

A Study to Assess the Anti Cholinergic Burden Index among Geriatrics

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ABSTRACT

Background: Older cohorts often present with multiple co morbid conditions, for which polypharmacy become inevitable. Geriatrics' also present with altered kinetics and dynamic changes. Polypharmacy together with their altered pharmacokinetic and pharmacodynamic changes among frail old patients' results in adverse drug reactions and also imparts drug burden to them. **Aim:** The aim of this retrospective pilot study is to analyse the drug burden (DBI) and anti cholinergic burden (ACB) index experienced by the geriatric cohorts. **Materials and Methods:** In this retrospective pilot study, the medical records of patients' aged 60 years and above were collected. Their demographics, medical and medication history were collected and analysed for co morbidity index, anti cholinergic burden and drug burden index. **Results:** In this retrospective pilot study, 104 patients' were recruited, of which 59.61 % were males and 40.38% were females. The average co morbidity index was 2.29 ± 1.5 . The average drug burden index owing to anti cholinergics and sedatives was found to be 0.34 ± 0.33 and 0.26 ± 0.29 respectively. **Conclusion:** The drug burden and anti cholinergic burden index substantiate that geriatrics with polypharmacy are in increased risk of cognitive and functional decline. Pharmacists' and physicians should work coherently and incorporate guidelines proposed by experts while prescribing for geriatric people.

Keywords: Anti cholinergic Burden Index (ACB), charlson Co morbidity Index (CCI), Drug Burden Index (DBI), polypharmacy

Received 14 Nov 2014

Received in revised form 12 Dec 2014

Accepted 14 Dec 2014

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INTRODUCTION

Anti cholinergics are drugs which acts on muscarinic receptors and exerts its action in opposite to that of acetyl choline. Acetyl choline plays a role in cognitive functions like learning and memory. Anti Cholinergics and drugs having anti cholinergic properties are used in elder cohorts to treat various disease conditions like overactive bladder and extra pyramidal symptoms [1-4]. Drugs like tricyclic anti depressants, anti psychotics, anti histamine and anti emetics have profound anti cholinergic properties amidst their pharmacodynamic activity. Adverse effects associated while prescribing drugs with anti cholinergic drugs properties includes delirium, dizziness, falls, constipation, confusion, cognitive impairment, impulsive behaviour, dry mouth and dry eyes [1, 5]. Anti cholinergic drug administration in older cohorts' leads

to adverse effects like poor cognition, decreased physical function, increased mortality and hospitalisation [3, 6-11]. The rationale of this study to analyse the patients' co morbidity index, and drug burden index experienced owing to senility and co morbid conditions.

The burden experienced by patients' owing to anti cholinergic drugs was measured using Drug Burden Index equation. The Drug Burden Index (DBI) is a recently developed scoring system that measures the exposure of anti cholinergic and sedative drugs by a patient. The Drug Burden Index is measured by using the formula $DBI = D / (\delta + D)$. Several studies have shown decline in physical functioning of geriatrics owing to higher DBI score (either to greater exposure to Anti Cholinergic, or Sedatives) [12- 14].

The Anti Cholinergic Cognitive Burden (ACB) Index measures the overall cognitive burden of Anti Cholinergic prescribed to patients. ACB scale was developed in 2008 through systemic literature review to identify the drugs with anti-cholinergic property. Drugs with possible cognitive effects were given a score of 1 (ACB=1) and drugs with definite cognitive effects were given a score of 2-3 (ACB= 2-3) [15].

The health status of the study population was assessed using Charlson Co morbidity Index (CCI). The CCI is a reliable tool to measure the health status of the patient. It comprises of 19 medical conditions and each condition was scored in the range of 1-6 depending on the severity [16, 17].

The objective of our Retrospective pilot study is to assess the Anti Cholinergic and co morbid Burden experienced by the patients' aged 65years and above.

MATERIALS AND METHODS

This retrospective pilot study was carried out in the GSL General Hospital, Rajahmundry, with prior permission obtained from the Medical Superintendent

of the Hospital and from the Medical Records Department. Medication Records of Patients' aged 65 years and above and who were admitted to the hospital for complaints other than Road Traffic Accident (RTA), poisoning and surgery were procured for the study. The patients' demographics, disease condition, duration of stay in the hospital, co morbid disease condition and drugs prescribed were collected in predesigned structured format. The study was carried out for a period of 3 months (May, 2013 till July, 2013) to analyse the Anti Cholinergic Burden experienced by the patients' using Anti cholinergic Burden (ACB) Index Scale and to analyse the co morbid status of the patients' using Charlson Co Morbid Index (CCI). The data were analysed using SPSS V-16.0.

RESULTS AND DISCUSSION

In this retrospective pilot study, a total of 104 patients aged ≥ 65 years were recruited and their demographics, average duration of stay in the hospital, average number of drugs prescribed to them during hospital stay are given in (Table 1).

Table 1: Characteristics of Study Population (N= 104)

Characteristics	Percentage (%) / Mean \pm S.D
Age	69.03 \pm 5.31 years
Gender	
Male	59.61%
Female	40.38%
Length of stay in hospital	7.77 \pm 4.62
Number of drugs prescribed	8.3 \pm 4.3
Charlson Co morbidity Index (CCI)	2.29 \pm 1.5
Drug Burden Index of Anti Cholinergic (DBI _{AC})	0.34 \pm 0.33
Drug Burden Index of sedatives(DBI _S)	0.26 \pm 0.29
Total Drug Burden Index (DBI _{Tot})	0.764 \pm 0.94

The patients' presenting complaints, past medical history and the initial diagnoses were also documented and the co morbidity index of the patients' was measured using Charlson Co morbidity Index (CCI) scale. The CCI is a valid and reliable instrument to measure the Co Morbidity. It encompasses 19 medical conditions and was weighed between scores of 1 to 6 with a total score ranging from 0 to 37 [16, 17].

The CCI accounts for physical function rather than mental function [2]. The study conducted by O. Best et.al, showed a lower median range of 2 for CCI, another study by

Lowery et.al, showed a median range of 5 for CCI [18, 19]. The calculated Charlson Co Morbidity Index (CCI) score of our study cohorts are given in (Table 1).

The Drug Burden Index is a validated pharmacological risk assessment tool, which measures the patients' response to anti cholinergics and sedative drugs. DBI takes into account both peripheral and central anti cholinergics and sedatives. Various studies showed that increased DBI is associated with functional impairment, repeated hospitalisation and frailty among geriatrics [13].

A large scale Finnish cohort study showed that increased DBI is associated with hospitalisation and mortality in people with and without Alzheimer's disease. A study conducted by Landi et. al and Cao et.al. in frail old community dwelling patients' showed a functional decline owing to anti cholinergic and sedative exposure [20, 21]. A study conducted in Residential Aged Care Facilities (RACFs) by Hilmer et.al., 2007 and Hilmer et.al., 2009 and Hosia -Randell, 2008 showed no decline in physical function owing to anti cholinergic and sedative exposure [13, 14, 22]. The Health ABC study conducted by Sarah N. Hilmer, 2009 showed that increased exposure to Anti Cholinergics and Sedative drugs as measured by DBI results in decreased physical function over 5 years in community dwelling older cohorts [14]. The Drug Burden of patients owing to Anti cholinergic were measured by using the formula $DB_{AC} = D / (\delta + D)$, where D is the daily dose and δ is the minimum recommended daily dose approved by the British National Formulary.

The Drug Burden Index score ranges from 0 to 1, where score 0 represents no drug burden, score between 0 and 1 represents low burden and score more than 1 signifies high burden.

In this retrospective pilot study, the DBI owing to anti cholinergics was measured and it is represented in (Table 1).

In our study, the cohorts are categorised into no exposure to DBI drugs (DBI = 0), low (DBI 0 to 1) and high (DBI >1) exposure to DBI drugs. 33.65%, 40.38%, 0.96%, 25% of patients' were exposed to DBI score of 0 (no exposure), 0 to 1(low), >1 (high exposure) respectively (Fig.1).

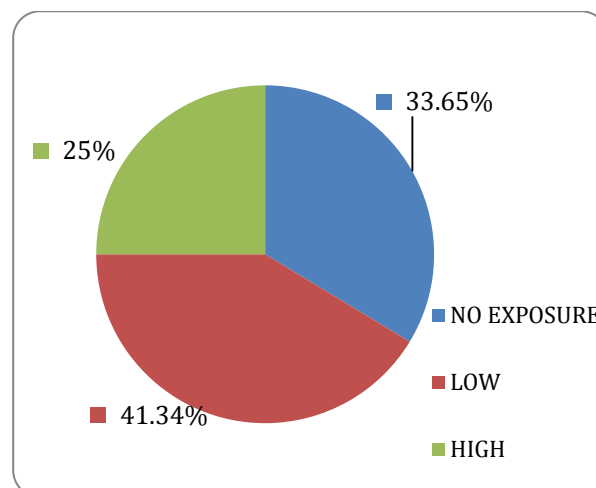


Figure 1: Percentage of Drug Burden Index (DBI) Exposure

The anti cholinergic drugs prescribed to the patients were identified by using Anti cholinergic cognitive burden (ACB) list and it identifies the medications with anti cholinergic property and has been used in various studies across the globe.

The ACB index assigns a score of 1 for drugs with possible anti cholinergic and score of 2 and 3 for drugs with definite and severe anti cholinergic property respectively. In a study conducted by Campbell et.al, the prescriptions with anti cholinergic medications increased the risk of delirium in hospitalised patients' [23-24].

A study conducted by Unax Lertxundi et.al, showed a mean ACB index of 3.28 among hospitalized geriatrics [26]. The Anti Cholinergic cognitive Burden of our study patients' was measured by using ACB Index scale and they were categorised into drugs having possible cognitive burden and definite cognitive burden on patients' (Fig. 2).

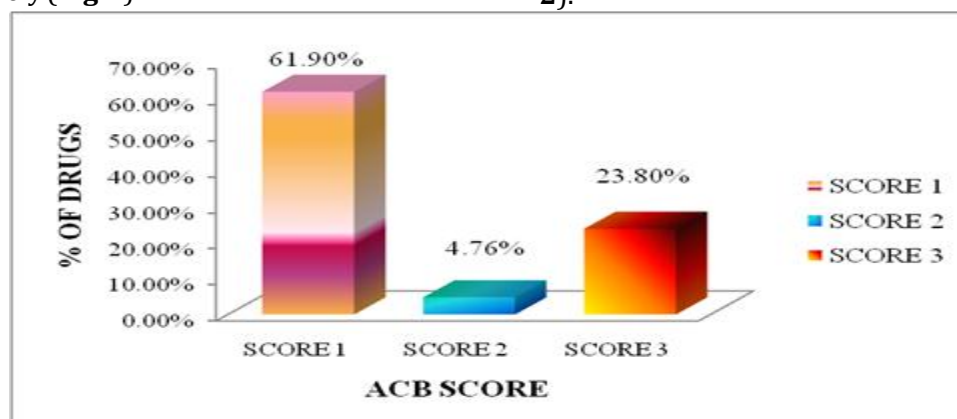


Figure 2: Anti Cholinergic Burden (ACB) Score of Study Population

CONCLUSION

Globalisation and increased access to health care needs results in populace longevity. Owing to which, there has been an increase in the population of geriatric cohorts living with multiple co morbid illness. Multiple co morbid illness among geriatrics directly correlates to poly pharmacy. The presence of multiple co morbid conditions of the patients' and the resultant poly pharmacy does impose a burden on the patients'. This pilot study which measures the co morbidity index and Anti Cholinergic Burden Index of geriatrics imparts that necessary parameters are to be implemented mandatorily and followed by clinical pharmacists' and physicians' to reduce the co morbid and drug burden experienced by the geriatric patients'.

ACKNOWLEDGEMENT

The authors' expresses their heartfelt gratitude to the Dean and Medical Records Officer of the GSL General Hospital and Medical College, for their valuable help in carrying out this research work.

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