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"ASSOCIATION BETWEEN ANTICHOLINERGIC BURDEN AND FUNCTIONAL OUTCOMES (ADL AND IADL) IN OLDER ADULTS: A PROSPECTIVE OBSERVATIONAL STUDY"

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ABSTRACT

Background: Anticholinergic medications are widely prescribed in older adults to manage various chronic conditions. However, these drugs are associated with adverse outcomes, including functional decline.

Objective: This study examined the association between cumulative anticholinergic burden and functional performance, specifically Activities of Daily Living (ADL) and Instrumental Activities of Daily Living (IADL), in an elderly population.

Methods: A prospective observational study was conducted among 235 individuals aged ≥60 years at a tertiary care hospital. Anticholinergic burden was assessed using a validated scoring system. Functional outcomes were evaluated using the Katz Index for ADL and the Lawton–Brody scale for IADL at baseline, 6 months, and 1 year. Stratified analysis by age and gender was conducted, and statistical associations were evaluated using t-tests, regression models, and correlation coefficients.

Results: 235 older adults were included in the analysis, with a mean age of 72.4 ± 7.8 years. Females comprised 59% of the cohort (n = 139), and males accounted for 41% (n = 96). The average number of medications per participant was 6.2 ± 2.1. Hypertension (76.6%), diabetes mellitus (64.3%), and osteoarthritis (48.1%) were the most common comorbidities.

Participants were categorized into anticholinergic burden groups as follows: low burden (n = 71; 30.2%), moderate burden (n = 91; 38.7%), and high burden (n = 73; 31.1%). This distribution formed the basis for all group comparisons in subsequent analyses. Although the association between anticholinergic burden and functional decline was not statistically significant, a moderate inverse trend between burden score and IADL performance was identified. The highest burden groups consistently demonstrated lower functional independence.

Conclusion: While no significant association was found between anticholinergic burden and functional scores, the observed patterns underscore the potential role of anticholinergic exposure in age-related functional deterioration. Routine burden assessments and deprescribing strategies may help mitigate risk in older adults.

Keywords: Anticholinergic burden, ADL, IADL, functional decline, elderly, geriatric pharmacotherapy

1. INTRODUCTION

The global population is aging rapidly, with India expected to have nearly 20.8% of its population above 60 by 2050[1]. As of 2022, approximately 10.5%—or 149 million—Indians were 60 years or older, underscoring the pace of demographic change.[1]

This demographic transition is accompanied by a rise in chronic comorbidities, leading to increased medication use. Polypharmacy—commonly defined as the use of five or more medications concurrently—is a growing concern in geriatric care. A recent systematic review indicated that nearly 49% of older adults in India experience polypharmacy[2], elevating the risk of adverse drug events. Among the most concerning drug classes in this context are anticholinergic medications[3].

Anticholinergic medications are routinely used to manage conditions such as urinary incontinence, depression, Parkinson’s disease, and gastrointestinal disorders. Despite their therapeutic benefits, these agents have been implicated in cognitive impairment, increased risk of falls, delirium, and overall decline in functional capacity in older adults[3,4]. The cumulative exposure to anticholinergic agents—quantified as anticholinergic burden—has been associated with both cognitive and physical deterioration, and it is recognized as a modifiable risk factor for geriatric syndromes[5]**.** This burden has important clinical implications for cognitive health and functional status, impacting an individual’s ability to perform Activities of Daily Living (ADL) and Instrumental Activities of Daily Living (IADL). The anticholinergic burden can be quantitatively assessed using several validated tools, including the Anticholinergic Cognitive Burden (ACB) scale, Anticholinergic Risk Scale (ARS), and Anticholinergic Drug Scale (ADS), each of which assigns weighted scores to medications based on their potential to cause anticholinergic side effects[6]. Given this multidimensional impact, assessing functional outcomes becomes critical to fully understanding the consequences of anticholinergic burden in older adults**.**

Functional status is a key determinant of an older adult’s independence, quality of life, and risk of institutionalization. It is typically assessed using standardized tools such as the Katz Index for basic Activities of Daily Living (ADL) and the Lawton–Brody scale for Instrumental Activities of Daily Living (IADL)[6–7]. These tools enable the early identification of individuals at risk for functional decline, allowing for timely interventions. While substantial research has linked anticholinergic burden to cognitive decline, fewer studies have explored its association with functional performance, particularly with ADL and IADL. The relationship may be influenced by factors such as age, gender, comorbidities, and the cumulative drug burden, yet evidence remains sparse in the Indian context[8].

Table:1 Commonly Prescribed Anticholinergic Medications

Drug Class	**Examples**
Antidepressants	**Amitriptyline, Nortriptyline, Paroxetine**
Antipsychotics	**Chlorpromazine, Clozapine, Olanzapine**
Antihistamines(1st generation)	**Diphenhydramine,Hydroxyzine, Chlorpheniramine**
Antispasmodics (for bladder)	**Oxybutynin, Tolterodine, Solifenacin**
Antiparkinsonian agents	**Trihexyphenidyl, Benztropine**
Antiemetics	**Promethazine, Prochlorperazine**
Muscle relaxants	**Cyclobenzaprine**
Other gastrointestinal agents	**Dicyclomine, Hyoscyamine**

Although the association between anticholinergic medications and adverse outcomes in older adults has been widely recognized in international literature, there remains a critical gap in understanding this relationship within the Indian healthcare context. Most existing studies originate from Western countries, where geriatric pharmacotherapy, healthcare infrastructure, and population profiles differ significantly from those in India. As a result, there is limited generalizability of these findings to Indian elderly populations, who frequently face disparities in access to healthcare, a high prevalence of undiagnosed conditions, and differences in drug prescribing patterns.

Recent Indian studies have begun to shed light on this issue. For instance, a cross-sectional study conducted at the All-India Institute of Medical Sciences, Rishikesh, found that 95.1% of elderly psychiatric outpatients experienced a significant anticholinergic burdenthat higher score on anticholinergic burden scales correlated with poorer health outcomes[9], with a strong association between polypharmacy and increased anticholinergic load[9]. Similarly, a retrospective analysis in a public teaching hospital in India highlighted among elderly inpatients[10]. Despite these findings, comprehensive evaluations linking anticholinergic burden to functional outcomes such as Activities of Daily Living (ADL) and Instrumental Activities of Daily Living (IADL) remain scarce[11]. In this study, we examined whether a higher cumulative anticholinergic burden would be associated with poorer functional outcomes (ADL and IADL) in older adults. A prospective longitudinal observational design was employed to investigate this potential association.

2. AIM &OBJECTIVES

Aim

Analysis of anticholinergic burden and functional outcomes in geriatric population of a tertiary care hospital.

Objectives

- Develop a list of anticholinergic medications based on the study health care setting. This list allows the calculation and utilization of AC burden using the Anticholinergic Risk Scale (ARS), Anticholinergic Drug Scale (ADS), and Anticholinergic Cognitive Burden Scale (ACB).
- To analyze the association of anticholinergic drug burden and Activities of Daily Living (ADL) and Instrumental Activities of Daily Living (IADL).

3. METHODOLOGY

A prospective longitudinal observational hospital-based outpatient study was conducted from April 2023 to May 2024 at the Department of Neuro-Medicine, Pushpagiri Medical College Hospital, a tertiary care teaching hospital in Kerala, India. The hospital provides services to a diverse geriatric population, making it a suitable setting for studying the clinical effects of polypharmacy and anticholinergic exposure. Participants were followed up at baseline, 6 months, and 1 year through scheduled outpatient reviews and telephonic follow-ups.

Ethical approval was obtained from the Institutional Ethics Committee. All participants provided written informed consent before enrollment. The following formula calculates sample size at a 95% confidence interval and a 5% margin of error

$$\text{Sample size} = \frac{\dfrac{z^2 \times p\,(1-p)}{e^2}}{1 + \left(\dfrac{z^2 \times p\,(1-p)}{e^2 N}\right)}$$

z(z-score) :1.96, p (population proportion):0.5, e (Margin of Error) =5%, N (Population size) =605

Study Population

This study included 235 community-dwelling older adults aged 60 years and above who attended the Neurology outpatient department of a tertiary care hospital in South Kerala. A purposive sampling strategy was employed to ensure the inclusion of participants who were available for regular follow-up and met specific clinical and functional criteria relevant to the study objectives. While this method may limit generalizability, it was chosen due to the practical constraints of longitudinal outpatient-based data collection and the need for consistency in participant monitoring.

Inclusion criteria comprised individuals aged ≥60 years, capable of providing informed consent (or with caregiver proxy consent), and attending scheduled outpatient visits during the study period. Exclusion criteria included patients with terminal illness, acute conditions necessitating hospitalization, and severe cognitive impairment defined as a Mini-Mental State Examination (MMSE) score ≤10. This cutoff was selected based on validated literature, which indicates that individuals scoring ≤10 are typically unable to reliably complete structured assessments such as ADL and IADL evaluations. [13]

To ensure a comprehensive assessment of drug exposure, the analysis documented and included all prescribed medications, over-the-counter (OTC) drugs, and herbal or traditional remedies taken regularly for at least two weeks before enrollment. This was particularly important given the potential anticholinergic effects of certain non-prescription and herbal products, which may otherwise go unaccounted for in conventional prescribing records.

Study Procedure

- **Assessment of Anticholinergic Burden**

Anticholinergic burden was calculated using a composite list ("We created a combined list of anticholinergic drugs by using three standard rating scales and recorded the highest score given to each drug.") prepared from the Anticholinergic Cognitive Burden (ACB) Scale, Anticholinergic Drug Burden scale (ADS), and Anticholinergic Risk Scale (ARS), validated tools commonly used in geriatric research and clinical practice[14]. Each medication in the participant's treatment regimen was assessed and scored based on its anticholinergic activity: 1 indicated possible anticholinergic activity. In contrast, a score of 2 or 3 reflected definite anticholinergic activity. The total cumulative burden was determined by summing the scores for all prescribed medications with anticholinergic properties. Participants were then categorized into three groups[15]:

- Low burden (score 0–1)
- Moderate burden (score 2–3)
- High burden (score ≥4)

- **Functional Outcome Assessment**

Functional status was evaluated using two validated scales:

- **Activities of Daily Living (ADL)** were assessed using the Katz Index, which evaluates six basic self-care tasks[16].[13]: bathing, dressing, toileting, transferring, continence, and feeding. Each task was scored dichotomously (independent/dependent), and total scores ranged from 0 (fully dependent) to 6 (fully independent)

- **Instrumental Activities of Daily Living (IADL)** were assessed using the Lawton–Brody Scale, which evaluates eight more complex functions[17].[14] such as using the telephone, shopping, food preparation, housekeeping, laundry, transportation, medication management, and financial handling. Scores ranged from 0 to 8 for women and 0 to 5 for men, depending on the gender-specific domains

Functional performance was assessed at three time points: baseline, 6 months, and 1 year, allowing the study to explore patterns of functional decline over time with anticholinergic burden.[18]

Data Collection
Demographic variables such as age, sex, educational status, and marital status were recorded. Clinical variables included the number and types of comorbidities (e.g., diabetes, hypertension, osteoarthritis), total number of medications, and detailed drug history were verified using hospital records, prescriptions, and direct participant interviews to ensure accuracy[19].[15]

Statistical Analysis
Descriptive statistics were used to summarize demographic and clinical characteristics. Continuous variables were expressed as means and standard deviations, while categorical variables were presented as frequencies and percentages. To determine differences between anticholinergic burden categories, independent t-tests (or Mann–Whitney U tests[20]. A p-value < 0.05 was considered statistically significant. Statistical analyses were performed using SPSS version 23.[16] where appropriate) were used for continuous variables, and chi-square tests were used for categorical variables. Associations between anticholinergic burden scores and functional outcomes were evaluated using Spearman's correlation coefficients and multiple linear regression models, adjusting for potential confounders such as age, gender, polypharmacy, and comorbidities[17]

4. RESULTS:
4.1. PATIENT DEMOGRAPHICS
Among the 235 patients, the age ranges from 60 to 88 years. The majority of patients are between the age of 70 and 74 years (33.2%), followed by 65-69 years of age (21.7%), 60-64 years (19.2%) and 75-79 years (18.7%). The prevalence of using anticholinergic drugs in the study population was the lowest in ≥80 years . The mean age was 70.6±6.22 years. The average age for males is approximately 71.7 years. The average age for females is about 69.5 years. The data reveals a staggering 81% of elderly individuals being prescribed over five medications. This striking insight emphasizes the critical need for a reevaluation of medication management for our aging population.25.5% of the study population were prescribed one anticholinergic drug, while 74.4% received more than one anticholinergic drug.

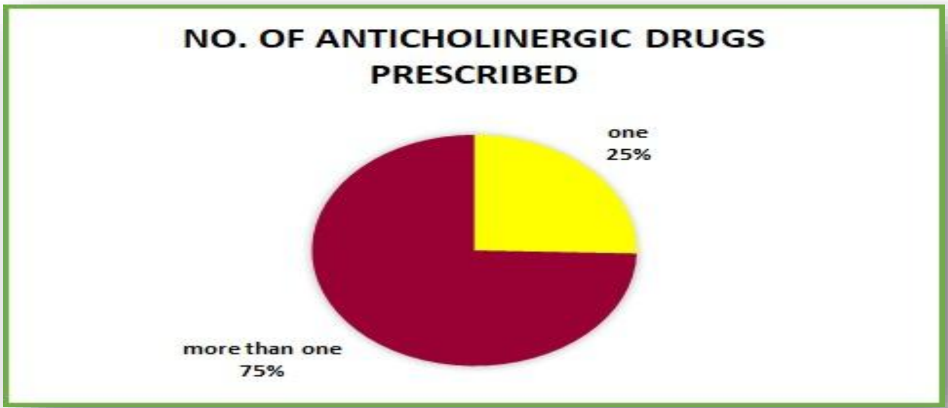

Figure 1: Distribution of patients based on the number of anticholinergic drugs

The study reveals that anticholinergic medications are primarily used for treating Neuropathic pain, Pain disorder, Parkinson's disease, and Depression, with the same percentage (22.5%) used for insomnia. They are also indicated for Vestibular-migraine, COPD, Seizures, Overactive bladder, and Cardiovascular disease. Nortriptyline (35.3%) is the most frequently prescribed anticholinergic medication in the study population, followed by Tramadol (32.7%) and Clonazepam (30.2%). Carbidopa-levodopa (25.1%), Amitriptyline (17.8%), Quietiapine (14.8%), Divalproex sodium (13.6%), etc. are the other anticholinergic drugs widely used in the population.

The results indicate that nearly half (43.5%) of the study population had been using anticholinergic drugs for more than 1 year. At baseline, 32% and 24.5% of the elderly were prescribed anticholinergic drugs from zero to six months and six to twelve months, respectively.

Table 1: Patient allocation based on anticholinergic drug burden score

Burden Score	Frequency	%
1	33	14.04
2	16	6.81
3	29	12.34
4	51	21.7
5	15	6.38
6	12	5.11
7	16	6.8
8	17	7.23
9	9	3.83
10	13	5.53
11	10	4.26
12	3	1.28
13	3	1.28
15	7	2.98
18	1	0.43

The result also depicts that 61.27% of patients were prescribed with an anticholinergic burden score of ≤5, 22.9% were prescribed with an anticholinergic drug burden score between 5 and 10, and 15.7 % were prescribed with anticholinergic drugs of high burden. (≥10).

Hypertension (74.8%) was the highest percentage of comorbidity in the study population followed by Diabetes Mellitus (58.7%) and dyslipidemia (51.9%). Stroke were also noted as the succeeding comorbidity with a percentage of 37.4% and followed by Paresthesia (30.6%), Neuralgia (32.3%), and Parkinsonism (27.2%).

4.2. PATIENT DISTRIBUTION BASED ON ACTIVITIES OF DAILY LIVING. (ADL)
All participants in the research initially presented with normal activities of daily living (ADLs) at the baseline assessment. However, following a year of observation, only 60.43% [142 individuals] retained normal ADLs. During this period, 16.17% [38 participants] transitioned to moderate functional impairment, while 23.40% [55 participants] exhibited severe functional impairment.

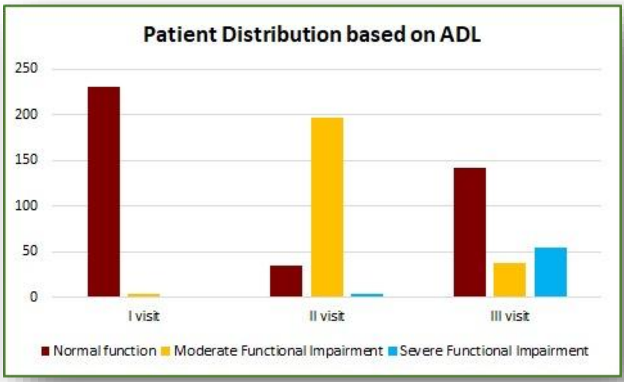

Figure 2: Patient distribution based on Activities of Daily Living across three visits

ADL Outcomes by Age and Gender Among all participants, 100 individuals (42.6%) experienced a decline in their ability to perform basic activities of daily living (ADL), while 135 (57.4%) retained functional independence. Gender-wise distribution revealed equal representation in the decline group (n = 50 males; n = 50 females). Notably, males exhibiting ADL decline were older on average[18] (mean age = 73.74 years), than females (mean age = 69.42 years). In the group with no ADL decline, females and males had mean ages of 69.53 and 70.2 years, respectively.

Further stratification by age revealed that among individuals aged 60–69, more females (n = 27) experienced ADL decline than males (n = 7). In contrast, males aged 70–79 were more likely to show functional decline (n = 39) than females (n = 17). The 80–89 age group exhibited a more balanced pattern between genders. There was an apparent age-related increase in the proportion of individuals experiencing ADL decline: 35% in the 60–69 age group, 46% in those aged 70–79, and 59% in the 80–89 age group. These findings emphasize the strong association between increasing age and functional deterioration.

Age Group	Gender	Decline in ADL	No decline in ADL
60-69	Female	27	33
60-69	Male	7	29
70-79	Female	17	30
70-79	Male	39	36
80-89	Female	6	3
80-89	Male	4	4

Table 2: Segmentation of patients based on age and gender based ADL outcome

Functional Status Over Time Evaluation across three clinical visits indicated a progressive decline in functional status[19]. The number of individuals showing ADL deterioration increased from 45 at Visit I to 70 at Visit II, and 95 at Visit III. The average age of individuals with worsening trajectories ranged from 62 to 74.5 years.

Among females, a frequent trajectory was an initial decline followed by partial recovery (normal → moderate → normal). Among males, a dominant trend was progressive decline, with 29 males showing continued deterioration to severe impairment by Visit III. These patterns underscore the variability in progression and the cumulative nature of functional decline over time.

4.3. PATIENT DISTRIBUTION BASED ON INSTRUMENTAL ACTIVITIES OF DAILY LIVING. (IADL)

IADL Outcome Distribution by Age and Gender.

Among participants aged 60–69, more females (63.33%) and males (65.38%) exhibited a decline in IADL performance. This trend persisted in the 70–79 age group, with 59.26% of females and 53.13% of males reporting reduced IADL independence. However, a reversal was observed in the oldest cohort (80–89 years), with 60% of females and 50% of males maintaining stable IADL function. This shift may reflect a survival effect or cohort-related variability, where individuals with better baseline functional and cognitive resilience were more likely to sustain independence over time.

Notably, these patterns correlated with cumulative anticholinergic burden scores, as higher burden categories tended to be associated with increased functional decline across age groups, particularly among younger elderly subgroups. Although not statistically significant in all strata, the observed trends suggest a clinically relevant association that warrants further investigation.

Table 3: Segmentation of patients based on age and gender based IADL outcome

Age Group	Gender	Decline	No Decline
60-69	Female	63.33	36.67
60-69	Male	65.38	34.62
70-79	Female	59.26	40.74
70-79	Male	53.13	46.88
80-89	Female	40	60
80-89	Male	50	50

Among females aged 60–69, those in the Decline group demonstrated a substantial drop in independence[20,] from 84.46% at Visit I to 46.37% by Visit III, in contrast to their No Decline counterparts, who remained consistently independent at 82.14%. Males in the same age group showed a similar trend, with a decline from 62.89% to 45.83% in the Decline group, while the No Decline group remained stable at around 56%.

In the 70–79 age group, females with a decline dropped from 84.62% to 46.29%, whereas those without a decline maintained independence at nearly 79%. The disparity was even more pronounced among males, where those who declined fell from 51.67% to just 26.66%, while the No Decline group remained stable around 55%. Among the oldest age group (80–89 years), females in the Decline group declined from 75.00% to 35.71%, while the group maintained independence at 56.86%.[21], while their No Decline counterparts showed no change at 69.33%. Similarly, males in this age group who experienced decline showed a reduction from 52.67% to 29.69%, whereas the No Decline

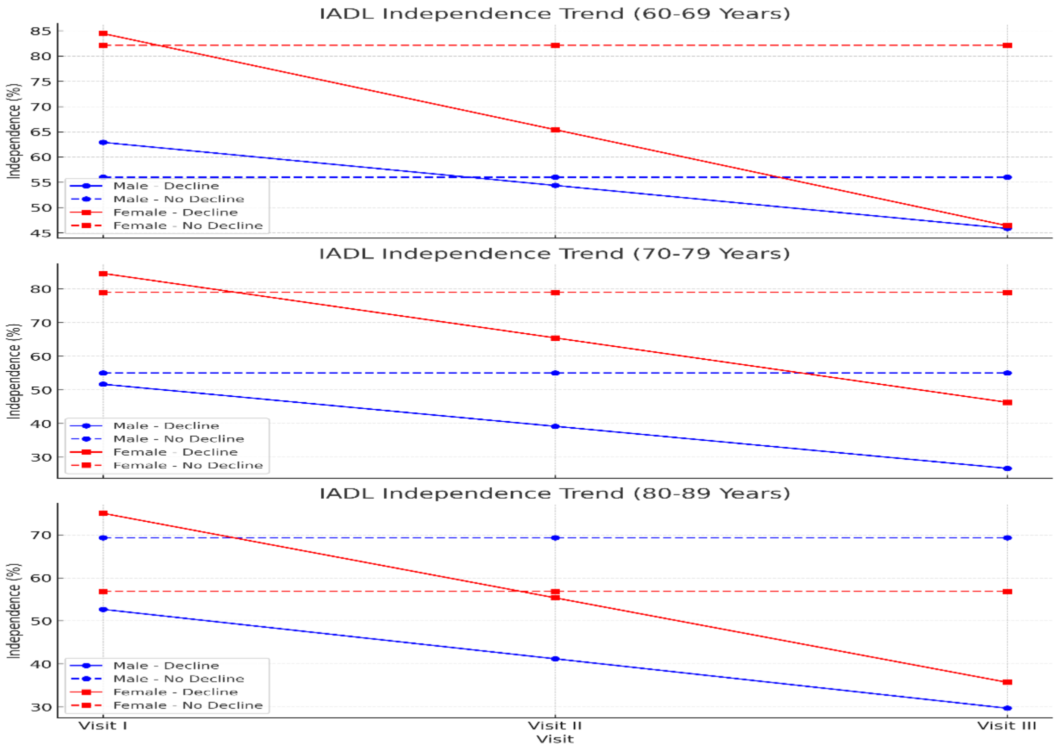

Figure 3: Patient distribution based on Instrumental Activities of Daily Living across three visits

Functional Status Over Time

To assess whether these observed differences were statistically significant, independent samples t-tests were conducted between the Decline and No Decline groups at each visit stage. The results indicated no significant difference at Visit I ($t = 0.24$, $p = 0.813$), suggesting that early-stage independence was comparable between groups. However, statistically significant differences emerged, confirming that individuals in the Decline group experienced a greater loss of functional independence as time progressed.[22] at Visit II ($t = –2.96$, $p = 0.014$) and Visit III ($t = –4.47$, $p = 0.001$).

4.4. PATIENT DISTRIBUTION BASED ON FUNCTIONAL OUTCOMES AND ANTICHOLINERGIC BURDEN.

Association Between Anticholinergic Burden and ADL To explore the potential association between anticholinergic burden and ADL outcomes, a box plot analysis compared burden scores[23] across individuals with and without ADL decline. The distribution of scores showed overlapping interquartile ranges, with comparable medians. The Mann–Whitney U test yielded a p-value of 0.701 and a small effect size ($r = 0.09$), indicating no statistically significant difference between the two groups. These findings suggest that anticholinergic burden, in isolation, may not be a strong predictor of basic functional decline.

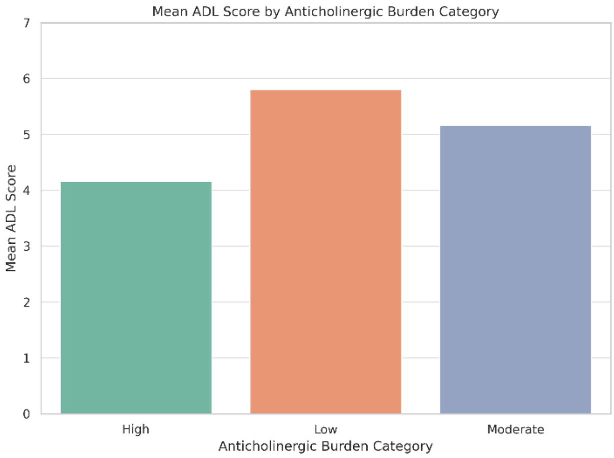

Figure 4: Association Between Anticholinergic Burden and ADL

Association Between Anticholinergic Burden and IADL Instrumental ADL (IADL) performance was evaluated as a percentage of independence in routine tasks. Correlation analysis between burden scores and mean IADL percentages across visits revealed a moderate inverse trend (Spearman's $\rho = -0.46$). However, the association did not reach statistical significance[24] ($p = 0.302$). Scatter plot visualization illustrated variability and lack of a definitive pattern, indicating that while a relationship may exist, it was not strongly evident in this sample.

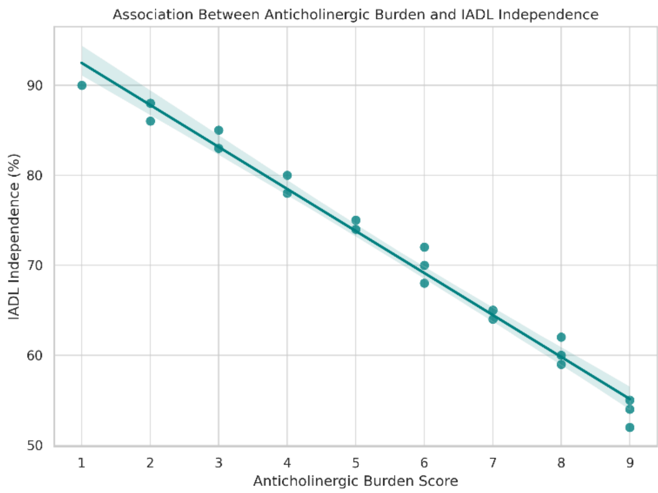

Figure 5: Association Between Anticholinergic Burden and IADL

Interpretation of the association between anticholinergic burden and functional outcomes
While a directional trend was observed, neither ADL nor IADL outcomes demonstrated a statistically significant association with anticholinergic burden scores. These results suggest that additional factors beyond anticholinergic medication exposure may contribute to functional decline and that the burden score alone may not serve as a standalone clinical predictor. Nevertheless, the age-associated progression of decline highlights the need for routine geriatric assessments, early interventions, and multidisciplinary care approaches.

5. DISCUSSION

This prospective observational study, conducted over 12 months and involving 235 community-dwelling older adults aged 60 years and above, explored the association between cumulative anticholinergic burden and functional outcomes, specifically Activities of Daily Living (ADL) and Instrumental Activities of Daily Living (IADL). While the findings did not reveal a statistically significant association between anticholinergic burden scores and ADL/IADL performance, clinically relevant trends were observed. These patterns were particularly notable when stratified by age and gender, suggesting that certain subgroups may be more vulnerable to the functional impacts of anticholinergic exposure.

The progressive decline in ADL and IADL observed over three clinical visits, especially among individuals in the older age brackets, aligns with previous evidence that highlights aging as a critical factor in functional deterioration. For instance, Landi et al. reported that anticholinergic drug use was associated with decreased physical function among frail elderly populations[16]. Similarly, Hilmer et al. found that higher Drug Burden Index scores correlated with functional decline in older individuals[17]. These findings are corroborated by Jyrkkä et al., who showed that increased drug burden was associated with a greater risk of decline in physical performance and mobility among home-dwelling elderly adults[18].

Notably, males in the 70–79 age group displayed a sharper reduction in IADL independence compared to their female counterparts, suggesting potential physiological or behavioural contributors to decline. This observation is consistent with findings by Gnjidic et al., who noted that older men are more susceptible to the adverse effects of medications with anticholinergic properties, potentially due to differences in muscle mass and metabolism[19]. Additionally, research by Nishtala et al. indicates that older women are generally more likely to engage in regular healthcare visits and adhere to prescribed treatments, which may contribute to delayed functional decline[20]. Supporting this, a study by Briet et al. observed gender differences in drug metabolism and clinical responses, reinforcing the need for gender-specific analyses in geriatric pharmacology[21.]

A key observation was the moderate inverse trend between anticholinergic burden scores and IADL independence. The regression analysis indicated a downward trajectory in IADL scores as burden increased. Although this relationship did not reach statistical significance, the trend reflects findings from earlier studies. For example, Campbell et al. demonstrated that higher anticholinergic cognitive burden scores were associated with impaired executive functioning and reduced capability in complex daily tasks[4]. Similarly, Salahudeen et al. found that increased anticholinergic burden was linked to functional impairment in older adults[5]. Further, Pasina et al. reported that anticholinergic load was associated with poor outcomes in hospitalized elderly patients, particularly in those with multiple chronic conditions[22].

However, not all research findings have shown consistent associations. For example, a study by Szatmari et al. found no significant association between anticholinergic burden and either cognitive or functional decline after adjusting for comorbidities, frailty index, and baseline medication use[23]. This suggests that the impact of anticholinergic medications may be attenuated when broader geriatric health parameters are considered, emphasizing the complexity of disentangling medication effects from age-related physiological decline. The inconsistency in findings across studies highlights the importance of individualizing patient assessments and incorporating multidimensional geriatric evaluations into prescribing decisions.

These findings are particularly relevant given the integral role of IADL in preserving autonomy and preventing institutionalization. Our data underscore that while anticholinergic burden alone may not account for all variations in functional status, it represents an important modifiable factor that should be considered in geriatric pharmacotherapy. As highlighted in previous literature, the impact of anticholinergics may be compounded by coexisting comorbidities, polypharmacy, and frailty. For instance, studies by Koyama et al. and Nishtala et al. have emphasized the additive risks associated with high anticholinergic exposure in polypharmacy contexts[19],[20]. In line with this, a cohort study by Han et al. reported a significantly increased risk of falls and fractures in individuals with higher cumulative anticholinergic exposure[24], indirectly influencing functional outcomes such as mobility and ADL performance.

Clinical guidelines increasingly support medication optimization; despite this sample's lack of strong statistical evidence, routine burden assessment and longitudinal monitoring are crucial, especially in patients exhibiting early signs of functional decline. This study underscores the importance of addressing anticholinergic burden in Indian older adults and supports the need for future multicentric studies and deprescribing-focused intervention strategies in older adults, particularly avoiding medications with strong anticholinergic activity. Tools such as the Anticholinergic Cognitive Burden (ACB) scale and Drug Burden Index (DBI) have been advocated to quantify risk and guide deprescribing efforts.

CONCLUSION

While no statistically significant association was found between cumulative anticholinergic burden and functional outcomes such as Activities of Daily Living (ADL) and Instrumental Activities of Daily Living (IADL), the observed inverse trends suggest a clinically relevant pattern warranting further exploration. A trend toward reduced functional independence, particularly in IADL, was noted among individuals with higher anticholinergic scores. These findings highlight the need for regular medication review in older adults, particularly those with multimorbidity and polypharmacy.

Since anticholinergic burden is modifiable, integrating standardized burden assessment tools into geriatric evaluations may support safer prescribing practices. Further large-scale, multi-centre longitudinal and interventional studies are needed to confirm these findings, especially in the Indian context, and to guide deprescribing strategies aimed at preserving functional autonomy in aging populations

STUDY LIMITATIONS

This single-centred study employed a purposive sampling strategy, which may limit its external validity. Additionally, reliance on patient and caregiver reports for certain functional assessments introduces the possibility of information bias. Nevertheless, the study achieved a high follow-up rate and utilized validated tools to assess both anticholinergic burden and functional outcomes.

FUTURE RECOMMENDATIONS

Future research should focus on conducting multi-centre, population-based studies with larger and more diverse samples to enhance the generalizability of findings. It is critical to develop and validate anticholinergic burden assessment tools tailored to the Indian geriatric population, considering region-specific prescribing patterns and commonly used medications. Additionally, future studies should incorporate parameters such as drug dosage and duration of use into burden assessment models to better capture the cumulative impact of anticholinergic exposure.

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