ROLE OF OVERSEAS COMMUNITY PHARMACIST IN HOME MEDICINE REVIEW - A REVIEW

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ABSTRACT

HMR services were specifically designed to assist consumers (especially elderly) living in their homes to have more benefits of medication regimen through medication review by community pharmacist and to prevent medication related problems. The operation of HMR involves a patient, General practitioner (GP), Accredited Pharmacist and Community Pharmacy. In some circumstances other health care team members such as nurses in community practice or careers are included in HMR process. The common activities observed during Medication use review services were checking rationality of drug, OTC products, patient medication adherence, drug therapy monitoring whether signs and symptoms are minimized or subsided, If drug related problems were identified they were reported to the concerned Physician or GP. Residential Medication Management Review Guidelines (RMMR) is the one which support the quality use of medicines and medication review services for aged patients with the assistance of accredited pharmacists. Benefits observed during collaborative practice between Pharmacist and General practitioners in overseas studies for providing medication reviews are identification of drug related problems and appropriate solution to it. People residing in UK care homes are weak and irresistible population who are at more risk of experiencing medication errors. Strategies that should be adopted to overcome medication errors in UK patients care homes are constant review of medication administration record, adequate training to the health care professionals in medication errors and designing research protocols on medication errors that help in evaluating the medication errors.

Key words: Home, Medication, Review, Pharmacists.
INTRODUCTION

Elderly patients usually suffer from chronic diseases such as Hypertension, Diabetes, Asthma etc. To treat them, physicians often prescribe multiple medicines. Advanced age in such elderly patients decreases the physiological activities of the systems. Polypharmacy may result in drug related problem such as drug interaction and adverse drug reaction that influence the desired therapeutic outcome in patients. Drug-related problem has been defined as “an event or circumstance involving drug treatment that actually or potentially interferes with a patient’s experiencing an optimum outcome of medical care” (Hepler and Strand 1990). The pharmacist by identifying drug related problems can minimise drug related morbidity and mortality, this has been reflected in Helper and Strand study 1990. Countries like Australia, England etc have introduced a system called Home Medicine Review (HMR). Home medication review is a system where community pharmacist will be conducting comprehensive medication review of a patient with a direction from the general practitioner. Community Pharmacist will have a prior appointment with the patient before he /she visits the patient’s home.

HMR health care service is more applicable to patients who are aged and are reckoned to be at risk of medication related problems. The HMR Pharmacist will conduct medication history interview with the patient, reviews the prescription for potential drug related issues and makes efforts to address the adherence related issues. Finally writes a report to the general practitioner about the patient related issues, drug related issues and strategies to overcome them. Based on the report, the general practitioner try to make suitable changes in the prescription and discuss the same with the patient, for effective therapeutic management.

This type of health care service is more applicable to patients who take five or more regular medications followed by patients who are worried or confused about their medicines or forget to take their medicines, those receiving more than 12 doses of medication per day and those who had a significant change in their medication regimen, those with literacy and language difficulties, impaired sight or those with cognitive difficulties and patients consulting several different doctors, including general practitioners and specialists are also the ideal candidates for HMR. Many overseas research studies were conducted to assess the usefulness of HMR service. The following findings reflect the usefulness of HMR to the Community.

HMR services by Community pharmacist to consumers in Australia is in practice since 2001. HMR services were specifically designed to assist consumers (especially elderly) living in
their homes to have more benefits of medication regimen through medication review by community pharmacist and to prevent medication related problems. Community Pharmacist conducts comprehensive medication review of each patient and finds out any drug related problem and resolves them accordingly. The operation of HMR involves a patient, General practitioner (GP), Accredited Pharmacist and Community Pharmacy. In some circumstances other health care team members such as nurses in community practice or careers are included in HMR process. The procedure adopted to carry out HMR service involves following steps.

- The accredited pharmacist visits the consumer at their home, reviews their medicine routine and provides their GP with a report.
- The GP and consumer then agree on medicine management plan.

The health care services rendered by community pharmacist will be getting remuneration in accordance to HMR programme funded through fifth community pharmacy agreement and GP will also be getting remuneration for the health care services rendered as per Medicare Benefits Schedule item 900, recommended by the Australian Government.

The HMR was created with the following objectives

1. **Rational use of Drugs**: To achieve safe, effective and rational use of medicines, wherein unnecessary health care expenditures can be minimised, as well as polypharmacy can prevented and minimized potential adverse drug reaction. Avoiding polypharmacy helps in decreasing ADR.

2. **Better Quality of life**: Patient Health Related Quality of Life and better patient outcomes can be attained by having good coordination among health care team members such as Pharmacist, GP, Nurse and Patient (if necessary health care taker).

3. **Rapport between patient and health care professional**: To improve good rapport among patient and health care professional as well as gain therapeutic knowledge to health care professionals.

4. **Awareness about diseases and medication**: To create awareness among patients about diseases and medicine aspects.

5. **Coordination among health care team members**: To have good coordination among health care team members to achieve patient health welfare.
Post discharge patients from hospital also benefit from the HMR service. Campbell Research and Consulting for the department of health and ageing have recommended following benefits of HMR services in Post discharge patients of hospital

- Decreasing the incidences of medication errors among the post discharge patients of hospital.
- Decreasing medication related hospitalization.
- Create good relationship among health care workers.
- Increase more number of patients for HMR Services.

Hospitals also recommend HMR Services to

1. Patients who are at more risk of having medication errors in immediate post discharge should be preferred.
2. Patient preferred community pharmacy/Accredited Pharmacist will be preferred for HMR service as they give comprehensive medication review in every patient and address drug related problems if found in their respective cases.

As per Australian Medicare specific criteria that are considered for patients to undertake HMR Services are

1. First priority for patients who are at more risk of having significant morbidity or death with medication errors.
2. Priority for patients whose medical condition cannot be managed either by inpatient or outpatient.
3. When patients’ medical condition cannot be managed by GP or other primary health care taker within given time.

The proposed HMR indicators for Patients as per Australian Medicare

If patient has to be recommended for HMR he or she has to meet the following requirements.
1. Prescribed patient with medication having narrow therapeutic index.
2. Recurrent hospitalization within two to six months.
3. Frequently changed medication regimen by concerned family physician leading to more confusion.¹
BENEFITS OF MEDICATION REVIEW SERVICE PROVIDED BY NEW ZEALAND PHARMACISTS:

Evan lee et al reflected in their research study that New Zealand Pharmacists have provided medication reviews for selected patients for almost two decades by working with GP for providing better health care. New Zealand introduced Pharmaceutical Review Services in 1998. A maximum of one review per patient was given financial assistance by the government. In 1996 New Zealand introduced Comprehensive Pharmaceutical Care based on a model from USA where pharmacist work in collaboration with GP to identify drug related problems, and resolve actual and potential problems. Pharmaceutical review services were government funded in New Zealand where patient need not bear any medication expenses, whereas Comprehensive Pharmaceutical Care is not a government funded health care services and patient must bear medical expenses by themselves. In 2007 New Zealand introduced Medication use review and adherence support services as part of the National Pharmacist Services Framework. The basic objective of introducing Adherence support services were patients receiving more number of medications for chronic medical conditions. Pharmacists should undergo Medication use review training course provided by the New Zealand College of Pharmacists (NZCP) and only after accreditation can render their Medication use review services. The procedure adopted in Medication use review (MUR) involves reviewing patient medications, identifying medication related problem if any and educating patients about their medications. Accredited pharmacists could not undertake Medication use review due to following barriers such as insufficient time, personal priorities, GP or patients not interested to participate in this research study, claiming Medication Use Review procedure is very complex.

The common activities observed during Medication use review services were checking rationality of drug, OTC products, patient medication adherence, drug therapy monitoring whether signs and symptoms are minimized or subsided, If drug related problems were identified they were reported to the concerned Physician or GP. New Zealand based Medication use reviews have concluded that patients were referred for MURs by GPs, pharmacists, nurses, relatives, or by self-referral and this health care service is carried out in patient’s home or in Community pharmacies. Author is of the opinion that Medication use review services should be carried out for longer period to establish the impact of health outcomes on patients.
MEDICINE REVIEW SERVICES IN AUSTRALIA AND NEW ZEALAND:
The Home Medicine Review services established in Australia have benefits for GP and Pharmacists, that both of them receive remuneration by Australian Government according to the health care services rendered to patient. Whereas the same rule cannot be applied in New Zealand based medication use review services until and unless it is funded by government for giving remuneration for both Pharmacists and GP. In New Zealand funding for Medicine review services will be approved in according to district health boards of Newzealand.

Residential Medication Management Review Guidelines (RMMR) is the one which support the quality use of medicines and medication review services for aged patients with the assistance of accredited pharmacists. This home medication management guidelines has been developed by Pharmaceutical society of Australia and funded by Australian government. To establish RMMR guidelines, communication and interrelation among the respective health care providers are necessary to create quality use of medicines with the development, implementation, monitoring of models of good pharmaceutical care practice. Research Pharmacist rendering health care services emphasizes on two wide areas according to this Australian health care guideline as mentioned below.

WHY PRIORITY SHOULD BE GIVEN FOR APPROPRIATE USE OF MEDICATIONS AND ITS MONITORING IN RESIDENTIAL AGED PATIENTS?
Priority is given for elderly patients as they are more susceptible for ADRs, altered hepatic and renal function status due to advanced age. Apart from these elderly patients may not adhere to medications due to dementia or emotional problems.

Quality use of medicine services help in getting maximum health care in ensuring rational use of medicines in residential aged patients.

According to Australian RMMR Guidelines Successful medication management depend on following factors

- A strong culture of appropriate information sharing
- The establishment of trust between parties
- Regular face to face interactions
- A commitment to teamwork and Collaboration
Establishing this type of RMMR Guidelines for residential aged patients in Australian study have reflected improved health outcomes.\textsuperscript{3}

\textbf{Turner et al suggested} medication review carried out by teamwork consisting of pharmacist and general medical practitioners is a broader researched tactic to get the most use of medications\textsuperscript{4}. According to them different health care benefits such as minimizing the adverse drug events, physical verification of storage and expiry date of medication and compilation of medication list comprising of prescribed and non prescribed medications. Author finally concludes that ADEs are more in elderly patients due to age related pharmacokinetic changes, but incidences of ADEs can be minimized by conducting more HMR programs in future.

Elder drug abuse means misusing drugs such as, deliberate consumption of excessive quantity of drug or not diagonally following correct directions of drug usage\textsuperscript{5}. Elderly abuse can occur in all cultures diagonally across all social and economic classes due to imbalance of power. The elder abuse prevention association finds out statistics of one lakh unreported cases of abuse per year in Australia. In a study conducted by Jenny et al, clearly signifies risk factors for elder abuse are dementia, mental illness, stroke, vision, auditory or intellectual impairment. Elderly patients with co morbid conditions are likely to use more number of medications and end up with unintentional adverse effects. Author concludes that elderly patients are more prone to adverse effects due to age related pharmacokinetic and pharmacodynamic changes. Polypharmacy and too little medications in elderly patients suffering from chronic medical conditions can end up with poor prognosis. Therefore the author suggests that frequent medication review on elderly patients by research pharmacist can help in overcoming medication abuse.\textsuperscript{5} Implementation of therapeutic guidelines will help in minimizing the inappropriate use of medications. A trial study by Bernal et al suggests that following therapeutic guidelines (i.e antithrombotics, B blockers, ACEIs and statins) used in the management of Acute coronary syndrome has shown better prognosis.\textsuperscript{6} Author also suggests that ACS patients has reflected further progression of disease and increased mortality rate due to inappropriate use of their medications. According to author one of the important problems reflected in this study was premature discontinuation of the medication and such as non adherence to medications in patients with ACS can lead to more problems. Therefore to overcome this problem regular medication review by pharmacists in post discharged patients with ACS can improve patient prognosis.\textsuperscript{6}
R. Holland et al has reported that older people are often affected by a number of diseases for which they receive polypharmacy which leads to complexities and drug toxicities that can be overcome by pharmacist medication review of such older people. The research carried out by pharmacist led medication review interventions should be based on the identified drug related problems and assess whether medication was responsible for hospitalization or mortality rate among patients. The study finally concludes that pharmacist led interventions in older patients may improve drug knowledge and drug adherence but lack of information reveals that whether the patient quality of life was influenced positively.\(^7\)

Debbie et al suggests that role of pharmacists is broadening in primary health care. According to author suggestions in order to have success in primary health care, there should be good teamwork among health care professionals.\(^8\) A literature review by the National Prescribing service of Australia has been able to identify more drug related problems during medication misadventure which accounts nearly 6% of hospitalization is due to adverse drug events when it is compared with medication errors. The important reason behind contributing medication errors was poor communication among the health care professionals. Author suggests that medication related problems can be overcome with good collaboration among health care professionals, the doctors and pharmacists.\(^8\)

**COLLABORATIVE PRACTICE BETWEEN PHARMACIST AND GENERAL PRACTITIONERS IN PATIENT CARE**

Australian and International studies have reflected the role of pharmacists in community had resulted in benefits such as direct patient care and better medication management. Medication reviews by pharmacist and general practitioners in UK and New Zealand have resulted in good integrity among health care professionals and for a better care to patients. Canada Research study suggests that general practitioners working with pharmacists in health care practice have yielded health benefits. Author suggests that general practitioner is more likely to accept pharmacist intervention if they have personal contact with the pharmacist rather than using a healthcare service led by a pharmacist who they do not personally know. A greater degree of faithfulness and collaboration is required when pharmacists and general practitioners are working in primary care environment. Overseas studies have reflected that integrated pharmacists working in primary care practices have shown improved patient outcomes.\(^8\)
Benefits observed during collaborative practice between Pharmacist and General practitioners in overseas studies for providing medication reviews are identification of drug related problems and appropriate solution to it. Australian pharmacists carrying out medication reviews in residential aged care facilities have been able to get government remuneration in 1997 and in 2001 for community pharmacists. Evidence based information such as different randomized trials have reflected improvements in prescribing, medication costs following pharmacist medication reviews in patients with hypertension, hyperlipidemia and diabetes. The Author finally concludes that effective health care services can be delivered only when there is good working relationship among healthcare professionals.

A.G.Zermansky et al has said that elderly people are often weak and can have progressive degenerative health problems. Increased risk of adverse drug events is attributed to multiple medications in elderly patients. Elderly patients often relying on health care takers and with frequent psychiatric problems underestimate their capacity to report Adverse drug reaction symptoms. Author suggests that clinical medication review should be conducted by research pharmacist within 28 days of randomization. Resources to be used for clinical medication review are GP clinical record, interview with the patient and health care taker. The findings of the reviews and recommendations for clinical medication review should be conveyed by the Pharmacist through a written Performa to the GP for acceptance and implementation of the same.

Standardized mini mental state examination and Barthel are the two methods applied in this research to evaluate overall level of mental and physical functioning of the patient. The intervention study did not show much difference in the overall level of mental and physical functioning as measured against Standardized mini mental state examination and Barthel index respectively. Clinical significance could not be identified among the two groups (i.e Intervention and Control) even though mortality was high at 15.3% (Intervention) followed by 14.5% (Control) during 6 months research period.

A.G.Zermansky et al Research suggests that pharmacist referred an intervention in 256 of 331 (77.4%) patients and in 657 of 2280 (28.8%) existing medicines. Over 75% (565/747) of the previous were accepted by the patient’s GP. The GP did not execute 23.4% (132/565) of the accepted recommendations, Over 7% (52/747) recommendations were rejected by the patient’s doctor. The overall implementation rate of recommendations, which means that pharmacist intervention, was considered in patient treatment. This shows that the role of
research pharmacist in HMR will enable to identify DRPs during medication review of patients which can help GP to decrease the burden in management strategies. This research study finally reflects that substantial change in patients medication regimens had occurred/been attained due to pharmacist intervention without significant change in pharmacoeconomics.9

According to Lee Furniss et al the role of pharmacist in medication review is to identify drug related problems and resolve accordingly.10 This research study focused on decreasing health care costs by identifying drug related problems such as inappropriate prescribing among patients. Research studies have reflected the importance of pharmacist’s role in reducing medication in nursing homes. The main outcome of this research study is decreasing the health care cost of medicines by reducing the number of medicines. Author finally concludes that Research pharmacist conducted medication review in UK with GPs help in rationalizing drug therapy for residents. Author predicted that this type of medication review may be cost effective for the National Health Service and could potentially have positive benefits for UK residents.10

Fletcher et al research study carried out by both pharmacist and nurse to access the use of medication appropriateness in elderly patients of Canadian population.11 The design applied in this research study was randomized controlled trial. Patients enrolled in this research study were from a single publicly funded family health network practice of 8 family physicians and associated staff serving 10,000 patients in a rural area near Ottawa, which is located in Canada. Family physicians considered elderly patients aged 50 years or older as they are at more risk of experiencing adverse drug reactions. A pharmacist or one of three nurse practitioner visited each patient at his or her home and conducted comprehensive medication review and developed tailored plan to optimize the medication use. The optimized medication use plan was developed in consultation with the patient and the patient’s doctor. The medication appropriateness index was applied in this research study to identify the rational use of medication among elderly patients. Author investigated the association between personal characteristics and inappropriate use at baseline and with improvements in medication use at the follow-up assessments. Pharmacist and nurse recorded all drug problems encountered during the trial. The medication appropriateness index was used to evaluate the prescriptions of medications. It has been reflected that medication appropriateness index has found to be proven as reliable, valid measure of appropriateness of
prescribing. This research study provides information only about clinical appropriateness of prescribed medication in each patient but Pharmacoeconomic component was missing. The author clearly suggests that they were more interested in knowing rational use of medications using medication appropriateness index rather than cost component of medication. The pharmacist used electronic data base as separate tool to monitor drug related problems for clinical management of patients. The electronic data base tool allowed the pharmacist to follow the patient to track individual patient progress by entering that information and retrieving those problems that had not been resolved in order that they might be addressed. A total of 120 patients were randomized to the intervention aim of the study. Evaluations were performed for 117 of these patients: 112 at baseline (4 patients took no medication, 1 withdrew, 1 died early on, 1 refused the pharmacist visit, and 1 assessment could not be completed for other reasons) and 114 at the end of the study (1 patient had no medication, 3 had died during the study, and 2 died shortly after the study ended and before the final MAI evaluation could be performed).

Fletcher et al research study reflected there was more inappropriate medication use at baseline in the older age groups, with those older than 80 years being five times more than those younger than 60 years to be prescribed inappropriate Medication. Those taking more than 4 drugs were also more likely to have inappropriate medications at baseline (OR = 6.64). Those without a university-level education were much more likely to have inappropriate medications at baseline (OR = 4.55). Fletcher et al concludes that the role of pharmacist in rationalising use of medications among elderly patients has decreased morbidity and mortality, apart from the effective counselling by pharmacist and nurse has created awareness about the safe use of medications in elderly patients.11

Hussainy et al tells Palliative care service is a service where it is meant to cure the pain but does not cure the illness.12 Approximately 50-90.5% of cancer patients and 9-16% of non-cancer patients are referred into palliative care services per one lakh population per year in Australia. Palliative care services are provided in three types of settings such as community, selected palliative care or hospice facilities (hospital meant for dying patients) and within acute care hospitals. Patients opting home as the most common setting where approximately 70-80% of patients receive palliative care with a significant proportion selecting to end life at home. A common problem reflected in the home is inability to sufficiently manage medications which are often seen in patients suffering from pain. This usually occurs due to
poor understanding and knowledge about medications and lack of health literacy in the palliative care population. The palliative care population has been traced as one of the groups who are at increased risk of medication misuse leading to adverse events and consequently drug induced hospital admissions.

Opioid analgesics are often used to treat chronic pain in palliative care population have a high incidence of significant adverse effects such as constipation, drowsiness and nausea. Further problems that crops up in this situation is the lack of patient information leaflet on medications which is especially more important for patients requiring palliative care. The Pharmaceutical manufacturer usually make patient information leaflet broader which makes it difficult for patients to understand and not useful to the patients from non English speaking backgrounds. Therefore patients and health care takers do not have any option but to search other primary and secondary sources of information such as the internet. The inability of managing medications among palliative care population could result into other problems which are reflected in indirect expenditures such as psychological, social and economic burdens on patients, health care takers and health care system, which are generally much higher than the cost of pharmacological and non pharmacological treatments. The palliative health care team is in right position to justify and prevent these drug related issues in a manner, so that their effects are minimised. Quality of care can be enhanced when patients are able to be treated by different health care practitioners each with their own set of knowledge, skills and experience. Hussian et al suggests that pharmacists are not extensively recognised as one of the important members of the palliative care health teams. But the role of pharmacist could be helpful as an integral team member whose contributions can potentially improve the patients medication management and reduce their risk of non concordance and hospital admissions due to drug induced. In a recent study by Wilson (2011)\textsuperscript{12} the maximum intervention by pharmacists were well accepted by physicians and most patients achieved the desired therapeutic outcome.

Palliative study was to develop role of a pharmacist in Australia in a community multidisciplinary palliative care team which had not previously been piloted. The final aim of this study was to develop a model of health care where pharmacist has an important role as a member of a community palliative care multidisciplinary team in achieving better outcomes of patients in terms of pharmaceutical care. The most important role of pharmacist in this health care team is to improve medication knowledge for different health care practitioners
within the team and for patients and their health care takers. His significance of this research work was to decrease misunderstanding on medications, wherever possible to reduce drug induced hospital admissions and lower costs to the health care system.12

Ahmad et al defines drug related problems are events or circumstances involving drug therapy that actually or potentially interfering with patient experiencing optimum outcome of medical problems/anticipated health outcomes.13 DRPs may be associated with contraindication, drug given without indication, interactions, ADR and ineffectivity of treatment. The contributing factors for these DRPs can be Prescription errors, patients not following the correct instructions given by Registered Medical Practitioners and the specific effects caused by each drugs. Factors that increases the risk of DRPs are more than 5 drugs in a Prescription, increased occurrence of diseases such as hypertension, DM, Asthma etc , Age progressing, not following the directions given by registered medical practitioner and lack of mutual understanding between different treating physicians. Prescribing more number of drugs in a prescription increases the risk of DRPs. Researcher Runciman found a relation between increased medication use has resulted hospitalization due to ADRs. Research review studies has reflected that health status in Elderly people has shown that multiple drug use is a strong predictor of hospitalizations, death, hypoglycaemia, fractures, impaired mobility, pneumonia and malnutrition.

Leendert et al suggest that elderly people have a more risk of hospitalization due to DRPs, especially if they receive 4 drugs or more and co morbidity. Elderly people more than 75 years seem at more risk for hospital admission caused by drug related problems. A Research study carried out in the Netherlands revealed the details about drug related problems occurrence of hospitalizations that were related to medication. This Netherland research study reflected that 12,793 patients were admitted to hospital/years of which 714 patients hospitalization were associated with medication related problems and 332 of these admissions were preventable. Netherland research study calculated that 19,000 hospital admissions per year were associated with medication and were preventable. Risk factors that were reflected in this study was receiving more number of drugs with different physicians, co morbidities, irrational combination of drugs and the use of inappropriate drugs. Patient disease progression has resulted due to non compliance in this research study. DRPs in Dutch population reflected that has influenced the efficacy of treatment or even enhance the risk of side effects and resulted 50% of the Dutch population discontinued the use of chronic
medications within one year. The specific reason for non-adherence in Dutch population showed that increased frequency of administration such as antihypertensive medications. Cholesterol lowering drugs, anti-rheumatic and antidepressants. Hospitalization could be considered as one of the important risk factor for causing DRPs in Dutch population. Hospitalizations and subsequent discharge could be considered as discontinuity of care due to change in medications such as stoppage of drugs. Change in doses and addition of new medications. Pharmacists have utilized computerized system to find drug related problems among patients in Netherlands. This application fails to find all drug problems and does not provide clear information with respect to problems in medication use which may be experienced by elderly patients. The present Dutch research study reflects that pharmacist is the one who perform a medication review on elderly patients discharged from the hospital. The main aim of medication review is to assist patients by reaching an agreement with the patient about treatment, optimising the impact of medicines, minimising the number of medication related problems and reducing waste. Royal et al conducted review research conducted in Dutch population. The finding suggests that pharmacist intervention in medication review decrease hospitalizations by 36%. Many research studies have reflected that cognitive behaviour treatment can be benefit able in improving medication compliance among patients. Change in attitude of patients with respect to medications can result in increased compliance with drug use.13

Desborough et al suggests that 82% of aged population in UK suffer from chronic illness in care homes and 48% were having to have 2 or 3 Co morbidities with Chronic conditions.14 The author suggests that increased morbidities in the UK population has occurred due to polypharmacy at their leaving settings. The active role of Pharmacists in medicines management issues reflected by national care standards commission in 2004 has shown that only 44% of elderly people living in care homes have met the minimum national standards on medication. Evidence suggests that role of pharmacist in medication review of elderly patients could be significantly improved by identifying /tracing medication related problems such as sub optimal therapy, increased duration of therapy where it does not have any benefits, other problems identified such as prescribing medicines to counter act adverse effect of another drug or prescribing drug without any objective evidence. Appropriate reasons for these types of problems goes unnoticed. The author suggests that poor medicine management has resulted therapeutic failure and more likelihood of resulting ADRs. Older Research studies have reflected the role of pharmacist medication reviews in primary care have shown
pharmacist ability to identify and resolve DRPs and reducing less number of drugs to be prescribed. The author suggests that more number of research studies have shown that role of pharmacists had poor rapport with general practitioner, which ultimately did not shown any improvement in clinical outcomes. This main objective of this research study is to decrease the health care costs by including economic evaluation in the pharmacist led medication reviews. The main goal of pharmacist led medication reviews is to optimise drug therapy for patients by altering medication costs. Incorporating medication costs in randomised controlled trials have demonstrated favourable prescribing outcomes. The author suggests the limitation of this research study in HCPs could not be able to evaluate the pharmacoeconomics in the patients who participated in this research study. The evidence information available where the pharmacists working in isolation have minimum impact on health care outcomes of patients in care homes and have failed to reflect cost effectiveness.

Desborough et al trials tells the main aim of this research study is designed to trace the high instances of irrational prescribing in care home residents, decrease the number of medication errors and increase the frequency of monitoring in drug therapy review of elderly patients in care home residents. Majority of DRPs were seen in prescriptions of psychiatric disorders such as psychoactive medications, therefore pharmacist led medication reviews in psychiatric patients of care home residents is predicted/forecasted to decrease the drug related problems.

Kingsly et al suggests proper education delivered in effective way to both children and their parents had reflected significantly can reduce the risk of hospitalisation. The role of pharmacist in HMRs of asthmatic patients has demonstrated improving quality of life. The author suggests criteria for a home visit include:

- Poor prognosis with chronic Asthma
- Non compliance issues.
- Multiple hospital admissions.
- Intensive admissions.
- Multiple Asthma Triggers.

The Australian Pharmacist on Home visits in Asthmatic patients of children had focussed the number of areas including:

- Allergen exposure e.g. pets within the home, soft toys in the bed.
- Smoking in the home
• Knowledge of medicines and appropriate use.
• Adherence to medicines and care plans.
• Psycho-Social issues

FREQUENCY OF HMRS IN CHILDREN BY AUSTRALIAN PHARMACISTS:
Among the 2,93,000 HMRs referrals received by GPs as of January 2011 only 142 were for children aged 0-4 years and 294 for those aged 5-14 years. The different barriers reflecting that lack of pharmacist carrying out research on HMRs for children include

• A lack of awareness that children are eligible for HMRs.
• An assumption that since Asthmatic children may only use one or two medicines that there should not be any problems.
• Insufficient hospital/GP/Community Pharmacist education.
• Lack of team integration of pharmacists into primary care.
• A lack of confidence that pharmacists have the skills to perform such HMRs

The HMR Research Pharmacist named Mr. Melnick shared his experiences with medicine use reviews in the UK as there is minimum number of research studies carried out on HMR for children. Melnick et al suggests that nurse led HMR on children has shown 79% had potentially modifiable risk factors responsible to cause their poorly controlled asthma, even though the children attended a tertiary paediatric respiratory centre. According to experiences gained by the study of Bracken, it would reflect that a successful paediatric Asthma HMR programme would need to focus on non pharmacological measures such as environmental and psycho-social concerns. Therefore training to pharmacists on HMR in Asthmatic children can have better influence in getting the good results. Finally author laments that this type of research work is immediately required to ascertain the Quality Assurance in HMR.15

Barber et al research study reflected older people residing in UK care homes (Care homes in UK means where patient residing in particular city will be getting health care facility by general practitioner, general practitioner is responsible to maintain medical record of that patient.16 Moreover patient will be getting twenty four hours nursing care. If patient in UK plans to transfer from own home to care home then patient can take decision either to continue with same general practitioner or replacement of general practitioner) are more prone to have risk of medication errors than any other group of population. According to author the main reasons behind this is polypharmacy, advanced age makes pharmacokinetic
and pharmacodynamic changes of drugs which can be held responsible for causing susceptible adverse drug reactions in this elderly population. Elderly patients with cognitive impairment will find it difficult to identify medication errors. Author suggests that in 2000 year a report documenting medication error was published and UK government was keenly interested to follow this documenting policy in order to minimise medication errors. According to author there were USA research studies reflecting about the medication errors in spontaneous system, but USA studies have not given importance to the prevalence of medication errors due to spontaneous system. The other drawback of USA research study was it could not provide information with regarding to specific medication error due to spontaneous reporting system. The basic objective of carrying out this research work was to identify prevalence of all types of medication errors in care homes (where more often elder people residing), to access the potential harm of these errors and to establish the underlying causes of these medication errors.

The selection criteria of this research work were based on different type of systems such as care homes, residential homes or combination. According to author more number of medication errors can be identified due to increased health care system created in health care practice. Three cities in UK such as West Yorkshire, Cambridgeshire and Central London were selected to obtain a varied sample. Patients residing in care homes who are receiving one or more medicines is enrolled in this research study by taking informed consent. Patients were selected on the randomisation basis. The patient data was collected by applying the two different methods such as qualitative and quantitative. The data collected with regarding to qualitative was medical history collected during patient interview. The quantitative data collected was to identify dispensing and monitoring errors which were conducted by pharmacist during clinical medication review of each randomly selected resident patients. Dispensing errors were identified by comparing the prescriptions and medication administration record sheets with the dispensed medicines by community pharmacist. The demographic data that was collected in this research study were number of residents approached, number of residents consented, number of residents excluded , number of residents entered into three different cities such as West Yorkshire, Cambridgeshire and Central London , gender such as female , age , nursing residents, residential residents, mean number of medicines per resident, median number of medicines per resident. Among 256 resident patients enrolled in this research study 178 resident patients had at least one medication error (prescribing, monitoring, administration or dispensing). Among the 147
resident patients who were prescribed a medicine which required monitoring were reflected with 18.4% (27) had monitoring errors. Medication administration errors occurred due to patients lack of awareness to medicines, poor physical condition finding it very difficult to administer medicines properly, wrong perception among the patients where they have feeling that medicines are poisonous, poor coordination among new drug delivery systems such as inhalers due to lack of education to patients. Dispensing errors occurred due to similar appearance of many tablets when removed from original containers, wrong interpretation of prescription by community pharmacist due to poor quality paper of prescription, poor writing by prescriber, poor language skills of home staff were identified, poor checking process by the community pharmacist at the time of dispensing.

Finally author concludes that people residing in UK care homes are weak and irresistible population who are at more risk of experiencing medication errors. Strategies that should be adopted to overcome medication errors in UK patients care homes are constant review of medication administration record, adequate training to the health care professionals in medication errors and designing research protocols on medication errors that help in evaluating the medication errors.16

Kalyango et al justifies the following reasons about the role of community pharmacist in home management of medicines in Uganda.17

1.60% of all deaths which is attributed in worldwide is mainly due to chronic diseases, which ultimately chronic diseases is responsible to cause disability also.
2. The risk of chronic diseases is rapidly increasing in developing countries.
3. Chronic conditions are often associated with more number of challenges including medicine related problems because of the increased period over which patients take medication and the large number of drugs they usually take.
4. The medicine related problems often seen are polypharmacy, non adherence to prescribed medicines, development of adverse events, inappropriate prescribing and dispensing, inadequate monitoring of treatment and poor home management of medicines.

The author suggests that there is very less research a study that is carried out on home management of medicines. The medication related problems often occurs when medicine are not properly managed among chronic disease patients. The influencing factors of DRPs that
usually results with respect to home management medicines among chronic disease patients are

- Not following the medicine instructions properly.
- Gender, age, confusion between trade and generic names, education level and number of medicines.
- 10-57% of incorrect use of medicines in home management medicines is reflected in older research studies.

The purpose of carrying out research in home medication management practices among chronic disease patients in developing countries like Uganda is due to following reasons:

- Lack of information about the use of drugs due to limited resources among chronic diseases.
- Poor literacy rate in Uganda.
- Poor literacy rate has resulted more confusion among patients.
- Patients with poor financial status may find it very difficult to purchase refrigerator, which ultimately certain drugs may loose their potency which is supposed to be stored in refrigerator.
- Weak drug policies and Regulatory bodies adopted by some countries may not adequately control the use of drugs.

Author tells that data was gathered by intern pharmacists who were given training on this research study. Patients suffering from chronic disorders such as Asthma, COPD and Cardiovascular diseases such as Angina, CCF, Hypertension, Stroke etc and were on treatment for the chronic diseases for minimum period of 2 months, residing within 1 KM of the Community Pharmacy was considered as inclusion criteria of this research study. Patients with chronic diseases who were not interested to get assistance from Research Pharmacist in managing their own medicines were excluded from the study. Research Pharmacist applied a pre tested Questionnaire and an observation checklist to get information on patients socio-demographics, past medical history and present medical history. The medical histories obtained by the participants in this research study were confirmed by reviewing the patient old medical record. The patient medical record reflected 15.9% (n=33) were caretakers of children among the 207 participants in this research study, while the rest were the patients themselves. Among the gender and marital status found in this research study were 66.2% (n=137) female and 49.5% (n=100) married. The most common
occupation was found to be businessperson (i.e 36.9%, n=76) followed by secondary school education as highest literacy status (i.e 33.8% n=68) in this research study. The most common chronic diseases among the patients/ participants enrolled in this research study were cardiovascular disease (42.5%) followed by diabetes (26.1%).

The findings in this research study were reflected as 50% of participants had inappropriate storage of medicines (51.7%,n=107) with 41.5% (n=86) keeping the medicines in inappropriate locations. The other problems reflected in Home medication management practices were keeping them under the pillow or in their pockets either as blister or strip packs or in medicine envelops which were mostly paper and therefore could easily get damaged while the medicine was in the pocket and some of the patients were not following the storage instruction of medicines properly such as medicines where they should have been stored in refrigerator rather not storing in refergeriator.8.7% had actual medication duplication followed by 50.7% had multiple prescribers for their disease condition.70% of patients were reflected with inappropriate home medication management practices. The different therapeutic classes reflected among the duplicated medicines were 38.9% analgesic, 22.2% drugs for asthma and cardiovascular disease followed by 11% were antacids. Factors associated with specific inappropriate home medicines management practices were reflected as having no medicines administration schedules, inappropriate storage of medicines, having multiple prescribers, drug hoarding. Author finally concludes that major significance of this research study was patient medication management practices were evaluated in their respective homes which showed very clearly how the patients have managed their medicines in according to the medication storage facilities existing their homes. Author also suggests that Uganda patients suffering from chronic diseases in home medication management practices were poor. Patients with poor literacy rate found very difficult to manage with home medication management practices. Therefore in order to strengthen home medication management practices in patients with poor literacy rate, health care workers specifically HMR pharmacist where he/she is more organised to carry out this type of research very often.

CONCLUSION
Most of the overseas authors suggest that role of pharmacist in home medicine review will help in identifying and resolving drug related problems. Patients with poor literacy rate may find it very difficult to manage with medicines, but in these type of situations pharmacist
intervention will be helpful to educate patients with regarding to medications as well as the importance of medication adherence.

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