

PREVALENCE OF MILD COGNITIVE IMPAIRMENT IN MIDDLE AGED POPULATION OF AHMEDABAD

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ABSTRACT

Background: The objective of this study is to identify the prevalence of mild cognitive impairment in middle aged population of Ahmedabad and to identify the factors affecting it.

Methodology: A cross-sectional analytical study was conducted in Ahmedabad. Cognition, physical activity, lifestyle and stress were assessed by asking the participants to fill Addenbrooke's cognitive examination-III test (ACE-3), International physical activity questionnaire-SF(IPAQ-SF), perceived stress scale (PSS) and Simple lifestyle indicator questionnaire (SLIQ) along with details.

Analysis: Data analysis was done using Microsoft excel and SPSS 20. Level of significance was kept 5%. Association was found using Chi square test between MCI and demographics, and other outcomes.

Result: Mean age of participants was 50.74 ± 4.5 years. Mean score of ACE-3 was 89.18 ± 8.2 , PSS was 14.98 ± 6.2 and SLIQ was 6.69 ± 1.3 . Prevalence of MCI was 38.18%. No association was found between MCI and gender($\rho=0.13, p=0.17$), stress($\rho=0.12, p=0.36$), SLIQ ($\rho=0.14, p=0.28$), physical activity ($\rho=0.12, p=0.35$), sleep hours ($\rho=0.02, p=0.88$), alcohol intake ($\rho=0.296, p=0.55$) or smoking ($\rho=0.67, p=0.14$).

Conclusion: Prevalence of MCI in middle-aged population is 38.18%. No association was found between MCI with stress, gender, lifestyle, physical activity, sleep hours, alcohol addiction and smoking.

Clinical implications: It is necessary for middle aged population to undergo MCI screening as it is treatable condition in early stages. Necessary interventions can be taken and dementia onset can be prevented or delayed. Further interventions for management of MCI should be studied.

Keywords: Mild cognitive impairment, Middle-aged population, Risk factors

INTRODUCTION

In India, cognitive decline is a major concern to public health [1]. Mild cognitive impairment (MCI) is a phase between healthy cognition and dementia which further leads to loss of memory.[2] According to studies, it is seen that there is 5-15% chance that people with mild cognitive impairment can develop

dementia in one year and 60% chance to develop dementia in next 10 years. [1]

Many people in India are usually unaware of the fact that they are undergoing cognitive decline which may be affecting their day to day life by small problems like slowness in answering, forgetfulness about small things, lack of attention compared to

previous years of life, etc. thus, they are moving towards the risk of developing dementia in further years due to their lack of knowledge and absence of regular screening for mild cognitive impairment.[1] Cognitive decline has been studied in old aged people. Middle age is often considered as a stage of normal cognition stage.[2] there is a strong debate going on various cross-sectional studies results which revealed that aging is associated with low cognition. [1] Necessary interventions can be taken based on early screening of mild cognitive impairment in middle aged population. [3] various studies show that cognitive functioning is maximum in early stages of life which further keeps on declining.[1] It is seen that multi-tasking and motor functions decline during middle-age. [1] There are certain factors that influence the cognitive performance like age, gender, obesity, hypertension, sleep disturbances, lack of physical activity etc. [1,4] In past few decades, India is experiencing a rapid change in people's lifestyle and environment, which are likely possible to expose individuals to risk factors for Alzheimer's Disease (AD) and thus can increase the prevalence of cognitive decline in middle aged population. [1]

SIGNIFICANCE

Many studies done previously have measured cognitive impairment in older adults and there is very less available research which includes middle aged population.[2] Identifying the factors influencing the cognitive impairment in middle-aged are important for early screening and prevention of dementia. [2]

OBJECTIVES

The objective of this study is to identify the prevalence of mild cognitive impairment in middle-aged and to identify factors affecting the experiences of subjective cognitive impairment.

METHOD

A cross-sectional analytical study was done in community of Ahmedabad. The study protocol followed the principles of the Declaration of Helsinki (2013 revision). Informed consent was obtained from the participants. Participants were selected using convenience sampling.

Participants aged between 40-65 years, both male and female and willing to participate were included

in the study. Pre-diagnosed cases of cognitive decline like dementia, Alzheimer, etc. and participants not able to read English or Gujarati were excluded.

Participants were recruited from SBB college OPD and community of Ahmedabad. Participants eligible after screening of inclusion and exclusion criteria were explained about the study. Informed consent was taken from the participants. Study duration was 3 months. Sample size calculation was done using the reference of previously done study by Gajbare Preeti et al. [1] And sample size obtained after calculation was 55 participants at 10% error.

OUTCOME MEASURES

Primary outcome for measuring cognition of participants was Addenbrooke cognitive questionnaire-III which measures memory (0-26), attention (0-18), fluency (0-14), language (0-26) and visuospatial abilities (0-16). Total scoring of this scale is 0-100. Cutoff score of less than 88 was considered as mild cognitive impairment while participants with score more than 88 was considered normal cognition. Reliability of ACE-III is high test-retest reliability and excellent internal consistency ($r=0.89$, $\alpha=0.90$ and 0.95). [5]

Secondary outcomes were hours of sleep, alcohol consumption, smoking, physical activity which was measured using IPAQ-SF, stress using perceived stress scale PSS-10 and lifestyle using SLIQ scale. Participants demographic data like age, gender, occupation was taken.

Lifestyle – Simple Lifestyle Indicator Questionnaire (SLIQ)

This scale assessed five lifestyle factors – diet, tobacco use, physical activity, stress and alcohol consumption. It provides scoring for all the five factors separately. It shows that higher the scoring healthier the participant. Its test retest reliability is 0.63 to 0.97 and $\alpha=0.58, 0.6$ for diet and physical activity respectively. [6]

Physical activity-International Physical Activity Questionnaire-SF(IPAQ-SF)

This scale is the short form version of IPAQ scale. It assesses the intensity of physical activity level of participants. It consists of seven items with 7 days recall which measures participants sitting time and

physical activity in their daily life. It is a self-reported questionnaire with high reliability ($\alpha < 0.80$). [7]

Stress - Perceived Stress Scale (PSS-10)

This scale is a self-reported questionnaire which measures the level of psychological stress on participants. It contains 10 items with scoring of 0-40. Higher the score higher is the level of stress in participants life. In this scale questions 1,2,3,6,9,10 measure the lack of control over their circumstance and questions 4,5,7,8 measures individuals perceived inability to handle a situation. The scoring of these 10 questions follows Likert scale 0-4 (0=never,4= very often).

Its reliability is >0.70 .[8]

STATISTICAL ANALYSIS

Characteristics values of age, ACE-III, SLIQ, IPAQ and PSS-10 were visualized using means and standard deviation. $P < 0.05$ was considered statistically significant. All analysis was performed in IBM SPSS V20.

Prevalence of mild cognitive impairment was found using Microsoft excel. Association was found using chi square test between mild cognitive impairment and gender, hours of sleep, alcohol intake and smoking respectively. Association of mild cognitive impairment with physical activity level, stress and lifestyle was analyzed using Spearman correlation.

RESULT

The prevalence of mild cognitive impairment was 38.18%. Among 55 middle-aged adults (i.e. 40-60 years) using ACE-III with cutoff score of 88. Table-1 shows the sociodemographic characteristics of the study.

To assess the relationship between covariates and MCI chi square test was used where factors like gender, hours of sleep, alcohol consumption and smoking were analyzed as shown in table-2. No significant association was seen between mild cognitive impairment and gender, hours of sleep, alcohol consumption and smoking.

Association of mild cognitive impairment with physical activity level, stress and lifestyle was analyzed using Spearman correlation co-efficient as

shown in table-3. No significant association was seen between mild cognitive impairment and physical activity level, lifestyle and stress.

Table:1 Mean and standard deviations of outcome measures

Variable	Mean (SD)
Age	50.74 (4.5)
Ace-III	89.18 (8.2)
PSS-10	14.98 (6.2)
SLIQ	6.69 (1.3)

Table: 2 Association of hours of sleep, gender, smoking and alcohol consumption

Variables	Rho – value	P - value
Hours of sleep	0.02	0.88
Alcohol consumption	0.29	0.55
Smoking	0.67	0.14
Gender	0.13	0.17

Table: 3 Association of physical activity level, stress and lifestyle with mild cognitive impairment (* shows significance)

Variable	R – value	P - value
Physical activity level	-0.06	0.66
Stress	-0.23	0.08
SLIQ	0.07	0.60

DISCUSSION

The prevalence of mild cognitive impairment was 38.18% ($n = 55$) in middle aged population of Ahmedabad. No significant association was seen between mild cognitive impairment and gender, hours of sleep, alcohol consumption and smoking. No significant association was seen between mild cognitive impairment and physical activity level and lifestyle. Significant association was found between mild cognitive impairment and stress.

Studies from south of India - Kerala [9] showed prevalence of MCI to be 26.06 % in middle aged population, from north India [10] it is 8.8 %, east region - Assam [11] indicates 24.2 %. Study from Pune showed 27.77% prevalence of mild cognitive impairment in middle aged population. [1]

This wide variation in prevalence may be due to difference in MCI definitions or different diagnostic criteria, in research methods, lack of standardized tool, which can make the comparison of results difficult. [1]

Sleep and cognition

Proper sleep is very necessary for the cognition. But in our study, we found no significant association of hours of sleep with mild cognitive impairment. In our study most of the participants showed more than 8 hours of sleep which may have affected the result. Many participants had difficulty in remembering their hours of sleep and no monitoring was done on our part which is one of the limitations in our study which may have affected the result.

Lifestyle and cognition

A person's lifestyle plays an important role on his/her cognition. Lifestyle includes diet, alcohol consumption, smoking.[1] No significant association was seen between alcohol consumption, smoking and lifestyle with mild cognitive impairment. In our study participants were all vegetarian and only 1 participant had addiction of smoking and alcohol consumption and also alcohol is banned in Gujarat which showed positive lifestyle in all participants which may have affected the results of our study.

Physical activity and cognition

It is found that people with high physical activity and active lifestyle have less decline in cognition compared to those who have low physical activity level and sedentary lifestyle.[12] But our study found contrasting result as no significant association was found between physical activity level and mild cognitive impairment which oppose the findings of the study done by Gajbare Preeti et al.

Stress and cognition

Stress is perceived as emotional and mental strain one feels when the problems exceed one's capacity.

It is said that long term high stress can cause cognitive decline as it which affects the memory retrieval and reasoning. It is said that stress for longer period can affect the NMDA receptors and neurogenesis process in hippocampus. [1] But our study found contrasting result as no significant association was found between physical activity level and mild cognitive impairment which oppose the findings of the study done by Gajbare Preeti et al.

Limitations in our study were absence of quota sampling, insufficient information on comorbidities like diabetes, hypertension, etc. which need to be assessed. Further studies including longitudinal study should be carried out to study the long-term effect on cognition.

CONCLUSION

Thus, study concludes that there is a need to prevent cognitive decline in middle aged population by timely screening and intervention to delay the onset of dementia, as the prevalence of MCI is 38.18 % in middle aged adults in Indian population. Stress was found to be one the potential risk factor for mild cognitive impairment in middle aged population. This can further help in forming the necessary intervention for the middle-aged population with mild cognitive impairment.

REFERENCES

1. Gazbare, P., & Palekar, T. J. (2024). Identifying mild cognitive impairment and its predictors among normal middle adulthood in Pune, Maharashtra: A community-based cross-sectional survey. *Clinical Epidemiology and Global Health*, 25, 101490.
2. Bai, W., Chen, P., Cai, H., Zhang, Q., Su, Z., Cheung, T., ... & Xiang, Y. T. (2022). Worldwide prevalence of mild cognitive impairment among community dwellers aged 50 years and older: a meta-analysis and systematic review of epidemiology studies. *Age and ageing*, 51(8), afac173.
3. Mohan, D., Iype, T., Varghese, S., Usha, A., & Mohan, M. (2019). A cross-sectional study to assess prevalence and factors associated with mild cognitive impairment among older adults in an urban area of Kerala, South India. *BMJ open*, 9(3), e025473.
4. Koyanagi, A., Oh, H., Vancampfort, D., Carvalho, A. F., Veronese, N., Stubbs, B., &

- Lara, E. (2019). Perceived stress and mild cognitive impairment among 32,715 community-dwelling older adults across six low- and middle-income countries. *Gerontology*, 65(2), 155-163.
5. So, M., Foxe, D., Kumfor, F., Murray, C., Hsieh, S., Savage, G., ... & Piguet, O. (2018). Addenbrooke's cognitive examination III: psychometric characteristics and relations to functional ability in dementia. *Journal of the International Neuropsychological Society*, 24(8), 854-863.
 6. Godwin, M., Pike, A., Bethune, C., Kirby, A., & Pike, A. (2013). Concurrent and convergent validity of the simple lifestyle indicator questionnaire. *International Scholarly Research Notices*, 2013(1), 529645.
 7. van der Ploeg, H. P., Tudor-Locke, C., Marshall, A. L., Craig, C., Hagströmer, M., Sjöström, M., & Bauman, A. (2010). Reliability and validity of the international physical activity questionnaire for assessing walking. *Research quarterly for exercise and sport*, 81(1), 97-101.
 8. Hore-Lacy, F., Gwini, S., Glass, D. C., Dimitriadis, C., Jimenez-Martin, J., Hoy, R. F., ... & Fisher, J. (2024). Psychometric properties of the Perceived Stress Scale (PSS-10) in silica-exposed workers from diverse cultural and linguistic backgrounds. *BMC psychiatry*, 24(1), 181.
 9. Mohan, D., Iype, T., Varghese, S., Usha, A., & Mohan, M. (2019). A cross-sectional study to assess prevalence and factors associated with mild cognitive impairment among older adults in an urban area of Kerala, South India. *BMJ open*, 9(3), e025473.
 10. Sengupta, P., Benjamin, A. I., Singh, Y., & Grover, A. (2014). Prevalence and correlates of cognitive impairment in a north Indian elderly population. *WHO South-East Asia journal of public health*, 3(2), 135-143.
 11. Saikia, A. M., & Rajendran, V. (2020). Prevalence and risk factors of mild cognitive impairment (MCI) among the elderly of Guwahati city, Assam: a cross-sectional study.
 12. Roh, M., Dan, H., & Kim, O. (2021). Influencing factors of subjective cognitive impairment in middle-aged and older adults. *International Journal of Environmental Research and Public Health*, 18(21), 11488.