to 2018, the number of leukemia cases markedly increased from 297,000 to 437,033 [416], accounting for close to 250,000 annual deaths due to AML worldwide [417]. Optimization of post-remission therapies to maintain complete remission and prevent relapse is a major challenge in treating patients with AML [418]. Children with Down syndrome have a 150-fold increased risk of developing AML and 20-fold increased risk of developing ALL [419]. The incidence of ALL is about 3.3 cases per 100,000 children [420]. Outcomes for patients with CML have substantially improved due to

advances in drug development and rational treatment intervention strategies [421]. Allowed costs for leukemia patients averaged almost \$157,000 in the year after diagnosis, with costs for AML almost tripling that amount, according to a new report from the Leukemia & Lymphoma Society (LLS) [422]. Malignant blood disorders cost €12 billion (\$13 billion) in EU in 2012, with more than 60% of that amount spent on healthcare costs and nearly a third spent on drugs [423].





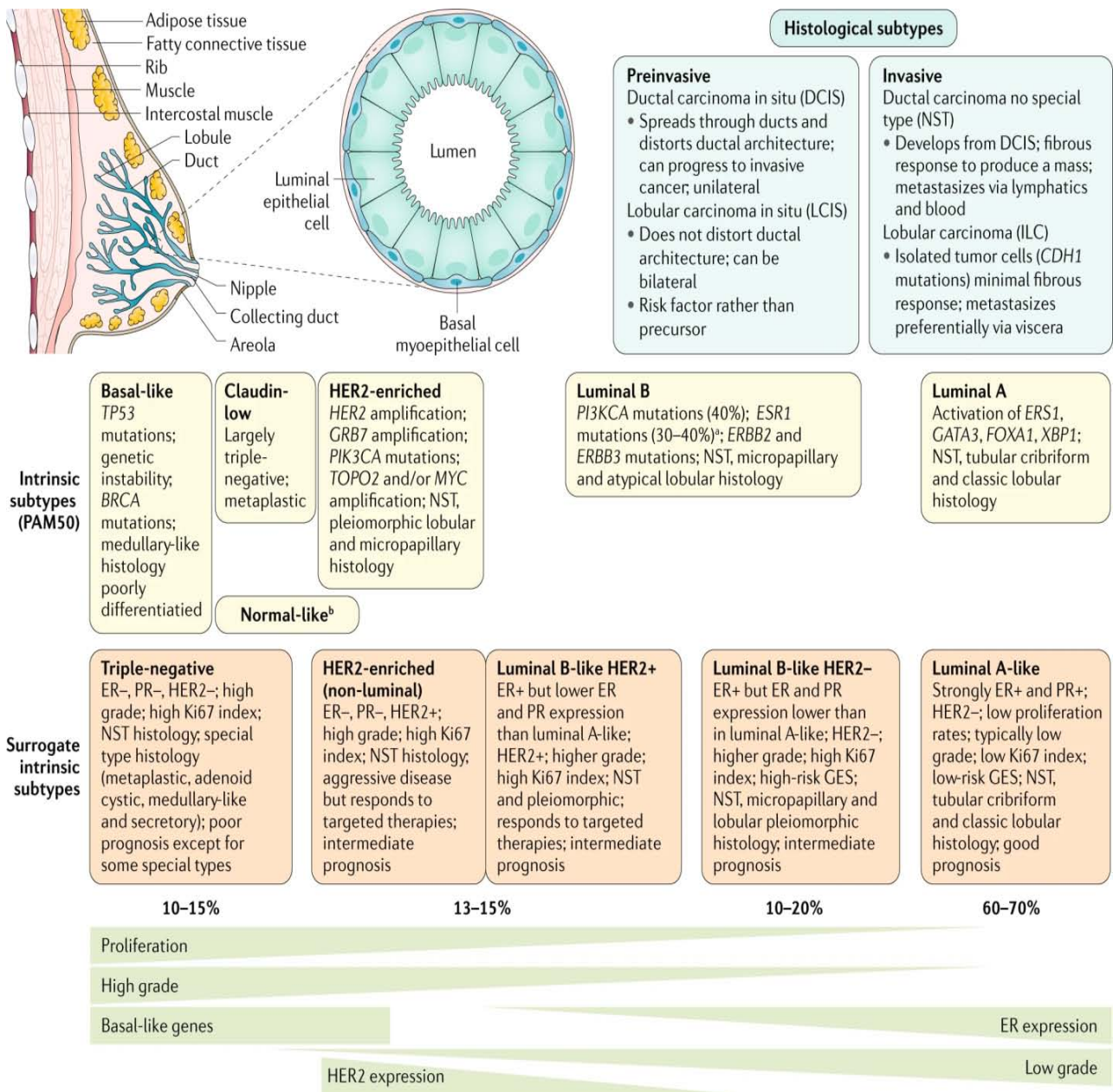
**Figure 21:** Treatment algorithm for patients with RR-AML [424]. There is no standard of care for the treatment of relapsed or refractory AML. A clinical trial is always the preferred option. The above algorithm is based on current clinical practice and will hopefully change in coming years due to improvements. In particular the targeted and immunotherapeutic agents detailed in this review may ultimately have utility in (1) initial therapy; (2) as a bridge to, or as a temporizing measure before, allo-HSCT; and/or (3) as part of consolidative therapy. \* Achievement of a complete remission (CR) prior to undergoing alloHSCT is associated with best survival and is generally preferred. The survival of patients with residual disease undergoing alloHSCT varies considerably however and this therapy may be a reasonable option in selected patients not in CR. HMA: Hypomethylating agent. LDAC: Low-dose cytosine arabinoside. Allo-HSCT: Allogeneic Hematopoietic Stem Cell Transplant.

The Leukemia/BMT Program's pharmacists have advanced specialty training in leukemia and bone marrow transplantation. They work directly with patients and the healthcare team, and are responsible for providing unbiased, patient-specific drug prescribing information and for identifying, preventing and resolving DRPs. They provide medication counseling when chemotherapy starts. While patients are on treatment, they check in periodically during a clinic visit (or hospitalization for inpatient chemotherapy) to answer any new medication-related questions or provide recommendations for symptom management. They can educate and counsel patients on chemotherapy and supportive-care medications both during their visit to the clinic or infusion center and after they head home. This entails reviewing home medications for potential drug-drug interactions, providing written materials detailing treatment regimens, and recommending options for nausea and pain management. Myeloma regimens, as an example of one condition for which multiple drugs are given on differing schedules, can be particularly complex. To ensure that patients are prepared to follow these regimens, pharmacists may work with nurses to create treatment calendars as visual aids [425]. The pharmacy team would ensure the NRT product is suitable for the patient based on their smoking status and lifestyle, and continue to ensure the NRT product is suitable on dispensing. Research has indicated that

non-adherence is a major contributing factor for treatment failure in patients with CML receiving imatinib, oncology pharmacists had a nearly 90% imatinib adherence rate compared to 65.8% in the usual care group [426].

### c) Breast Cancer

The most common breast cancer type is the invasive ductal carcinoma accounting for 70-80% of all breast cancers diagnosed [427]. It starts in a milk passage (a duct), breaks through the wall of the duct and invades the tissue of the breast [428]. In US, 232,000 new cases of breast cancer were diagnosed [429] and claimed the lives of 40,290 women [430] in 2015. First-degree relatives of patients with breast cancer have a 2-fold to 3-fold excess risk for development of the disease [431]. BRCA1 and BRCA2 are the 2 most important genes responsible for increased breast cancer susceptibility [432]. Early breast cancer detection programs depend for effectiveness on the participation rate, which is affected by risk factor awareness [433]. Since 1990, between 384,000 and 614,500 breast cancer deaths have been averted due to increased mammography screening and improved treatment [434]. However, more than 25% breast cancer is projected to be increased by 2020 [435].



**Figure 22:** Breast Cancer Features [436]. All breast cancers arise in the terminal duct lobular units (the functional unit of the breast) of the collecting duct. The histological and molecular characteristics have important implications for therapy, and several classifications on the basis of molecular and histological characteristics have been developed. The histological subtypes described here (top right) are the most frequent subtypes of breast cancer; ductal carcinoma (now referred to as ‘no special type’ (NST)) and lobular carcinoma are the invasive lesions; their preinvasive counterparts are ductal carcinoma in situ and lobular carcinoma in situ (or lobular neoplasia), respectively. The intrinsic subtypes are based on a 50-gene expression signature (PAM50). The surrogate intrinsic subtypes are typically used clinically and are based on histology and immunohistochemistry expression of key proteins: estrogen receptor (ER), progesterone receptor (PR), human epidermal growth factor receptor 2 (HER2) and the proliferation marker Ki67. Tumors expressing ER and/or PR are termed ‘hormone receptor-positive’; tumors not expressing ER, PR and HER2 are called ‘triple-negative’. The relative placement of the boxes aligns with the characteristics (for example, proliferation and grade) in green, negative; +, positive. GES, gene expression signature. (a) *ESR1* mutations induced by aromatase inhibitor targeted therapy. (b) Artefact; expression of normal breast components due to low tumor cellularity.

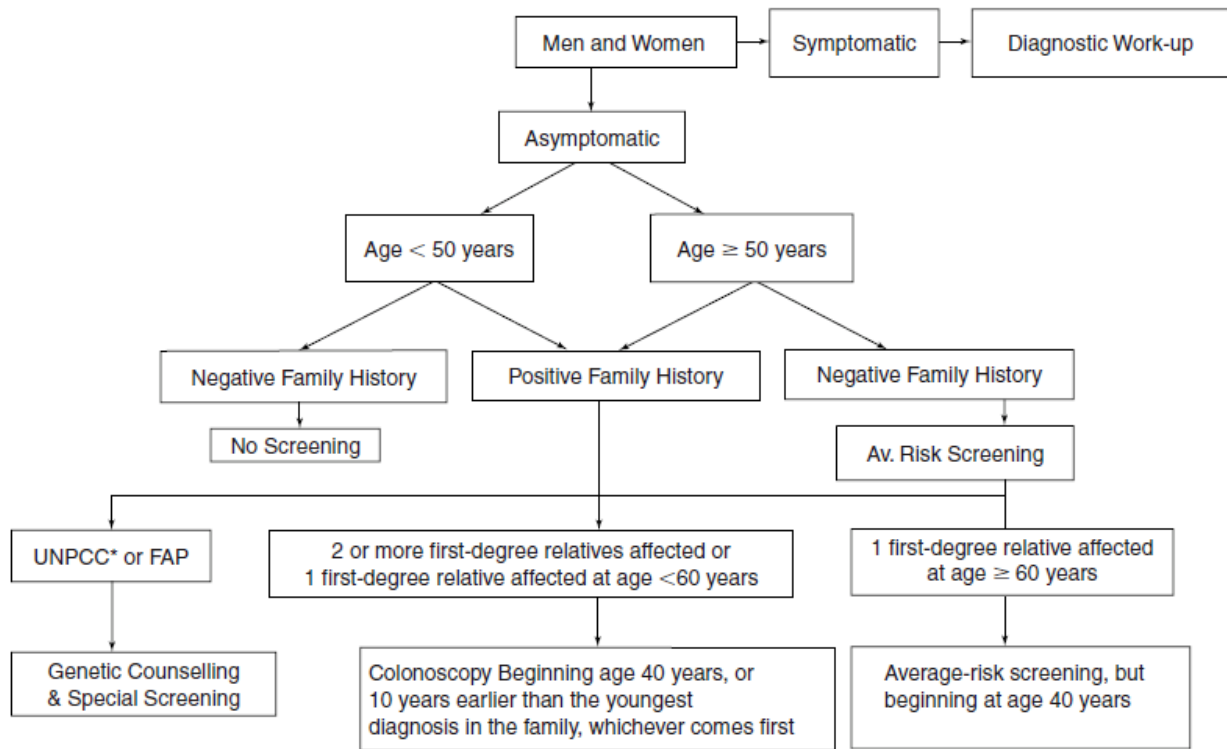


Women with breast cancer had a higher risk of developing new comorbidities than women without cancer [437]. stressful life [438], urban living, mastectomy [439], lower socioeconomic status [435], [440], genetic predisposition, African-American origin, not having children or breastfeeding, early menstruation/late menopause, obesity, alcohol abuse, HRT after menopause, benign breast conditions or having breast proliferation, using contraceptives and exposure to diethylstilbestrol [441], age between 40-60, late age first pregnancy, smoking [442], abortion history [443] are the associated factors. Distressingly, the 5-year cumulative mortality remains unacceptably high at 50%, primarily due to a late-stage presentation [316]. Wearing bra is not associated with breast cancer risk [443] but wearing (tight) bras for many hours and having breast implants [442], [445] may have associations. Around 60% of breast cancer mortality occurs in LMICs [446]. Conflicting data exists about the influence of oral contraceptive pills (OCPs) on the development of breast cancer. There are clear benefits to the use of OCPs, including a reduction in ovarian cancer risk by 40% and reduction in endometrial cancer risk by 60%. Due to evidence from the Women's Health Initiative, use of hormone replacement therapy is not recommended for patients to prevent the occurrence of breast cancer [447]. Yuan et.al, 2019 reported that medical and surgical abortion and less than 20 years IUD use could increase the risk of breast cancer for post-menopausal women [448]. The prevalence costs of breast cancer care in the US in 2010 was \$16.5 billion [449,450], and exceeded \$39 billion before 2017 [451]. Pharmacists can improve chemotherapy breast cancer patients' QOL regarding malaise and nausea by providing personal counseling before the medical examinations. In addition to the attending physician and nurses, pharmacists can also partially alleviate malaise through active intervention that involves patient counseling and guidance [452]. It is worth mentioning that clinical pharmacists are well accepted as patient medication educator and psychological consultant. Wang et.al, 2015 reported reduced fatigue, the symptoms of nausea and vomiting, and pain as they followed clinical pharmacists' advice. Medication education and nonpharmacological intervention (e.g., cognitive behavioral interventions, relaxation interventions, and music therapy) by clinical pharmacists could effectively improve the quality of sleep and reduced cancer-related constipation and diarrhea of cancer patients [453]. Clinical pharmacist may observe all patients who receive active therapy, and monitors the emergence and management of treatment-related toxicities through patient assessment and evaluation of laboratory results. During discussions with the patient, the clinical pharmacist may reinforce the importance of adhering to therapy as prescribed. This is especially important for patients who receive oral chemotherapy, which is self-administered so patients

may have fewer clinic visits than those who receive IV treatment. Depending on the patient's needs, the clinical pharmacist may also work with other staff members, such as financial counselors or social workers, to optimize patient care. Similarly, clinical pharmacists confer with specialty pharmacists to ensure that insurance issues are resolved so that the patient receives timely access to treatment. In some cases, it may be necessary to switch therapies. When this occurs, clinical pharmacists leverage their specialized training to make treatment recommendations based on the patient's breast cancer subtype, extent of disease, treatment history, and performance status [454].

#### d) *Colorectal Cancer*

Colorectal cancer (CRC) is the third most common cancer worldwide and the fourth most common cause of cancer death [455]. It is the second leading cause of death in US, affecting some 135,000 estimated new patients with more than 50,000 deaths every year [456-458]. In 2015, there were 376,000 new cases and 191,000 deaths in China [459]. The overall incidence of CRC is decreasing in many high-income countries, although reported significant increase in Denmark, New Zealand, Australia, UK and Canada, mainly driven by increases in distal (left) tumors of the colon and predominant in [460-467]. Lifestyle determines around 50% to 60% incident of CRC irrespective of age [468-471]. Physical activity may prevent approximately 15% of the colon cancers [472]. Fish, poultry, cheese, fruit, vegetables, tea and coffee were not associated with colorectal-cancer risk [473]. Alcohol consumption, red meat/processed meat, junk food, smoking, diabetes and obesity potentiate the same risk [474-477]. In 2018, the estimated national expenditure was \$16.6 billion in US, which was \$4.5 billion to \$9.6 billion in 2009 and projected to be more than \$20 in 2020 [478-480]. There were over 1.8 million new cases in 2018. Hungary, North Korea, Slovakia, Norway, Denmark, Portugal, Japan are in the top-ranking positions [481]. 5-year survival for patients with stage IV CRC is less than 10% [482]. The overall risk of CRC among patients with ulcerative colitis is about ten times higher than that of the general population [483]. CRC patients have unique psychosocial needs (e.g., isolation, embarrassment) related to altered eating and bowel habits and sexual dysfunction that warrant clinical attention [484].



**Figure 23:** Algorithm for colorectal cancer screening [485]. +, Either colorectal cancer or adenomatous polyp; \*, HNPCC = hereditary nonpolyposis colorectal cancer and FAP = familial adenomatous polyposis.

Multiple risk factors are associated with the development of this malignancy, including genetic susceptibility, environmental, and life-style. It has been suggested that diets high in fiber are protective against the development of colorectal cancer. Cho et.al, 2019 revealed that age, sex, family history of colorectal cancer, and education and additionally adjusted for the five modifiable risk factors (i.e., prior BMI, physical activity, dietary inflammatory index, smoking, and alcohol consumption) are CRC promoters [486]. The risk of colon cancer may be increased as much as twofold in men who are in the highest quintile of body size. Potential mechanisms to this relationship include the observation that physical activity stimulates bowel peristalsis, resulting in decreased bowel transit time, and the possibility that exercise can alter levels of blood glucose, insulin, and other hormones, which may reduce tumor cell growth. In the Physicians' Health Study, men with C-peptide in the top vs the bottom quintile had a 2.7-fold significantly higher risk of colorectal cancer after control for BMI and exercise [487]. Heavy alcohol consumption increases risk of rectal and colon cancer by as much as two to three times, although some studies have found no significant increase in risk [488]. The strongest evidence-based screening recommendations include offering annual fecal occult blood testing (FOBT) or flexible sigmoidoscopy every 5 years. Each of these screening tests has been associated with reductions in mortality. Patients with a positive specimen should be followed up with colonoscopy.

Flexible sigmoidoscopy reduced mortality by two-thirds for lesions within reach of the sigmoidoscope. Hypnosis, music and relaxing video reduced anxiety and pain associated with colonoscopy and need for sedation during colon cancer screening [489-497]. The pharmacist can help provide educational and financial resources and relieve any anxiety related to the screening process. Pharmacists have the ability to recommend colorectal cancer screening tips and tools to reduce risk. Pharmacists can also refer patients to qualified health care providers for follow-up care and act as a prescriber-patient liaison. Pharmacists can also play an essential role by reviewing the proper instructions for any colorectal screening preparation medications [498]. Pharmacists should be aware that there are differences in the guidelines with regards to method and frequency of colorectal cancer screening, but the accepted starting range for screening all adult patients at average risk is 50 years. Mass media campaigns have increased the awareness of the need for colon cancer screening, and counseling by pharmacists is a good way to help reinforce these recommendations. Additionally, pharmacists should be aware of patients displaying any of the colorectal cancer warning signs (eg, bleeding, changes in bowel habits, weight loss, abdominal pain) so that they can be referred to appropriate medical care and diagnostic work-up. Chemotherapy-induced diarrhea can negatively affect the QoL of patients and treatment process. A chemotherapeutic treatment for colon cancer consisting

of fluorouracil and capecitabine is associated with 50%, and irinotecan with 80% occurrence of diarrheal symptoms. Also, the clinical oncology pharmacist has an important role in the identification and resolution of DRPs. Evaluation of symptom-related quality of life is important for the monitoring of patients receiving chemotherapy [499].

#### e) *Prostate Cancer*

Prostate cancer is the second most frequent malignancy (after lung cancer) in men worldwide, counting 1,276,106 new cases and causing 358,989 deaths (3.8% of all deaths caused by cancer in men) in 2018. Based on GLOBOCAN 2018 estimates, 1,276,106 new cases of prostate cancer were reported worldwide in 2018, with higher prevalence in the developed countries [500,501]. In Europe, prostate cancer is now the most common cancer in men, accounting for 23% of all male cancers and 10% of cancer-related deaths in males in 2012 [502]. In the USA, the total estimated expenditure on prostate cancer was \$9.9 billion 2006 [503] and expected to be \$39 billion to more than \$58 billion in 2020 [504]. The incidence rate of prostate cancer increases dramatically after 55 years of age. Americans have a 5-year survival approximately 15% less than whites, perhaps due to the combination of higher levels of testosterone compared to white males and increased androgen receptor activation. Obesity is associated with an increased risk of prostate cancer mortality and recurrence. Low-fat diets and other dietary considerations such as  $\beta$ -carotene, lycopene, and vitamin E may be protective, although these are still unproven [502]. Smoking has not been associated with an increased risk of prostate cancer, but smokers with prostate cancer have an increase in mortality [505,506]. Alcohol consumption does not appear to be associated with the development of prostate cancer [507,508]. Many patients with localized prostate cancer are asymptomatic, while those with more invasive disease develop symptoms of alterations in urinary frequency, hesitancy, and flow, and new-onset impotence. There are several prostate cancer cell lines that form primary tumors, but will not metastasize to bone [509]. Some nonspecific signs of more advanced disease include anemia and weight loss. The prostate specific antigen (PSA) test involves taking a simple blood sample and detecting the enzyme levels. While it is simple and readily available, it does generate false-positives and false-negatives and cannot be recommended alone as a screening tool. The American Cancer Society recommends digital rectal examination (DRE) and prostate specific antigen (PSA) be offered annually to men beginning at age 50 years with at least a 10-year life expectancy, and to younger men (45 years old) who are considered to be at high risk for prostate cancer development (eg, those with a strong family history, African Americans) [510,511]. If both tests are normal,

no further diagnostic work-up is required. If either is abnormal, further work-up by transrectal ultrasound is indicated. However, to transition to patient-centered care, pharmacy services should organize around the understanding of patients' needs, preferences, and expectations for the clinical judgment and decision-making processes. Pharmacist-patient communication is an important strategy for humanized practice. This allows the pharmacist to see beyond an individual with health problems to a patient being with particularized needs [512]. The initial management of newly diagnosed prostate cancer should consider the extended natural history of this malignancy and the risk of progression to more aggressive disease. Shared decision-making, the patient's life expectancy, and personal preferences play an increasing role in the choice of appropriate treatment options. Pharmacists may play an important role in consulting and educating patients about the screening tests, treatments, and related benefits and harms. Enhanced risk-classification methods and expanded treatment options allow pharmacists to counsel patients regarding therapy based on cancer prognosis and patient preference. Androgen deprivation therapy (ADT) remains the standard of care for newly diagnosed metastatic disease and an important option in the management of higher risk localized cancer. Pharmacists are well-equipped to provide patient counseling and management of complications of ADT [513]. Patel et.al, 2016 demonstrated maximized oral chemotherapy treatment outcomes with the addition of a formalized monitoring program directed by an oncology pharmacist [514]. Also, pharmacist led adherence program facilitated timely dose adjustments and high patient adherence [515]. Pharmacists can play active roles in the management of prostate cancer, particularly by assisting in the prevention and management of the side effects of hormone therapy and chemotherapy. Hormone therapy can be associated with various adverse effects, such as osteoporosis and hot flashes. Pharmacists can suggest therapies to manage hot flashes and promote the intake of adequate amounts of calcium and vitamin D to prevent osteoporosis. Common side effects of systemic chemotherapy, such as neutropenia and thrombocytopenia, can lead to dose reductions or treatment delays, if not managed properly. Pharmacists, using a variety of online resources can counsel patients and ensure the maximum cycles of chemotherapy can be administered [516,517].

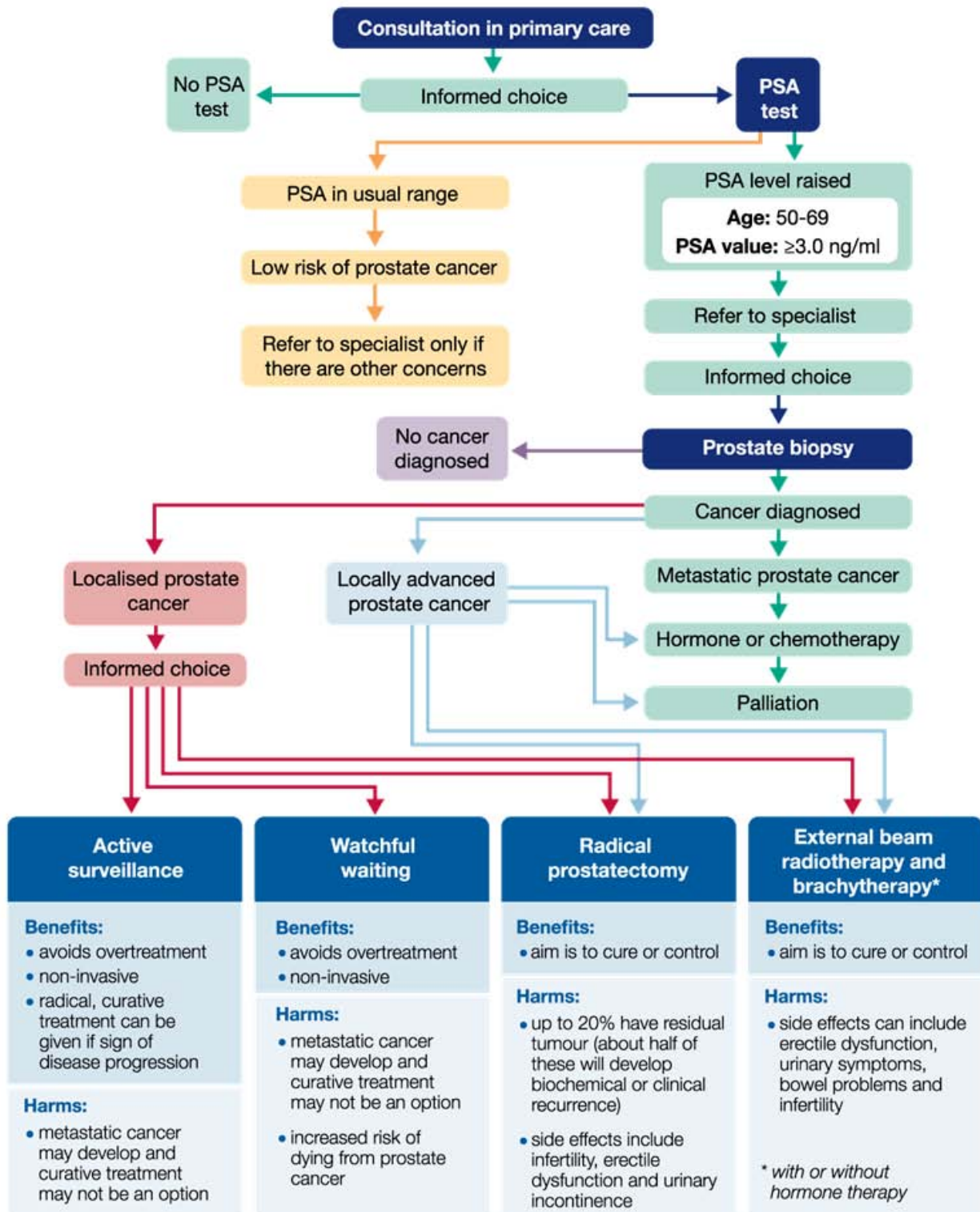


Figure 24: Prostate-specific antigen (PSA) testing and prostate cancer patient pathway [518]. Screening for prostate cancer is a highly debated topic due to limitations in the sensitivity and specificity of the PSA test, and also due to the potential harms of unnecessary investigations. In the UK, there is currently no formal screening program. The Department of Health has developed the Prostate Cancer Risk Management Program (PCRMP) for men aged over 50 years, which includes a pathway shown in this figure. The program aims to help ensure that the GP and the patient make robust, informed decisions regarding investigation for prostate cancer.

## XVII. CONCLUSION

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 QoL. To date, numerous studies have found an increased rate of hospital admission rates secondary to medication noncompliance and/or 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 pharmacist. Preventive or chronic 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. Clinical pharmacists use population health methods to generate chronic disease management referrals for patients with uncontrolled chronic conditions. 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. Also, pediatric clinical pharmacists have evolved over the last 2 decades and have proven to be a key player in the multidisciplinary team. Although, there are ample of evidences of positive impact on clinical, humanistic and economic outcomes and the benefits of clinical pharmacists managing chronic conditions have been extensively published, their involvement in the multidisciplinary team providing care to patients with chronic cases, more high-quality research is warranted.

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### Abbreviations

American Association of Colleges of Pharmacy (AACP); Accreditation Council for Pharmacy Education (ACPE); International Diabetes Federation (IDF); Hemoglobin A1c (HbA1c); Ischemic Heart Disease (IHD); Myocardial Infarction (MI); Coronary Heart

Disease (CHD); Disability-Adjusted Life Year (DALY); Quality of Life (QoL); Drug Related Problems (DRPs); Inflammatory bowel disease (IBD); Hormone replacement therapy (HRT); Bone-Mineral Density (BMD); Chronic Obstructive Pulmonary Disease (COPD); LDL cholesterol (LDL-C); Gastroesophageal Reflux Disease (GERD); Obstructive Sleep Apnea (OSA); Subclinical Hypothyroidism (SCH); National Alliance on Mental Illness (NAMI); Major Depressive Disorder (MDD); National Mental Health Survey (NMHS); Australian Bureau of Statistics (ABS); National Survey of Mental Health and Wellbeing (NSMHWB); Coronary Heart Disease (CHD); Mental Health (MH); Antidepressant Drug Treatment (ADT); Canadian Network for Mood and Anxiety Treatments (CANMAT); Psychiatric Emergency Services (PES); Disability-Adjusted Life Year (DALY); Drug-Related Problems (DRPs); Value of Lost Economic Welfare (VLW); Amyotrophic Lateral Sclerosis (ALS); Serotonin and Norepinephrine Reuptake Inhibitors (SNRIs); Tricyclic Antidepressants (TCAs); Antimicrobial Stewardship Programs (ASPs); End-Stage Renal Disease (ESRD); Chronic Kidney Disease (CKD); Men who have Sex with Men (MSM); Non-small-cell lung cancer (NSCLC); Enzyme-Linked Immunosorbent Assay (ELISA); Leukemia & Lymphoma Society (LLS); Acute Lymphoblastic Leukemia (ALL); Acute Myeloid Leukemia (AML); Chronic Myeloid Leukemia (CML); Nicotine Replacement Therapy (NRT); Androgen Deprivation Therapy (ADT); Prostate Specific Antigen (PSA); Digital Rectal Examination (DRE); Prostate Specific Antigen (PSA); Fecal Occult Blood Testing (FOBT); Global Cancer Incidence, Mortality and Prevalence (GLOBOCAN)

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## What Affects Community Mental Health?

By Dr. Tuğba Gültekin

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**Abstract-** Community mental health is a system that puts “human” before “patient.” This system is ethically based on human rights, and in terms of effectiveness, it is based on concrete evidence. Patient participation is an significant aspect of this system as the patient is included in the process at every stage of treatment. The purpose of this review is to describe the factors affecting community mental health. We can talk about three potential categories that affect community mental health: individual characteristics and behaviors, social and economic conditions, and environmental factors. Individual features and behaviors include low self-esteem, emotional and cognitive disability, lack of communication skills, medical illness, and substance use.

**Keywords:** *community mental health, affecting factors, health, spirit, human rights, respect for human, freedom.*

**GJMR-K Classification:** *NLMC Code: WM 101*



*Strictly as per the compliance and regulations of:*



# What Affects Community Mental Health?

Dr. Tuğba Gültekin

**Abstract-** Community mental health is a system that puts “human” before “patient.” This system is ethically based on human rights, and in terms of effectiveness, it is based on concrete evidence. Patient participation is an important aspect of this system as the patient is included in the process at every stage of treatment. The purpose of this review is to describe the factors affecting community mental health. We can talk about three potential categories that affect community mental health: individual characteristics and behaviors, social and economic conditions, and environmental factors. Individual features and behaviors include low self-esteem, emotional and cognitive disability, lack of communication skills, medical illness, and substance use. Social and economic conditions include loneliness, loss of a relative, neglect and family conflicts, exposure to violence and abuse, low income and poverty, difficulties and failures at school, job stress, and unemployment. Environmental factors include weak access to fundamental services, injustice and discrimination, social inequalities and gender inequalities, and exposure to war, migration, and other disasters. Events that force individuals to migrate, acts of violence, and coercive life events are the most important environmental factors that negatively affect mental health. In protecting community mental health, it is substantial that health care providers provide the necessary care, counseling, support and training to individuals and their families as individuals who have the opportunity to closely monitor this triangular relationship at the individual, family, and community level.

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## I. INTRODUCTION

The World Health Organization (WHO) defines health as a state of complete physical, social, and spiritual well-being. In light of this definition, it is evident that for the individual to be fully healthy, the individual must have good mental health as well as good physical health [1]. On the other hand, Freud has made a simple definition of mental health as “the ability to work and love” [2].

Mental health is a dynamic state of internal equilibrium which enables individuals to use their abilities in harmony with universal values of society (respect and care for oneself and other living beings; recognition of connectedness between people; respect for the environment; respect for one’s own and others’ freedom) [3].

Community mental health is a system that puts “human” before “patient”. This system is ethically based on human rights, and in terms of effectiveness it is based on concrete evidence. Patient participation is an

important aspect of this system as the patient is included in the process at every stage of treatment [4]. We can talk about three potential categories that affect community mental health: individual characteristics and behaviors, social and economic conditions, and environmental factors [5]. The mental health of individuals affects community mental health.

## II. WHAT AFFECTS COMMUNITY MENTAL HEALTH?

*Individual characteristics and behaviors* include low self-esteem, emotional and cognitive disability, lack of communication skills, medical illness, and substance use [5, 6].

*Low self-esteem:* When people perceive a threat to their self-esteem, they exhibit self-preventive behavior. There is a negative relationship between low self-esteem and self-prevention [7]. Low self-esteem can lead to isolation from others, and even to violence and anger if there is a threat to ego [8, 9]. Being a social entity, isolation from others adversely affects the mental health of humans. Furthermore, behaviors of violence and anger towards other people adversely affect the mental health of others.

*Emotional and cognitive impairment:* It is the inadequacy of interest and motivation, concepts, cognitive abilities, memory, reasoning, and various other internal mental functions. Emotional and cognitive deficiencies of people lead to negative social effects. The lack of emotional self-awareness often makes individuals very sensitive. They overreact to any problem and always feel tired or overwhelmed in the face of any difficulty, be it large or small [10].

*Lack of communication skills:* While most people are unaware that they cannot make meaningful and useful speeches, they violently resist accepting the truth when this situation is explained to them. Those who waste their time and energy and that of others feed the negative emotions they have with their accusations, complaints, and criticisms on the one hand, and on the other hand create stress in their environment. Dökmen listed the causes of communication conflicts as cognitive, perceptual, emotional, unconscious processes of the people engaged in communication, individual needs, communication skills, personal factors, cultural factors, roles, social and physical environment, and the quality of the message [11]. From this point of view, it is seen that communication conflicts, especially stress and anger, negatively affect the mental health of individuals.

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*Substance use:* Studies using the Minnesota Multidimensional Personality Inventory (MMPI) showed that in addition to psychotic deviation, the risk of depression, hysteria, and psychasthenic was high in alcohol addicts, whereas risk of psychotic deflection and hypomania were found to be especially higher in patients using narcotic drugs. The psychopathic deviation scores of heroin addicts were significantly higher [12].

*Social and economic conditions* include loneliness, loss of a relative, neglect and family conflicts, exposure to violence and abuse, low income and poverty, difficulties and failures at school, job stress, and unemployment [5].

*Neglect and family conflicts:* Negative effects of parents on physical and emotional neglect of children constitute an important risk factor. The most important of these negative effects are aggressive behavior exhibited by the parent. This is very important because, in the family, parents can easily direct aggressive behavior towards their children [13]. It is known that neglects and traumas experienced in childhood negatively affect the mental health of individuals.

*Exposure to violence and abuse* is caused by factors such as low socio-economic status, physical and sexual abuse, poverty, homelessness, child neglect, malnutrition, negative peer support, and exposure to social violence [14]. It is usually manifested in the form of humiliation, shouting, telling another person he/she is inadequate, he/she can amount to nothing, and intimidation. Exposure to violence and abuse in every period of life creates feelings of insecurity, insufficiency and adversely affects the mental health of individuals and families.

*Low income and poverty:* Poverty is defined in the simplest sense as the inability of people to meet their daily basic needs such as food, shelter, health, transportation, etc., which are essential for the survival of people, or not having sufficient financial income to meet these needs. While the world economy is growing, and global wealth is increasing, poverty has now become a serious problem that continues to grow at its usual pace and threatens the peace, tranquility and happiness of countries around the world. 14% of the world's population (880 million people) earns less than \$1 per day, 22% (1 billion 400 million people) earns less than \$1.25 per day, and 40% (2 billion 600 million people) earns less than \$2 per day [15]. Every year, around one billion people in the world are struggling with hunger, not accessing basic food products, and more than ten million people die of malnutrition. Persons who cannot meet their daily basic human needs will have high levels of anxiety, high risk of stress, anxiety, depression, low life expectancy, and low satisfaction from life.

*Work stress and unemployment:* The social costs of unemployment include an increase in crime rates,

dissolution in the social structure, unbalanced migration, and increase in suicide rates. Unemployment causes a decrease in the income that the individual expects for the future, a limitation in consumption habits, and social isolation. Theoretical approaches on this subject state that as a result of these negativities, the individual's suicidal tendencies will increase [16].

Lastly, *environmental factors* include thin access to elementary services, injustice, and discrimination, social inequalities, and gender inequalities, and exposure to war, migration, and other disasters [5].

*Injustice and discrimination:* Human rights are the rights that people have only because they are human. Some people are excluded from the social sphere because of their characteristics. Discrimination can be solely based on gender, but also on belonging to a different race, believing in distinct religions, or having different sexual orientations [17]. Discriminatory behaviors can lead to negation outcomes such as burnout, unhappiness, work stress, and cynicism. Discrimination, exclusion, injustice, and unethical behavior in community affect not only the individual but also the mental health of all individuals in the society. According to Lerner and Miller, if people are subjected to very traumatic experiences or successive unjust situations that make them believe the world is unstable, chaotic, and unfair, this may lead to a feeling of unsafety and worry, and even increase suicidal tendencies [18].

*Social inequalities and gender disparities:* Social inequalities have an important place among the determinants of community mental health. Regional, economic, gender-based, educational and racial/ethnic inequalities prevent access to the resources and fair distribution of services necessary to protect mental health in a society. As a result, the mental health of those exposed to one or more of these inequalities is negatively affected [19].

One of the most significant reflections of gender inequality is seen in the field of health care. Studies show that women live longer than men, but their quality of life is lower, and they suffer from more diseases. For example, according to a research conducted in the USA, limitation of activity due to health problems is 25% higher in women compared to men and the number of days spent in bed as a result of acute conditions is also 35% higher in women [20, 21]. In another study, it was observed that women were more exposed to the risks that would negatively affect their mental health compared to men, and prevalence of psychological diseases was higher in women [22].

*War and migration:* The number of immigrants is increasing due to the direct or indirect effects of globalization, regional conflicts, war, poverty, and improving transportation and communication opportunities. According to statistics, the number of international immigrants in the world is estimated to be 214 million today, compared to 150 million in 2000 [23].



The direction of migration around the world is generally from less developed countries to developing or developed countries, from rural areas to urban areas [24]. With the act of migration, individuals willingly or involuntarily leave the family environment in which they are raised and the social values they are accustomed to and move to a different perimeter in terms of language and culture [25]. During this transition, individuals face many stressors such as social isolation, loneliness, language barrier, unemployment, and cultural differences. Due to the negative impact of stress on health and the inadequacy of coping mechanisms, immigrants face many health problems of physiological and psychological origin [26]. Battles, acts of violence and coercive life events that force people to migrate are the most important environmental factors that negatively affect mental health.

### III. CONCLUSION AND RECOMMENDATIONS

There are many factors affecting community mental health. Healthy individuals form healthy families and healthy families form healthy communities. Community mental health practices play an important role in preventing mental illnesses. The main purpose of these services is to protect mental health, to prevent the occurrence of mental illness and to bring practices studies to the public (primary prevention), to provide early diagnosis, treatment and care of mental illnesses (secondary prevention), to provide rehabilitation and maintenance of care and to create a system for this purpose (tertiary prevention) [27]. It is highly important that individuals with mental illness, suffering from neglect or abuse, who are in a crowded family, have had to migrate, have experienced death, separation or illness, or families with low-socio-economic status or exhibiting violent behavior are identified in the early period and supported for positive mental development [14].

The development of basic cognitive and social skills is important in protecting community health. Basic cognitive and social skills; ability to recognize, express and modulate one's own emotions, as well as empathize with others; flexibility and ability to cope with adverse life events and function in social roles; and harmonious relationship between body and mind represent important components of mental health which contribute, to varying degrees, to the state of internal equilibrium [3].

In protecting community mental health, it is important that health care providers provide the necessary care, counseling, support, and training to individuals and their families as they have the opportunity to closely monitor this triangular relationship at the individual, family, and community level.

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## The Economically Viable Salary for Fresher Medical Graduate in the Public Sector of Contemporary India

By Dr. Ravinder Ahlawat, Dr. Nitin Garg, Dr. Swati Singh & Dr. Amit Lathwal

*Abstract- Background:* The apex court has intervened in the conduct of the medical entrance test and has directed to conduct a common entrance test through the country. It has also ensured regulation of fee structures in all the colleges. This has created opportunities where medical education market can be studied with some confidence.

*Aims and Objectives:* To compare the tuition fee for completing medical graduation and salary received by fresh Medical graduate in the public sector of contemporary India

*Keywords:* fresh medical graduate, remuneration, costing of medical education.

*GJMR-K Classification:* NLMC Code: QU 18



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# The Economically Viable Salary for Fresher Medical Graduate in the Public Sector of Contemporary India

Dr. Ravinder Ahlawat <sup>α</sup>, Dr. Nitin Garg <sup>σ</sup>, Dr. Swati Singh <sup>ρ</sup> & Dr. Amit Lathwal <sup>ω</sup>

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- 1) To analyze the tuition fees of MBBS (Bachelor of Medicine and Bachelor of Surgery) in private Medical Colleges with its relationship with remuneration offered in the public sector in contemporary India.
- 2) To calculate the financial breakeven point for an MBBS doctor employed in the public sector.

**Observation and Result:** The likely expenditure per student for MBBS degree will be about sixty-five lacs. This is a big amount keeping in view the financial resources of average Indian families. This will have an initial implication of whether or not to go for medical education. Those who opt to go ahead will be constrained to think how will they be able to break even and make it a financially viable proposition. With this mindset, the noble ideas of the profession will take a back seat. This will influence his choice of practice. His inclination would be towards private establishments and seldom towards state-owned hospitals. In nut shell, his actions will be oriented towards a break-even angle only. All this will prove detrimental towards rural health initiatives until and unless there is a sea change in Government policy towards salaries of the doctor.

**Conclusion:** Privatization of medical education will influence the statistic on availability in the health sector without strengthening the present health system.

**Keywords:** fresh medical graduate, remuneration, costing of medical education.

## I. AIMS

To compare the tuition fee for completing medical graduation and salary received by fresh Medical graduate in the public sector of contemporary India.

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## II. OBJECTIVES

1. To analyze the tuition fees of MBBS in private Medical Colleges and its relationship with remuneration offered in the public sector in contemporary India.
2. To calculate the financial break-even point for an MBBS doctor employed in the public sector.

## III. INTRODUCTION

Economic evaluation has become a fundamental part of planning processes in several countries. In India, efforts to supplement the salary of the doctors in the public sector were made right from the 1920s in the forms of Non-Practicing Allowance and Special Pay, etc. However, no efforts have been made to evaluate the income threshold for attracting doctors to work in the public health sector.

In the republic of India, public sector is the major recruiter of the medical professionals and they are facing difficulty to recruit doctors for jobs in rural and difficult areas.<sup>1</sup> The national average in the public health sector is one doctor per 10189 population, ranging from 28391 for Bihar to 2203 for Delhi.<sup>1</sup> Lack of inclination among the doctors to join in the public sector and very high attrition rates, are the point of concern for most of the public health sector across the country. One of the problems faced by most of the state government is to determine appropriate remuneration, which will attract and retain freshly passed out MBBS graduates. Moreover, it has been experienced that the salary structure provided by the state governments is the basis of the remunerations offered by the private sector to the fresh medical graduate doctors, contrary to the well-established senior consultants, which is determined by their reputation and marketing potential.

There are increasing concerns expressed by different stakeholders in the rising cost of health care in India. The role of the physician on the health care can be in two ways:

1. Directly by increasing the fee for the consultation.
2. Indirectly by way of choice, he made for the patient concerning the technology and resource required during the treatment.

The direct way is not so high, but the physician being the final decision maker and the existence of information asymmetry in health sciences, this role needs to be examined further.

Given the changing trend in medical education, a paradigm shift is observed in recent years with the increase in the number of private medical colleges and effectively increased the number of doctors trained by them in the country. According to the Medical Council of India, there are 479 Medical Colleges in India, out of which 226 are managed by the public sector and 253 by the private entities. Similarly, out of 61,145 seats of MBBS, 30,880 are in public sector, and 30,265 seats are in the Private Medical Colleges.<sup>2</sup> Professional education market in India until in the recent past was unregulated, with no regulatory framework and mechanism for the fee structure in the medical education. With the introduction of NEET (National eligibility cum entrance test and fixation of fee structures in medical education institution, an opportunity has been created to analyze the fee structure of medical colleges across the country.

This study was conducted to find the average economic burden on a medical student for doing MBBS in a private medical college and the financial break-even period for an MBBS doctor employed in the government sector at present rates of remuneration. A break-even analysis was conducted.

*Type of study:* The present study is Descriptive.

*Duration of the study:* January to March 2018.

*Study Area:* All the deemed medical universities who were participating in NEET counseling for the 2017 session were included for the study.

*Statistics tool:* The Microsoft Excel Worksheet was used for descriptive statistics and the interrelationship of the various factors.

*Premise:* This study is based on the assumption that anationalized bank has financed the fees for the complete duration of the course. During the discussion with bank officers, we found that the student has to repay the loan after the completion of the course (5.5 years including one-year compulsory internship), and till then, only interest component is levied. The financial sheet was prepared with the assumption that the rate of interest and other factors will remain unchanged during the entire repayment period. For a pay-back period of 10 years, i.e. 15.5 years after the first payment of fees was made, EMI comes out to approximately Rupees 1,02,000.

It is pertinent to mention here that in case any student pays the fees on his own without taking the loan, an opportunity cost is assumed for the amount of fees paid. The duration of the internship was assumed as a non-profit, no loss year.

For this study, we assumed that the student would be offered a government job as soon as he passes out from the college.

*Data Collection:* The website of NEET was explored to find out the structure of fees charged by the medical colleges across the country. Fees of medical institutions available under the category of deemed universities were considered for the study. Only one medical college with zero tuition fees was excluded from the study. Only tuition fees are considered for the study, all other types of fees like Hostel fee, Admission Fee, College Security, Hostel Security, Bank Guarantee and any other charges usually levied upon the student was not included, as there is variability in that and no reliable data was available.

To calculate the monthly income, the entry-level pay scales of one of the states in North India, with all the parameters such as Basic pay, Dearness Allowance, Non-Practicing Allowance, and Medical Allowances. Along with this, the standard deductions such as the National Pension Scheme, Group Insurance Scheme, and Income Tax were taken into consideration. The household expenditure/ consumption is taken as rupees thirty thousand for the first year, and standard inflation as experienced is added for each year.<sup>3</sup>

#### IV. OBSERVATIONS AND RESULTS

The fee was calculated using the fee structure of the deemed university from the NEET web site, DGHS, Ministry of Health and Family Welfare (GOI).<sup>4</sup> The fee structure of twenty-four deemed universities was considered for the study, which ranges from rupees nine lakhs to twenty-five lakhs per annum with an average of 14.61 lakhs. The average fee for the MBBS course (whole duration of 4.5 years) comes to 65.74 lakh.

The present salary structure of one state government was taken for the study. The Basic pay of a newly appointed M.O. is Rs.56100 with D.A. (5%), 25% NPA (House rent allowance was not included as it was assumed that M.O. has to avail that facility). Taking into consideration the present rate of rising in the DA is likely to increase up to 35 % after five years. The gross salary of the Medical Officer is expected to be Rs. 95,169 as per Table Table -1:

*Table 1:* Anticipated Salary Slip of Medical Officer on joining

Pay component	Amount	Deduction	Amount	EMI	Household expenditure
Basic pay	56100/-	NPS	5610/-		
DA 35%	19635/-	GIS	60/-		
NPA @25%	18934/-	Income tax	10688/-		
Medical Allowance	500/-				
Gross Salary	95,169/-				
Net salary	78811				
Total				1,02,000/-	25,000/-

In the above calculation, it is clear that M.O. will get Rs.78,811 as Net Salary, after deduction of Rs 5610 for NPS, Rs 60 as GIS and Rs 10,688 as Income Tax. To sustain life and to fulfill the obligations towards family, an M.O. will incur an expenditure of 25,000/- monthly and Rs 53,811 would be left as disposable income. Out of that, he is expected to pay an EMI of Rs 1,02,000/-.

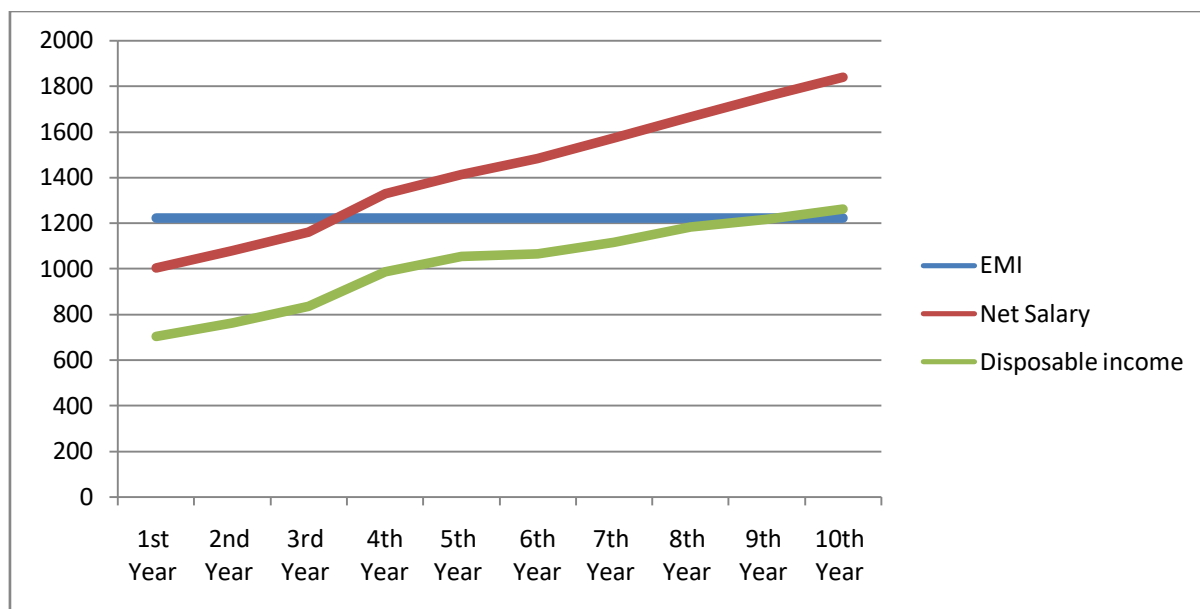
For tracing the financial position for the next ten years, the standard inflation factor added to the expenditure, and disposable income calculated accordingly.

The following table shows the calculation of all parameters for ten years:

*Table 2:* Calculation of EMI/ Gross Salary / NPS deduction/ Income Tax / Net salary of Medical officer (Amount in Thousand Rupees)

	EMI	Gross salary	Deduction for NPS	Income Tax	Net Salary	Household Expenditure	Disposable income
1 <sup>st</sup> Year	1224	1202.5	68.8	128.3	1004.7	300	704.7
2 <sup>nd</sup> Year	1224	1313.3	70.9	161.5	1080.2	317.1	763.1
3 <sup>rd</sup> Year	1224	1434.8	73	197.9	1162.4	326.8	835.6
4 <sup>th</sup> Year	1224	1682.6	79.3	272.3	1329.6	341.5	988.1
5 <sup>th</sup> Year	1224	1809.7	83	310.4	1414.8	360.9	1053.9
6 <sup>th</sup> Year	1224	1914.6	85.5	341.8	1485.7	419.5	1066.2
7 <sup>th</sup> Year	1224	2044.5	88.1	380.8	1574.1	458.5	1115.5
8 <sup>th</sup> Year	1224	2179.3	90.8	421.3	1665.8	482.9	1182.9
9 <sup>th</sup> Year	1224	2312.7	93.8	461.3	1756.9	539	1217.8
10 <sup>th</sup> Year	1224	2436.2	96.7	498.4	1840.5	578.1	1262.4

It is evident from the table that the gross salary of an M.O. will be above the EMI in the 2<sup>nd</sup> year of service, and the net salary will be above the EMI in the 4<sup>th</sup> year of service, which means he has nothing in hand to lead his life. However, the disposable income (Net Salary minus Household Expenditure) will be above the EMI only in the 10<sup>th</sup> year.



Graph 1: The area between the EMI and disposable is the gap the medical officer has to generate for sustaining his life.

Table 3: The table showing the cumulative salary, deductions, and EMI over the first ten years of service of Medical Officer (in lakhs)

	EMI	Gross salary	Deduction for NPS	GIS	Income tax	Net salary	Household Expenditure	Disposable income
1 <sup>st</sup> year	12.24	12.02	0.69	0	1.28	10.04	3	7.04
2 <sup>nd</sup> year	24.48	25.15	1.39	0.04	2.89	20.84	6.17	14.67
3 <sup>rd</sup> year	36.72	39.5	2.12	0.02	4.87	32.47	9.43	23.03
4 <sup>th</sup> year	48.96	56.33	2.92	0.04	7.59	45.76	12.85	32.91
5 <sup>th</sup> year	61.2	74.42	3.75	0.05	10.7	59.91	16.46	43.45
6 <sup>th</sup> year	73.44	93.57	4.6	0.07	14.12	74.77	20.65	54.11
7 <sup>th</sup> year	85.68	114.02	5.48	0.08	17.93	90.51	25.24	65.27
8 <sup>th</sup> year	97.92	135.81	6.39	0.1	22.14	107.17	30.07	77.1
9 <sup>th</sup> year	110.16	158.94	7.33	0.1	26.75	124.74	35.46	89.27
10 <sup>th</sup> year	122.4	183.3	8.3	0.11	31.74	143.14	41.24	101.9

The different components/ parameters of salary EMI and disposable income are shown in Figure-1 and Table-3. As evident from above, the present salary of MO is inadequate to repay the loan. The sustainable monthly salary for the M.O. was calculated to be Rs 1, 58,333 only.

### V. DISCUSSION

The problem of low salary is common in other countries also. According to one study at university of Yale in the United States of America the average debt on the medical students is \$161,290 (Rs 1, 06, 79,011) while the average income at the start of her carrier per year is \$ 55,000 (Rs. 36, 41,550). The average salary of the freshly pass out medical student is not sufficient against the financial burden. He has to spend 80 hours per week or almost 13 hours per day for a week of 6 days regularly, having repercussions on patient safety

issues. Also as per estimates, there would be a deficit of more the 130,000 doctors by 2025.

The increase in the number of MBBS graduates is not likely to have any change in the health sector. The graduates passing out of private medical colleges are least likely to join the public health sector, because of the financial situation. This may even induce them to adopt unethical practices achieving breakeven.<sup>5</sup> As the medical industry in India is practically unregulated, the chances are there that overtreatment and costly technology would be able to gain its foot very firmly. There are higher possibilities of them settling into the urban areas and resort to income supplementing activities or having more inclination to costly medical technologies, even when low-cost alternatives are available.

The policy of an open economy in the field of medical education will have far-reaching impacts, as

analyzed above. The graduate produced from such a system will be unaffordable to the government sector in the absence of any additional means of income. Or the option of unethical practices or concealed private practice will be hard to prevent in the absence of incentive. The importance of how much he is going to be paid increases as the financial burden of getting a medical graduation increases.<sup>6</sup> We can also say that higher the financial burden for getting medical graduation, higher is the income consciousness.

Various state governments in India have adopted a different type of stick and carrots policies for providing medical facilities in rural areas. A few of them are monetary also. It is the right time to adopt the policy of repayment of loan by government on the pattern of USA.<sup>7</sup>

## VI. CONCLUSION

The study indicates an action on the following three fronts:

1. Reduction of the rate of interest on the education (medical education in particular) loan.
2. The increase in the salary of the doctors in the government sector (particularly state governments), so that the salary becomes enough to break even within ten years.
3. Regulation of medical education, particularly fee structures. The hospitals that are performing well and have existed for more than 5-10 years should be allowed for medical education so that the students need not finance the treatments of the patents from the higher tuition fees.
4. In addition, more studies may be required for finding other factors having implication on the medical education market.

*Limitations of the study:* It is assumed that every student has to take a 100% loan for his education. This has many limitations:

1. No bank is financing 100% tuition fees
2. Everyone need not to avail the facility of loan
3. The maximum limit for education loans is 25 lakhs.

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# Intercultural Adaptation and Mental Health of Indonesian Health Workers Coming to Japan under the Economic Partnership Agreement

By Fumiko Sato

*Aino University*

**Abstract-** Following the Economic Partnership Agreement (EPA) between Japan and Indonesia coming into effect, acceptance of Indonesian nursing and care worker candidates began in 2008. From the following fiscal year, acceptance was expanded to include the Philippines and Vietnam. The medical and nursing care fields in Japan are gradually becoming internationalized. We speculated that EPA candidates would adapt to living and working in Japan, which has a different culture from their own country. This study assessed their adaptability to Japanese culture, mental health, and the clarified factors related to their mental health, based on the results of a quantitative survey.

**Keywords:** *EPA, indonesian, intercultural adaptation, mental health.*

**GJMR-K Classification:** *NLMC Code: WA 305*



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**Keywords:** EPA, indonesian, intercultural adaptation, mental health.

## I. INTRODUCTION

Japan has started receiving nurse and care worker candidates from Indonesia based on the Economic Partnership Agreement (EPA), which came into effect in 2008. Furthermore, from the following year, nursing and care candidates have come to Japan from the Philippines and Vietnam (Ministry of Health, Labor and Welfare 2018). Foreign nurses and care worker candidates are aiming to obtain national qualifications while receiving employment and training at each facility. Many of the candidates have experience as nurses in their home countries and have nursing knowledge and skills; however, they cannot work as regular nurses or care workers in Japan unless they pass the national examination (Hatanaka and Tanaka 2012).

After obtaining the national qualification, they are allowed to continue working without a limitation to their length of stay; however, about 20% of those who have acquired national qualifications returned home (Ikeda 2014). There were many reasons for returning home, such as to care for parents and get married; however, there were also cases where the respondents were frustrated by not being able to use the Japanese well and placed in harsh working environment with strict rules and long working hours (Ikeda 2014).

As the nurses adapt to the different culture in Japan while working, they can feel stressed, which Japanese people may not even notice. The accumulation of stress influences on mental health.

Ishikawa and Takahashi (1993) noted that cultural differences, including changes in lifestyle, language, climate, and other environmental changes caused by overseas migration could be very confusing to the migrant. In many cases, the accumulation of daily stresses leads to mental and physical fatigue, which, if left untreated, can cause physical and mental problems. Indeed, psychiatric issues are increasing among foreign people living in Japan who have to deal with various stresses in their daily lives (Onishi 2003).

In previous studies, it reported that the mental health of foreign people living in Japan might be affected by living and adapting to a different culture. There are few studies focusing on the intercultural adaptation and mental health of foreign healthcare workers<sup>1)</sup> under the EPA. Therefore, this study aimed to clarify intercultural adaptation, mental health, and factors related to their mental health among Indonesian healthcare workers who came to Japan under the EPA.

## II. METHODS

### a) Participants and data collection

Participants were Indonesian healthcare workers who came to Japan under the EPA. Generally, recipient facilities do not announce their acceptance of Indonesian EPA migrant workers to the public. Therefore, the participants were those employed at medical and care giving facilities that openly accepted these workers. The identity of these facilities was only accessible to the author. Data collection was performed between November 2012 and March 2013; survey request forms and questionnaires mailed to the managers of these recipient facilities (206 workers from 87 facilities). The managers distributed the survey to Indonesian EPA workers working at the respective facilities. Only those workers who consented to cooperate for the survey completed the questionnaire and returned anonymously.

### b) Study instrument

#### i. Demographics

We obtained the demographics of the study group from questions addressing population and household conditions as well as socioeconomic conditions. In the population and household conditions, gender, age, marital status, religion, number of years

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living in Japan, level of Japanese language proficiency. In the socioeconomic conditions, we examined academic background, classification of the current workplace, number of years of working at the current workplace, work pattern, target national qualification, status of acquiring the national qualification.

ii. *Intercultural adaptation*

The adaptation scale for international students in Japan developed by Uehara (Uehara 1992), concerning The Freshman's Scale of Adjustment by Baker (Baker et al. 1985) (Baker and Siryk 1986) was adopted for measuring the level of intercultural adaptation. The scale is composed of 56 questions in five areas: "Learning/Research," "Mental and Physical Health/Emotion," "Interpersonal Relationships," "Culture", and "Living Comfort/Economy." For each scale, respondents were asked to choose from five responses (1. Not applicable at all <1> to 5. Very much applicable <5>). This scale is frequently used as an adaptation scale in Japan, and its validity of reliability was confirmed (Sasaki and Mizuno 2000). In this study, some questions were modified so they applied to Indonesian health workers and simplified to a total of 34 items.

iii. *Level of mental health (GHQ28)*

We used the General Health Questionnaire (GHQ) as a measure for the mental health level of the participants. GHQ is a scale for measuring mental health developed by Goldberg (Goldberg and Hillier 1979) and used in various fields (Nakayama and Daibo 1985). GHQ has three versions: GHQ60 (60-item version) as well as its shortened versions GHQ30 (30-item version) and GHQ28 (28-item version). Fukunishi (1990) has reported the effectiveness of these shortened versions. In this study, GHQ28 was used, taking into consideration the burden of extensive questioning of the participants. The grading method was as follows: following the guidelines for the Japanese version (Nakawaga and Daibow 1985), we graded the four choices for each item as 0-0-1-1 points, and the total score was determined. The highest score of the GHQ28 is 28. The higher score indicates a lower level of mental health. According to the guidelines, individuals scoring 5 or less are considered to be healthy, whereas those scoring 6 points or higher are at risk of mental problems. Many studies have examined the reliability and validity of GHQ28 in various populations and reported its usefulness independent of cultural differences, language, and religion (Nakagawa and Daibow 1985).

c) *Data analysis*

Descriptive statistics were applied to assess the demographics, intercultural adaptation, and mental health status of the participants. The total score of GHQ28 was used to divide the respondents into two groups: a "risk absent group" and a "risk present

group," based on the GHQ28 total score. For categorical variables, we used the Chi-Square test or Fisher's exact test, and for quantitative variables, an unpaired t-test was performed to investigate the determinant factors for mental health. We used SPSS Ver. Twenty for Windows for the analyses, with the level of significance at 0.05% for both sides.

d) *Ethical considerations*

This study was approved by the Ethics Review Board of Senri Kinran University, School of Nursing, Japan. The purpose of the study was clearly stated on the title page of each questionnaire. In addition, it also mentioned that cooperation for the anonymous survey was voluntary.

### III. RESULTS

The questionnaire was distributed to 87 facilities nationwide. Six of the 87 facilities returned 15 uncompleted questionnaires for various reasons such as the Indonesian workers had already returned to their home country or had resigned the facility. We obtained responses from 71 of 191 questionnaires sent to migrant workers in 35 facilities (a facility recovery rate of 43.2%, and the actual participation rate of 37.2%).

a) *Demographics*

Table 1 showed the results.

Of the 71 participants, 57 (80.3%) were female, the mean age was 28.8 years, and 70.0% of participants were single. For the years of living abroad, 50.7% had lived in Japan for at least three years. As for Japanese language proficiency, 56.3% of respondents answered that they still had difficulty in daily conversation. About the highest level of education, 81.7% graduated from the vocational school, which provides three years of professional education after graduating from high school. In terms of the classification of current workplaces, hospitals (71.4%) were the most common, followed by aged-care nursing homes (20.0%), and long-term health care facilities (8.6%). The national qualification aimed for by the majority of participants was the nursing qualification (73.1%), followed by the care worker qualification (26.9%). The status of acquisition of the national qualification was "not acquired" in 61.4% of participants, and "acquired" in 38.6%.

Table 1: Demographics of the subjects (N = 71)

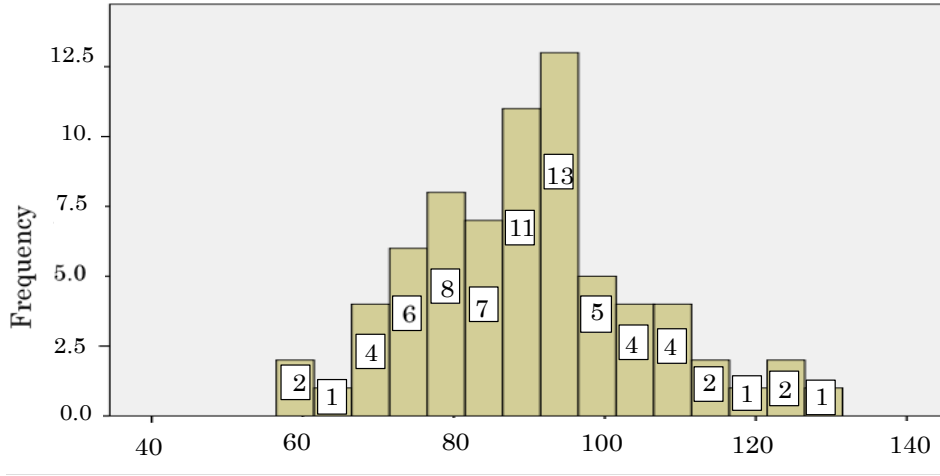
Items	
< Population and household conditions >	
<b>Gender</b>	
Female	57 (80.3)
Male	14 (19.7)
<b>Age</b> (range : 24-36)	28.8(±2.7)
<b>Marital Status</b>	
Single	49 (70.0)
Married	21 (30.0)
<b>Religion</b>	
Islam	43 (60.0)
Other	28 (39.4)
<b>Number of year living in Japan</b>	
Less than 3 year	35 (49.2)
3 years or more	36 (50.7)
<b>Level of Japanese language proficiency</b>	
Still find daily conversation difficult	40 (56.3)
No problems in daily conversation and	31 (43.7)
< Socioeconomic conditions >	
<b>Academic background</b>	
Vocational school	58 (81.7)
University or above	13(18.3)
<b>Classification of the current workplace</b>	
Hospital	50 (71.4)
Aged-care nursing home	14(20.0)
Long-term health care facility	6(8.6)
<b>Number of years working at thecurrent workplace</b>	2.2 (±1.2)
<b>Work pattern</b>	
Part time	6(8.7)
Full time	63(91.3)
<b>Target national qualification</b>	
Nurse	49(73.1)
Care worker	18 (26.9)
<b>Status of acquiring the national qualification</b>	
Not acquired	43(61.4)
Acquired	27(38.6)

Values are N (%) or mean ± SD (Standard Deviation). The totals for some categories do not equal due to missing data.

b) Intercultural adaptation

The average score was 90.1 (± 14.9). The lowest score was 59, and the highest score was 127. On this scale, the higher the score, the lower the adaptability to the different cultures. Thirty-three out of 71 subjects (46.4%) showed higher scores than the average score. Fig. 1 shows the distribution of total scores on this scale. The Cronbach alpha (reliability

coefficient) in this study was 0.85. The scores for each item were calculated by summing the items in the subscales of the five areas. Table 2 shows the average value and standard deviation of all items, and each area. Also, we calculated the percentage of each area to the perfect score as the % score. The "culture" area was the highest at 56.3%.



Distribution of intercultural adaptation

Figure 1: Distribution of total score of intercultural adaptation scale (N=71)

The figure on bar chart indicates the frequency of the total score scaled in vertical axis.

c) Mental health survey

All survey items in GHQ28 were graded with the scoring 0-0-1-1 point system; the lowest score was 0, the highest score was 17, and the mean was 2 points (IQR 1.0-5.0). In the present study, 55 (77.5%)

participants scored five or less, and the rest of 16 (22.5%) might develop some mental health problems (See Figure 2 for score distribution). The Cronbach's alpha for GHQ28 in the present study was 0.89, suggesting high internal consistency.

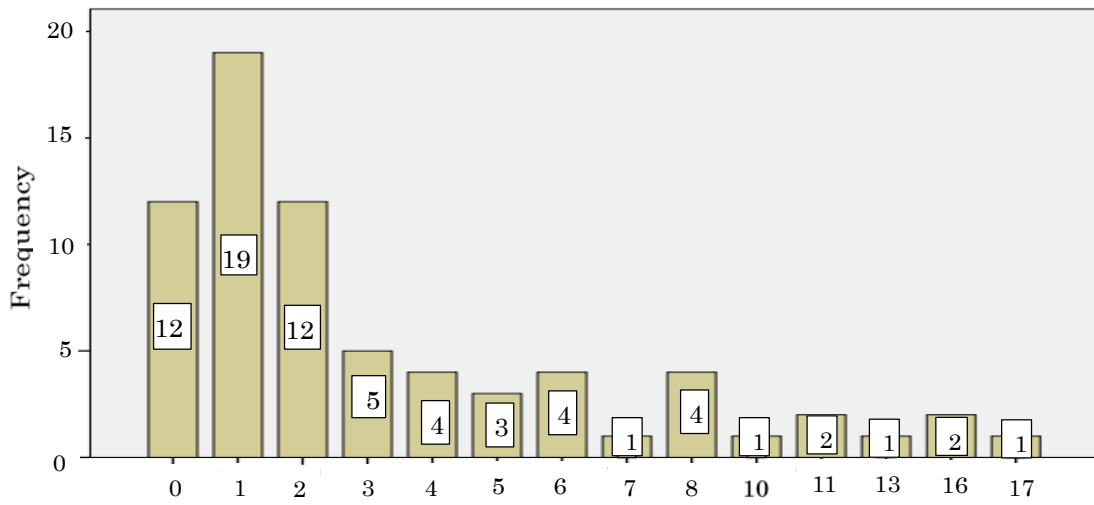


Figure 2: Distribution of GHQ 28 Score (N=71)

The figure on bar chart indicates the frequency of the total score scaled in vertical axis.

Table 2: Total score of intercultural adaptation scale by area

Areas	Average	Mean±SD	% Score
Learning/Research (6 items)		16.3±3.7	54.3
I don't feel like studying recently	2.3		
I am not confident in my ability to continue studying in Japan	2.4		
I can't study as I intended	2.5		
I am frustrated because I don't understand Japanese medical/nursing terminology	3.2		
I have trouble understanding Japanese even if I read books and materials in my field	2.8		
Recently I have been working very hard to study *	3.2		
Mental and Physical Health/Emotion(7 items)		18.2±5.7	52
Recently I have been severely exhausted	3.2		
Recently I often feel homesick	3.4		
Recently I have been experiencing anxiety	2.8		
I often become lonely these days	2.5		
Recently I have been unable to sleep well	2.3		
Recently I have been nervous	2		
Recently I have been emotionally unstable	2.1		
Interpersonal Relationships (8 items)		16.9±4.0	56.3
I have Japanese friends with whom I can talk about anything at work *	3		
I have foreign friends (including Indonesians) with whom I can talk about anything in Japan *	3.4		
I have a Japanese friend with whom I can talk about anything outside the workplace	2.8		
I can't talk casually to my colleagues at work	2.1		
I don't think I'm ever going to be able to associate with Japanese people	2		
Recently I have become distressed by my interpersonal relationships	2.3		
I frequently visit my Japanese friend's home *	2.7		
Overall, I am satisfied with my current relationships at work *	3		



Culture (6 items)		16.9±4.0	56.3
	I have trouble understanding Japanese greetings and courtesies	3.1	
	I feel that foreign people are conspicuous and my actions are restricted	2.4	
	As Japanese have strong group consciousness, I feel it is difficult to participate in their group	2.5	
	I feel frustrated because Japanese expressions are sometimes indirect	3.3	
	I still don't understand the characteristics of Japanese society	2.7	
	Before coming to Japan, I didn't get much information about Japan	2.9	
Living Comfort/Economy (7 items)		18.7±3.2	56.3
	The place where I currently live is very comfortable and satisfying *	3	
	The security where I live is very good *	3.6	
	Rent is expensive and life is difficult	2.2	
	I'm very troubled economically	2	
	I feel it is difficult to associate with my neighbors.	2.6	
	The climate here is unbearable	2.5	
	Overall, I am satisfied with my current life in Japan *	2.8	

Items marked with \* are reversed items. The percentage of each item to the perfect score was calculated as the % score

d) *Mental health and related factors*

Table 3 shows the results, we divided the respondents into two groups based on the results of the mental health survey. Respondents scoring 5 points or less were in the "risk absent group" and those scoring 6 points or more in the "risk present group." All items were analyzed by the Chi-Square test, Fisher's exact test, or an unpaired *t*-test. The results showed a significant difference between the risk absent group and risk present group in four items: "gender," "number of years living in Japan," "status of acquiring the national qualification," and "total score of intercultural adaptation scale." For gender, the percentage of females in the risk present group was significantly higher than the males, and the longer they lived in Japan (more than three years), the more risk the respondents had of having mental problems. The percentage of participants in the

risk present group was significantly higher among those who had acquired a national qualification than in those that had not.



Table 3: Influencing factors for mental health

	Total (N=71)	Risk absent group (N=55)	Risk present group (N=16)	p
<b>&lt; Population and household conditions &gt;</b>				
<b>Gender</b>				0.02*
Female	57 (80.3)	41 (71.9)	16 (28.1)	
Male	14 (19.7)	14 (100.0)	0 (0.0)	
<b>Age (range : 24-36)</b>	28.8±2.7	28.5±2.7	29.3±2.8	0.30
<b>Marital Status</b>				0.05
Single	49 (70.0)	42 (85.7)	7 (14.3)	
Married	21 (30.0)	13(61.9)	8 (38.1)	
<b>Religion</b>				0.77
Islam	43 (60.6)	34 (79.1)	9 (20.9)	
Other	28 (39.4)	21 (75.0)	7 (25.0)	
<b>Number of years living in Japan</b>				0.02*
Less than 3 year	35 (49.2)	31 (88.5)	4 (11.4)	
3 years of more	36 (50.7)	24 (66.7)	12 (33.3)	
<b>Level of Japanese language proficiency</b>				0.39
Still find daily conversation difficult	40 (56.3)	29 (72.5)	11 (27.5)	
No problems in daily conversation	31 (43.7)	26 (83.9)	5 (16.0)	
<b>&lt; Socioeconomic conditions &gt;</b>				
<b>Academic background</b>				1.00
Vocational school	58 (81.7)	45 (77.6)	13 (22.4)	
University or above	13 (18.3)	10 (76.9)	3 (23.1)	
<b>Classification of thecurrent workplace</b>				0.46
Hospital	50 (71.4)	40 (80.0)	10 (20.0)	
Aged-care nursing home	14 (20.0)	9 (64.3)	5 (35.7)	
Long-term health care facility	6 (8.6)	5 (83.3)	1 (16.7)	
<b>Number of years working at the current workplace</b>	2.2±1.2	2.1±1.2	2.7±0.9	0.05
<b>Work pattern</b>				0.60
Part time	6 (8.7)	4 (66.7)	2 (33.3)	
Full time	63 (91.3)	50 (79.4)	13 (20.6)	
<b>Target national qualification</b>				0.50
Nurse	49 (73.1)	40 (81.6)	9 (18.4)	
Care worker	18 (26.9)	13 (72.2)	5 (27.8)	
<b>Status of acquiring the national qualification</b>				0.01*
Not acquired	43 (61.4)	38 (88.4)	4 (11.6)	
Acquired	27 (38.6)	17 (63.0)	10 (37.0)	
<b>&lt; Intercultural adaptation scale &gt;</b>				
<b>Total score</b>	90.1±14.9	85.9±11.8	104.5±15.7	<0.01**
Learning/Research	16.3±4.1	15.4±3.4	19.1±3.3	<0.01**

Mental and Physical Health/Emotion	18.2±5.7	16.3±4.1	24.5±6.0	<0.01**
Interpersonal Relationships	21.2±4.1	20.5±3.4	23.13±3.9	0.01*
Culture	16.9±4.0	16.0±3.6	19.8±4.0	<0.01**
Living Comfort/Economy	17.8±3.2	17.5±2.9	18.2±3.9	0.46

Values are N (%) or mean ± SD (Standard Deviation), \* <0.05, \*\*<0.01

For intercultural adaptation, the total score was significantly higher in the risk present group than in the risk absent group. These were significant differences in “Learning/Research,” “Mental and Physical Health/Emotion,” “Interpersonal Relationships,” “Culture”, and “Living Comfort/Economy.” In particular, “Mental and Physical Health/Emotion” had the highest score in the risk present group.

#### IV. DISCUSSION

##### a) Intercultural adaptation

In the subscale of intercultural adaptation, the %score in the “Culture” area was the highest. The questions items in this area included: “I have a trouble in understanding Japanese greetings and courtesy”, “I feel that foreign people are conspicuous and my actions are restricted”, “As Japanese have strong group consciousness, I feel it is difficult to participate in their group,” and “I feel frustrated because Japanese expressions are sometimes indirect”.

As Indonesians are from a country with a culture that uses a more direct way of speaking than Japan, there are many cases where Japanese perceive their way of speaking as offensive and feel uncomfortable (Obata and Kukihara, 2012). The nursing and care worker candidates have an opportunity to receive a 6-month language training course before and after traveling to Japan. However, the Japanese language barrier is large (Endo, 2012). Moreover, Japanese language training after placement at the facility is not consistent, and depending on the facility, EPA candidates may be forced to study by themselves (Endo, 2012). In this study, 40(56.3%) of the respondents answered that daily conversation was still difficult. In addition to deficiencies in language ability itself, there was a lack of opportunities to learn skills for dealing with Japanese people, such as how to respond in a culturally appropriate way. This condition may lead to maladaptation of Indonesian EPA candidates to Japanese culture. Also, there is some Japanese staff who have difficulty communicating with Indonesian candidates. They feel uncomfortable and confused due to cultural differences (Obata and Kukihara, 2012). These misunderstandings are a major obstacle to mutual understanding.

##### b) Mental health and related factors

From the results of this survey, approximately 20% of the participants were at risk of developing mental problems. The relevant factors were “gender,” “number

of years living in Japan,” “status of acquiring the national qualification,” and “total score of intercultural adaptation scale.” Regarding “sex,” Ozeki et al. (2006) reported that foreign females living in Japan were more mentally stressed and more likely to have mental health problems than foreign males; similar results to the present study, with all participants in the risk group being female. Ozeki et al. (2010) stated that men generally tended to prefer not to show others their emotions if their emotions are regarded as mentally weak, and this may have influenced the mental health results of this study.

Regarding the “a number of years living in Japan,” those who stayed in Japan for more than three years had more mental problems than those who stayed for less than three years. According to the EPA framework, the maximum period of stay allowed for obtaining national qualifications is three years for nursing candidates, and four years for care worker candidates (Ministry of Health, Labor and Welfare 2017). If they cannot obtain the national qualification within this period<sup>2)</sup>, they are required to return to their home country after expiration of the period. Therefore when the respondents’ stay in Japan exceeds three years, they are in the final year of the period of stay for nursing candidates, and for the care worker candidates, their final chance to pass the national examination is approaching. Under these circumstances, we speculate that mental stress will increase, which will influence on the mental aspect.

The “status of acquiring the national qualification” was also a factor that influenced the mental health of the participants. According to the EPA framework, after obtaining a national qualification, it is possible to work as a regular nurse or a care worker, and there is no restriction to a period of stay (Ministry of Health, Labor and Welfare 2017). When the EPA candidate becomes qualified staff, there may be an influence on their mental health due to the expansion of their roles and responsibilities.

Regarding the “total score of intercultural adaptation scale,” in the EPA system, basic Japanese language skills were acquired in the 6-month language training period before and after traveling to Japan; however, there are very few opportunities to experience Japanese culture. As they did not have sufficient means to resolve cultural differences, this resulted in stress (Hatanaka 2018). Ishikawa and Takahashi (1993) also stated that the accumulation of mental and physical fatigue due to living in a different culture for a long time

affected mental health status. This tendency was seen in the present study as the “total score of intercultural adaptation” was higher in the risk present group than the comparison group.

Furthermore, by the subscales of the intercultural adaptation scale, the score in the “Mental and Physical Health/Emotion” area was highest in the risk present group. Survey items in that area included: “Recently I have been severely exhausted,” “Recently I have been unable to sleep well,” and “Recently I have been emotionally unstable.” If this mental and physical exhaustion continues, it may lead to accidents (Suzuki et al. 2004). Three groups, “Learning/Research,” “Interpersonal Relations,” and “Culture” also showed high scores. The current support for EPA healthcare workers should be reviewed immediately, especially at facilities that accept female foreign workers.

As indicated by the Japan International Corporation of Welfare Services (JICWELS, 2019), at facilities that accept nursing and care worker candidates train them under certain conditions, with the provision of appropriate training that incorporates information on preparation for national examinations as well as learning support for acquiring specialized knowledge and skills.

Continuous support for Japanese language and culture studies is also a requirement for the recipient facilities, so that the candidates could adapt to the workplace and lifestyle habits (JICWELS 2019). However, as a country, there is no uniform policy regarding the content of these training programs (Nagae et al.2013). Instead, each facility accepting foreign healthcare workers is entrusted to provide the appropriate support. Moreover, since the expense related to the training is the responsibility of the facilities, there is a significant variability in the implementation status among the facilities (Nagae et al.2013, Kim 2010).

In addition to the differences in performance at recipient facilities, our survey found that there is a lack of comprehensive support with a medium- to a long-term perspective that covers cultural adaptation to life in Japan and the work environment, and that looks at life after passing the national examination. The current EPA framework limits the number of national examinations that can be taken and the length of stay, so the biggest priority of the EPA candidates and the recipient facilities are the national examinations (Hatanaka and Tanaka, 2012). In this situation, other support becomes insufficient. Measures such as printing hiragana on top of each Chinese character (Kanji) that expresses a complicated technical term in the national exam, and allowing EPA candidates who fail the exam but achieve a satisfactory total score to be allowed to extend their stay period or re-take the exam are appropriate (Ministry of Health, Labor and Welfare 2019). Even at the national level, there is no mention of how to support continued employment after passing the national examination, because the main focus is succeeding in the national

examination (Nagae et al. 2013). This exam-focused support may affect the mental health of foreign healthcare workers and lead to resignation.

It has been eleven years since the first EPA candidates came to Japan; however, little is known to the public regarding the specific support at the facility that accept such foreign healthcare workers. A social welfare corporation reported in Ito (2018) accepted 76 foreign EPA candidates who worked in 11 facilities, of which 30 passed the national exam. The corporation hired its teacher once a week and conducted 4 hours of Japanese language classes paid for by the corporation. The recipient facilities had regular meetings with foreign healthcare workers about their concerns about work and considered together with the foreign healthcare worker what was necessary to enable them to work in Japan for a long time and prevent resignations. Also, corporations that provide a chance for foreign workers to be promoted helps to maintain their motivation. Tukazaki (2010) also reported that at a medical facility, the director stated that support measures to assist foreign nurses pass the national examination were a top priority. After passing the exam, the nurses were given further practical training in all areas of the ward. These approaches were originally developed by the facilities.

Sharing the outcomes of successful cases may facilitate the development of a structured program of support for accepted foreign healthcare workers (Furukawa et al.2012), which is the responsibility of each employing facility in Japan. Also, it may allow for the present support system now centered on measures for passing the national exam, to transform into one that provide mid- and long-term support even after candidates have passed the examination.

Finally, Japan is facing an unprecedented aging society problem, and medical care needs are expected to increase in the near future. To provide enough services with the proper quality, it is essential to secure human resources in the field of medical and nursing care. It is vital to create an attractive working environment and effective support, so that foreign workers can work in Japan for as long as possible.

#### *Supplementary note*

1. In this study, “healthcare workers” referred to nursing and care worker candidates, and those who passed the national examination.
2. During the period of stay, nursing candidates had the opportunity to take the national examination three times in three years, whereas care worker candidates have the opportunity to take the national exam once in the fourth year.

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The FARSM member is eligible to join as a paid peer reviewer at Global Journals Incorporation (USA) and can get remuneration of 15% of author fees, taken from the author of a respective paper. After reviewing 5 or more papers you can request to transfer the amount to your bank account.



## MEMBER OF ASSOCIATION OF RESEARCH SOCIETY IN MEDICAL (MARSM)

The ' MARSM ' title is accorded to a selected professional after the approval of the Editor-in-Chief / Editorial Board Members/Dean.

The “MARSM” is a dignified ornament which is accorded to a person’s name viz. Dr. John E. Hall, Ph.D., MARSM or William Walldroff, M.S., MARSM.



MARSM accrediting is an honor. It authenticates your research activities. After becoming MARSM, you can add 'MARSM' title with your name as you use this recognition as additional suffix to your status. This will definitely enhance and add more value and repute to your name. You may use it on your professional Counseling Materials such as CV, Resume, Visiting Card and Name Plate etc.

*The following benefits can be availed by you only for next three years from the date of certification.*



MARSM designated members are entitled to avail a 25% discount while publishing their research papers (of a single author) in Global Journals Inc., if the same is accepted by our Editorial Board and Peer Reviewers. If you are a main author or co-author of a group of authors, you will get discount of 10%.

As MARSM, you will be given a renowned, secure and free professional email address with 30 GB of space e.g. [johnhall@globaljournals.org](mailto:johnhall@globaljournals.org). This will include Webmail, Spam Assassin, Email Forwarders, Auto-Responders, Email Delivery Route tracing, etc.







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Once you are designated as MARSM, you may send us a scanned copy of all of your credentials. OARS will verify, grade and certify them. This will be based on your academic records, quality of research papers published by you, and some more criteria.

It is mandatory to read all terms and conditions carefully.



## AUXILIARY MEMBERSHIPS

### Institutional Fellow of Open Association of Research Society (USA) - OARS (USA)

Global Journals Incorporation (USA) is accredited by Open Association of Research Society, U.S.A (OARS) and in turn, affiliates research institutions as “Institutional Fellow of Open Association of Research Society” (IFOARS).



The “FARSC” is a dignified title which is accorded to a person’s name viz. Dr. John E. Hall, Ph.D., FARSC or William Walldroff, M.S., FARSC.

The IFOARS institution is entitled to form a Board comprised of one Chairperson and three to five board members preferably from different streams. The Board will be recognized as “Institutional Board of Open Association of Research Society”-(IBOARS).

*The Institute will be entitled to following benefits:*



The IBOARS can initially review research papers of their institute and recommend them to publish with respective journal of Global Journals. It can also review the papers of other institutions after obtaining our consent. The second review will be done by peer reviewer of Global Journals Incorporation (USA) The Board is at liberty to appoint a peer reviewer with the approval of chairperson after consulting us.

The author fees of such paper may be waived off up to 40%.

The Global Journals Incorporation (USA) at its discretion can also refer double blind peer reviewed paper at their end to the board for the verification and to get recommendation for final stage of acceptance of publication.



The IBOARS can organize symposium/seminar/conference in their country on behalf of Global Journals Incorporation (USA)-OARS (USA). The terms and conditions can be discussed separately.

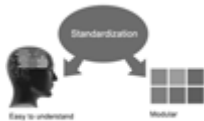
The Board can also play vital role by exploring and giving valuable suggestions regarding the Standards of “Open Association of Research Society, U.S.A (OARS)” so that proper amendment can take place for the benefit of entire research community. We shall provide details of particular standard only on receipt of request from the Board.



The board members can also join us as Individual Fellow with 40% discount on total fees applicable to Individual Fellow. They will be entitled to avail all the benefits as declared. Please visit Individual Fellow-sub menu of GlobalJournals.org to have more relevant details.



We shall provide you intimation regarding launching of e-version of journal of your stream time to time. This may be utilized in your library for the enrichment of knowledge of your students as well as it can also be helpful for the concerned faculty members.



After nomination of your institution as “Institutional Fellow” and constantly functioning successfully for one year, we can consider giving recognition to your institute to function as Regional/Zonal office on our behalf. The board can also take up the additional allied activities for betterment after our consultation.

**The following entitlements are applicable to individual Fellows:**

Open Association of Research Society, U.S.A (OARS) By-laws states that an individual Fellow may use the designations as applicable, or the corresponding initials. The Credentials of individual Fellow and Associate designations signify that the individual has gained knowledge of the fundamental concepts. One is magnanimous and proficient in an expertise course covering the professional code of conduct, and follows recognized standards of practice.



Open Association of Research Society (US)/ Global Journals Incorporation (USA), as described in Corporate Statements, are educational, research publishing and professional membership organizations. Achieving our individual Fellow or Associate status is based mainly on meeting stated educational research requirements.

Disbursement of 40% Royalty earned through Global Journals : Researcher = 50%, Peer Reviewer = 37.50%, Institution = 12.50% E.g. Out of 40%, the 20% benefit should be passed on to researcher, 15 % benefit towards remuneration should be given to a reviewer and remaining 5% is to be retained by the institution.



We shall provide print version of 12 issues of any three journals [as per your requirement] out of our 38 journals worth \$ 2376 USD.

**Other:**

**The individual Fellow and Associate designations accredited by Open Association of Research Society (US) credentials signify guarantees following achievements:**

- The professional accredited with Fellow honor, is entitled to various benefits viz. name, fame, honor, regular flow of income, secured bright future, social status etc.



- In addition to above, if one is single author, then entitled to 40% discount on publishing research paper and can get 10% discount if one is co-author or main author among group of authors.
- The Fellow can organize symposium/seminar/conference on behalf of Global Journals Incorporation (USA) and he/she can also attend the same organized by other institutes on behalf of Global Journals.
- The Fellow can become member of Editorial Board Member after completing 3yrs.
- The Fellow can earn 60% of sales proceeds from the sale of reference/review books/literature/publishing of research paper.
- Fellow can also join as paid peer reviewer and earn 15% remuneration of author charges and can also get an opportunity to join as member of the Editorial Board of Global Journals Incorporation (USA)
- • This individual has learned the basic methods of applying those concepts and techniques to common challenging situations. This individual has further demonstrated an in-depth understanding of the application of suitable techniques to a particular area of research practice.

**Note :**

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- In future, if the board feels the necessity to change any board member, the same can be done with the consent of the chairperson along with anyone board member without our approval.
- In case, the chairperson needs to be replaced then consent of 2/3rd board members are required and they are also required to jointly pass the resolution copy of which should be sent to us. In such case, it will be compulsory to obtain our approval before replacement.
- In case of “Difference of Opinion [if any]” among the Board members, our decision will be final and binding to everyone.

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# PREFERRED AUTHOR GUIDELINES

## **We accept the manuscript submissions in any standard (generic) format.**

We typeset manuscripts using advanced typesetting tools like Adobe In Design, CorelDraw, TeXnicCenter, and TeXStudio. We usually recommend authors submit their research using any standard format they are comfortable with, and let Global Journals do the rest.

Alternatively, you can download our basic template from <https://globaljournals.org/Template>

Authors should submit their complete paper/article, including text illustrations, graphics, conclusions, artwork, and tables. Authors who are not able to submit manuscript using the form above can email the manuscript department at [submit@globaljournals.org](mailto:submit@globaljournals.org) or get in touch with [chiefeditor@globaljournals.org](mailto:chiefeditor@globaljournals.org) if they wish to send the abstract before submission.

## BEFORE AND DURING SUBMISSION

Authors must ensure the information provided during the submission of a paper is authentic. Please go through the following checklist before submitting:

1. Authors must go through the complete author guideline and understand and *agree to Global Journals' ethics and code of conduct*, along with author responsibilities.
2. Authors must accept the privacy policy, terms, and conditions of Global Journals.
3. Ensure corresponding author's email address and postal address are accurate and reachable.
4. Manuscript to be submitted must include keywords, an abstract, a paper title, co-author(s') names and details (email address, name, phone number, and institution), figures and illustrations in vector format including appropriate captions, tables, including titles and footnotes, a conclusion, results, acknowledgments and references.
5. Authors should submit paper in a ZIP archive if any supplementary files are required along with the paper.
6. Proper permissions must be acquired for the use of any copyrighted material.
7. Manuscript submitted *must not have been submitted or published elsewhere* and all authors must be aware of the submission.

## **Declaration of Conflicts of Interest**

It is required for authors to declare all financial, institutional, and personal relationships with other individuals and organizations that could influence (bias) their research.

## POLICY ON PLAGIARISM

Plagiarism is not acceptable in Global Journals submissions at all.

Plagiarized content will not be considered for publication. We reserve the right to inform authors' institutions about plagiarism detected either before or after publication. If plagiarism is identified, we will follow COPE guidelines:

Authors are solely responsible for all the plagiarism that is found. The author must not fabricate, falsify or plagiarize existing research data. The following, if copied, will be considered plagiarism:

- Words (language)
- Ideas
- Findings
- Writings
- Diagrams
- Graphs
- Illustrations
- Lectures



- Printed material
- Graphic representations
- Computer programs
- Electronic material
- Any other original work

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1. Substantial contributions to the conception and acquisition of data, analysis, and interpretation of findings.
2. Drafting the paper and revising it critically regarding important academic content.
3. Final approval of the version of the paper to be published.

### Changes in Authorship

The corresponding author should mention the name and complete details of all co-authors during submission and in manuscript. We support addition, rearrangement, manipulation, and deletions in authors list till the early view publication of the journal. We expect that corresponding author will notify all co-authors of submission. We follow COPE guidelines for changes in authorship.

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### Appealing Decisions

Unless specified in the notification, the Editorial Board's decision on publication of the paper is final and cannot be appealed before making the major change in the manuscript.

### Acknowledgments

Contributors to the research other than authors credited should be mentioned in Acknowledgments. The source of funding for the research can be included. Suppliers of resources may be mentioned along with their addresses.

### Declaration of funding sources

Global Journals is in partnership with various universities, laboratories, and other institutions worldwide in the research domain. Authors are requested to disclose their source of funding during every stage of their research, such as making analysis, performing laboratory operations, computing data, and using institutional resources, from writing an article to its submission. This will also help authors to get reimbursements by requesting an open access publication letter from Global Journals and submitting to the respective funding source.

## PREPARING YOUR MANUSCRIPT

Authors can submit papers and articles in an acceptable file format: MS Word (doc, docx), LaTeX (.tex, .zip or .rar including all of your files), Adobe PDF (.pdf), rich text format (.rtf), simple text document (.txt), Open Document Text (.odt), and Apple Pages (.pages). Our professional layout editors will format the entire paper according to our official guidelines. This is one of the highlights of publishing with Global Journals—authors should not be concerned about the formatting of their paper. Global Journals accepts articles and manuscripts in every major language, be it Spanish, Chinese, Japanese, Portuguese, Russian, French, German, Dutch, Italian, Greek, or any other national language, but the title, subtitle, and abstract should be in English. This will facilitate indexing and the pre-peer review process.

The following is the official style and template developed for publication of a research paper. Authors are not required to follow this style during the submission of the paper. It is just for reference purposes.



### ***Manuscript Style Instruction (Optional)***

- Microsoft Word Document Setting Instructions.
- Font type of all text should be Swis721 Lt BT.
- Page size: 8.27" x 11", left margin: 0.65, right margin: 0.65, bottom margin: 0.75.
- Paper title should be in one column of font size 24.
- Author name in font size of 11 in one column.
- Abstract: font size 9 with the word "Abstract" in bold italics.
- Main text: font size 10 with two justified columns.
- Two columns with equal column width of 3.38 and spacing of 0.2.
- First character must be three lines drop-capped.
- The paragraph before spacing of 1 pt and after of 0 pt.
- Line spacing of 1 pt.
- Large images must be in one column.
- The names of first main headings (Heading 1) must be in Roman font, capital letters, and font size of 10.
- The names of second main headings (Heading 2) must not include numbers and must be in italics with a font size of 10.

### ***Structure and Format of Manuscript***

The recommended size of an original research paper is under 15,000 words and review papers under 7,000 words. Research articles should be less than 10,000 words. Research papers are usually longer than review papers. Review papers are reports of significant research (typically less than 7,000 words, including tables, figures, and references)

A research paper must include:

- a) A title which should be relevant to the theme of the paper.
- b) A summary, known as an abstract (less than 150 words), containing the major results and conclusions.
- c) Up to 10 keywords that precisely identify the paper's subject, purpose, and focus.
- d) An introduction, giving fundamental background objectives.
- e) Resources and techniques with sufficient complete experimental details (wherever possible by reference) to permit repetition, sources of information must be given, and numerical methods must be specified by reference.
- f) Results which should be presented concisely by well-designed tables and figures.
- g) Suitable statistical data should also be given.
- h) All data must have been gathered with attention to numerical detail in the planning stage.

Design has been recognized to be essential to experiments for a considerable time, and the editor has decided that any paper that appears not to have adequate numerical treatments of the data will be returned unrefereed.

- i) Discussion should cover implications and consequences and not just recapitulate the results; conclusions should also be summarized.
- j) There should be brief acknowledgments.
- k) There ought to be references in the conventional format. Global Journals recommends APA format.

Authors should carefully consider the preparation of papers to ensure that they communicate effectively. Papers are much more likely to be accepted if they are carefully designed and laid out, contain few or no errors, are summarizing, and follow instructions. They will also be published with much fewer delays than those that require much technical and editorial correction.

The Editorial Board reserves the right to make literary corrections and suggestions to improve brevity.



## FORMAT STRUCTURE

***It is necessary that authors take care in submitting a manuscript that is written in simple language and adheres to published guidelines.***

All manuscripts submitted to Global Journals should include:

### **Title**

The title page must carry an informative title that reflects the content, a running title (less than 45 characters together with spaces), names of the authors and co-authors, and the place(s) where the work was carried out.

### **Author details**

The full postal address of any related author(s) must be specified.

### **Abstract**

The abstract is the foundation of the research paper. It should be clear and concise and must contain the objective of the paper and inferences drawn. It is advised to not include big mathematical equations or complicated jargon.

Many researchers searching for information online will use search engines such as Google, Yahoo or others. By optimizing your paper for search engines, you will amplify the chance of someone finding it. In turn, this will make it more likely to be viewed and cited in further works. Global Journals has compiled these guidelines to facilitate you to maximize the web-friendliness of the most public part of your paper.

### **Keywords**

A major lynchpin of research work for the writing of research papers is the keyword search, which one will employ to find both library and internet resources. Up to eleven keywords or very brief phrases have to be given to help data retrieval, mining, and indexing.

One must be persistent and creative in using keywords. An effective keyword search requires a strategy: planning of a list of possible keywords and phrases to try.

Choice of the main keywords is the first tool of writing a research paper. Research paper writing is an art. Keyword search should be as strategic as possible.

One should start brainstorming lists of potential keywords before even beginning searching. Think about the most important concepts related to research work. Ask, "What words would a source have to include to be truly valuable in a research paper?" Then consider synonyms for the important words.

It may take the discovery of only one important paper to steer in the right keyword direction because, in most databases, the keywords under which a research paper is abstracted are listed with the paper.

### **Numerical Methods**

Numerical methods used should be transparent and, where appropriate, supported by references.

### **Abbreviations**

Authors must list all the abbreviations used in the paper at the end of the paper or in a separate table before using them.

### **Formulas and equations**

Authors are advised to submit any mathematical equation using either MathJax, KaTeX, or LaTeX, or in a very high-quality image.

### **Tables, Figures, and Figure Legends**

Tables: Tables should be cautiously designed, uncrowned, and include only essential data. Each must have an Arabic number, e.g., Table 4, a self-explanatory caption, and be on a separate sheet. Authors must submit tables in an editable format and not as images. References to these tables (if any) must be mentioned accurately.





## Figures

Figures are supposed to be submitted as separate files. Always include a citation in the text for each figure using Arabic numbers, e.g., Fig. 4. Artwork must be submitted online in vector electronic form or by emailing it.

### PREPARATION OF ELETRONIC FIGURES FOR PUBLICATION

Although low-quality images are sufficient for review purposes, print publication requires high-quality images to prevent the final product being blurred or fuzzy. Submit (possibly by e-mail) EPS (line art) or TIFF (halftone/ photographs) files only. MS PowerPoint and Word Graphics are unsuitable for printed pictures. Avoid using pixel-oriented software. Scans (TIFF only) should have a resolution of at least 350 dpi (halftone) or 700 to 1100 dpi (line drawings). Please give the data for figures in black and white or submit a Color Work Agreement form. EPS files must be saved with fonts embedded (and with a TIFF preview, if possible).

For scanned images, the scanning resolution at final image size ought to be as follows to ensure good reproduction: line art: >650 dpi; halftones (including gel photographs): >350 dpi; figures containing both halftone and line images: >650 dpi.

Color charges: Authors are advised to pay the full cost for the reproduction of their color artwork. Hence, please note that if there is color artwork in your manuscript when it is accepted for publication, we would require you to complete and return a Color Work Agreement form before your paper can be published. Also, you can email your editor to remove the color fee after acceptance of the paper.

### TIPS FOR WRITING A GOOD QUALITY MEDICAL RESEARCH PAPER

**1. Choosing the topic:** In most cases, the topic is selected by the interests of the author, but it can also be suggested by the guides. You can have several topics, and then judge which you are most comfortable with. This may be done by asking several questions of yourself, like "Will I be able to carry out a search in this area? Will I find all necessary resources to accomplish the search? Will I be able to find all information in this field area?" If the answer to this type of question is "yes," then you ought to choose that topic. In most cases, you may have to conduct surveys and visit several places. Also, you might have to do a lot of work to find all the rises and falls of the various data on that subject. Sometimes, detailed information plays a vital role, instead of short information. Evaluators are human: The first thing to remember is that evaluators are also human beings. They are not only meant for rejecting a paper. They are here to evaluate your paper. So present your best aspect.

**2. Think like evaluators:** If you are in confusion or getting demotivated because your paper may not be accepted by the evaluators, then think, and try to evaluate your paper like an evaluator. Try to understand what an evaluator wants in your research paper, and you will automatically have your answer. Make blueprints of paper: The outline is the plan or framework that will help you to arrange your thoughts. It will make your paper logical. But remember that all points of your outline must be related to the topic you have chosen.

**3. Ask your guides:** If you are having any difficulty with your research, then do not hesitate to share your difficulty with your guide (if you have one). They will surely help you out and resolve your doubts. If you can't clarify what exactly you require for your work, then ask your supervisor to help you with an alternative. He or she might also provide you with a list of essential readings.

**4. Use of computer is recommended:** As you are doing research in the field of medical research then this point is quite obvious. Use right software: Always use good quality software packages. If you are not capable of judging good software, then you can lose the quality of your paper unknowingly. There are various programs available to help you which you can get through the internet.

**5. Use the internet for help:** An excellent start for your paper is using Google. It is a wondrous search engine, where you can have your doubts resolved. You may also read some answers for the frequent question of how to write your research paper or find a model research paper. You can download books from the internet. If you have all the required books, place importance on reading, selecting, and analyzing the specified information. Then sketch out your research paper. Use big pictures: You may use encyclopedias like Wikipedia to get pictures with the best resolution. At Global Journals, you should strictly follow here.



**6. Bookmarks are useful:** When you read any book or magazine, you generally use bookmarks, right? It is a good habit which helps to not lose your continuity. You should always use bookmarks while searching on the internet also, which will make your search easier.

**7. Revise what you wrote:** When you write anything, always read it, summarize it, and then finalize it.

**8. Make every effort:** Make every effort to mention what you are going to write in your paper. That means always have a good start. Try to mention everything in the introduction—what is the need for a particular research paper. Polish your work with good writing skills and always give an evaluator what he wants. Make backups: When you are going to do any important thing like making a research paper, you should always have backup copies of it either on your computer or on paper. This protects you from losing any portion of your important data.

**9. Produce good diagrams of your own:** Always try to include good charts or diagrams in your paper to improve quality. Using several unnecessary diagrams will degrade the quality of your paper by creating a hodgepodge. So always try to include diagrams which were made by you to improve the readability of your paper. Use of direct quotes: When you do research relevant to literature, history, or current affairs, then use of quotes becomes essential, but if the study is relevant to science, use of quotes is not preferable.

**10. Use proper verb tense:** Use proper verb tenses in your paper. Use past tense to present those events that have happened. Use present tense to indicate events that are going on. Use future tense to indicate events that will happen in the future. Use of wrong tenses will confuse the evaluator. Avoid sentences that are incomplete.

**11. Pick a good study spot:** Always try to pick a spot for your research which is quiet. Not every spot is good for studying.

**12. Know what you know:** Always try to know what you know by making objectives, otherwise you will be confused and unable to achieve your target.

**13. Use good grammar:** Always use good grammar and words that will have a positive impact on the evaluator; use of good vocabulary does not mean using tough words which the evaluator has to find in a dictionary. Do not fragment sentences. Eliminate one-word sentences. Do not ever use a big word when a smaller one would suffice.

Verbs have to be in agreement with their subjects. In a research paper, do not start sentences with conjunctions or finish them with prepositions. When writing formally, it is advisable to never split an infinitive because someone will (wrongly) complain. Avoid clichés like a disease. Always shun irritating alliteration. Use language which is simple and straightforward. Put together a neat summary.

**14. Arrangement of information:** Each section of the main body should start with an opening sentence, and there should be a changeover at the end of the section. Give only valid and powerful arguments for your topic. You may also maintain your arguments with records.

**15. Never start at the last minute:** Always allow enough time for research work. Leaving everything to the last minute will degrade your paper and spoil your work.

**16. Multitasking in research is not good:** Doing several things at the same time is a bad habit in the case of research activity. Research is an area where everything has a particular time slot. Divide your research work into parts, and do a particular part in a particular time slot.

**17. Never copy others' work:** Never copy others' work and give it your name because if the evaluator has seen it anywhere, you will be in trouble. Take proper rest and food: No matter how many hours you spend on your research activity, if you are not taking care of your health, then all your efforts will have been in vain. For quality research, take proper rest and food.

**18. Go to seminars:** Attend seminars if the topic is relevant to your research area. Utilize all your resources.

**19. Refresh your mind after intervals:** Try to give your mind a rest by listening to soft music or sleeping in intervals. This will also improve your memory. Acquire colleagues: Always try to acquire colleagues. No matter how sharp you are, if you acquire colleagues, they can give you ideas which will be helpful to your research.



**20. Think technically:** Always think technically. If anything happens, search for its reasons, benefits, and demerits. Think and then print: When you go to print your paper, check that tables are not split, headings are not detached from their descriptions, and page sequence is maintained.

**21. Adding unnecessary information:** Do not add unnecessary information like "I have used MS Excel to draw graphs." Irrelevant and inappropriate material is superfluous. Foreign terminology and phrases are not apropos. One should never take a broad view. Analogy is like feathers on a snake. Use words properly, regardless of how others use them. Remove quotations. Puns are for kids, not grunt readers. Never oversimplify: When adding material to your research paper, never go for oversimplification; this will definitely irritate the evaluator. Be specific. Never use rhythmic redundancies. Contractions shouldn't be used in a research paper. Comparisons are as terrible as clichés. Give up ampersands, abbreviations, and so on. Remove commas that are not necessary. Parenthetical words should be between brackets or commas. Understatement is always the best way to put forward earth-shaking thoughts. Give a detailed literary review.

**22. Report concluded results:** Use concluded results. From raw data, filter the results, and then conclude your studies based on measurements and observations taken. An appropriate number of decimal places should be used. Parenthetical remarks are prohibited here. Proofread carefully at the final stage. At the end, give an outline to your arguments. Spot perspectives of further study of the subject. Justify your conclusion at the bottom sufficiently, which will probably include examples.

**23. Upon conclusion:** Once you have concluded your research, the next most important step is to present your findings. Presentation is extremely important as it is the definite medium through which your research is going to be in print for the rest of the crowd. Care should be taken to categorize your thoughts well and present them in a logical and neat manner. A good quality research paper format is essential because it serves to highlight your research paper and bring to light all necessary aspects of your research.

## INFORMAL GUIDELINES OF RESEARCH PAPER WRITING

### **Key points to remember:**

- Submit all work in its final form.
- Write your paper in the form which is presented in the guidelines using the template.
- Please note the criteria peer reviewers will use for grading the final paper.

### **Final points:**

One purpose of organizing a research paper is to let people interpret your efforts selectively. The journal requires the following sections, submitted in the order listed, with each section starting on a new page:

*The introduction:* This will be compiled from reference matter and reflect the design processes or outline of basis that directed you to make a study. As you carry out the process of study, the method and process section will be constructed like that. The results segment will show related statistics in nearly sequential order and direct reviewers to similar intellectual paths throughout the data that you gathered to carry out your study.

### **The discussion section:**

This will provide understanding of the data and projections as to the implications of the results. The use of good quality references throughout the paper will give the effort trustworthiness by representing an alertness to prior workings.

Writing a research paper is not an easy job, no matter how trouble-free the actual research or concept. Practice, excellent preparation, and controlled record-keeping are the only means to make straightforward progression.

### **General style:**

Specific editorial column necessities for compliance of a manuscript will always take over from directions in these general guidelines.

**To make a paper clear:** Adhere to recommended page limits.



### *Mistakes to avoid:*

- Insertion of a title at the foot of a page with subsequent text on the next page.
- Separating a table, chart, or figure—confine each to a single page.
- Submitting a manuscript with pages out of sequence.
- In every section of your document, use standard writing style, including articles ("a" and "the").
- Keep paying attention to the topic of the paper.
- Use paragraphs to split each significant point (excluding the abstract).
- Align the primary line of each section.
- Present your points in sound order.
- Use present tense to report well-accepted matters.
- Use past tense to describe specific results.
- Do not use familiar wording; don't address the reviewer directly. Don't use slang or superlatives.
- Avoid use of extra pictures—include only those figures essential to presenting results.

### **Title page:**

Choose a revealing title. It should be short and include the name(s) and address(es) of all authors. It should not have acronyms or abbreviations or exceed two printed lines.

**Abstract:** This summary should be two hundred words or less. It should clearly and briefly explain the key findings reported in the manuscript and must have precise statistics. It should not have acronyms or abbreviations. It should be logical in itself. Do not cite references at this point.

An abstract is a brief, distinct paragraph summary of finished work or work in development. In a minute or less, a reviewer can be taught the foundation behind the study, common approaches to the problem, relevant results, and significant conclusions or new questions.

Write your summary when your paper is completed because how can you write the summary of anything which is not yet written? Wealth of terminology is very essential in abstract. Use comprehensive sentences, and do not sacrifice readability for brevity; you can maintain it succinctly by phrasing sentences so that they provide more than a lone rationale. The author can at this moment go straight to shortening the outcome. Sum up the study with the subsequent elements in any summary. Try to limit the initial two items to no more than one line each.

*Reason for writing the article—theory, overall issue, purpose.*

- Fundamental goal.
- To-the-point depiction of the research.
- Consequences, including definite statistics—if the consequences are quantitative in nature, account for this; results of any numerical analysis should be reported. Significant conclusions or questions that emerge from the research.

### **Approach:**

- Single section and succinct.
- An outline of the job done is always written in past tense.
- Concentrate on shortening results—limit background information to a verdict or two.
- Exact spelling, clarity of sentences and phrases, and appropriate reporting of quantities (proper units, important statistics) are just as significant in an abstract as they are anywhere else.

### **Introduction:**

The introduction should "introduce" the manuscript. The reviewer should be presented with sufficient background information to be capable of comprehending and calculating the purpose of your study without having to refer to other works. The basis for the study should be offered. Give the most important references, but avoid making a comprehensive appraisal of the topic. Describe the problem visibly. If the problem is not acknowledged in a logical, reasonable way, the reviewer will give no attention to your results. Speak in common terms about techniques used to explain the problem, if needed, but do not present any particulars about the protocols here.



*The following approach can create a valuable beginning:*

- Explain the value (significance) of the study.
- Defend the model—why did you employ this particular system or method? What is its compensation? Remark upon its appropriateness from an abstract point of view as well as pointing out sensible reasons for using it.
- Present a justification. State your particular theory(-ies) or aim(s), and describe the logic that led you to choose them.
- Briefly explain the study's tentative purpose and how it meets the declared objectives.

#### **Approach:**

Use past tense except for when referring to recognized facts. After all, the manuscript will be submitted after the entire job is done. Sort out your thoughts; manufacture one key point for every section. If you make the four points listed above, you will need at least four paragraphs. Present surrounding information only when it is necessary to support a situation. The reviewer does not desire to read everything you know about a topic. Shape the theory specifically—do not take a broad view.

As always, give awareness to spelling, simplicity, and correctness of sentences and phrases.

#### **Procedures (methods and materials):**

This part is supposed to be the easiest to carve if you have good skills. A soundly written procedures segment allows a capable scientist to replicate your results. Present precise information about your supplies. The suppliers and clarity of reagents can be helpful bits of information. Present methods in sequential order, but linked methodologies can be grouped as a segment. Be concise when relating the protocols. Attempt to give the least amount of information that would permit another capable scientist to replicate your outcome, but be cautious that vital information is integrated. The use of subheadings is suggested and ought to be synchronized with the results section.

When a technique is used that has been well-described in another section, mention the specific item describing the way, but draw the basic principle while stating the situation. The purpose is to show all particular resources and broad procedures so that another person may use some or all of the methods in one more study or referee the scientific value of your work. It is not to be a step-by-step report of the whole thing you did, nor is a methods section a set of orders.

#### **Materials:**

*Materials may be reported in part of a section or else they may be recognized along with your measures.*

#### **Methods:**

- Report the method and not the particulars of each process that engaged the same methodology.
- Describe the method entirely.
- To be succinct, present methods under headings dedicated to specific dealings or groups of measures.
- Simplify—detail how procedures were completed, not how they were performed on a particular day.
- If well-known procedures were used, account for the procedure by name, possibly with a reference, and that's all.

#### **Approach:**

It is embarrassing to use vigorous voice when documenting methods without using first person, which would focus the reviewer's interest on the researcher rather than the job. As a result, when writing up the methods, most authors use third person passive voice.

Use standard style in this and every other part of the paper—avoid familiar lists, and use full sentences.

#### **What to keep away from:**

- Resources and methods are not a set of information.
- Skip all descriptive information and surroundings—save it for the argument.
- Leave out information that is immaterial to a third party.



**Results:**

The principle of a results segment is to present and demonstrate your conclusion. Create this part as entirely objective details of the outcome, and save all understanding for the discussion.

The page length of this segment is set by the sum and types of data to be reported. Use statistics and tables, if suitable, to present consequences most efficiently.

You must clearly differentiate material which would usually be incorporated in a study editorial from any unprocessed data or additional appendix matter that would not be available. In fact, such matters should not be submitted at all except if requested by the instructor.

**Content:**

- Sum up your conclusions in text and demonstrate them, if suitable, with figures and tables.
- In the manuscript, explain each of your consequences, and point the reader to remarks that are most appropriate.
- Present a background, such as by describing the question that was addressed by creation of an exacting study.
- Explain results of control experiments and give remarks that are not accessible in a prescribed figure or table, if appropriate.
- Examine your data, then prepare the analyzed (transformed) data in the form of a figure (graph), table, or manuscript.

**What to stay away from:**

- Do not discuss or infer your outcome, report surrounding information, or try to explain anything.
- Do not include raw data or intermediate calculations in a research manuscript.
- Do not present similar data more than once.
- A manuscript should complement any figures or tables, not duplicate information.
- Never confuse figures with tables—there is a difference.

**Approach:**

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Put figures and tables, appropriately numbered, in order at the end of the report.

If you desire, you may place your figures and tables properly within the text of your results section.

**Figures and tables:**

If you put figures and tables at the end of some details, make certain that they are visibly distinguished from any attached appendix materials, such as raw facts. Whatever the position, each table must be titled, numbered one after the other, and include a heading. All figures and tables must be divided from the text.

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Position your understanding of the outcome visibly to lead the reviewer through your conclusions, and then finish the paper with a summing up of the implications of the study. The purpose here is to offer an understanding of your results and support all of your conclusions, using facts from your research and generally accepted information, if suitable. The implication of results should be fully described.

Infer your data in the conversation in suitable depth. This means that when you clarify an observable fact, you must explain mechanisms that may account for the observation. If your results vary from your prospect, make clear why that may have happened. If your results agree, then explain the theory that the proof supported. It is never suitable to just state that the data approved the prospect, and let it drop at that. Make a decision as to whether each premise is supported or discarded or if you cannot make a conclusion with assurance. Do not just dismiss a study or part of a study as "uncertain."



Research papers are not acknowledged if the work is imperfect. Draw what conclusions you can based upon the results that you have, and take care of the study as a finished work.

- You may propose future guidelines, such as how an experiment might be personalized to accomplish a new idea.
- Give details of all of your remarks as much as possible, focusing on mechanisms.
- Make a decision as to whether the tentative design sufficiently addressed the theory and whether or not it was correctly restricted. Try to present substitute explanations if they are sensible alternatives.
- One piece of research will not counter an overall question, so maintain the large picture in mind. Where do you go next? The best studies unlock new avenues of study. What questions remain?
- Recommendations for detailed papers will offer supplementary suggestions.

**Approach:**

When you refer to information, differentiate data generated by your own studies from other available information. Present work done by specific persons (including you) in past tense.

Describe generally acknowledged facts and main beliefs in present tense.

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<i>Introduction</i>	Containing all background details with clear goal and appropriate details, flow specification, no grammar and spelling mistake, well organized sentence and paragraph, reference cited	Unclear and confusing data, appropriate format, grammar and spelling errors with unorganized matter	Out of place depth and content, hazy format
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<i>Result</i>	Well organized, Clear and specific, Correct units with precision, correct data, well structuring of paragraph, no grammar and spelling mistake	Complete and embarrassed text, difficult to comprehend	Irregular format with wrong facts and figures
<i>Discussion</i>	Well organized, meaningful specification, sound conclusion, logical and concise explanation, highly structured paragraph reference cited	Wordy, unclear conclusion, spurious	Conclusion is not cited, unorganized, difficult to comprehend
<i>References</i>	Complete and correct format, well organized	Beside the point, Incomplete	Wrong format and structuring





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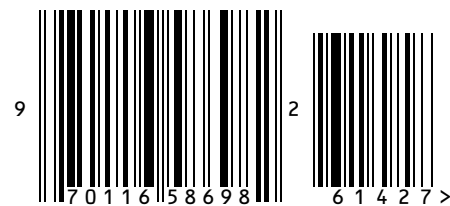
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