

# Comparison of Mental Imagery Ability between Community Dwelling and Institutionalized Older Adults

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## ABSTRACT

**Background:** Mental imagery is an important adjunct to geriatric rehabilitation. It is beneficial especially when physical practice has limitation. As there is a decline in the cognitive abilities with ageing, ability to use mental imagery may also differ in older adults, especially community dwelling and staying in institutions.

**Aim:** The present study aimed at comparing the ability to use mental imagery between community dwelling and institutionalized older adults.

**Methodology:** After giving informed consent, 100 mobile senior citizens (above 65 years) from both institutional setting and community from Mumbai participated in the cross sectional study. A shortened form of Bett's questionnaire upon mental imagery was administered.

**Statistical analysis:** Comparison of the total scores as well as scores of seven subscales of the shortened form of Bett's questionnaire was done between community and institutionalized geriatrics. Time required to complete the questionnaire was also compared between the groups.

**Results:** The mean of total score as well as time taken was significantly less in community dwelling than in institutionalized older adults as per the unpaired t test. ( $p < 0.0001$ ) Statistically significant difference was observed in all the domains of mental imagery in both the groups using ANOVA ( $p < 0.001$ ). Within group comparison using ANOVA showed no statistical difference in institutionalized older adults ( $p = 0.064$ ); but in community dwelling older adults, imagery in emotion was significantly difficult than the other domains ( $p = 0.001$ ).

**Conclusions:** Mental imagery ability in all the sensory domains was found to be less in institutionalized compared to community dwelling older adults.

**Keywords:** Mental imagery, shortened form of Bett's questionnaire, ageing

## INTRODUCTION

Elderly population in India is constantly increasing over the years. This population needs to be healthy both physically as well as mentally for a better quality of life. Studies have shown that aging leads to neurological changes affecting a person's physical and mental abilities. There are various strategies used by the physiotherapist to promote healthy

ageing. Mental imagery is one of the strategies used in rehabilitation as it has been found to have benefits when combined with physical practice.<sup>[1]</sup> Mental imagery has been extensively researched by the psychologists, neuroscientist and physical therapists.

Routinely mental imagery is discussed in terms of visual or motor imagery. Visual imagery is referred as the

images or pictures that a person's mind forms while thinking about some object or event while the relevant object, event actually away from the senses. Motor imagery is the kinesthetic imagery when there is no actual movement or performance of a task. But imagery in other sensations like auditory, olfactory or haptic also exist. [2,3] We may use imagery in one sensation or combination of sensations.

Imagery has gained more importance in the older adults who can use this method especially when physical practice has limitations. Some studies support the use of mental imagery in older adults while some studies indicate that ageing has detrimental effect on mental imagery. [4-6] Evidence also suggests that older adults have problem in certain domains of mental imagery while they are comparable with young adults in the other. [7-10] Mental imagery is a part of cognitive domain. Decline in cognitive functions is more pronounced as age advances. [11,12] But it is also known that healthy ageing shows less cognitive decline. [13] Hence mental imagery ability may differ in older adults. In metropolitan city like Mumbai, both community and institutional geriatric population exist. A recent study indicates that there is a difference in cognitive ability between them. [14] Training with mental imagery may not be optimum in older adults without proper assessment. Hence the purpose of the study was to compare the mental imagery ability between community dwelling and institutionalized older adults. A shortened form of Betts questionnaire upon mental imagery was used to assess mental imagery ability in the present study. [15,16]

## MATERIALS AND METHODS

After obtaining Institutional research committee's approval, the cross-sectional study was carried out. A total number of 100 adults above 65 years of age participated in the study. 50 older adults from community (Group A) and 50 institutionalized older adults (Group B) were included in the study. Ratio of male-

female participants (30 males and 20 females) was same in both the groups. All the participants were functionally independent and did not require any assistance in performing activities of daily living. Adults with known neurological or psychiatric disorder were excluded from this study. After taking the informed consent, the Betts questionnaire upon mental imagery was administered. Each question was scored and total time to complete the questionnaire was also noted.

**Statistical analysis** -The questionnaire has total 35 questions with 7 subscales for each sensory modality. Participants had to create a mental image for each question and explain the image formed. Based on the explanations, each question was scored between 1 and 7. Lower the score meant better mental imagery abilities. The data was found to be normally distributed. Both the groups were compared in terms of total score and time using unpaired t test. Further, scores of seven subscales were compared between the groups as well as within the groups using ANOVA.

## RESULTS

Statistical analysis suggested that the community dwelling older adults (Group A) had lower scores than institutionalized older adults (Group B) when compared using unpaired t test. It was also found that Group B took more time to complete the questionnaire than Group A. ( $p=0.0004$ ) as seen in Table 1. One-way analysis of variance (ANOVA) followed by Bonferroni's post hoc test for multiple pairwise comparisons of subscales (7 domains) was done; it also showed significant difference between the groups (Table 2).

**Table1** Comparison of score of short Bett's questionnaire and time required for completion between Community and institutionalized older adults

Parameters	Group A		Group B		P Value
	mean	SD	mean	SD	
Total score	96.68	17.49	137.88	23.64	0.001*
Total time (Minutes)	13.38	7.35	18.12	5.44	0.004*

Inference-The total score and time was found to be less in community geriatrics

compared to institutionalized geriatrics using unpaired t test

**Table2.** Comparison of score of seven subscales of short Bett's questionnaire between Community and institutionalized older adults..

Parameters	Group A		Group B		P Value
	mean	SD	mean	SD	
Taste	12.32	4.05	18.26	4	0.001*
Movement	12.52	3.53	19.76	5.55	0.001*
Sound	13.12	3.45	20.04	4.33	0.001*
Touch	13.26	4.03	20.22	3.94	0.001*
Vision	14.56	2.15	20.54	4.9	0.001*
Smell	15.24	3.39	20.54	4.13	0.001*
Emotion	15.62	3.49	21.07	3.79	0.001*

Group A Community older adults

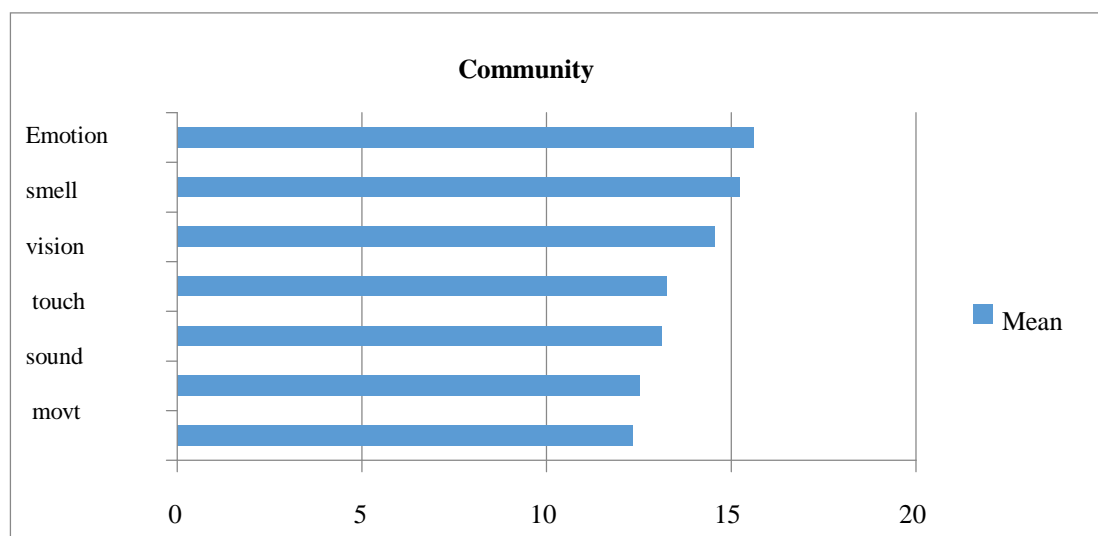
Group B Institutionalized older adults

SD standard deviation

\*statistically significant (Significance level at  $p < 0.05$ )

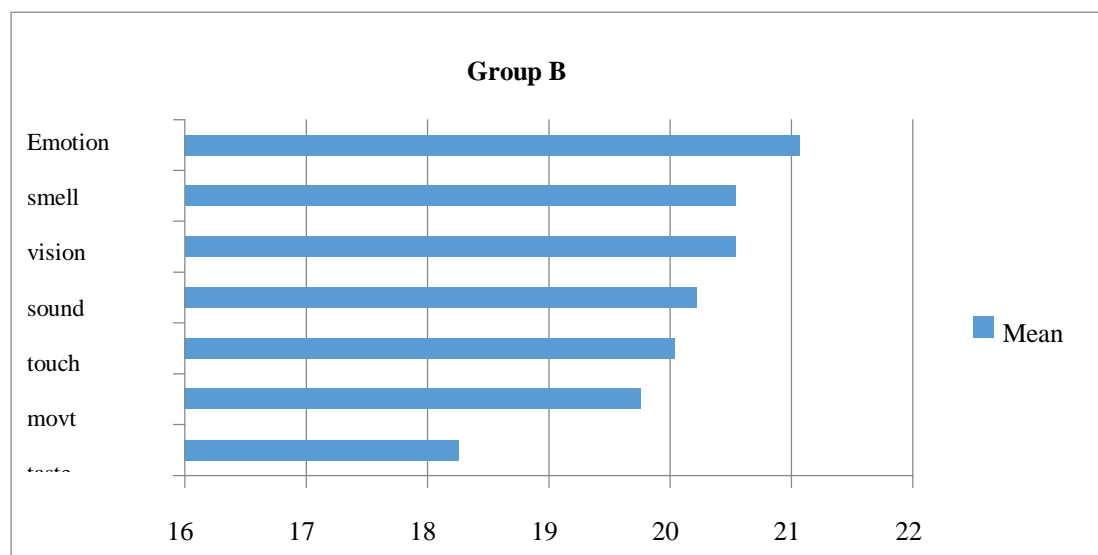
The scores of all the subscales were found to be less in community older adults compared to institutionalized older adults using ANOVA followed by Bonferroni's post hoc test.

When seven subscales within group were compared using ANOVA, in community dwelling older adults, imagery in emotion was significantly difficult than the other subscales. (0.001) (refer to graph 1); but there was no statistical difference in institutionalized older adults. (0.064)



**Graph 1** Comparison of sensory domains (subscales) in community dwelling older adults

Comparison between the domains showed that the score of emotion domain was significantly more than the other domains using ANOVA. ( $P = 0.001$ ) in community dwelling older adults



**Graph 2** Comparison of sensory domains (subscales) in institutionalized older adults.

Comparison between the domains showed no significant difference using ANOVA. ( $P=0.064$ ) in institutionalized older adults.

## DISCUSSION

Mental images arise from perceptual representations that are created from stored information. Evidence suggests the same areas of the brain used for normal perception are activated by mental imagery. [17-19] Visual mental images and perceived stimuli are represented similarly and can be processed in the same way. [20] Cognitive decline with aging is routinely described in terms of speed of processing, perception, attention, memory. Imaging techniques like PET scan and functional MRI have also identified age related structural changes in brain. [21]

The current study comparing the sensory imagery has found community dwelling older adults outperforming the institutionalized older adults in the total scores. Institutionalized older adults showed less performance in all the domains indicating overall decline in mental imagery and they also took more time to complete the questionnaire. It indicates that aging is an inevitable but heterogeneous phenomenon. It causes changes in the nervous system that can affect physical and mental abilities; with different people losing these abilities at different rates.

The components of shortened form of Bett's questionnaire included various domains of mental imagery. The questions were related to familiar visual, auditory, gustatory, olfactory, haptic experiences. It was more of a recall of these previously perceived events. As the age advances; there occurs a neurological change that declines the capacity of the functioning brain. A study suggested that slowing of information processing and reduction in accuracy of mental imagery were mediated by declines in working memory but not by decrease of sensory-motor speed. [22]

People staying in old age homes go through a lot of changes in both environment as well as behavior. Changing environment and staying away from the

family leads to emotional pressure. Being in the familiar environment and with the family is the major motivation of them being able to live healthy. Therefore loss of motivation is experienced commonly. Residing in the old age homes would reduce the level of independent activities of the individual to some extent. These activities can be anything in relation to their hobbies, social pursuits, jobs, and careers. Evidence suggests that more the person is physically active, more they can delay the age related neurological changes of the brain. [23]

Bett's questionnaire targets processing of information from various components of sensory system; it comprises imagery from visual (setting sun image), auditory (sound of car horn), olfactory (smell of paint), tactile (touch of sand) sensations. It also targets assessing mental image pertaining to movements (stair climbing), gustatory (taste of salt), and emotions (feeling of hunger). There was discernible decline in the level of imagery in the institutionalized older adults with respect to community dwelling older adults when both the groups were compared. However, the pattern of sensory imagery was not found to differ significantly in both the groups i.e. imagery of emotion or feeling was difficult and gustatory imagery was comparatively easy.

The scores of community older adults were not much reduced in comparison to a previous study on young adults. [24] But the pattern in both the groups was different from that seen in young adults. Previous studies have indicated that emotional imagery was most vivid followed by visual imagery in young adults. [24,25] But in the present study, olfactory and visual Imagery was difficult in older adults. This change in the domain of imagery can be attributed to the decreasing dominance of visual motor imagery with aging and an age-related decline in visuo-spatial and kinesthetic working memory. [5] However movement i.e. kinesthetic imagery was

found to be preserved in older adults. Motor imagery refers to imagining an action without its actual execution.

Our findings are supported by a review that advocates using mental practice as a safe and easy way to help preserving/improving motor function in the elderly. [9] Motor imagery has given promising results in young as well as old adults. [26,27]

Various domains of mental imagery should be taken into consideration for research and clinical practice in older adults as the strategies of intervention could be different from that in young adults. Care should be taken especially in institutionalized older adults where mental imagery ability is reduced in all the sensory domains.

## CONCLUSION

Mental imagery ability was found to be less in institutionalized compared to community dwelling older adults. Though the decline was seen in all the sensory domains in institutionalized older adults; the pattern of mental imagery ability was similar to community dwelling older adults. The imagery of emotion or feeling was most difficult and gustatory imagery was most easy in all the participants. Within the group of community dwelling older adults, imagery of emotion was significantly difficult compared other domains of imagery. But in institutionalized older adults, there was no difference in the imagery ability across all the domains.

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