ABSTRACT

Medication management services are area oriented towards patient safety, medication appropriateness, effect of drug and adherence with the help of pharmacist and other healthcare providers to improve the health outcomes. In older aged population chronic non communicable diseases like hypertension, diabetes, COPD etc. are common and this leading to Polypharmacy and medication inappropriateness. Polypharmacy is further results to drug interaction with drug, food and body fluids and increase drug related problems. These medication problem leads to decreased level of medication adherence. Pharmacist plays an important role in minimizing drug related mortality and morbidity. As per the 2010 data out of 57 million deaths, chronic non communicable diseases like cardiovascular disease, COPD, cancer, Diabetes mellitus contributes more for mortality that is 36 million (63%). In these more than three quarters of deaths occurred in elderly patients. As per the survey conducted by govt. of India in 2017 shows 5% of population are above 65 years and estimated that by the time of 2050 India holds 20% of population are above 65years. These numbers provide evidence of the chronic shortage of trained healthcare professionals such as physicians, dentists, nurses, pharmacists due to the poor economic situation in India. The evolution of the role of the pharmacist, with the rapid development of pharmacy practice and pharmaceutical care, points to the significance of the responsibilities of a pharmacist in ensuring medication use for patients is safe, effective, and rational. Significant accomplishments will be achieved in rural areas relation to the development of strategies to improve medication use and enhance the positive health outcomes in the elderly population.
the individuals and it mainly focuses on patient need and concerns to increase health outcome.

2. Medication appropriateness evaluation, patient safety concern, drug adherence. Availability of medicines and cost (Kippen et al., 2005; MMS, 2018; Services, 2004).

3. Together approach from pharmacist and other healthcare providers to increase health outcome. Educating patient and patient care takers.

4. Achieve anticipated health outcome.

In countries like India which has diverse population and culture, chronic non communicable diseases are common mainly in geriatric population. This is always results in multiple drug therapy- Polypharmacy. Polypharmacy is most common in geriatric patients’ leads to major drug related problems and drug interactions and eventually decreases drug adherence in geriatrics (Pitkala et al., 2001; Gudi et al., 2019).

**Why elderly??**

Globally, Compare to all other causes for death s in every year chronic non communicable disease place major cause and it is major burden in low and middle income countries like India, Pakistan etc. As per the 2010 data out of 57 million deaths, chronic non communicable diseases like cardiovascular disease, COPD, cancer, Diabetes mellitus contributes more for mortality that is 36 million (63%). In these more than three quarters of deaths occurred in elderly patients. According to WHO definition for elderly is a person individual over age of 65 years and that’s further classified as young adults, old, and oldest (Guénette and Moisan, 2011; Hegde et al., 2016; Liang et al., 2015).

In elderly patients drug related problems and medication adherence is more compare to other age groups due to altered dose, frequency or some time they stop taking medicines because of misconception about medicines. Inappropriate drug selection is major problem in these age group patients due to multiple co morbid conditions and major concern to be taken about their health (Alderman et al., 2013). Adverse drug reaction is one of the major problems in elderly patients, and they are considered as 5th common cause for deaths (Gudi et al., 2019). Every elder population numbers are increasing globally and statically quarter of the population will be on the age of 65years and above by the time of 2034 and that is 2.5 times increase in the number compare to 2010 stastical survey. As per the survey conducted by govt. of India in 2017 shows 5% of population are above 65 years and estimated that by the time of 2050 India holds 20% of population are above 65years (Guénette and Moisan, 2011; Pouranayatihosseinabad et al., 2018).

As per the older research studies pharmacokinetic and pharmacodynamics activities in elderly is differs from other age groups. Pharmacokinetic activates like absorption, distribution, metabolism, and excretion process are decreased due to age factor and other activates such as first pass metabolism, bioavailability, protein binding and renal hepatic clearance decreases (Guaraldo et al., 2011).

**Why Rural Areas?**

The emerging burden of communicable and non-communicable diseases has led to a shortage of primary care physicians in rural areas in both developed and developing countries. Currently, according to the estimates provided by the World Health Organization (WHO), nearly 57 countries are facing a shortage of trained healthcare professionals. According to this research study doctor-patient ratio among following countries reflects that, for every 1000 patients, Japan has the doctor-patient ratio of 2:1 South Korea has a ratio of 2:0 Singapore has a ratio of 1:8 and China has a ratio of 1:4. On the other hand, India has a very low ratio of 0.69 for every 1000 people residing in its rural communities. For 70% of the Indian rural population, the patient-physician ratio is extremely low and amounts to a mere 0.39 per1000 people. These numbers provide evidence of the chronic shortage of trained healthcare professionals such as physicians, dentists, nurses, pharmacists due to poor economic situation in India. Older research studies shows that healthcare services in rural areas are lacking because of less man power which had resulted in poor prognosis among patients suffering from chronic medical conditions. As far the knowledge of research investigator, this type of research studies carried out in rural areas are very less. Elderly patients suffering from chronic medical conditions such as hypertension, diabetes, hyperlipidemia etc. needs to have a close monitoring of blood pressure, blood sugar and cholesterol levels to evaluate whether they are responding to the prescribed medicines. Pharmacist can play an important role in assessing therapeutic outcomes among elderly rural patients suffering from chronic medical conditions by evaluating respective physiological parameters of medical condition, so that dose of medicine can be adjusted in according to existing status of physiological parameter (Pouranayatihosseinabad et al., 2018).
Assessment of Medication adherence elderly patients

Medication adherence is generally a medical advice to the patient and it is defined as “the patient behavior to medical advice given by healthcare practitioners about taking medicines, diet, and lifestyle modification. Adherence is generally estimated only for drugs by using different scales according to mode of administration. Pill count method (capsules, tablets), weight of formulation (creams, lotions), bioassay and medication adherence questionnaires are the different set of scales to assess medication adherence of individuals. Number of tablets missed, number of days without medication therapy are the estimates of drug adherence (Vik et al., 2004; Cargill, 1992; Rich et al., 1996).

Omission of medicines is the most common problem seen for less medication adherence (Vik et al., 2004; Kruse et al., 1992).

Measurement of Adherence

There are many methods to estimate medication adherence.

Objective Methods

Bioassay

Bioassay is a direct assessment toll for estimation of adherence which helps to check drug metabolites concentration in biological fluids like blood and urine in general. Sometimes the results differ by food drug interactions and sometimes its changes based on individual physiological activity, dosing, Polypharmacy and drug half-life. Bioassay is very cost consuming and time consuming it is not feasible for regular estimation.

The Pill Count Technique

Pill count is indirect toll for the assessment of medication adherence and it is estimated by using following formula.

\[
\% \text{ adherence} = \left( \frac{N \text{ tablets taken}}{N \text{ tablets that should have been taken}} \right) \times 100
\]

Now a day’s electronic monitoring system has been used to check medication adherence. Medication monitoring system is not only helping to check the number of doses missed but it also helps to provide details about medication appropriateness about dosing.

Subjective Methods

In subjective method for estimation of medication adherence is done by healthcare professionals like nurses, doctors or pharmacists. Estimation of adherence is done by interviewing the patient or patient care takers by using set of questions contains details about name, indications, frequency and dose of medicines prescribed. Sometime patients can self-estimate and report their estimations by using these questionnaires (Vik et al., 2004), as shown in Figure 1.

Drug Related Problems in Elderly

Drug related problem is defined as “it is an event occurred in drug therapy which can directly or indirectly affect the desire health outcome” (Fiss et al., 2010; Alderman et al., 2013; PCNE, 2006). Drug related problem is basically classified as primary domains for problems (6 main domains and...
21 sub domains), primary domain for causes (5 main domains and 33 sub domains) and primary domain for interventions (5 main domains and 17 sub domains) as shown in Figure 2.

MATERIALS AND METHODOLOGY

A systematic search was performed using electronic scientific databases such as PubMed, Scopus, Embase, and Web of Science for studies published between 1992 and December 2018, pertaining to medication management in elderly patients residing in rural areas.

For the particular review articles are searched using key words like Medication management, Medication adherence, Drug related problems, Medication related problems, elderly, Home medication review in rural areas.

Inclusion criteria
Articles published between 1992 to December 2018.
Full text articles contain studies on rural settings.

Exclusion criteria
Incomplete studies.
Articles published other than English language.

Literature Review

In total, 113 studies were obtained from the searches, of which 36 articles were excluded as duplicates. Titles and abstracts were studied and assessed for the remaining 80 studies, of which 58 were excluded due to no links between the titles and/or abstracts. From remaining 22 full-text arti-
cles were assessed, and 4 were removed for not meeting the outcome of interest and/or not following the study inclusion criteria. Finally, 18 studies were included in the review; however, publication bias was not assessed, which is a limitation of this article. In all reviewed articles the study participants are included from the rural areas and mainly focus on pharmacist provided medication management for rurally residing elderly patients.

Pharmacist identified most of the issues related with medication adherence and drug related problems. In studied articles drug-drug interaction, adverse drug reactions, Polypharmacy, inappropriate drug selection, over dose, under dose, drug without indication and non-adherence to medicines are most common drug related problems seen which affecting health outcome in elderly patients. Majority of the times availability of pharmacies for rural elderly peoples are difficult and this is the major concern for health care practitioners. The evidences show that retaining the pharmacies and pharmacist in rural areas is very difficult because of low income and financial stress (Xu and Borders, 2003). Medication management services follows wide range of professional responsibilities to pharmacists or other healthcare providers, and focus on scope of practice.

Medication management services are not limited to following responsibilities it will differs from the individual need.

1. Collecting and assessing the obtained data from the patient about his/her health status.
2. Designing a medication therapy plan according to patient health conditions.
3. Assessing the designed treatment plan for appropriateness and initiate the treatment, changes are done in treatment plan based on patient response.
4. Evaluate and monitor patient response to therapy, which includes safety and effectiveness of the drug.
5. Perform medication review process periodically to identify drug related problems and try to prevent, minimize and resolve the problems.
6. Document the patient details and health status and communicate the essential information with other primary healthcare providers.
7. Educate the patient by using verbal or providing educating tools to enhance the knowledge of patients about appropriate use of medicines.
8. Inform the patient and give supporting services which helps to increase the patient medication adherence.
9. Repeat the medication management review process with the help of other healthcare providers to achieve desired health outcome ((MMS), 2018; Services, 2004).

Medication adherence plays important tool to determine the effectiveness of treatment. Non adherence is become the major concern in elderly patients and which is increasing the cost of care and hospitalization. In one of the study shows that only 63% of the older population are fully adherent to their medication regimens. A hospital based study shows that patient who are admitted due to cardiovascular high risk shows only 40.1% are only fully adherent (Hegde et al., 2016).

Study conducted in Karnataka for the assessment of medication adherence and drug related problem shows that 36.4% of the study population is partially adherent to prescribed regimen and non-adherence in older adults shows the results vary from 40% to 75% (Hegde et al., 2016).

Gilbert et al. conducted a study to assess usefulness of Home medication review and they had taken 1000 patients by the help of 129 doctors and 63 pharmacists. In the study they found 2,900 drug related problems in which 17% were inappropriate drug selection and 20% were poor of medication adherence is due to lack of knowledge about drug and its use. Finally the researcher was able to resolve 85% of drug related problems (Gudi et al., 2019).

CONCLUSIONS

The evolution of the role of the pharmacist, with the rapid development of pharmacy practice and pharmaceutical care, points to the significance of the responsibilities of a pharmacist in ensuring medication use for patients is safe, effective, and rational. Significant accomplishments will be achieved in rural areas relation to the development of strategies to improve medication use and enhance the positive health outcomes in the elderly population.

However, while the uptake and integration of the HMR program into the health system have been promising, research findings evaluating the outcomes of this service should be implemented in everyday practice to achieve the highest possible improvement in health outcomes and cost savings.

Conflict of Interest

None.
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None.

REFERENCES


