

**Chapter-IV**

**RESULTS**

## RESULTS

On the basis of the objectives of the study, descriptive statistics and analysis of variance (ANOVA) were used to analyze the data obtained from the sample. The overall layout of results was categorized into 2 sections. The first section deals with t-test and second section deals with ANOVA.

### **Section-1: Comparisons between insomniacs and controls.**

In this section, t-test was carried out to find out whether the means of two groups i.e. control group and insomniacs are *statistically* different from each other or not on all the dependent variables included in the study (sleepiness, simple reaction time, learning, memory and health). This section deals with an overall sample of 200.

**Table 4: Significance of difference between mean scores of control group (n = 100) and insomniacs (n = 100) on various variables [df = 198]**

<b>Variable</b>	<b>Group</b>	<b>Mean</b>	<b>SD</b>	<b>t</b>	<b>Sig. (p&lt;)</b>
<b>Sleepiness</b>	Control	6.53	4.42	15.10	.01 level
	Insomniac	15.02	3.46		
<b>Simple reaction time (sec)</b>	Control	.460	.15	14.85	.01 level
	Insomniac	.1130	.42		
<b>Learning Maze(trial)</b>	Control	6.20	1.77	14.35	.01 level
	Insomniac	10.43	2.35		
<b>Memory (WMS-III)</b>	Control	64.58	15.01	8.68	.01 level
	Insomniac	44.22	18.01		
<b>Health GHQ(distress)</b>	Control	9.51	3.90	26.98	.01 level
	Insomniac	27.46	5.38		

When judged on sleepiness, the mean score of control group (6.53) was found to be lesser than that of insomniacs (15.02) and the difference between the two means is statistically significant at .01 levels of probability. It is observed that the day time sleepiness is more in insomniacs as compared to the control group.

Above t values reveal that the mean simple reaction time (.46 sec) of control group is lesser than the mean RT score (1.13 sec) of insomniacs. Value of 't' is 14.85 which is statistically significant at .01 level. It appears that the performance of control group is much better (faster) than those suffering from insomnia who were slower to react.

Similarly, rate of learning was observed in both the groups and as indicated in the Table-4, Mean score of control group (6.20) comes out to be lesser than the mean score of insomniacs (10.43). 't' is significant at .01 level of probability. Rate of learning is thus found to be faster in control group than the insomniacs who mastered the same maze by taking four more trials.

In case of memory, the mean score of control group (64.58) is more than that of the insomniac group (44.22). 't' value is statistically significant. It shows that the memory of control group is better than the memory of the insomniacs.

General Health was another variable which was of major concern. As seen in Table 4, the mean score (9.51) of control group is less than the mean score (27.46) of insomniacs. 't' value is also statistically significant. Since GHQ yields negative scores which reveal that the health of normal group is better than the group with insomnia who appeared to be distressed.

Thus, insomniacs feel more sleepiness, were slower to react, slower to learn, had poorer memory and had more distressing symptoms than controls who do not have sleep problems.

## **Section-2: ANOVA for sleepiness, simple reaction time, learning, memory and health**

In this section description of ANOVA is given which was carried out to find the effect of time, conditions (groups) and their interactive effect on sleepiness, simple reaction time, learning, memory and health, i.e. whether time, conditions (groups) as well as altogether time and conditions (groups) had significant or non-significant effect on all the above mentioned variables. Although the study was ex post facto and quasi experimental, yet the total variability in obtained scores was split into "between-groups" and "within groups" variability. Between-groups variability may be caused by the variation in independent variable, individual differences in subjects, experimental error, or a combination of any of these. Within group effects were time (four levels : pretesting, 20 days post, 40 days post and 60 days post treatment). Another within group effect was an interaction between conditions (treatment groups) and time (four intervals). Here a sample of 96 insomniacs was divided into 4 conditions (groups) each comprising of 24 insomniacs. Groups were divided on the basis of 4 treatment conditions (described in methods) i.e. management and prescription (n=24), management and non prescription (n=24), non management and prescription (n=24), non management and non prescription (n=24). The effects were displayed in a graphical form for all the variables whenever significant. Description for each of the dependent variable is presented separately owing to heterogeneity among the nature of variables, MANOVA was not attempted.

### **Sleepiness**

Sleepiness scores of subjects were obtained with the help of Epworth Sleepiness Scale. Table 5 depicts the means for main effects of time and conditions and interactive means on sleepiness in insomniacs.

**Table 5: Means of sleepiness score for four groups (condition) under four time levels (N = 384: 4X96)**

Groups Time	(M – P)	(M – NP)	(NM – P)	(NM – NP)	Main Means
	1	2	3	4	(Time)
1	14.13	15.00	12.83	12.04	13.50
2	6.17	7.83	8.58	10.42	8.25
3	6.92	7.17	7.00	5.83	6.73
4	3.29	5.54	6.29	5.38	5.12
Main Means (groups)	7.63	8.89	8.68	8.42	

M - P: Both management and prescription

M - NP: management and non prescription

NM - P: non management and prescription

NM - NP: non management and non prescription

**Table 6: Summary of ANOVA for sleepiness**

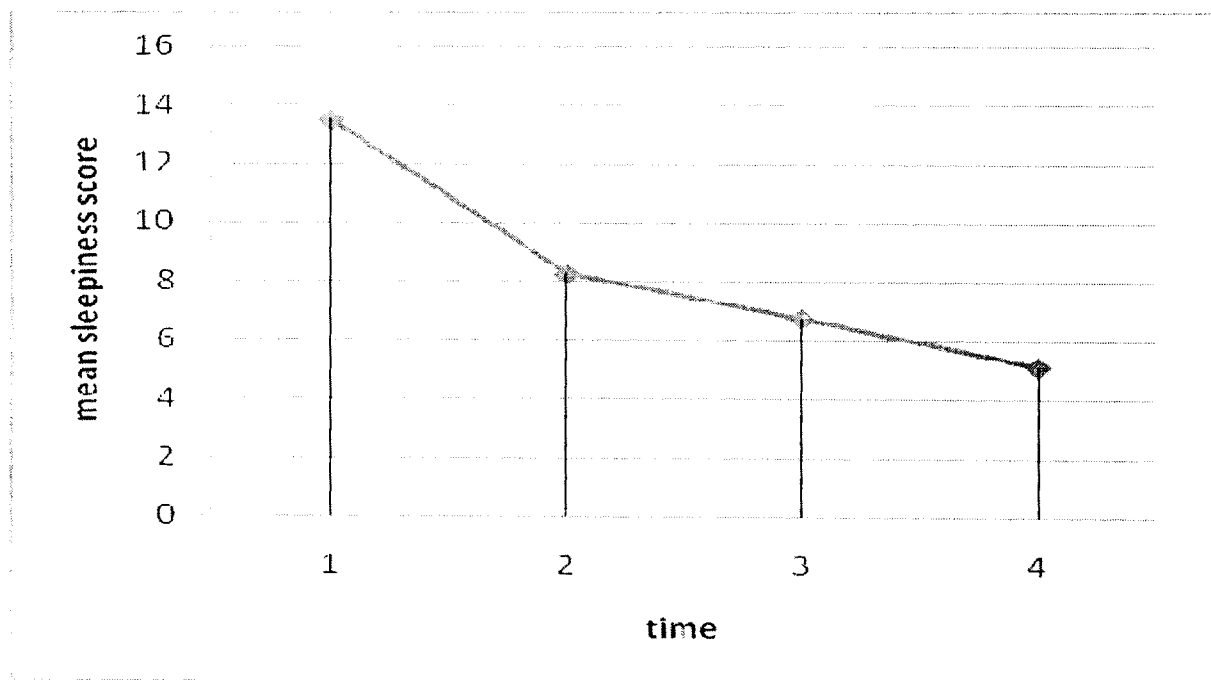
Source	SS	df	MS	F	p <
Time	3670.615	3	1223.538	66.009	.000
Condition	87.677	3	29.226	1.577	.195
Time* condition	532.698	9	59.189	3.193	.05
Error (Residual)	6821.250	368	18.536		

Table 6 shows the summary of ANOVA. It revealed that time was found to be a significant source of variance ( $F = 66.009$ ). It was observed that insomniacs showed apparent decrement in sleepiness with time as clear by means at various durations (13.50, 8.25, 6.73 and 5.12). The difference observed was significant.

Condition emerged as a non-significant source of variance ( $F = 1.577$ ). Management and non prescription together displayed more scores (8.89) as compared to the rest three (7.63, 8.68 and 8.42). Management in conjunction with prescription displayed reduced sleepiness.

Time and condition taken together revealed a significant interactive effect, since  $F$  was 3.193, significant at .05 levels.

**Figure 1: Means of Sleepiness for all the four time intervals**



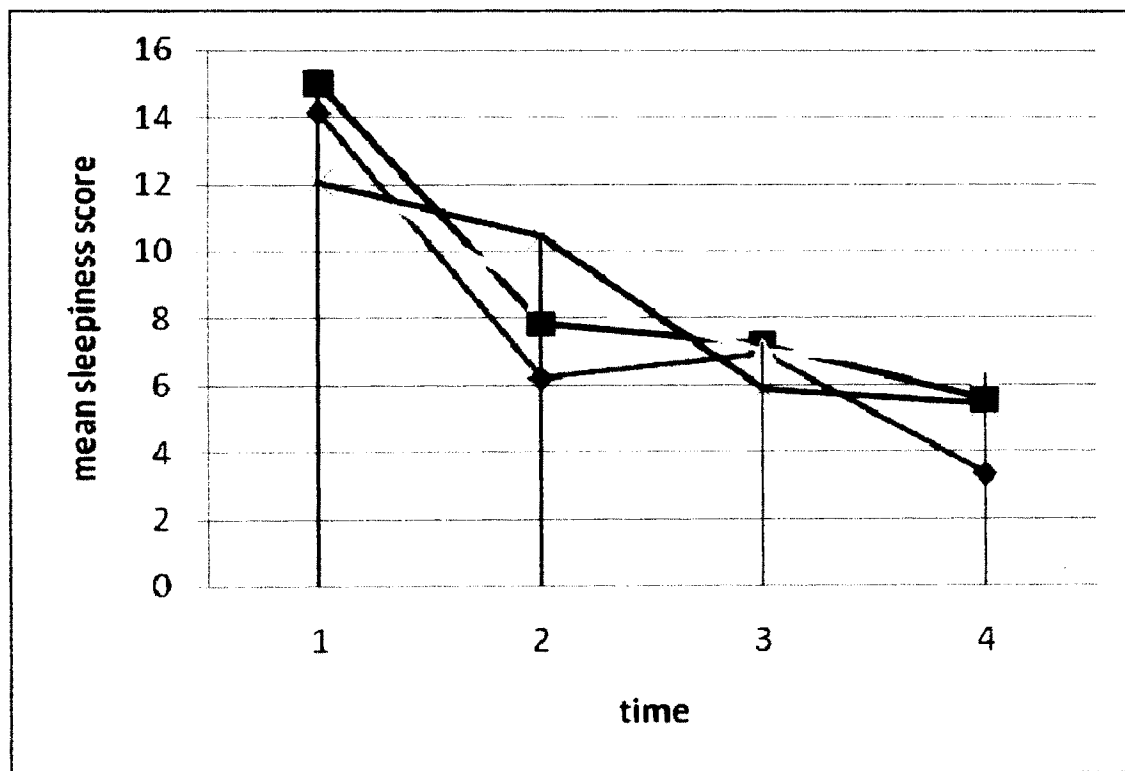
- 1-pretest mean sleepiness score
- 2-post 20 days mean sleepiness score
- 3-post 40 days mean sleepiness score
- 4-post 60 days mean sleepiness score

Figure 1 displays mean sleepiness score of all the four time levels (Table 5). The Figure shows that time 4 (after 60 days of treatment) had lowest mean score (5.12) indicating it to be the most effective time duration of treatment in comparison to the other three. Time 1 and 2 demonstrated

high mean score in comparison to time 3 and 4. Mean scores of sleepiness for pretest mean score was found to be 13.50 and that of post 20 days treatment was 8.25.

These findings suggest that time play an important role in optimizing sleepiness as well as other important clinical outcomes. It was noted that scores on sleepiness after treatment were more substantial than no treatment or less time of treatment. Thus, it can be concluded that time is imperative in reducing sleepiness in insomniacs and the type of condition given was found to be trivial.

**Figure-2: Mean sleepiness score of four groups (conditions) under four time intervals**



- 1-pretest mean sleepiness score
  - 2-post 20 days mean sleepiness score
  - 3-post 40 days mean sleepiness score
  - 4-post 60 days mean sleepiness score
- condition 1
  - condition 2
  - condition 3
  - condition 4

It was observed in Figure 2 that there was a consistent pattern of time on sleepiness score. Sleepiness kept reducing after treatment was given. Thus we can say that time dependent effects were observed in sleepiness in all the groups (conditions). Condition – 1 (M - P) illustrated substantial results and thus ample reduction in daytime sleepiness.

Since group (condition) \* time was significant, the comparisons between time intervals for four conditions was done separately by repeated ANOVA. Time was a within group factor.

**Table: 7: Pairwise comparison between sleepiness (condition-1: both management and prescription)**

(I) Time	(J) Time	Mean Differences (I-J)	S.D	Sig. p<
1	2	7.88*	.138	.001
	3	10.68*	.135	.001
	4	7.64*	.120	.000
2	3	2.80*	.078	.053
	4	-.240	.055	.009
3	4	-3.04*	.064	.000

Above Table depicts the pairwise comparison of time gaps in the scores of sleepiness.

As seen above in the Table, pretest mean score is significantly different from post 20 days mean score (7.88), post 40 days mean score (10.68) and post 60 days mean score (7.64). However, post 20 days mean score is not significantly different to post 60 days mean score (.240) but is significantly different to post 40 days mean score (2.80). Post 40 days mean score and post 60 days mean score (3.04) show a significant difference as revealed by mean difference values.



**Table: 8: Pairwise comparison between sleepiness (condition-2: only management and no prescription)**

(I) Time	(J) Time	Mean Differences (I-J)	S.D	Sig. p<
1	2	8.200*	1.11	.000
	3	9.800*	1.01	.000
	4	7.880*	1.03	.000
2	3	1.600	1.11	.163
	4	-.320	1.32	.811
3	4	-1.920	1.04	.079

As seen in Table 8, pretest mean score is significant with post 20 days mean score (8.200), post 40 days mean score (9.800) and post 60 days mean score (7.880). But post 20 days mean score is not significant with post 40 days mean score (1.600) and post 60 days mean score (.320). Also, post 40 days mean score is not significant with post 60 days mean score (1.920).

**Table- 9: Pairwise comparison between sleepiness (condition-3: only prescription and no management)**

(I) Time	(J) Time	Mean Differences (I-J)	S.D	Sig. p<
1	2	8.04*	1.06	.000
	3	8.60*	1.11	.000
	4	8.24*	.97	.000
2	3	.560	1.23	.65
	4	.200	1.17	.86
3	4	-.360	.58	.54

Pretest mean score is significant with post 20 days mean score (8.04), post 40 days mean score (8.60) and post 60 days mean score (8.24). But post 20 days mean score is not significant with post 40 days mean score (.560) and post 60 days mean score (.200). Also, post 40 days mean score is not a significant with post 60 days mean score (.360).

**Table: 10: Pairwise comparison between sleepiness (condition-4: neither management nor prescription)**

(I) Time	(J) Time	Mean Differences (I-J)	S.D	Sig. p<
1	2	8.95*	1.22	.000
	3	11.22*	.827	.000
	4	9.90*	1.02	.000
2	3	2.27	1.10	.052
	4	.95	.98	.342
3	4	-1.31	.91	.162

Pretest mean score is significant with post 20 days mean score (8.95), post 40 days mean score (11.22) and post 60 days mean score (9.90). But post 20 days mean score is not significant with post 40 days mean score(2.27) and post 60 days mean score (.95). And, post 40 days mean score is not significant with post 60 days mean score (1.31).

In all the four groups (conditions), sleepiness seems to decrease after the onset of management or/and prescription. However, in one group it also decreased after 20 days, i.e., at 40 days and 60 days intervals. This group was given both management and physician's prescription. Time dependent effect was not observed in other groups. This pattern was, therefore, responsible for this interactive effect.

## Simple Reaction Time

The SRT score of 384 subjects were obtained by using Simple Visual Stimulus. Mean SRT of all the subjects obtained under four time conditions was analyzed for three sources (Table 11). Three sources were time effect, repeated factor on four groups (conditions) which was between subject factor and the third source was the interaction between the two main effects.

**Table 11: Means of SRT (sec) for four groups (conditions) under four time levels (N = 384: 4 x 96)**

<b>Groups</b> <b>Time</b>	<b>(M – P)</b> <b>1</b>	<b>(M – NP)</b> <b>2</b>	<b>(NM – P)</b> <b>3</b>	<b>(NM – NP)</b> <b>4</b>	<b>Main Means</b> <b>(Time)</b>
<b>1 (pre test)</b>	1.085	1.212	1.141	1.122	1.140
<b>2 (20 days)</b>	.855	.708	.572	.576	.678
<b>3 (40 days)</b>	.731	.713	.591	.741	.694
<b>4 (60 days)</b>	.417	.409	.518	.464	.452
<b>Main Means</b> <b>(groups)</b>	.772	.760	.706	.726	

**M - P: Both management and prescription**

**M - NP: management and non prescription**

**NM - P: non management and prescription**

**NM - NP: non management and non prescription**

Table 11 depicts the means for main effects of conditions and time on simple reaction time. The SRT scores were analyzed by ANOVA to verify the significance of two main effects- time (0, 20, 40 and 60 days) and conditions (1, 2, 3 and 4) as well as their interactive effect (time X conditions). Summary Table of ANOVA (4 x 4) is presented in Table- 12.

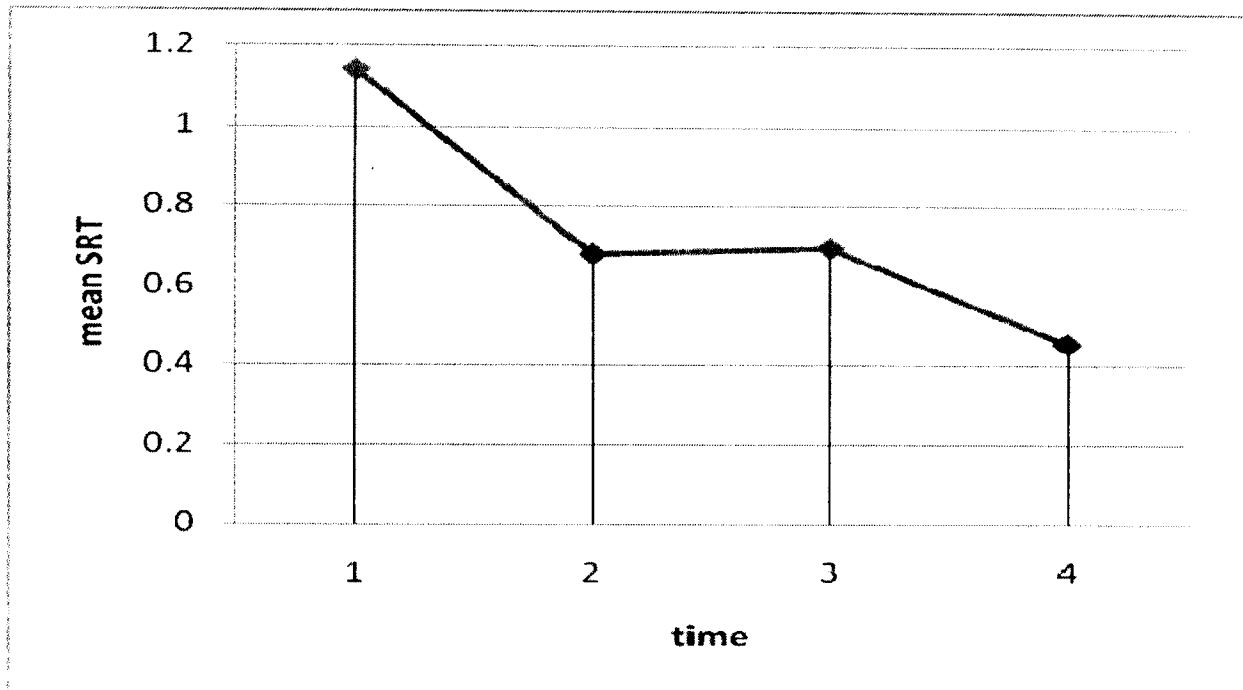
**Table 12: Summary Table of ANOVA for Simple Reaction Time**

<b>Source</b>	<b>SS</b>	<b>df</b>	<b>MS</b>	<b>F</b>	<b>p &lt;</b>
<b>Time</b>	23.903	3	.269	1.752	.000
<b>Condition</b>	.269	3	.090	.819	.484
<b>Time* condition</b>	1.752	9	.195	1.77	.071
<b>Error (Residual)</b>	40.314	368	0.110		

The F value for time source was 1.752 which was significant. However, the condition (treatment) was having a non significant effect on simple reaction time as indicated by its F value as .819 being its probability less than .0001 at 3 and 368 degrees of freedom. It was observed that insomniacs before management had high mean RT scores (1.140) in comparison to those after giving treatment conditions after a gap of fixed days (.678, .694, .452). However, the valid consequence of time was not invariant across groups (conditions) leading to a non significant interactive effect between time and conditions. ANOVA revealed that time \* condition was a non significant source of variance as indicated by F values (.071) being non significant beyond 0.05 level of probability.

The means of various groups (conditions) have been shown in Figure 3.

**Figure-3: Means of SRT for all the four conditions (groups)**



1-pretest mean SRT score

2-post 20 days mean SRT score

3-post 40 days mean SRT score

4-post 60 days mean SRT score

Figure 3 displays mean simple reaction time scores of all the four times (from Table 11). The Figure exhibits prominent role of time duration on SRT as the mean after 60 days of management is .452 which shows the steepest decreased curve in comparison to the earlier times. All the groups (conditions) displayed enhanced results with augment in time, the mean scores at interval 2 and 3 being .678 and .694 respectively. These results show that time was adequate to bring about improvements in SRT trials. It signifies the important role of time in SRT of insomniacs. Also, as witnessed from means of pretest mean score and 2, it was evident that the trials of SRT trimmed down considerably indicating that time was important in bringing about enhancement in SRT.

Time dependent effects were observed in Figure 3. After 60 days SRT were lowest i.e., processing was rapid. It indicated that a minimum of 60 days of treatment condition should be given to bring about a gain in the SRT in insomniacs because the mean scores were inconsistent at 20 and 40 days interval.

## Learning

Learning scores of 96 subjects at four times were obtained by taking number of trials on Stylus Maze Learning. The cellwise means have been shown in Table-13.

**Table 13: Means of learning score (Trials) for four groups (conditions) under four time levels (N = 384: 4 X 96)**

<b>Groups</b> <b>Time</b>	<b>(M – P)</b> <b>1</b>	<b>(M – NP)</b> <b>2</b>	<b>(NM – P)</b> <b>3</b>	<b>(NM – NP)</b> <b>4</b>	<b>Main means</b> <b>(Time)</b>
<b>1</b>	14.69	14.41	13.20	11.03	13.33
<b>2</b>	11.08	10.7	10.3	9.52	10.4
<b>3</b>	7.48	7.20	8.41	9.41	8.12
<b>4</b>	6.12	6.29	8.59	7.59	7.14
<b>Main means</b> <b>(Groups)</b>	9.84	9.65	10.13	9.39	

**M - P: Both management and prescription**

**M - NP: management and non prescription**

**NM - P: non management and prescription**

**NM - NP: non management and non prescription**

The learning scores were analyzed by ANOVA to verify the significance of two main effects – time and conditions as well as their interactive effect. Summary of ANOVA is presented in Table 14.

**Table 14: Summary of ANOVA for learning**

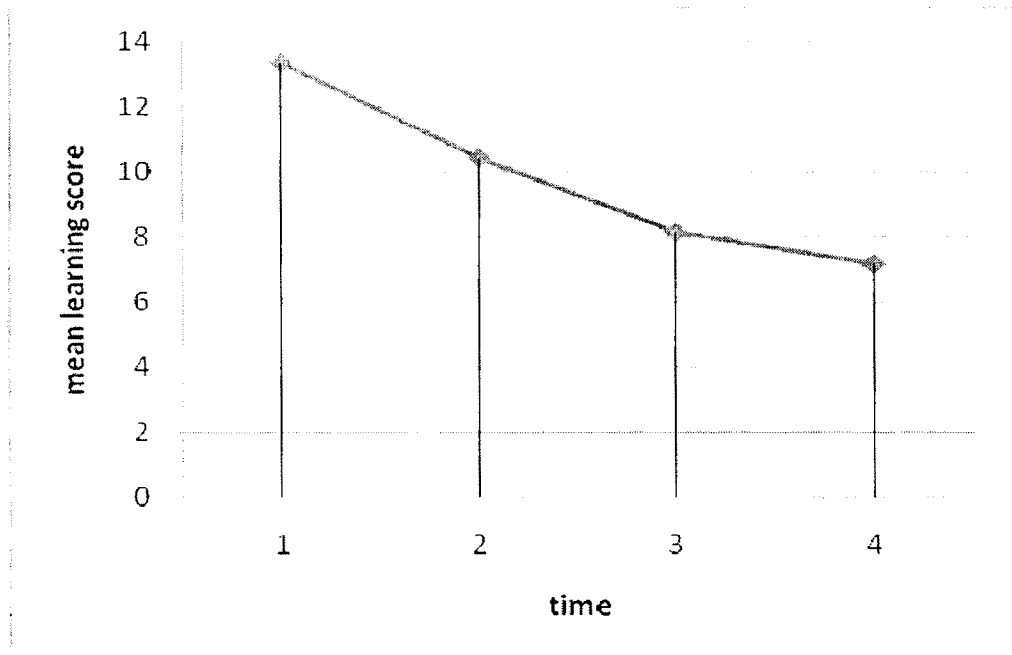
<b>Source</b>	<b>SS</b>	<b>Df</b>	<b>MS</b>	<b>F</b>	<b>p &lt;</b>
<b>Time</b>	724.206	3	241.402	19.249	.000
<b>Condition</b>	28.055	3	9.352	.746	.525
<b>Time* condition</b>	1827.335	9	203.037	16.190	.000
<b>Error</b>	4615.144	368	12.541		

ANOVA revealed that the time was found to be a significant source of variance since F was 19.249.

It was observed that with time the no of trials reduced. The scores were 13.33 before management and 7.14 after 60 days of management. As revealed by the mean scores it was evident that the pattern of improvement in learning was consistent.

It was further observed that condition emerged as a non significant source of variance as revealed by F value of .746 being statistically non significant beyond .001 level. Time and conditions taken altogether showed significant interactive effect (F = 16.190, df = 9/368, p < .001).

**Figure 4: Means of learning for all the four time levels**



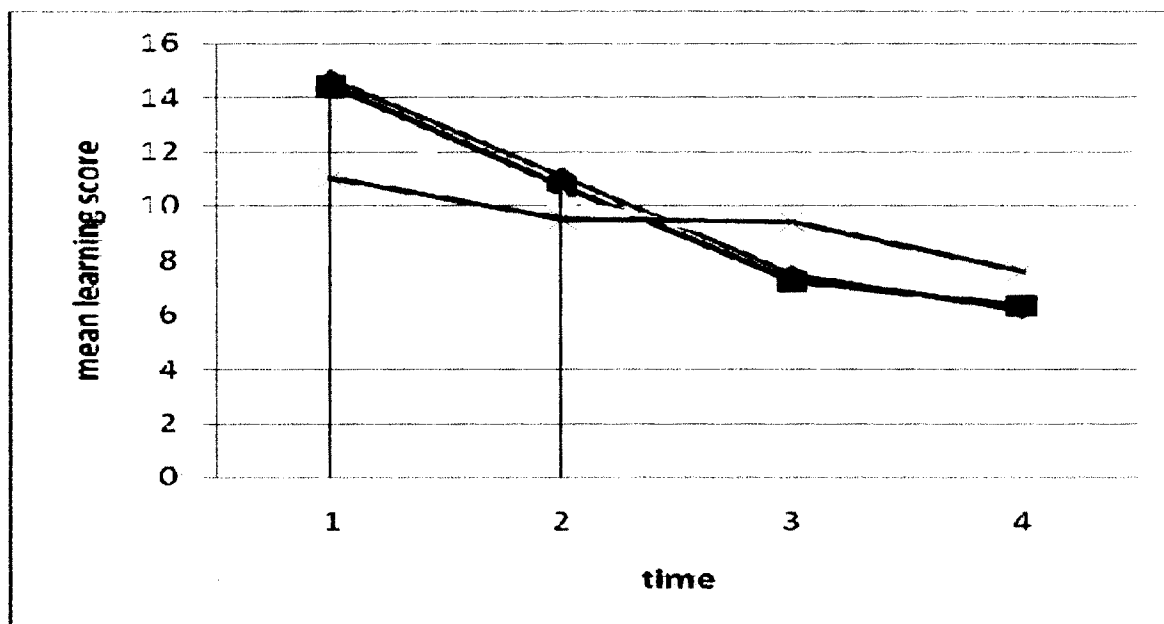
- 1-pretest mean learning score
- 2-post 20 days mean learning score
- 3-post 40 days mean learning score
- 4-post 60 days mean learning score

As seen in Figure 4, the mean learning trials reduced from pretest mean score (13.33) to post 20 days mean score (10.4), further decreased at post 40 days mean score (8.12) and then was lowest after post 60 days mean score (7.14).

Thus, it was also evident that certain amount of time of treatment was obligatory to bring about a decline in mean learning trials and in turn augment learning. This disclose the indispensable role of time in learning in insomniacs.



**Figure 5: Mean learning trials of four groups (conditions) under four time interval.**



1-pretest mean sleepiness score

2-post 20 days mean sleepiness score

3-post 40 days mean sleepiness score

4-post 60 days mean sleepiness score

■ condition 1

■ condition 2

■ condition 3

■ condition 4

It was observed in Figure 5 that in all the groups (conditions), after a certain trials taken on Stylus Maze Learning were truncated, i.e., learning was swift after 60 days of management. Thus, we can say that time dependent effects were observed in learning. It was also evident as seen in group 1 and 2 that management was essential, either alone or accompanied with prescription in bringing about improvement in learning.

Since group (condition) X time was significant, the comparisons between time intervals for four conditions was done separately by repeated ANOVA. Time was a within group factor.

**Table- 15: Pairwise comparison between Learning (condition-1: both management and prescription)**

(I) Time	(J) Time	Mean Differences (I-J)	S.D	Sig. p<
1	2	3.464*	.701	.000
	3	-3.577*	.655	.000
	4	5.027*	.613	.000
2	3	-7.041*	.609	.000
	4	1.563*	.595	.015
3	4	8.604*	.684	.000

As revealed by Table 15 Pretest mean score is significant with post 20 days mean score(3.464), 3(3.577), and 4(5.027). Post 20 days mean score is significant with post 40 days mean score(7.041) and 4(1.563) and post 40 days mean score is also significant with post 60 days mean score(8.604).

**Table- 16: Pairwise comparison between Learning (condition-2: only management and no prescription)**

(I) Time	(J) Time	Mean Differences (I-J)	S.D	Sig. p<
1	2	4.880*	.646	.000
	3	-3.949*	.738	.000
	4	4.020*	.960	.000
2	3	-8.829*	.727	.000
	4	-.860	.838	.315
3	4	7.970*	.889	.000

Table 16 depicts the pair wise comparison of time gaps in the scores of learning.

As seen above in the Table, pretest mean score is significantly different from post 20 days mean score (4.880), 3(3.949) and 4(4.020). However, post 20 days mean score is not significantly different to post 60 days mean score(.860) but is significantly different to post 40 days mean

score(8.829). Post 40 days mean score and post 60 days mean score (7.970) show a significant difference as revealed by mean difference values.

**Table: 17: Pairwise comparison between Learning (condition-3: only prescription and no management)**

(I) Time	(J) Time	Mean Differences (I-J)	S.D	Sig. p<
1	2	3.284*	.744	.000
	3	-3.053*	1.05	.008
	4	1.720	1.04	.113
2	3	-6.337*	1.04	.000
	4	-1.564	.98	.126
3	4	4.772*	1.15	.000

From Table 17, it is clear that pretest mean score is significant with post 20 days mean score (3.284) and 3(3.053) but non-significant with post 60 days mean score(1.720). Post 20 days mean score is significant with post 40 days mean score(6.337) but non-significant with post 60 days mean score(1.564). Post 40 days mean score is also significant with post 60 days mean score (4.772).

**Table: 18: Pair wise comparison between Learning (condition-4: neither management nor prescription)**

(I) Time	(J) Time	Mean Differences (I-J)	S.D	Sig. p<
1	2	2.664*	.556	.000
	3	-5.161*	.97	.000
	4	2.107	1.09	.067
2	3	-7.825*	1.05	.000
	4	-.556	1.00	.585
3	4	7.268*	1.38	.000

Time I is non-significant with post 60 days mean score (2.107) but significant with post 20 days mean score (2.664) and 3(5.161) and However post 20 days mean score is non-significant with post 60 days mean score (.556) but significant with post 40 days mean score(7.825). Post 40 days mean score is significant with post 60 days mean score (7.268).

## Memory

The Wechsler Memory Scale (WMS-III) developed by Wechsler was used to assess the level of memory among 96 insomniacs of all the four groups (conditions) under four time intervals. The mean scores from group 1 to group 4 increased from 47.20 to 69.58.

**Table 19: means of memory score for four groups (conditions) under four time levels (N = 384: 4X96)**

Groups Time	(M – P)	(M – NP)	(NM – P)	(NM – NP)	Main means
	1	2	3	4	(Time)
1	35.34	48.84	51.33	53.30	47.20
2	69.66	61.91	64.18	65.78	65.38
3	70.39	71.28	69.32	62.93	68.48
4	74.39	66.15	68.55	69.23	69.58
Main means (groups)	62.45	62.05	63.35	62.81	

**M - P: Both management and prescription**

**NM - P: non management and prescription**

**M - NP: management and non prescription**

**NM - NP: non management and non prescription**

Table 19 depicts the means for main effects of time and conditions on memory scores.

ANOVA indicated condition was significant beyond the confidence level of probability (Table 20).

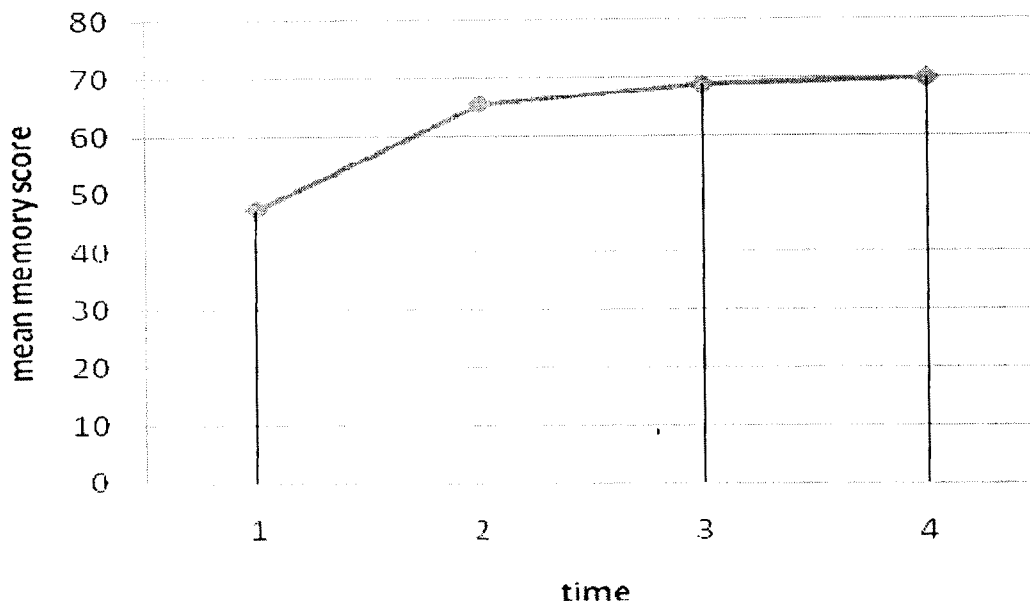
**Table 20: Summary Table of ANOVA**

Source	SS	df	MS	F	p <
Time	31501.070	3	10500.357	30.754	.000
Condition	87.943	3	29.314	.086	.968
Time* condition	7318.183	9	813.131	2.382	.013
Error (Residual)	125646.52	368	341.431		

ANOVA revealed time as a significant source of variance in memory as indicated by F as 30.754.

Condition effect was however found non significant (F = .968). The interactive effect appeared significant between time and conditions (F = 2.382).

**Figure 6: Means of memory for all the four time intervals**

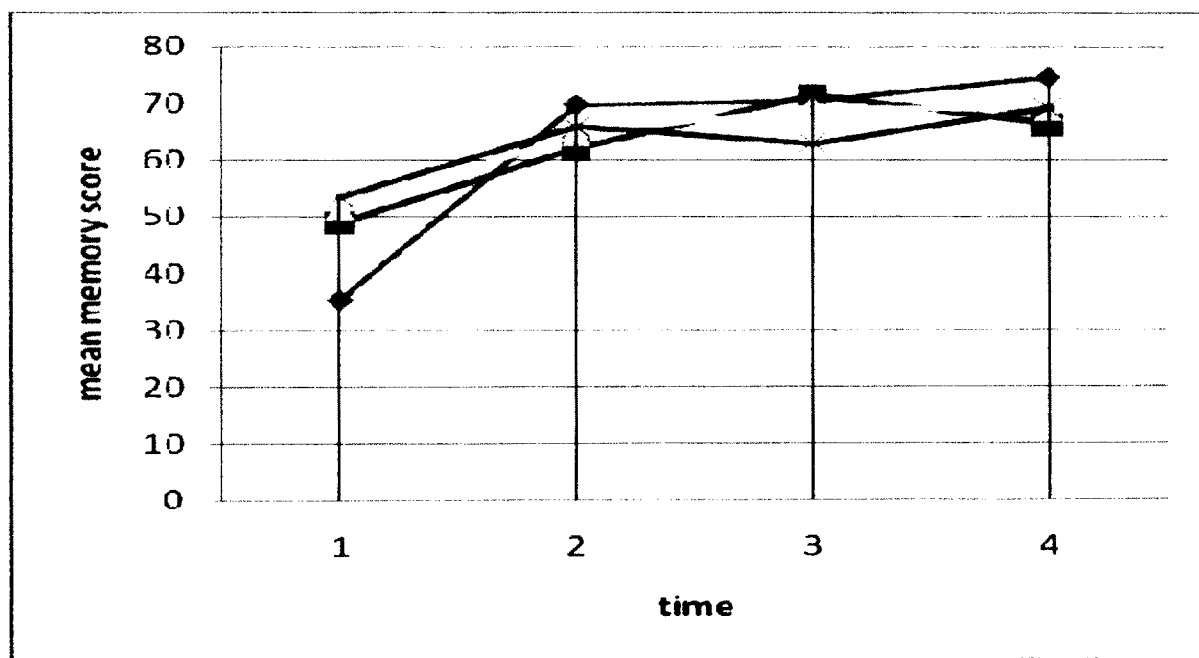


- 1-pretest mean memory score
- 2-post 20 days mean memory score
- 3-post 40 days mean memory score
- 4-post 60 days mean memory score

Figure 6 displays memory means under various treatment conditions at different time intervals. Mean memory scores at pretest mean score (47.20) and post 20 days mean score (65.38) augmented appreciably in contrast to group 3 (68.48) and 4 (69.58) indicating time as very imperative in boosting memory. At post 40 days mean score and post 60 days, increase in memory was moderate and inconsistent. This crossover was mainly responsible for the interactive effect.

Management and prescription are observed to be making a striking variation in the memory of insomniacs. Management was also imperative but when given unaccompanied (without prescription).

**Figure-7: Interactive means of memory for time and conditions**



1-pretest mean memory score

2-post 20 days mean memory score

3-post 40 days mean memory score

4-post 60 days mean memory score

■ condition 1

● condition 2

▲ condition 3

◆ condition 4

Time dependent effects were observed in the Figure above. In all the groups (conditions), there was a substantial increase in memory after 60 days of time interval. Group 1 with both management and prescription revealed a noteworthy improvement in memory with time.

Since group (condition) X time was significant, the comparisons between time intervals for four conditions was done separately by repeated ANOVA. Time was a within group factor.

**Table- 21: Pairwise comparison between memory (condition-1: both management and prescription)**

(I) Time	(J) Time	Mean Differences (I-J)	S.D	Sig. p<
1	2	-21.715*	3.880	.000
	3	-11.792*	4.441	.014
	4	-19.600*	4.996	.000
2	3	9.924*	4.620	.042
	4	2.116	4.563	.647
3	4	-7.808	4.661	.103

Pretest mean score is significant with post 20 days mean score (21.715), 3(11.792), and 4(19.600). Post 20 days mean score is significant with post 40 days mean score (9.924) but non-significant with post 60 days mean score (2.116) and post 40 days mean score (7.808) is also non-significant with post 60 days mean score.

Group 1 shows tremendous increase in memory with increase in time.

**Table- 22: Pairwise comparison between memory (condition-2: only management and no prescription)**

(I) Time	(J) Time	Mean Differences (I-J)	S.D	Sig. p<
1	2	-35.723*	4.577	.000
	3	-35.233*	5.036	.000
	4	-39.526*	4.066	.000
2	3	.490	5.811	.934
	4	-3.803	3.931	.343
3	4	-4.293	5.157	.413



Pretest mean score is significant with post 20 days mean score(35.723), 3(35.233) and 4(39.526). But post 20 days mean score is not significant with post 40 days mean score(.490) and 4(3.803). And, post 40 days mean score is not significant with post 60 days mean score (4.293). In group 2 the memory shows a little improvement from pretest mean score to post 40 days mean score.

**Table- 23 : Pairwise comparison between memory (condition-3: only prescription and no management)**

(I) Time	(J) Time	Mean Differences (I-J)	S.D	Sig. p<
1	2	-25.109*	6.028	.000
	3	-17.412*	6.008	.008
	4	-23.786*	5.267	.000
2	3	7.697	4.998	.137
	4	1.323	5.351	.807
3	4	-6.374	3.971	.122

Pretest mean score is significant with time 2 (25.109), 3 (17.412) and 4 (23.786). But post 20 days mean score is not significant with post 40 days mean score(7.697) and 4 (1.323). Also, post 40 days mean score is not significant with post 60 days mean score (6.374). In case of group 3 results does not change much from pretest mean score to post 40 days mean score.

**Table- 24: Pairwise comparison between memory (condition-4: neither management nor prescription)**

(I) Time	(J) Time	Mean Differences (I-J)	S.D	Sig. p<
1	2	-25.065*	4.300	.000
	3	-19.491*	5.485	.002
	4	-24.274*	5.425	.000
2	3	5.575	5.552	.327
	4	.791	4.005	.845
3	4	-4.783	5.869	.424

The Wechsler memory scale developed by Wechsler was used to assess the level of memory among 100 insomniacs on all 4 groups (conditions).

Pretest mean score is significant with 2(25.065), 3(19.491) and 4(24.274). But post 20 days mean score is not significant with post 40 days mean score(5.575) and post 60 days mean score (.791). However, post 40 days mean score is not a significant with post 60 days mean score (4.783).

Time was statistically significant at .01 levels in memory as indicated by F value. Time plays an important role in the status of memory effects emerged four groups (conditions) after each time duration. In group 4, there is further reduction in memory with increase in duration of conditions.

## Health

The GHQ-12 was used to analyze the scores of health. The means for general health score were found. Table 24 indicates the means for main effects of time and conditions on health as well as interactive means.

**Table- 25: Mean general health score for four groups (conditions) under four time level (N = 384: 4 X 96)**

<b>Groups</b> <b>Time</b>	<b>(M – P)</b> <b>1</b>	<b>(M – NP)</b> <b>2</b>	<b>(NM – P)</b> <b>3</b>	<b>(NM – NP)</b> <b>4</b>	<b>Main Means</b> <b>(Time)</b>
<b>1</b>	26.75	27.17	23.54	21.33	24.70
<b>2</b>	13.83	14.50	13.04	13.67	13.76
<b>3</b>	12.96	12.83	13.67	18.83	14.57
<b>4</b>	3.46	5.33	8.29	7.87	6.24
<b>Main Means</b> <b>(groups)</b>	14.25	14.96	14.64	15.43	

**M - P: Both management and prescription**

**M - NP: management and non prescription**

**NM - P: non management and prescription**

**NM - NP: non management and non prescription**

**Table 26: Summary of ANOVA for health (GHQ scores)**

Source	SS	df	MS	F	p <
<b>Time</b>	14548.531	3	5516.177	114.077	.000
<b>Condition</b>	71.677	3	23.892	.494	.687
<b>Time* condition</b>	1466.448	9	162.939	3.370	.001
<b>Error (Residual)</b>	<b>17794.583</b>	368	48.355		

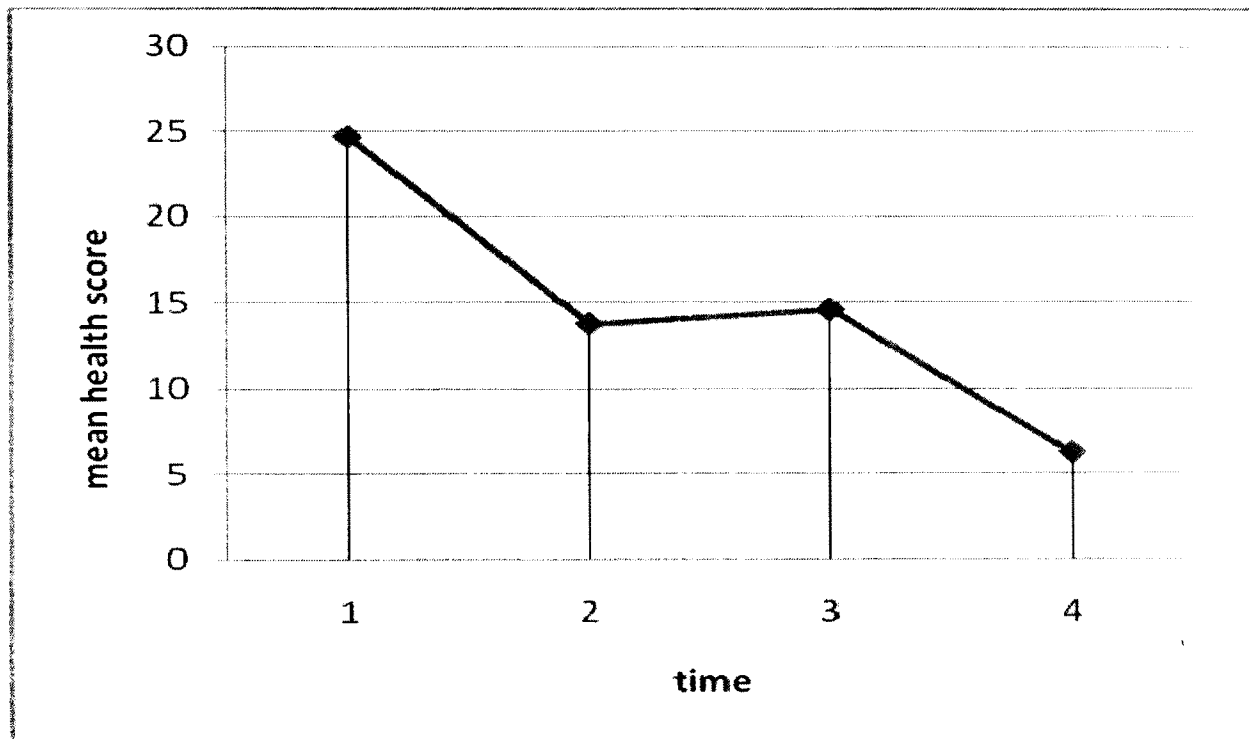
ANOVA was carried out to find the significance of effect of two main variables – time and conditions as well as their interactive effect (time X condition).

Table 26 shows the summary of ANOVA, which revealed that the time was a significant source of variance as indicated by F as 114.007 (3/368,  $p < .05$ ). It was observed that the means reduced with time but there was an inconsistent pattern from post 20 days mean score 0 to post 60 days mean score 0 and later got effortlessly affected with increase in time of management. The means were condensed in all the time gaps from pretest to post 60 days of treatment (24.70, 13.76, 14.57, 6.24 from Table 24).

Condition as a main effect however, emerged as a non significant source of variance ( $F = .494$ ).

A significant interactive effect emerged between time and conditions ( $F = 3.370$ ,  $p < .05$ ).

**Figure 8 : Means of health for all the four time levels**

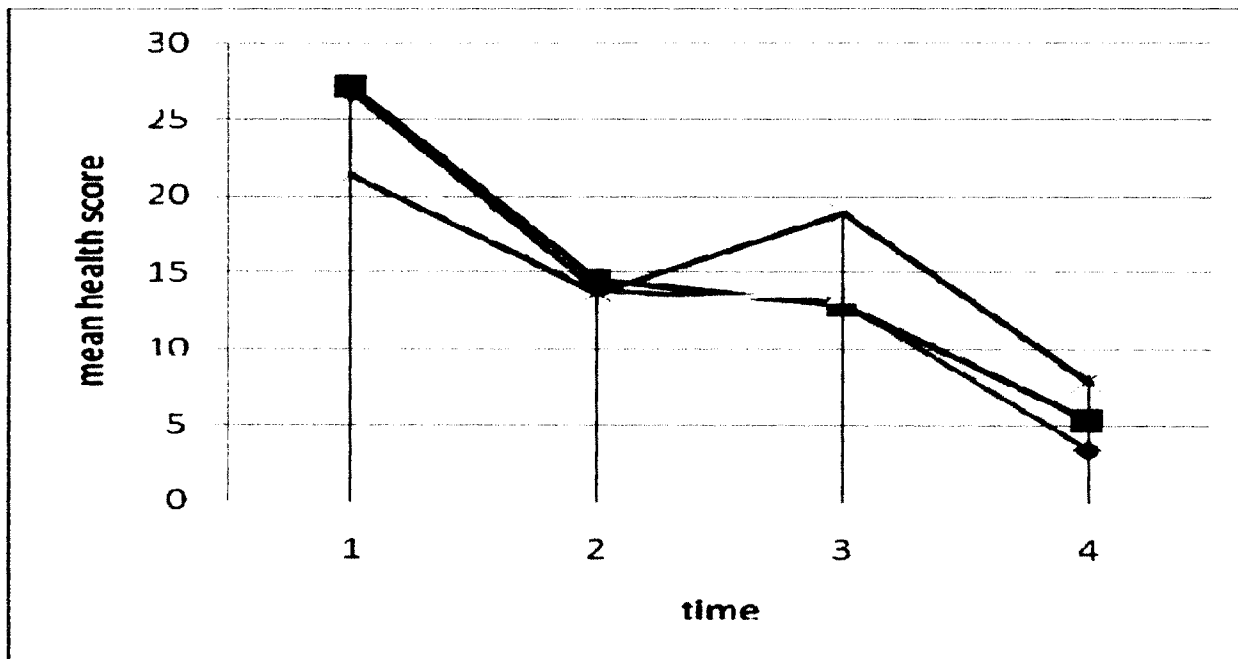


- 1-pretest mean health score
- 2-post 20 days mean health score
- 3-post 40 days mean health score
- 4-post 60 days mean health score

Figure 8 depicts mean health score of the four time levels. The Figure indicates buffering effect in health in post 60 days mean score (mean = 6.24) and condensed effect in health in post 20 days mean score (mean = 13.76) and post 40 days mean score (mean= 14.57) since their mean values did not augment massively.

Thus, it can be said that time perks up health and duration was essential. The results indicate an imperative role of time in tumbling the health scores and in turn improving health.

**Figure 9: mean health scores of four groups (conditions) under four time intervals**



- 1-pretest mean health score
  - 2-post 20 days mean health score
  - 3-post 40 days mean health score
  - 4-post 60 days mean health score
- condition 1
  - condition 2
  - condition 3
  - condition 4

It was observed that health improved after 60 days of treatment conditions. Time dependent effects were observed in health scores in group 1(both management and prescription) and group 2 (with only management). Thus, it is concluded that M-P and M-NP groups (conditions) performed satisfactorily on memory test.

Since group (condition) X time was significant, the comparisons between time intervals for four conditions was done separately by repeated ANOVA. Time was a within group factor.

**Table- 27: Pairwise comparison between Health (condition-1: both management and prescription)**

(I) Time	(J) Time	Mean Differences (I-J)	S.D	Sig. p<
1	2	15.120*	1.34	.000
	3	11.760*	.95	.000
	4	23.840*	1.00	.000
2	3	-3.360*	1.23	.012
	4	8.720*	1.07	.000
3	4	12.080*	.72	.000

Above Table depicts that pretest mean score is significant with post 20 days mean score(15.120), 3(11.760), and 4(23.840). Post 20 days mean score is significantly different from post 40 days mean score(3.360) and 4(8.720) and post 40 days mean score is significant with post 60 days mean score(12.080). In this group with condition that both management and prescription are given i.e. group 1, there is a taper or a decrease in the score on health (GHQ-12) with increase in duration of time in each group from 20 to 40 to 60 days.

**Table- 28 : Pairwise comparison between Health (condition-2: only management and no prescription)**

(I) Time	(J) Time	Mean Differences (I-J)	S.D	Sig. p<
1	2	18.450*	2.209	.000
	3	14.636*	1.333	.000
	4	25.409*	1.420	.000
2	3	-3.409*	1.451	.029
	4	7.364*	1.565	.000
3	4	10.773*	1.069	.000

Above Table depicts that pretest mean score is significant with post 20 days mean score(18.450), 3(14.636), and 4(25.409). Post 20 days mean score is significantly different from post 40 days mean score(3.409) and 4(7.364) and post 40 days mean score is significant with post 60 days mean score(10.773).

In the second group i.e. the group with management only and no pharmacological prescriptions, there is also an improvement in the results but less as compared to group 1.

**Table- 29: Pairwise comparison between Health (condition-3: only prescription and no management)**

(I) Time	(J) Time	Mean Differences (I-J)	S.D	Sig. p<
1	2	15.720*	1.732	.000
	3	13.080*	1.147	.000
	4	21.560*	1.246	.000
2	3	-2.640	1.664	.126
	4	5.840*	1.494	.001
3	4	8.480*	.965	.000

Above Table depicts the pairwise comparison between sleepiness of time gaps for the scores of health.

As seen above in the Table, pretest mean score is significantly different from post 20 days mean score(15.720), 3(13.080) and 4(21.560). However, post 20 days mean score is not significantly different to post 40 days mean score(2.640) but is significantly different to post 60 days mean score(5.840). Post 40 days mean score and post 60 days mean score(8.480) show a significant difference as revealed by mean difference values.

The third group with prescription only and without management shows a further reduction in the effects in comparison to the first 2 groups (conditions) indicating prescription as an unpreferred approach for health.



**Table- 30: Pairwise comparison between Health (condition-4: neither management nor prescription)**

(I) Time	(J) Time	Mean Differences (I-J)	S.D	Sig. p<
1	2	13.440*	1.66	.000
	3	12.880*	1.23	.000
	4	23.000*	1.30	.000
2	3	-.560	1.46	.705
	4	9.560*	1.27	.000
3	4	10.120*	1.08	.000

Pretest mean score is significant with post 20 days mean score(13.440), 3(12.880), and 4(23.000). Post 20 days mean score is significant with post 60 days mean score(9.560) but non-significant with post 40 days mean score(.560). However, post 40 days mean score is significant with post 60 days mean score(10.120).

It is evident that there is maximum decline in the scores of health indicating improvement in health in the other groups (conditions). When observed without management and without prescription, group-4 does not show much improvement in the effects in comparison to the rest of the 3 groups (conditions).

ANOVA was carried out to find the significance of effect of time of management on health of insomnia.

## **FINDINGS:**

1. Insomniacs had both psychological and cognitive alterations as compared to control group.
2. Insomnia had a significant effect on General Health.
3. Cognitive performances i.e., Simple reaction time, Learning and Memory were affected by insomnia.
4. Daytime Sleepiness among insomniacs was more prominent.
5. Management was found to be effective in the treatment of insomnia and its related consequences.