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Research Article

EVALUATING NON-COMMUNICABLE DISEASES IN GERIATRICS WITH EMPHASIS ON POLYPHARMACY AND ITS COST BURDEN

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ABSTRACT

Now-a-days, Non communicable Diseases and polypharmacy are the major reason for mortality. NCD's needs long term treatment leading to higher expenses and in presence of co-morbidities, situation worsen and need multiple drug use contributing to consequences along with cost burden, low QOL and even death. A prospective observational study aimed to assess the economic burden of NCD along with polypharmacy in Geriatrics and AGS 2016 Beers Criteria was used to evaluate the potentially inappropriate medication use. A total of 211 geriatric patients were included, where majority were males (67%, n=141). Among NCDs, cardiovascular diseases (39.5%,n=68) were more prominent. Our study found that mean drug cost of branded drugs was adding an extra burden to the patient than the generic drug cost. Management of NCDs in geriatric patient is a challenge, since the geriatric population come across with co-morbidity, where treating each and every condition leads to multiple drug use. Efforts by clinical pharmacist should be done to improve the proper medication use, minimise adverse effects, improve quality of life, and create awareness regarding benefits and availability of generic medicine.

INTRODUCTION

Non communicable Diseases are generally defined as the diseases which progress slowly and are of long duration. According to a report by the World Economic Forum and the Harvard School of Public Health Dominant diseases in NCDs have a strong link with mortality and morbidity is cardiovascular diseases, diabetes, cancer and chronic respiratory diseases and mental illness. When comes to mortality percentage of NCDs, 82% of mortality burden is due to Cardiovascular diseases, Currently it was estimated that 2.7 million death occur due to CVD which was predicted to rise to 4 million by 2030. Diabetes, Type II DM accounts for about 90-95% of all diabetes cases. Chronic respiratory Diseases (Asthma, COPD, Respiratory allergies, Occupational lung diseases) jointly accounts for about 7% deaths worldwide. Cancer, there are many types of cancers and mortality due to cancer was estimated to rise from 12.9 million in 2009 to 17 million by 2020. Mental illness, According to WHO, globally 100 million people suffer from alcohol or drug abuse disorders, 25million people from schizophrenia and over 100 million people suffered from alcohol or drug abuse disorders in 2002.[1-4] Assessing the burden of these risk factors can predict the burden of disease which can help in developing interventions. Risk factors include Tobacco Consumption; it is strongly cited as a main risk factor for development of NCDs like cardiovascular disease, COPD, Cancers. Alcohol consumption, nearly 62.5 million people in India was estimated to drink alcohol in India in 2004. Improper diet and physical inactivity-Consumption of unhealthy oils high in saturated and trans-fats, excess salt intake, sedentary lifestyle are linked to NCDs. According to WHO, 4.1 million annual deaths have been attributed to excess salt/sodium intake, 1.6 million deaths annually can be attributed to insufficient physical activity. Health care system of India is majorly focused on acute care than the chronic care resulting in less adequate care giving at both primary and secondary care levels. However, India had laid down some National programmes to Address NCDs which include National Cancer Control Programme (NCCP), National Trauma Control Programme (NTCP), National Mental Health Programme (NMHP), the National Tobacco Control Programme (NTCP), and the National Programme for Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases and Stroke (NPCDCS). In 2011, the National Programme for the Healthcare of the Elderly (NPHCE) has also been started.[1,6] The burden of NCDs through Cost-of-illness

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approach (estimates of direct and indirect costs of NCDs) are as follows,

Table 1 The burden of NCDs through cost-of-illness approach

NCDs	Expenditure In 2010(USD)	Expected Expenditure In 2030(USD)
Cancer	290 Billion	458 Billion
CVD	863 Billion	1.04 Trillion
COPD	2.1 Trillion	4.8 Trillion
Diabetes	500 Billion	745 Billion
Mental illness	2.5 Trillion	6 Trillion

Polypharmacy use of multiple drugs by one individual is called as polypharmacy, which is majorly linked with co-morbidity. Since the recent decade Polypharmacy has been increasing and will continue to increase unless there is decrease in unnecessary drug prescriptions and appropriate therapeutic management in patients with multiple disease conditions. Polypharmacy leads to consequences such as medication non adherence, adverse drug effects, drug resistance, increase length of stay in hospital, medication errors, drug interactions, increase in economic burden and even death. Consequences of multiple drug use lead to decrease therapeutic efficacy and further hospitalisation. WHO predicted that "By 2050, the world's population aged 60 years and older is expected to total 2 billion". Geriatrics are subjected to use an multiple drugs due to co-morbidities leading to medication-related problems due to change in pharmacokinetic processes. Evidence shows that at least one drug that is not medically necessary is being consumed by greater than 50% of elderly patients, nearly 40% of elderly patients consume more than 5 prescription medication and about 20% take more than 10 drugs.[7-13] Negative consequences are associated with polypharmacy, where the burden of consuming multiple medications is significantly linked with Increased Healthcare Costs-In 2014 about $3 trillion was estimated to have spent by United States (US) on total national health care expenditures, of which 9.8% ($294 million) was spent on prescription drugs. A study conducted in Sweden reported that those consuming more than 5 medications had a increase in prescription drug expenditure of about 6.2% and those consuming more than 10 medication had 7.3% increase. Adverse Drug Effects occurs due to polypharmacy in hospital setting; increase the likelihood of morbidity, length of stay (LOS) and the cost of care. Drug-Interactions in a patient taking 5-9 medications had a 50% probability whereas the risk increased to 100% when a patient was found to be taking 20 or more medications. Medication Non-adherence, Complicated medication regimen and polypharmacy is strongly associated with Non adherence in older population. It is also associated with potential disease progression, treatment failure, hospitalization, and ADEs, all of which could be life-threatening. Nutrition-A prospective cohort study reported that malnourished and risk of malnourishment was about 50% in patients consuming 10 or more drugs.[13,15] Evidence based interventions have been developed to reduce polypharmacy, patient non adherence, inappropriate prescribing. Many of the developed strategies focus on elder population and include: Deprescribing, Patient education, Promote better medication reconciliation.

The Primary objective of the study was to examine the cost expenditure and influence of multiple drug use in geriatric patients with Non-communicable diseases. Secondary objective was to evaluate the direct cost expenditure of the patient in the hospital setting., evaluate the influence of co-morbidities on prescription and its burden, Identify the Potentially Inappropriate Medication use (PIMs), Identify the risk groups, assess the negative consequences of polypharmacy, identify the best cost-effective alternative to the prescribed drugs and evaluate the severity of drug interactions.

MATERIALS AND METHODS

This was a Prospective observational study conducted in Department of General Medicine, Tertiary care super speciality hospital, Kurnool, Andhra Pradesh, India for a period of 6 months. Sample size was calculated by considering both the method associated criteria and statistical measures of 5% margin of error, 95% level of confidence and 50% response distribution. Epi info (version 7.2.21) was used to calculate the sample size and was formulated as 269. This study criteria was taken as follows.

Inclusion criteria

- Patients diagnosed with chronic Non communicable Disease
- Patients who were prescribed with two or more drugs.
- Age to be considered ≥60 years.
- Either gender was considered.
- Patient on regular follow-ups
- Patients who have given informed consent

Exclusion criteria

- Patients unwilling to participate in the study.
- Patients who are discharged on the same day of admission.
- Outpatients are excluded.
- Patients who are unable to communicate.

Statistical analysis

The data were entered and analysed using the Microsoft Excel. Descriptive statistics such as frequencies and proportions were used for data summarisation. Drug interactions in prescriptions were analysed using MICROMEDEX 2.0. Chi square and Correlation were used to assess the level of significance as felt appropriate. The level of significance for independent variables was set at 0.05.

RESULTS AND DISCUSSION

A Total of 211 geriatric cases were collected where 67% (n=141) were male and 33% (n=70) were female. In this study major percentage of subjects are males (67%) and the similar finding was observed in a study by kumar K *et al*.[17] This may be because males was more prone suffer from NCDs like cardiovascular diseases, stroke, Diabetes mellitus etc. due to more risk factors in men like sex hormones, obesity, physical stress, alcohol consumption, smoking. The total geriatric populations were classified into six age groups and Subjects in each group were recorded. 60-64 age group subjects are considered as beginning of old age, 65-74 age group subjects are considered as young old group, 75-84 are considered as middle old group, more than 85 age groups subjects are considered as oldest old group. Mean age was 69.2±1 (95% CI)

in our study. The data from our study represents that majority (28%,n=59) of the patients were in the age group of 65-69 years (young old) , followed by 60-64 age group (27%,n=58) ,70-74 age group (18%,n=38), 75-79 age group (12%,n=26), 80-84 age group (11%,n=23), ≥85 age group (3%,n=7). Several previous study were found having the same results as of our study, Among them a data based observational study by bahler *et al*. states that majority of their study sample falls in age group of 65-69 years (28%,n=66,190). One more study was found published in PLOS One by Kim H *et al*. where 33.9% (highest percentage) of their study population were under 65-69 years.[18,19] Data on Social Habits like alcohol consumption, smoking were collected in the study.

Parameters with their frequency and percentage are mentioned in Table 2. A study done by Amin T *et al*. stated that smoking, alcohol consumption, obesity, diet, presence of hypertension, high lipid profile, inactivate behaviour are the risk factors for causing NCDs and found that 22% of their study population were smokers which was similar to our study but one more finding in their study was only 3% had no NCDs risk factors, which was in contrast to our study we have 62% of study subjects who are not having NCD risk factor this may be due to elder age of the subjects and awareness among them about the effect social habits on their health.[20]

Table 2 Social habits among subjects

Social Habits	Frequency	Percentage
Smoking	43	20%
Alcohol	14	7%
Both	24	11%
None	130	62%

Polypharmacy was observed based on the number of drugs prescribed in each subjects and found that all the 211 subjects in our study had polypharmacy. The average number of drugs for prescription was found to be 9.92 ±0.53 (95% CI). Polypharmacy was categorized into four types [No polypharmacy (0-2 drugs), minor polypharmacy (3-5days), major polypharmacy (6-9 drugs), excessive polypharmacy (≥10 days)], which were analyzed in our study subjects and found that 48% (n=101) subjects had excessive polypharmacy, 42% (n=89%) had major polypharmacy, 10% (n=21) had minor polypharmacy. Results along with their percentage are mentioned in Table 3.

Table 3 Prevalence of polypharmacy

Poly Pharmacy	Frequency	Percentage (%)
No Polypharmacy	0	0
Minor (3-5)	21	10
Major (6-9)	89	42
Excessive (≥10)	101	48

The numbers of drugs prescribed to the various age groups were analyzed. The highest prevalence of polypharmacy was among Young old (n=59) and are presented in Table 4. The results are similar to a study in Abu Dhabi, where the rate of polypharmacy was less in the older age group (≥ 80 years).

Table 4 Prevalence of polypharmacy-age wise

Age	Number of drugs				
	0-2	3-5	6-9	≥ 10	Total
60-64	0	6	24	29	58
65-69	0	9	22	27	59
70-74	0	2	18	18	38
≥75	0	3	3	27	56

The prevalence of polypharmacy among the male patients was high (66.82% n=141) than females (33.17% n=70). As shown in Table 5, which was similar to study done by Al-Hashar *et al*. but other studies were also found where higher polypharmacy rates were seen in females than males. This dissimilarities in the studies maybe due to the differences in physician prescribing drugs in consideration with gender along with subjects level of education and their economic status as factors of influence.[21,22]

Table 5 Prevalence of polypharmacy-Gender wise

Gender	Polypharmacy			
	3-5	6-9	≥ 10	Total
Female	6	29	35	70
Male	15	60	66	141

Consequences of polypharmacy (Drug Interaction, Adverse drug effects) were identified. Drug interactions were more prevalent than adverse drug effects that were 65%, 35% respectively. Our study finding were similar to study done by John *et al*. where 66.6% of study subjects had drug interactions which was due to increase in number of drug per prescription.[23] A moderate uphill positive relationship was observed between polypharmacy and drug interaction (r^2=0.5) and adverse effects (r^2=0.4). Total number of drug interactions was 630 with a mean of 4.1±3.6 per patient. Severity of drug interaction were assessed and found that major severity of drug interactions have the upper hand (n=370). In our study, 40% of the study population was experiencing ADE, which was which was higher than the ADE incidence of 6.7% found in the meta-analysis of 39 prospective studies from US hospitals conducted by Leape L. *et al*.[24] The Patients experiencing the ADE were taking a mean of 11.02±3.9 drugs when compared with those not experiencing ADE with mean of 9.3±3.9 drugs. The results found in our study were similar to the results from study conducted by Koh Y *et al*. where Patients suspected of experiencing an ADE were taking more number of drugs than those not having an ADE.[25] Table 6 shows the severity of drug interactions in respect to polypharmacy categories. A study conducted by Salwe K *et al*. found that moderate drug interactions were more prevalent in their study than the major interaction which was contrast to our study this can be explained by the categories of drugs prescribed in the study, as our study purely includes NCDs, and the drugs used to treat NCDs are more prone to cause Drug Interactions, Adverse effects than the drugs used to treat other diseases.[26]

Table 6 Severity of drug interactions in respect to polypharmacy

Polypharmacy	Severity of drug interactions			
	Contra-Indicated	Major	Moderate	Minor
Minor (3-5)	0	20	6	0
Major (6-9)	2	84	50	5
Excessive (≥ 10)	12	266	160	25
Total	14	370	216	30

Number of co-morbidities in our study subjects was evaluated. Out of 211 subjects, majority of subjects had two and more co-morbidities (n=114), 79 subjects have single co-morbidities, 18 subjects have no co-morbidities as shown in Table 7. In our study, it was observed a positive uphill linear relationship between co-morbidities and number of drugs prescribed (r^2=0.7) which means polypharmacy was proportional to co-morbidities, which was also observed in many study such as study done by Al-Hashar *et al*.[21] Increase in polypharmacy with increase in co-morbidities can be explained by urge to treat multiple co-morbidities with number of different medications. Drugs used to treat co-morbidities can cause adverse effects, which in turn require drugs to treat these ADE, thus adding more medication.

Table 7 Polypharmacy association with co-morbidities

Co-Morbidities	Polypharmacy			
	Minor	Major	Excessive	Total
1	10	38	31	79
≥2	8	44	62	114

Average length of hospital stay was (4.6±2.26) days. Table 8 shows the length of hospital stay per number of drugs used. Our study shows that there was no association of polypharmacy with length of hospital stay (p=0.07) which was found similar in many studies among them study done by Nobili A *et al*. states that polypharmacy was not a predictor for length of hospital stay and found that occurrence of ADE in hospital was the most significant predictor for prolonging hospital stay by nearly 4 days.[27]

Table 8 Polypharmacy association with length of hospital stay

No. of drugs	Number of days					
	2	3-5	6-8	9-11	≥ 12	Total
Minor (3-5)	3	18	0	0	0	21
Major (6-9)	8	65	12	2	2	89
Excessive (≥ 10)	5	63	27	3	3	101

Out of 211 subjects prescription,71% prescriptions (n=150) have drugs which comes under beers criteria (PIMs) and each prescription contains at least one inappropriate medication which was found similar in the study done by Osei E *et al*. where, Among the 60 patients evaluated, 44 (73%) were on at least one PIM. Another study done by Tripathi C *et al*. where, the study states that according to Beers criteria, at least one potentially inappropriate medication was prescribed in 590 (87.3%) patients.[28, 29] Total of 38 drugs were prescribed which meets beers criteria, and aspirin (n=81) was the most frequently used drug followed by insulin (n=61) and Lorazepam, Amitryptylline, Hydroxyzine, Meloxicam were least prescribed (n=1). Drugs along with their frequencies are mentioned in Table 9. A study done by Salwe K *et al*. observed that aspirin was the most frequently used Potential inappropriate medicines (PIM) prescribed in admitted elderly patients.[26] Increase in number of drugs used (polypharmacy) may lead the increase risk for the subject to get exposed to potential inappropriate medicine. This was found in several studies where there was a clear and positive association of PIMs with number of drugs prescribed, one of those Studies was done by Vieira de Lima *et al*. noted that polypharmacy was a factor strongly associated with PIM use, since patients taking many medications have a more chance of receiving an inappropriate prescription and are more likely to have multiple pathologies, hospitalizations, and consultations with multiple doctors of various specialties, which could lead to prescriptions of PIMs. Elderly people with cerebrovascular disease and psychiatric disorders have 7.3 and 5.3 times higher chances of using PIMs.[30]

Table 9 Frequently used inappropriate medications

Inappropriate drug	Frequency
Aspirin	81
Insulin	61
Amlodipine	39
Heparin	34
Clonazepam	25
Tramadol	24
Telmisartan	23
Glyceryl Trinitrate	21
Metformin	20
Mannitol	18
Torsemide	14
Diclofenac	14
Dicyclomine	13
Alprazolam	12
Glimepiride	10
Trypsin	9
Potassium Chloride	7
Pheneramine	6
Spirinolactone	5
Prazosin	5
Amiodarone	5
Diltiazem	5
Phenylephrine	4
Nitrofuratoin	4
Mefenamic Acid	4
Escitalopram	4
Piroxicam	3
Dopamine	3
Metolazone	3
Zolpidem	2
Clinidium	2
Theophylline	2
Etiophylline	2
Ibuprofen	2
Lorazepam	1
Amitryptylline	1
Hydroxyzine	1
Meloxicam	1

The most prevalent NCD among the study subjects was cardiovascular Disease (n=68), and the least NCD identified was psychiatry diseases (n=0) as mentioned in Table 10. The prevalence of cardiovascular diseases (39.5% n=68) was found higher than other diseases which was similar to results observed in study by Al-Hashar *et al*.[21] Prevalence of cardiovascular diseases can be related to high probability of elders to suffer from these diseases due to risk factors.

Table 10 Prevalence of NCD

NCDs	Frequency
Stroke	31
Respiratory (Asthma, COPD)	16
Diabetes Mellitus	16
Cardiovascular Diseases	68
Psychiatry Diseases	0
Cancer	2
Others	39

Subjects with NCD combinations were identified and the major combination found was Diabetes mellitus + cardiovascular Disease (n=14) followed by stroke + cardiovascular diseases (n=6) as shown in Table 11.

Table 11 NCD combinations present in subjects

Combination of NCDS	Frequency
Stroke+CVD	6
COPD+CVD	3
DM+CVD	14
Asthma+DM	1
COPD+DM+CVD	2
DM+CVD+CKD	3

NCD combinations with other diagnosis were also estimated and the results were mentioned in Table 12.

Table 12 NCD combination with other diagnosis

NCDs+Other diseases	Frequency
COPD+CKD	1
COPD+TB	1
COPD+PD	1
COPD+Anemia	1
COPD+Gastroentiritis	1
DM+Cellulitis	5
DM+Asthma	1
DM+Pneumonia+ILD	1
DM+CLD	1
DM+Renalcalculi	1
DM+CKD	1
DM+Meningioencephalitis	1
CVD+Cellulitis	2
CVD+Edema	1
CVD+CKD	3
CVD+Ulcer	1
CVD+Appendicitis	1
CVD+Bacillary dysentry	1
CVD+CLD	1
CVD+ALD	1
CVD+Gastritis	2
CVD+Pancreatitis	1

Among 211 study subjects, approximately 95% of the branded drugs were prescribed. Direct cost expenditure with branded drugs and Generic cost were calculated. Average drug cost, bed stay cost, diagnosis cost, physician visit cost, and other cost were segregated and calculated and depicted in Table 13 and Table 14.

Table 13 Direct cost expenditure with branded drugs

Parameter	Cost (Rs)
Branded Drug Cost	**8,33,253**
Bed stay	12,80,500
Diagnosis	7,52,335
Physician Visit	8,99,400
Other Costs	36,085

Table 14 Direct cost expenditure with generic drugs

Parameter	Cost (Rs)
Branded Drug Cost	**3,50,901**
Bed stay	12,80,500
Diagnosis	7,52,335
Physician Visit	8,99,400
Other Costs	36,085

Branded drug cost and generic drug cost was calculated and compared, where cost of branded drug (Rs.8,33,253) was far more high than Generic drug cost (Rs.3,50,901). Bed stay cost, diagnosis cost, physician visit cost, and other cost were similar in both brand and generic because we didn't conduct this in multicenter site and hence there was no alternative to compare. A study done by Kankeu H *et al*. found that NCDs pose a heavy financial burden which affected many households than other disease, cost of drugs were almost larger and main component in the total expenditure. However, cost of branded drugs imposed the patients to have more unnecessary expenses, which can be reduced by use of generic drugs where ever possible.[31] Cost burden increases due to presence of co-morbidities which can be explained by increase in cost of number of drugs used to treat different co morbidities. Similar findings were seen in study conducted by Cortaredona S *et al*. where the costs was substantially higher for individuals with co-morbidity than individuals without co-morbidities.[32] We found a moderate positive linear relationship between presence of co-morbidities with drug cost (r^2=0.6) and the cost related to respective co-morbidities are mentioned in Table 15.

Table 15 Effect on cost by co-morbidities

Parameter	Cost
Co-morbidities	18309.62±10518.12
No Co-morbidities	16547.47±10216.8

Average Drug cost were calculated in respect to number of co-morbidities and found that drug cost increases with increase in number of co-morbidities as in Table 16.

Table 16 Cost in relation with number of co-morbidities

Comorbidities	Drug cost
0	16547.47
1	17484.61
2	18350.14
≥2	**19094.43**

By observing Table 17, we concluded that there was increase in drug cost with increase in number of medications and found that drug cost and polypharmacy was highly correlated (r^2=0.7).

Table 17 Association of cost with increase in number of medication

Parameter	Average drug cost
3-5	11708.6
6-9	15176.1
≥10	21553.7

As observed in our study brand drug cost was far higher than Generic drug cost, which definitely shows impact on the patient's economic burden. The perception of generics use in elderly was varied, many of them have negative perceptions because they have majorly seen only the branded drugs purchased, sold, advertised during their life time, and now they find it difficult to accept the generic alternatives. Yet many patients are in the dilemma that only brand name products are efficacious. Purchasing medications have become a financial choice rather than a personal one. Many researches, surveys were conducted to determine whether generic drugs were as effective as branded drugs. Among such survey, in June 2006, the Kaiser Family Foundation conducted a survey entitled "Seniors' Early Experiences with Their New Medicare Drug Plans" and found that a considerable number agree that these agents are equally effective, compared with their previous branded products. Many researches shows the opposite results. It is still a controversial topic which has equal supporters. Our suggestion is branded drugs are to be used only when there is a necessity (when no generic is available/when patient is not responding to generic/in case of life saving drugs) and rest drugs to be used are generics which provide equal effect. However, as health care costs continue to rise, the search for economical and effective medication therapies is becoming

more important. Awareness on cost saving characteristic of generic drug usage should be done especially among the Patients suffering from NCDs (which imposes a huge cost burden), physician so that they could optimise the good therapeutic drug plan for the patient, which is effective and increase the patients quality of life. Pharmacists and physicians can play a key role in changing patient's traditional perceptions by educating patients about the generic drug use, its cost saving nature, its efficacy. Pharmacists are the most important component of healthcare profession who have a significant role in educating patients, promoting rational drug use, preventing polypharmacy. Drug information like side effects of drugs, drug interactions, benefit of medication use and overdose information etc. should be provided by the pharmacist to the geriatric patients so as to maintain appropriate medication adherence. Pharmacist is expected to provide the information regarding the best cost effective drug to the physician so as to improve the patient health outcome. One more responsibility of pharmacist is to make physician aware about the Beers Criteria and minimise the PIM use except where clinically warranted to help mitigate potential harms that may be associated with using these types of medications. Proper relationship between pharmacist-physician is also very important. By Collaboration of physician, pharmacist and patients, a best treatment plan is evolved which is optimised, effective and economic. The study limitations includes, Small sample size: This was due to less hospitalisation of patients >60 years in our hospital (within our study period). Small sample size was attributed due to our inclusion criteria and time limitation. Hence, limiting generalisability of the study findings. We conducted this study in only one hospital setting, which was the reason for no psychiatry cases in our study. We did not collect any information regarding OTC medications and other supplements. An intervention to prevent polypharmacy was not implemented. The impact of polypharmacy on medication adherence and other health outcomes was not investigated and needs to be addressed in future studies.

CONCLUSION

Our study disclosed the high prevalence of cardiovascular diseases among NCDs and an alarming high rate of polypharmacy among the geriatric population. Polypharmacy have been drawing attention as an emerging health concern in world. Cost burden to the patient also increases as number of medications increases as shown in the study. Potentially inappropriate medication use was seen in our study which should be avoided in geriatric so as to improve the patients health and quality of life unless in unavoidable conditions. Efforts should be made to improve the proper medication use, minimise adverse effects, improve quality of life, and provide drugs which are both effective and economic to patient. There are many Evidence-based interventions, which have been implemented to reduce polypharmacy, patient non-adherence, inappropriate prescribing. Physician should focus on prescribing low cost evidence based medicine The contribution of clinical pharmacists is essential, as they have a key role in improving the appropriate use of medications. Awareness regarding benefits and availability of generic medicine should be done by the clinical pharmacist among both patients and physician.

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Abbrevations

ADE: Adverse drug Effect
ALD: Alcoholic Liver Disease
CHF: Congestive Heart Failure
CKD:Chronic Kidney Disease
CLD: Chronic Liver Disease
COPD: Chronic Obstructive Pulmonary Disorder
CVD: Cardiovascular Disease
DM: Diabetes Mellitus
IADLs: Instrumental Activities Of Daily Living
ILD: Inflammatory Lung Disease
NCCP: National Cancer Control Program
NFHS: India's National Family Health Survey
NTCP: National Trauma Control Program
NPCB: National Program for Control of Blindness
NMHP: National Mental Health Program
NPCDCS: National Program for Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases and Stroke
NPHCE: National Programme for the Healthcare of the Elderly
PD:Parkinsons Disease
TB: Tuberculosis

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