PM is a specific kind of memory, which may be defined as remembering to remember or remembering to perform an intended action where an intention is formed and then realizing it at some appropriate time or in response to some external cue, in the future. Research into the nature of PM has implicated two components i.e. remembering to remember (PM) and remembering content (RM). Successful execution of the PM task is related to myriad cognitive abilities, such as, executive functioning, fluid intelligence, episodic memory and perceptual speed but only weakly related to self rating of memory (primarily retrospective) and personality traits. Researchers have used objective, subjective, electrophysiological measures for quantification of PM.

Research has shown that one of the important factor which influences PM is aging, as in old age there is an increase in incidence of neuropathological diseases leading to severe cognitive deficits and impaired everyday functioning and when people complain about memory failures they usually are more concerned with prospective than retrospective memory problems as the PM failures disrupt their day to day functioning. Researches investigating age related impairments in PM have yielded contradictory results where a number of researchers have failed to observe any decrement while others have reported a robust decline in PM in later adulthood. Meta-analytical and review studies have attributed the contradictory findings to variations in nature of response (self-initiated vs automatic), cues (cued vs non-cued; focal vs non-focal cues and regular vs irregular cues), setting (laboratory vs naturalistic), working memory(load of ongoing secondary activity, deactivation of completed intention), motivation level (importance, relevance or difficulty of task) and utilization of compensatory strategies. Comparison of subjective measures of PM have also yielded contradictory findings where increase in perceived PM deficits with aging have been reported in some studies while others found no variation. A probable explanation for this fact could be that older subjects recruit some compensatory strategies to overcome the dysfunctional effect of aging on PM and therefore the decline in routine PM is not subjectively (self-reported) or
objectively (in routine task performance in naturalistic settings by oneself or others) perceived.

Aging is accompanied by changes in the brain, both at the structural as well as the functional level, which in turn influence cognitive functioning. However, aging does not lead to a uniform decline in PM performance as older subjects have been found to perform better than/or similar to young subjects in naturalistic settings and on nonfocal, habitual and time based PM. Since older subjects can counter age related neural decline by reorganization of neuro cognitive processes and adoption of effective strategies, the present investigation focused on assessment of age related PM deficits and the accompanying neuropsychological changes to provide insight into the cognitive and neural bases of prospective memory. The following problem was formulated for the present investigation.

**Problem:** To assess the Neuropsychological Substrate of Prospective Memory: An Age Related Study.

The specific objectives of the study were to assess the impact of age on prospective memory and retrospective memory, along with the age related decline in neuropsychological functioning and assessment of the relation between neuropsychological functioning and PM.

The following hypotheses were formulated:

1. Subjective PM performance would remain invariant across the developmental groups.
2. There would be an inverted ‘U’ shaped relationship between objective PM performance and age.
3. Subjective and objective RM performance would vary significantly across the developmental group.
4. Neuropsychological functioning would decline progressively with age.
5. Neuropsychological functioning of respondents with lower PM would be significantly poorer in comparison with respondents with higher PM.

The present study was conducted in two phases. For Phase I, a multi-group (5 group) quasi-experimental design with 250 respondents (age range: 13-75 years) selected from various developmental age i.e. Adolescents, Young Adult, Adult, Middle Age and Old Age, was used. For Phase II, 110 respondents were selected.
from three developmental ages i.e. Adult, Middle Age and Old Age, and the respondents of the Adult group were divided into two groups on the basis of their objective PM performance. For the remaining two groups, Low PM respondents were selected. Thus a two group design was used to compare the neuropsychological functioning of low and high PM subjects and a multi-group design with three groups was used to study the accompanying age related neuropsychological dysfunction. Only three respondents, in the age range of 41-75 years fulfilled the criterion for inclusion in high PM group. Therefore, their individual profiles were considered. SPM, PRMQ and PM Task were administered to the 250 respondents in Phase-I and AIIMS Comprehensive Neuropsychological Battery was administered to the 110 respondents, in Phase-II.

For analysis of difference among/between the mean scores, one way Analysis of Variance followed by post-hoc test (Tukey, Tukey-Kramer) or t-test was used.

Analysis of Phase I, revealed that subjective PM was invariant across a wide age range i.e. 13 to 75 years. However, objective PM was found to be significantly poorer in the Adult (26 to 40 years), Middle Age (41 to 60 years) and Old Age (61 to 75 years) groups as compared to the Adolescent (13 to 17 years) and Young Adult (18 to 25 years) groups. Further PM of Middle Age group was significantly poorer as compared to the Adult group while no significant differences were found between the Middle Age and Old Age groups. Thus, the proposed inverted relation between PM and aging could be verified for the adult subjects, i.e. 26 to 75 years. The analysis of the RM scores showed a progressive decline in subjective as well as objective RM where the decline started in the adults (26 years onwards) but was evident from middle age onwards and the differences were less evident on subjective RM.

Analysis of Phase II revealed some neuropsychological deficits, i.e. sensory motor functions, language (expressive speech, receptive speech, writing), memory and intellectual processes, are susceptible to aging. Aging (41 years onwards) was found to have a more pronounced dysfunctional effect on the right hemisphere while that on the left, excepting the left frontal lobe was lesser. However, global lobular dysfunction was found in the Old Age (60 yrs +) group. Comparison of the neuropsychological and lobe function of low and High PM group subjects showed a
significant PM deficit from 35 years onwards. Although aging did not result in a uniform decrease in neuropsychological and lobe functions of the respondents with PM deficits it was found to be associated with PM deficits. Motor functioning, was found to be significantly associated with PM deficits.

Thus, the present results verify three of the proposed hypotheses (1,4,5) while two hypotheses (2,3) was partially verified i.e. for the adult age continuum.