Factors Affecting Medication Adherence and Strategies to Improve Medication Adherence in Elderly Patients.

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ABSTRACT: Poor adherence to treatment regimens among elderly patient have always been a substantial road block to achieving a better outcome for the patients. Adherence to treatment regimen is the key link between treatment and outcome in medical care. Medication adherence richly deserves attention and much impetus is needed to develop new ideas and theories to improve it. The different factors contributing to affect in adherence to medication in elderly patients are mentioned. i.e. patient, healthcare providers, socio-economics, medication and condition related factors. The different methods to address the above factors have been mentioned in this study. In view of this, our study is focused on the factors affecting medication adherence and strategies to improve medication in elderly patient.

Keywords: Medication Adherence, Compliance, Non adherence, Treatment, Factors, Elderly patients, Medication Regimen.

I. INTRODUCTION:

The World Health organization estimated in 2003 that in the developed countries, medical adherence to only 50% in patients suffering from chronic medical illness and in developing countries the problem is much higher. The term 'Medication Adherence' is defined as the extent to which a person's behavior in taking medication corresponds with the medication regimen from a health care provider[1]. The elderly population of age 65 and above is expected to grow from 250 million in 2010 to about 1.5 billion in 2050[2]. This definition implies that the patient agrees with, and actively implements the health care's provider recommendations. Compliance is used more when the patient is acting passively according to the provider's orders. Finally, Persistence is defined as the duration of time from therapy initiation to discontinuation[3]. The most important chronic diseases in elderly population are cardiovascular diseases, Mental Health Problems, Cancer, Diabetes Mellitus, Musculoskeletal system diseases and injuries. Drug related problems and medication adherence is more in elderly patients when compared with other age groups due to altered dose or due to dose frequency or sometime they stop taking medicine because of misconception about medicines. Pharmacological therapy is the key element in the treatment of chronic diseases. However, it is estimated that about 50% of elderly patients with chronic diseases do not take medication as prescribed which results in decreased therapeutic efficacy for the patient[2,4].

NICE (National Institute of Health and Care Excellence) Guidelines refer to two types of Non-Adherence: "Intentional" and "Unintentional". Patients deciding not to follow treatment advice (i.e. Omitting Prescriber's advice or skipping or discontinuation of medication due to experienced side effects) is referred to as intentional non adherence. Patient failing to understand the instruction for use (or) medication cost barrier (or) forgetting to take medication is referred to as unintentional non adherence. According to World Health Organization (WHO), the determinants of non-adherence are categorized into five factors: Socio economic (e.g. Poor socioeconomic status, illiteracy, unemployment), Health Care system factors (e.g. Inability in accessing pharmacy, poor treatment by untrained staff, lack of feed back or treatment follow up). Therapy related factors (e.g. Complexity of medical regimens, poor labeling institutions, high medication cost). Condition related (e.g. Severity of symptoms, rate of progression or level of disability). Patients related (e.g. Old age, knowledge and beliefs, Health literacy). Specific skills is required for

identification of non-adherence, Low medication adherence can lead to increasing the risk for Adverse Drug reactions, increased health care lost and lower quality of life, poor clinical outcome. Therefore Improvement of medication adherence is important in patient with chronic disease to minimize early deaths and social burden. The Objective of this study is focused specifically on providing an overview of factors medication adherence and strategies to improve medication in elderly patients[2,5].

Adherence and its Importance:
As far as adherence is concerned, the term implies passive submission on the patient to the subscriber's authority and obeys treatment regimens. Adherence refers to the self initiated choice of the patient to closely follow a treatment plans. The health care providers have to monitor

the patient's medication adherence to the medication, instruction on drug usage so that they are benefitted from the therapy. There are many situations in clinical practice where adherence is extremely important for better therapeutic outcomes which include chronic disease such as Diabetes mellitus and Hypertension, Replacement therapy such as Thyroxin and insulin, Maintenance of pharmacological effect, maintenance of serum drug concentration and some disease of public health where non adherence is a major obstacles to achieving control[6]. Adherence to medication treatment is essential in order to obtain the full therapeutic benefit[7]. Improved patient- provider communications, systems to reconcile pre hospitalization medications, as well as development of mechanisms to enhance adherence, may prevent errors and become new targets for quality improvement[8, 9].
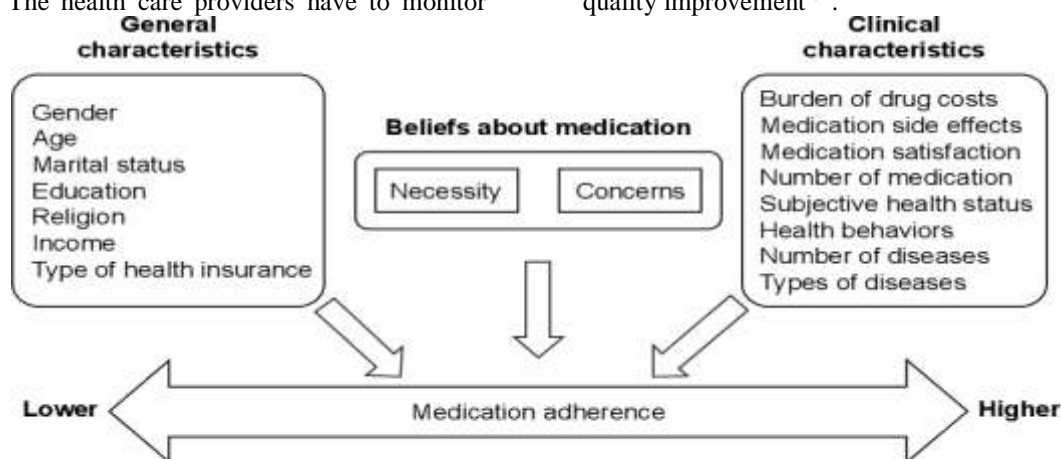

Fig1: Relationship between beliefs about Medication and Medication adherence.(Hwa yeon park et al[2].)

Factors affecting Medical adherence:[1,5,10]
According to the WHO, Non-adherence to the medication is one the major clinical problem in management of patients with chronic illness.

Adherence is a multidimensional phenomenon determined by the interaction of several different factors:

Table 1: Factors affecting adherence:

Factors	Description
1. Patient Factors	1. Physical impairments such as motor disability, Hearing, Swallowing problems may lead to risk for non-adherence in elderly patients. 2. Mental State and behavioral attitudes or habits such as fear of side effects, Lack of interpersonal relationships, Anxiety, Sleep disturbances may be associated with poor Medical Adherence. 3. Lack of medication knowledge, Health literacy and

		misunderstanding of verbal instruction, lack of motivation, Apprehension about possible side effects. 4. Past medical history related such as History of dizziness.
2. Medication Factors		1. Medication factors such as the complexity of medication regimen. 2. Formulation and packaging of drugs, drug interaction, poor labeling instruction. 3. Frequency of drug administered, treatment interference with life style.
3. Health Care Provider Factors		1. Lack of proper communication regarding the efficacy of drug instruction for use adverse side effects. 2. Patients – Physical relationship is one of the important health care systems and provides a positive outcome on medication adherence.
4. Socio Economic Factors		1. Better Medication-adherence observed in patients who have social support from family, friends or care giver. 2. Lack of proper communication, trust, dissatisfaction with Doctor, visits, Difficulty in assessing pharmacy, lost of medications.
5. Conditions related factors.		1. Declination of the treatment regimen in patients who suffers from chronic diseases (or) illness such as Hypertension, Diabetes Mellitus, Chronic Kidney disease. 2. Lack of understanding the illness out comes if not treated in time.

Measurement of adherence:

There are numerous methods to measure and quantify medication adherence. The measurements of medication adherence are categorized into direct and indirect. Each method have each strength and limitations but none of them can be considered gold standard. The direct method is measuring adherence includes- Directly observed therapy, Measuring of the drug in biological fluid. The indirect methods is measuring adherences includes pill counts, electronic medication monitors, assessment of patient's clinical response, rate of prescriptions refills and measurements of physiologic markers and patient diaries[1, 11].

Direct methods:

The direct methods refer to the directly observed therapy measurements of the concentration of the metabolites on drugs on urine of blood. Although direct methods are considered as adequate and accurate method which can result out strong evident of the intake of the drug. Direct approaches are expensive and could be considered as intervention by the patient. However, for some drug measuring this levels contributes to good and common methods and assessing adherences for example: The concentration of serum in antiepileptic drug like phenytoin or valproic acid will reflect adherences to the treatment with these medications and the sub therapeutic level will possibly reflect poor adherence as well as dose strengths[11, 12].

Table 2: Direct methods[11].

Assessment method	Advantage	Disadvantage
Direct Methods :		

1. Directly observation of therapy	Accurate	In oral administration patients can hide the pills and throw them later.
2. Measurement of medicines/ Drug level in blood	Objective	Individual differences: Chances of giving false impression of adherence, Expensive
3. Biological marker test	Objective; Used for measuring placebo and in clinical trials	Needs expensive quantitative assays.

Indirect methods:

The indirect methods refer to the measurement of adherence which includes pill counts, using electronic databases, electronic medication monitoring devices, patient diaries, and questioning the patients. However, questioning the patients contributes misrepresentation and results in the health care provider's overestimating the patient's medication adherence[11].

Pill count is a common method that calculates the amount of dose that have been ingested on taken appointments and compares it with the total amount of dosage the patient have received although pill count method is simple and easy to perform, this method give rise to many problems. For this pill counts should not be assumed to be a good measurement of adherence[11,12].

Electronic databases such as pharmacy, maintenance, registries provide that the refills are measured at several interval of time. It gives the opportunity to monitor non-adherence in a large population.

Electronic monitoring devices such as Medication event monitoring system are devices incorporated in the container that store the post medication history of the patients. It gives accurate information about the amount of dose taken and the side effects from the dosing regimen. Incorrect use of the electronic device and opening of the container without taking the medication could lead to false result. Although, the use of medication event monitoring system in large population is limited due to high price of device[11,12].

Questionnaires are standardized form of self-report for evaluation of adherence to a particular medical regimen and help in giving more information about attitude, behavior and intention[12].

Table 3: Indirect methods[11].

Assessment method **Indirect Methods:**	Advantage	Disadvantage
1. Pill count	Commonly used in clinical trial, Easy performance	No evidence if the medications are taken.
2. Electronic health records	Convenient, Inexpensive, Accessibility to non-adherence in large population	Evidence in drug being dispensed but not ingested.
3. Self reported measure	Inexpensive, easy to perform.	Easily altered by the patient.
4. Electronic monitoring devices.	Objective, precised and detailed information, Highly accurate	No actual evidence of medication being ingested.
5. When the patient are young	Simple	Can be easily distorted.

Barriers to Medication Adherence:

Common barriers to Adherence are under the patient's control, So that the attention so that attention to them is necessary and an important step in improving adherence. The most common reason for the patients not taking medication included forgetfulness (30 percent), Other priorities (16 percent), decision to omit doses (11 percent), lack of information (9 percent), and emotional factors (7 percent); 27 Percent of the respondents did not provide a reason for poor adherence to a regimen[13]. Patients face the challenges of paying for treatment costs. For instance, A patient who cannot pay for high quality medicines due to financial strains becomes dependent on others to pay for medications. Poverty, financial strain, or having inadequate insurance coverage make it more difficult for patients to adhere to treatment[14]. Physician contribute to patient's poor adherence by prescribing complex regimen, failing to explain the benefit and side effects of medication adequately, not giving consideration to the patient's lifestyle or the cost of medications and having poor therapeutic relationships with their patients More broadly, Health care systems create barriers to adherence by limiting access to healthcare, using a restricted formulary, and having prohibitively high cost for drugs[15]. To improve the patient's medication adherence, The medical team should focus on the particular health care programs for each patient based on their experiences and unique role and challenges in life to increase their adherence to treatment[16,17].
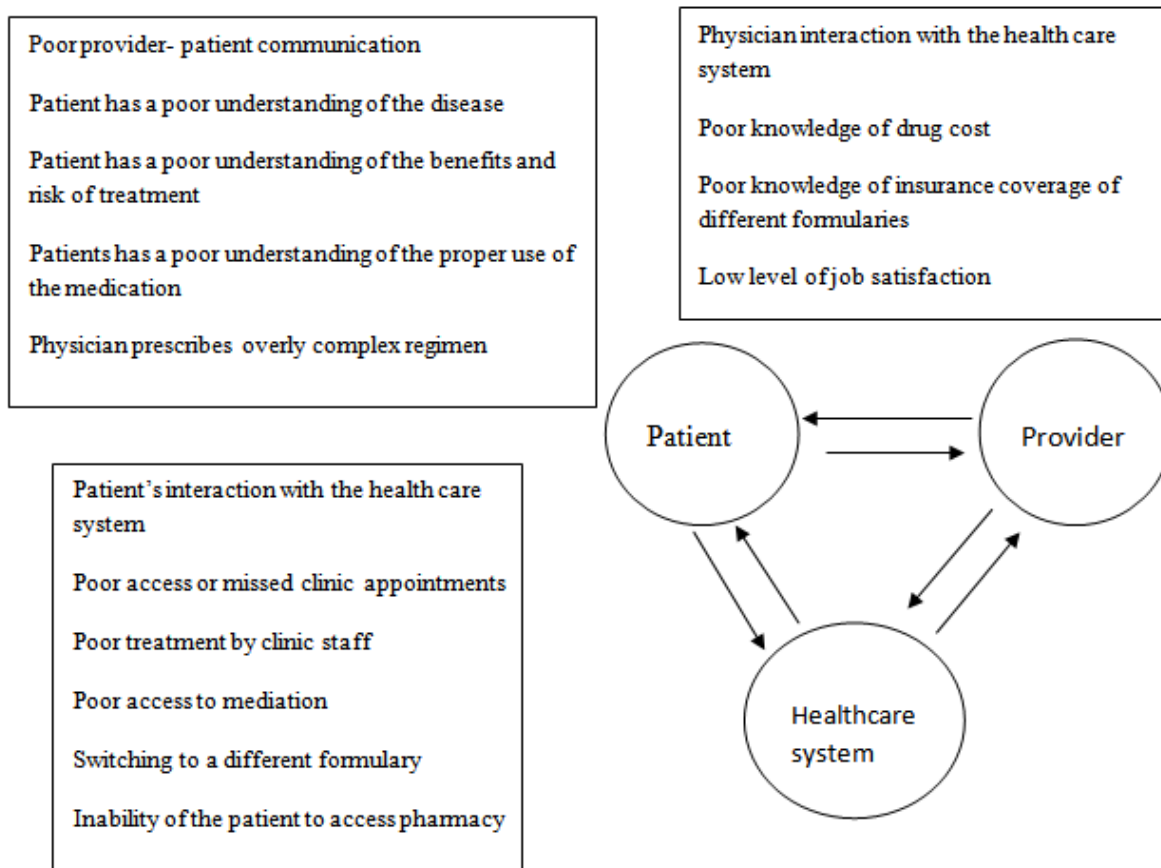

Fig2: The interaction among the patient, health care provider and health care system depicted are those that can have a negative effect on the patient's ability to follow a medication regimen11.

Measures to Improve Adherence:

The efficacy of medication and adherence to therapeutic routine determines the effectiveness of treatment. There are numerous methods where health care providers can give to improve the medication adherence.

Simplifying patient's drug list:

Physicians can use simple everyday language and have the patients repeat the drug dosage instruction for proper misunderstanding of drug regimen. This regimen can be simplified for better clearer understanding by end users or physicians without altering the therapeutic intent of the regimen prescribing cost effective medicine will reduce the economic burden of the patient and thereby increasing compliance prescribing combination drugs instead if many individual drugs . Patients should be cautiously prescribed and reviewed overtime and monitoring drug- drug interactions should be done to reduce the adverse effects. The advantages of simplification of drug regimen include reduce risk of treatment failure and improvement in the quality of life[10,15].

Usage of Adherence Aids:

Many adherence aids are available which can help the patients to organize their Medication. The most common form of adherence aid is the reminders. A simple reminder can be a Medication Box or Alarms. Another form of Adherence Aids include Micro Electronic devices which can give feed back to the patients on whether they are taking the medications on time and as prescribed by the Physicians. Others ICTs, such as Mobile devices can help in improving the health outcomes of the patient by sending phone calls and Text Messages (SMS)[15]. The introduction of a video can reduce failure of adherence and contribute to patient safety[18].

Physicians and other Health Care provider's Education:

Providing training for physicians and Education on patient interaction, the work of Medical Assistants and organizing educational programs for the pharmacists are recommended. Several studies shows that the patient does not always follow prescription advice and forget significant portion of the Health Care provider explained about treatment. Therefore, the medication advice to the patient can be instructed in a simple every language[15]. The involvement of the patient's family member and friends may help in understanding the treatment pattern and diagnosis in the Elderly Patients[19].

Communication with patients:

Patient's communication involve the interventions ranging from physicians- patients communication through e-mails or telephonic reminders and to involving the patient's attainder in the discussion in the discussions with the health care provider[20]. Studies have shown that 50% of Psychological and Psychiatric problems are missed by Physicians due to lack of proper communication 54% of patient's problem and 45% of patient concerns are neither neglected by the physicians nor disclosed by the patient providing the valuable information about all areas that the individual finds comfortable and encouraging them to share if decision making attitude are significantly related to medical adherence[15,21].

Evaluation of adherence:

The evaluation of adherence is very important in elderly patients in terms of both research and clinical practice. The Different methods of measuring adherence exist which can be categorized as direct or indirect. The Direct methods of evaluating Medical Adherence include physiological or biochemical (e.g. Detection of drug metabolites in urine or blood sample).Indirect methods which are more commonly used which includes monitoring the medication usage (e.g. Pill counting, pharmacy records, electronic monitoring devices[15,20].

II. CONCLUSION:

Improvement in Medication adherence will have a greater influence on the health of the patient then any new discovery in Medical Science[21]. In elderly Patients, Medication Adherence tends to decrease for many reasons, such as cognitive decline or increase in depression developing with age. Common forgetfulness, Lack of knowledge about drugs, side effects concern was found to be significant Medication Management. Patient – Centered Outcomes, such as health related quality of life are important measures that capture patient's perspectives and experiences about functionality and well being[22]. All Adherences must be considered to be improving the patient's ability to follow a medication regimen. The development of communication skills for patient- centered pharmaceutical care should focus on establishing a rapport with older patients[23]. It is important to keep in mind the patient, health care providers, health care system, socio economic factors[24]. Medication adherence needs to be ensured so that the elderly patients would be able to receive maximum therapeutic benefits and increase in better quality of life[25]

III. ACKNOWLEDGEMENT:

REFERENCE:

[1]. Dwajani S, Prabhu MR, Ranjana G, Sahajananda. Importance of medication adherence and factors affecting it. International Journal of Comprehensive and Advanced pharmacology. 2018, 3 (2):69-77.

[2]. Hwa yeong Park, Sin Ae Seo, Hyeyoung Yoo, Kiheon Lee. Medication adherence and beliefs about medication in elderly patients living alone with chronic diseases. Patient preference and Adherence 2018, 12:175-182.

[3]. Erika Zelko, Zalika klemenc-ketis and Ksenija tusek-bunc. Medication adherence in elderly with polypharmacy living at home. A systemic Review of Existing Studies. Mater Sociomed 2016, 28(2):129-132.

[4]. Abhishek S, Jaya devkumar. Need of pharmacist on Management for Elderly Patients residing in rural area. International Journal of Research in Pharmaceutical Sciences. 2020, 11(3):2809-2814.

[5]. Angela Frances Yap, Thiru Thirumoorthy, Yu heng kwan. Medication adherence in elderly. Journal of clinical Gerontology and Geriatrics 2015, 7:64-67.

[6]. S.Z Inamdar, R.V. Kulkarni, S.R Karajgi, F.V. Manvi, M.S. Ganachari, B.J.Mahendra Kumar. Medication Adherence in Diabetes Mellitus: An overview on pharmacist role. American Journal of Advanced Drug Delivery 2013, 1(3):238-250.

[7]. Anju P R Abubaker Siddiq, A Study of Medication Adherence and Medication Compliance to Insulin Therapy in Type I and Type II Diabetic Patients. Indian Journal of pharmacy practice. 2018, 11(3):130-133.

[8]. Marya J. Cohen, Shimon Shaykevich, Courtney Cawthon, Sunil Kripalani, Micheal K. paacsche-Orlow, Jeffrey L. Schnipper, Predictors of Medication Adherence Postdischarge :The impact of Patient Age, Insurance Status, and Prior Adherence. Journal of hospital medicine. 2012, 7 (6):470-475.

[9]. Marjolein Engelkes, Hettie M. Janssens, Johan C. de Jongste, Miriam C.J .M. Sturkenboom and Katia M.C. Verhamme. Medication Adherence and the risk of severe asthma exacerbations; a systemic review. Eur RespirJ 2015, 45:396-407.

[10]. Dr. Angel George, Dr. Neelima.K. Rajan, Dr. Jinumol joy, Lency George, Maria George. Medication Adherence in Elderly: A Review Article. Journal of Medical Sciences and Clinical Research. 2020, 08(07):556-568.

[11]. Lars Osterberg, and Terrance Blaschke. Adherence to Medication. The New England Journal of Medicine 2005, 353:487-497.

[12]. Laura Alexandra Anghel, Andrea Maria Farcas, Radu Nicolae oprean. An overview of the common methods used to measure treatment adherence. Medicine and pharmacy reports.2019, 92(2).

[13]. Myriam Jaam, Muhammad Abdul Hadi, Nadir Kheir, Mohammad Issam Diab, Samya Ahmad Al- Abdulla, Ahmed Awaisu . A qualitative exploration to barriers to medication adherence among patients with uncontrolled diabetes in Qatar:integrating perspectives of patients and health care providers. Patient preference and adherence 2018, 12:2205 – 2216.

[14]. Mehdi Rezaei, Sina Valiee, Mohammad Tahan, Fariba Ebtekar, Reza Ghanei Gheshlagh. Barriers of Medication Adherence in patients with type-2 diabetes: a pilot qualitative study. Diabetes, Metabolic Syndrome and Obesity : Targets and Therapy 2019, 12:589-599.

[15]. Michel Burnier, Erietta polychronopoulou and Gregoire Wuerzner . Hypertension and drug adherence in the elderly. Frontiers in Cardiovascular medicine .2020: 7, 1-9.

[16]. Alessandra Marengoni, Alessandro Monaco, Elosio costa, Antonio Cherubini, Alexandra Prados-Torres, Christiane muth, Rene J. F. Melis, Luca Pasina, Tischa J.M. van der cammen, Katie palmer, Sergio pecorelli, Graziano onder. Strategies to Improve Medication Adherence in older persons: Consensus statement from the senior italia federanziani advisory board. @Sprenger International publishing Switzerland 2016, 10 40266 :016-0387.

[17]. Sara J.T.Guilcher, Amanda C. Everall, Tejal patel, L. packer, Sander L. Hitzig and Aisha k. lofters. Medication adherence for persons

with spinal cord injury and dysfunction from the perspectives of healthcare providers: A qualitative study. The journal of spinal cord medicine .2019, 24:216-225.

[18]. Marie T.Brown, Jennifer Bussell, Suparna Dutta, Katherine Davis, Shelby Strong, and Suja Mathew. Medication Adherence: Truth and consequences. The American Journal of the Medical Sciences. 2016, 351(4):387-399.

[19]. Wubshet H. Tesfaye, Charlotte Mc Kercher, Gregory M. Peterson, Ronald L. Castelino, Matthew Jose, Syed Tabish R.Zaidi and Barbara C.Wimmer. Medication Adherence , Burden and Health Related Quality of life in adults with predialysis chronic kidney disease: A prospective Corhort Study. International Journal of environmental research. 2020, 17;371:1-13.

[20]. Hyekyung Jin, Yeonhee kim, Sandy jeong Rhie. Factors affecting medication adherence in elderly people, patient preference and adherence 2016, 10:2117-2115.

[21]. Alfred Coleman. Medication Adherence of Elderly citizens in retirement homes through a mobile phone adherence monitoring framework (Mpamf) for developing countries: A case study in south Africa.

Indian journal of pharmaceutical education and research 2014, 48(3):6-11.

[22]. Daniel Gomes, Ana Isabel Placido, Rita Mo, Joao Lindo Simoes, Odete Amaral, Isabel Ferenandes, Fatima Lima, Manuel Morgado, Adolfo Figueiras, Maria Teresa Herdeiro and Fatima Roque. Daily Medication management and adherence in the polymedicated Elderly: A cross sectional study in Portugal. International journal of environmental research And public health. 2020, 17(200):1-13.

[23]. Francisco Javier Acosta, Jose Luis Hernandez, Jose Pereira, Judit Herrera, Carlos J Rodriguez. Medication adherence in schizophrenia. World Journal of psychiatry.2012, 2(5)74-82.

[24]. Abdul Kader Mohiuddin. Risk and Reasons associated with medication Non-Adherence.Journal of Clinical Pharmacy. 2019, 1(1):50-53.

[25]. Priti Pednekar, Debra A., Heller, Andrew M Peterson. Association of Medication Adherence with Hospital Utilization and costs Among Elderly with Diabetes Enrolled in A State Pharmaceutical Assistance Program. Journal of Managed Care and Speciality Pharmacy. 2020, 26(9):1099-1110.