

A Prospective Study To Analyze The Cognitive Function And Drug Utilization Pattern In Patients With Dementia In A Tertiary Care Teaching Hospital

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ABSTRACT

Dementia is a condition of the gradual decline of mental functions such as thinking, memory, and reasoning that is severe enough to interfere with a person's daily functioning. Dementia is not a disease itself, but rather a group of symptoms that are caused by various diseases or conditions. Cognitive decline is one of the important factors affecting the quality of life in geriatric patients, although the WHO has declared 'Dementia' as a priority health condition. Drug utilization review is defined as an authorized, structured, ongoing review of prescribing, dispensing and use of medications. The aim of this study was to analyze the cognitive function and drug utilization pattern in dementia cases. The study design was an observational, prospective study of one month – interval follows up, including both male and female patients of age group > 45 yrs in Pushpagiri medical college hospital, Thiruvalla. The total sample size of the study was 56. The cognitive function was analyzed by Addenbrooke's cognitive examination scale and drug utilization pattern analyzed through patient's prescription records and a detailed patient data collection proforma.

Key words: Drug utilization, dementia, cognitive function

INTRODUCTION

Dementia is emerging as an important health problem of elderly people worldwide. For most people's occasional decline in memory are a part of normal aging process, and not a warning sign of serious mental deterioration or the onset of dementia. The major difference between age-related memory loss and dementia is that the age-related memory impairment is not disabling, but dementia causes persistent, disabling reduction in two or more intellectual abilities such as memory, language, judgment, and abstract thinking^[1,3]

Dementia is emerging as an important health problem in Kerala, the southernmost state of India. The number of elderly people in Kerala increased from 0.9 million (5.3%) in 1961 to 2.5 million (8.3%) in 1991 and 3 million (9.5%) in 2001 and the rate of incidence is gradually increasing.^[2]

Dementia is usually caused by nervous system disease, especially Alzheimer's disease, is increasing in frequency more than most of other types of dementia. The first defined histopathologic features of AD were extracellular amyloid plaques and intracellular neurofibrillary tangles. Also, the increased incidence of AIDS dementia complex, which results from HIV infection, helps account for the increased

dementia in recent history, although with the invention of newer and better drugs to treat HIV, the occurrence of AIDS-associated dementia is declining. Vascular dementia is the second most common cause of dementia after Alzheimer's disease. The term "mixed dementia" is most commonly applied when hallmark pathologies of Alzheimer's disease and vascular dementia coexist but can also describe Alzheimer's and coexisting pathology of other forms of dementia.^[4,5,6] Patients with cognitive impairment may experience a range of behavioral problems that can be frustrating for caregivers. By keeping the patient active, focusing on their positive abilities, and avoiding stress can minimize the extent of cognitive deterioration in dementia cases.

The drug utilization evaluation (DUE) was originally known as drug utilization review (DUR) in the 1970s and early '80s. The terms DUE and DUR are interchangeable.^[7]

The World Health Organization (WHO) addressed drug utilization as the marketing, distribution, prescription and use of drugs in a society, considering its consequences, either medical, social, and economical. A drug utilization study is an essential part of pharmaco-epidemiology. The

principal aim of drug utilization studies is to facilitate the rational use of drugs in populations. Drug utilization studies can increase understanding of how drugs are being used as follows. In the present status it is considering as a valuable investigation resource in pharmaco-epidemiology pharmaco-vigilance & pharmaco-economics.^[8,9]

The pharmacist's participating in DUR programmes can directly improve the quality of care for patients, individually and as populations to prevent the use of un-necessary or inappropriate drug therapy, prevent adverse drug reactions and improve over all drug effectiveness.

METHODOLOGY

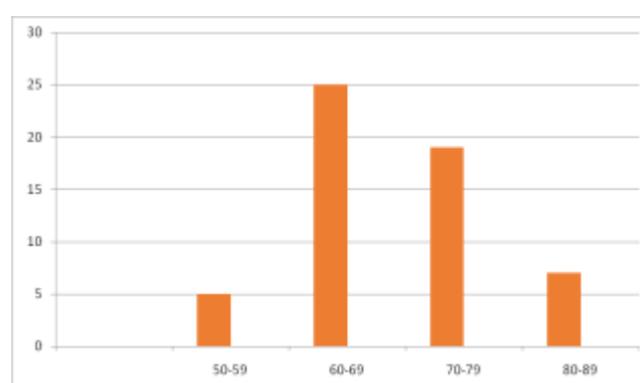
A prospective observational study was carried out in the Neurology department of Pushpagiri medical college hospital, Tiruvalla. The study was carried out from March 2014 to August 2014 in patient's diagnosed with dementia of age group >45 years. The study subjects were selected based on the inclusion and exclusion criteria. Both male and female patients were included and patients diagnosed with psychiatric illness prior to dementia and those who are not willing to participate were excluded from the study. The total sample size of the study was 56. Patient's data collection form was prepared on the basis of study objectives. A written informed consent was taken from the patient or caregiver in a prescribed format. The study protocol was approved by human ethics committee of Pushpagiri medical college hospital. The study was implemented by direct interview with the patient or informant. The drug utilization pattern in dementia patients analyzed through patient's prescription records and using a patient data collection proforma for recording the demographic details of the patient, past medical history, drug allergies, drug interactions, adverse drug reactions, and other medical conditions. Cognitive assessment was carried out by Addenbrooke's cognitive examination scale which is a brief cognitive test that assesses five cognitive domains namely: Attention / orientation, memory, verbal fluency, language and visuospatial abilities. The obtained clinical data's statistically analyzed through SPSS Software version 21.00, significance was determined using the paired t-test (at a significance level of 0.05)

OBSERVATIONS & RESULTS

Table: 1 Distribution of patients based on age group

Sl. No	Age group (Yrs)	Frequency (n=56)	Percentage (%)
1	50-59	5	8.9
2	60-69	25	44.6
3	70-79	19	33.9
4	80-89	7	12.5

Fig: 1 Distribution of patients based on age group

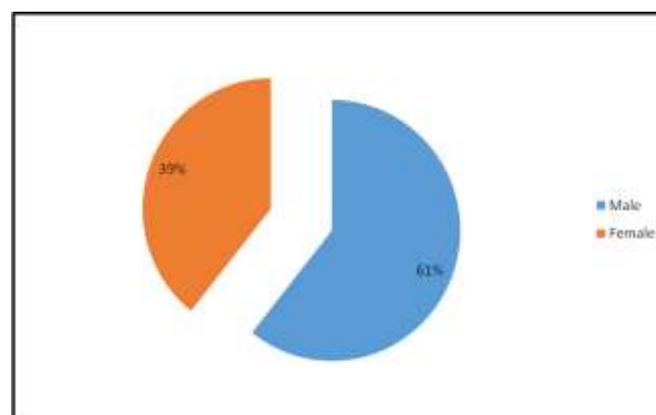


In the study, patients between the age group 60-69 (44.6%) found to be higher in number diagnosed with dementia

Table: 2 Distribution of patients based on gender

Sl. No	Gender	Frequency (n=56)	Percentage (%)
1	Male	34	60.70
2	Female	22	39.30

Fig: 2 Distribution of patients based on gender

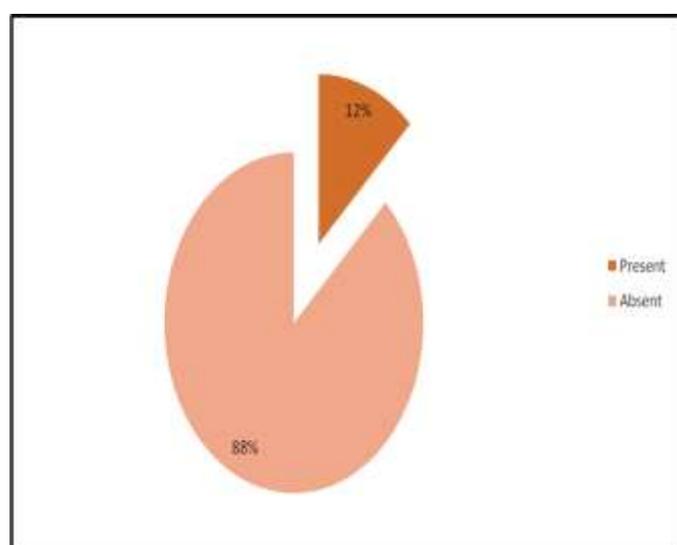


In the study population male gender (61%) is higher in number diagnosed with dementia and (39%) were females.

Table: 3 Distribution of patients based on family history

Sl. No	Family history	Frequency (n=56)	Percentage (%)
1	Present	7	12.5
2	Absent	49	87.5

Fig: 3 Distribution of patients based on family history

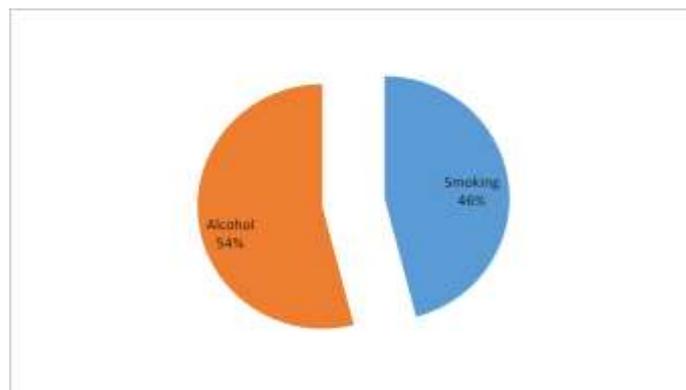


In the study population 12.5% cases have significant family history of dementia

Table 4: Distribution of patients based on Social habits

Sl. No	Social habits	Frequency (n=56)	Percentage (%)
1	Alcohol	20	54
2	Smoking	17	46

Fig: 4 Distribution of patients based on Social habits

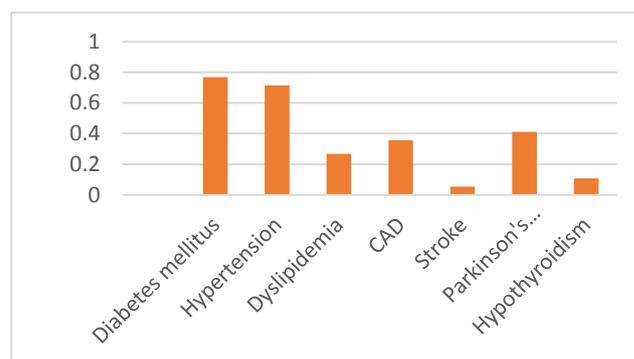


In the study population (54%) had the habit of alcohol and (46%) had smoking habit

Table 5: Co-morbid conditions associated with dementia

Sl. No	Co-morbidities	Frequency (n=56)	Percentage (%)
1	Diabetes mellitus	43	76.8
2	Hypertension	40	71.4
3	Dyslipidemia	15	26.8
4	Coronary artery diseases(CAD)	20	35.7
5	Stroke	3	5.4
6	Parkinson's disease	23	41.1
7	Hypothyroidism	6	10.7

Fig: 5 Co-morbid conditions associated with dementia

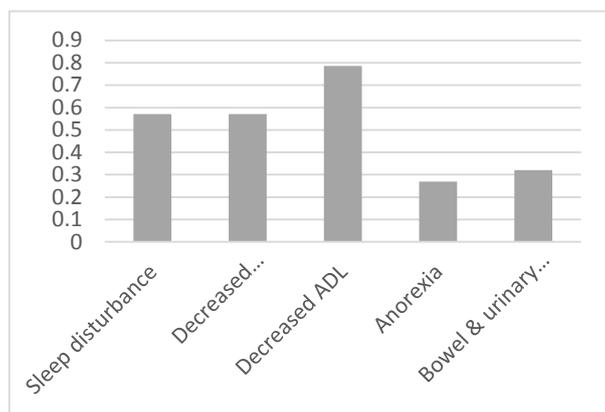


In the study population Diabetes mellitus (76.8 %) and Hypertension (71.4%) were found to be the highest co-morbidities associated with dementia

Table 6: Complications associated with dementia

Sl. No	Complications	Frequency (n=56)	Percentage (%)
1	Sleep disturbance	32	57.1
2	Decreased emotional health	32	57.1
3	Decreased activities of daily living (ADL)	44	78.6
4	Anorexia	15	27
5	Bowel and urinary incontinency	18	32.1

Fig. 6: Complications associated with dementia

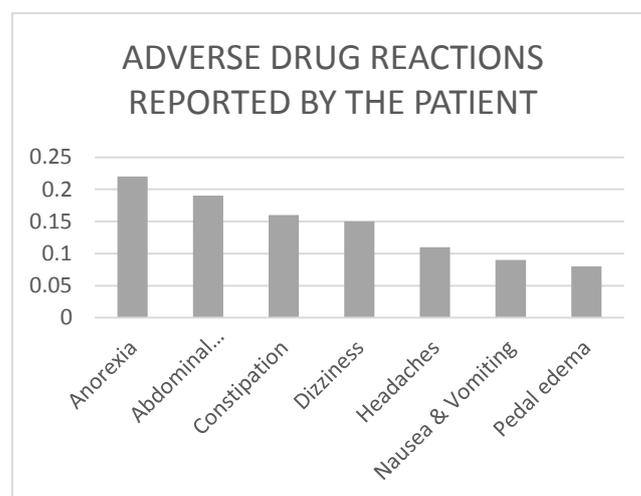


In the study majority of the populations had the complications decreased ADL (78%) and sleep disturbances (57.1%)

Table 7: Adverse drug reactions reported by the patient

Sl. No	ADR	Frequency (n=56)	Percentage (%)
1	Anorexia	15	22
2	Abdominal discomfort	13	19
3	Constipation	11	16
4	Dizziness	10	15
5	Head aches	7	11
6	Nausea and vomiting	6	9
7	Pedal edema	5	8

Fig. 7: Adverse drug reactions reported by the patient

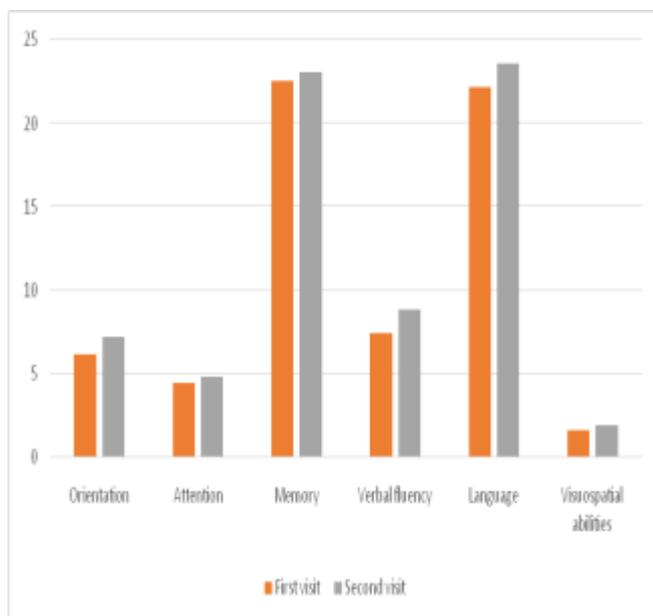


In the study most reported adverse drug reactions were anorexia (22%), abdominal discomfort (19%) and constipation (16%)

Table 8: Parameters analyzed under Addenbrooke's-cognitive examination scale (ACE)

Sl. No	Parameters	First visit Mean±SD	Second visit Mean±SD	P-Value
1	Orientation	6.196±1.565	7.250±1.861	.000**
2	Attention/Concentration	4.464±1.501	4.803±1.833	.038*
3	Memory	22.535±5.805	23.071±6.352	.155
4	Verbal fluency	7.410±2.104	8.875±2.080	.000**
5	Language	22.196±3.365	23.607±3.472	.000**
6	Visuospatial abilities	1.660±0.939	1.910±1.100	.047*

Fig 8: Parameters analyzed under Addenbrooke’s-cognitive examination scale (ACE)



In the study most of the parameters analyzed under ACE, orientation, attention, verbal fluency, and visuospatial abilities were found to be statistically significant

Table 9: Drug utilization pattern in Dementia

Sl. No	Drugs	Frequency (n=56)	Percentage (%)
1	Anti-choline-esterases	56	100
2	Anti-depressants (SSRIs)	14	25
3	Benzodiazepines	13	23.2
4	Neuroleptics	11	19.6
5	Anti-Parkinsonian drugs	31	55.3
6	Anti-convulsants	22	39.2
7	Hypo-glycemics	43	76.7
8	Anti-	40	71.4

	hypertensives		
9	Anti-dyslipidemics	16	28.5
10	Anti-platelets	26	46.4
11	Thyroid preparations	5	8.9
12	Urinary anti-spasmodics	14	25
13	Analgesics & anti-pyretics	7	12.5
14	Proton pump inhibitors	10	17.8
15	Multi-vitamins	36	64.2
16	Calcium supplements	19	33.9

Dementia is one of the most disabling disorders afflicting adult and elderly population reaching to epidemic proportions with an estimated 4.6 million new cases worldwide each year. It is expected that the burden of dementia will be increasing in developing countries due to increase in longevity and increasing prevalence of risk factors such as hypertension and stroke. More than half of these individuals have Alzheimer’s disease (AD) resulting in a progressive decline in cognitive function and communication, together with the frequent occurrence of neuropsychiatric symptoms.^[10, 4] Drug utilization evaluation is an ongoing authorized and systematic quality improvement process which is designed to review drug use, provide feedback of results to clinicians and other relevant groups, develop criteria and standards which describe optimal drug use and promote appropriate drug use through education and other interventions.^[11]

Majority of patients in this study belonging to the age group 60-69 (44.6%) followed by 70-79 (33.9%). Regarding gender distribution males dominated the study population (60.7%) for males and (39.3%) females. This result correlated with the findings from the study conducted Mansi patel et al^[12]

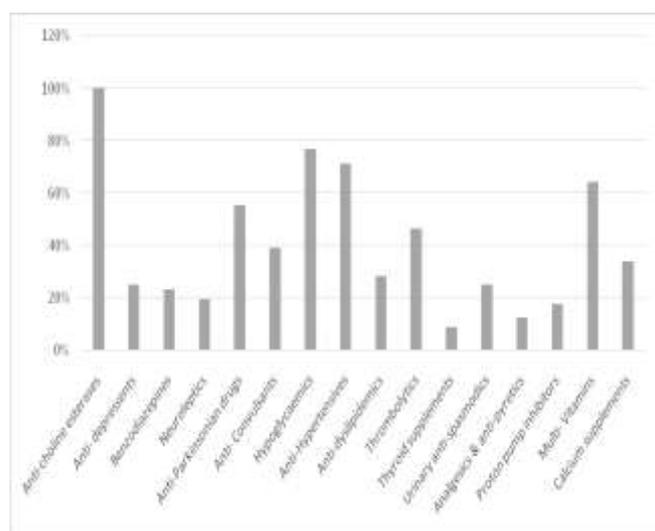
Most of the patients with dementia are geriatrics; taking polypharmacy the results generated from the study reveals that majority of them had one or more co-morbidities like diabetes mellitus (76.8%) hypertension (71.4%) dyslipidemia (26.8%) coronary artery diseases (35.7%) stroke (5.4%) parkinson’s disease (41%) hypothyroidism (11%) . The findings were correlated with the study conducted by Karan Thakker et al, Mansi patel et al^[13, 12]

In the study, patients who are alcoholics (35.7%) and smokers (30.4%) had severe disease severity than others. Most of the life style diseases have a greater impact on dementia severity especially diabetes mellitus, Parkinson,s disease hypothyroidism and stroke.

In the assessment of cognitive examination by ACE scale the parameters orientation, attention/concentration, memory, and verbal fluency, visuospatial abilities, found to be improved in majority of patients. Anti-cholinesterase’s found to be effective and well tolerated in most patients with dementia. The results were correlated with the findings from the study conducted by Boada-Rovira M et al^[14]

The most commonly prescribed anti-cholinesterase inhibitor was donepezil (Alzil) (57.14%) in a dose range of 5mg once daily for duration of 1-3 months, followed by combination of donepezil with memantine (Alzil M) (42.9%) in a dose range of 5mg for 1-3 months duration. The Present study reveals that Donepezil (57.14%) and combination of donepezil with memantine (42.9%) were found to be the

Fig 9: Drug utilization pattern in Dementia



In the study anti-cholinesterase (Donepezil) (100%) is the prescribed anti-dementia medication for all cases of dementia followed by various other therapeutic categories for controlling the co-morbid conditions.

DISCUSSION

most prescribed anti-dementia drug in patients with mild to moderate dementia. This result correlates with the findings from the study conducted by Karan Thakkar et al and Rungsanpanya et al ^[12, 15]

The other classes of drugs prescribed are neuroleptics (11%) anti-depressants (25%) anxiolytic agents (23.2%) hypoglycaemics (76.8%) anti-hypertensives (71.4%) anti-parkinsonian drugs (55.4%) anti-convulsants (39.3%) anti-dyslipidemics (28.6%) thrombolytics (46%) thyroid preparations (9%) proton pump inhibitors (18%) analgesics and anti-pyretics (12.5%) multi-vitamins (64.3%) calcium supplements (33.9%) urinary anti-spasmodics (25%). The most commonly prescribed neuroleptic drug was Quetiapine (11%) in a dose range of 25-100 mg prescribed more in male patients. The drug might be a choice since it has lesser propensity of causing extra-pyramidal side effects as compared to other anti-psychotic drugs. This result correlated with the findings from the study conducted by Mansi patel et al ^[12] The most commonly prescribed anti-depressant was Fluoxetine followed by escitalopram and dosulepin. Clonazepam was the most commonly prescribed anxiolytic agent in a dose range of 0.5 mg for duration of 1-3 weeks. The most commonly prescribed hypoglycemic agent was metformin followed by combination of metformin with glibenclamide. The highest prescribed anti-hypertensive agent was telmisartan followed by metoprolol and enalapril.

Syndopa plus and ropinirole were the commonly prescribed anti-parkinsonian drugs. The most commonly prescribed anti-convulsant was phenytoin followed by gabapentin, pregabalin and clobazam. The most commonly prescribed anti-dyslipidemic agent was rosuvastatin followed by fenofibrate. The most commonly prescribed thrombolytic agent was aspirin followed by clopidogrel. Thyroxine sodium was the most commonly prescribed thyroid preparation. Omeprazole was the most commonly prescribed proton pump inhibitor. The most commonly prescribed drug under analgesic and anti-pyretic was ultracet (combination of tramadol hydrochloride and acetaminophen). The most commonly prescribed multi-vitamin was nexfolin (L-methylfolate/ methylcobalamin/ n-acetylcysteine) and calinept (calcitriol 0.25 mcg, calcium carbonate 1250 mg.) was the most commonly prescribed calcium supplement. The most commonly prescribed urinary anti-spasmodic was darifenacin followed by terol (tolterodine).

The high prescription of antihypertensives, hypoglycemics, anti-parkinsonian drugs, thrombolytics and anti-convulsants can be explained by the high prevalence of hypertension, diabetes mellitus, parkinson,s disease , coronary heart problems and epileptic-seizures in the geriatric population.

In the study neuroleptics are prescribed judiciously in dementia patients. The utilization rate of multi-vitamins increased in most patients similar results were found in the study conducted by Mansi patel et al ^[12]

CONCLUSION

The study concludes that patients suffering with memory impairment and cognitive decline are increasing especially in geriatric populations. The most common risk factors identified are age, diabetes mellitus, Parkinson,s disease, stroke, hypothyroidism, CAD, alcoholism and smoking. The cognitive abilities tends to be improved in most cases of dementia with cholinesterase inhibitors and memantine and the utilization rates of multi-vitamins found to be inflated. Majority of the patients with dementia are geriatrics, taking polypharmacy in such cases the chances of occurrence of adverse drug reactions, contra indications and drug interactions may be high so it is essential to conduct further pharmacovigilance and economic studies in dementia cases as it will improve the overall pharmaceutical care to the patient.

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