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An education based ergonomic intervention programme for Gauteng call centre workers with upper extremity repetitive strain injuries

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CHAPTER 4
RESULTS

4.1 RESULTS PHASE 1

Questionnaires were handed out in the seven call centres selected for the study resulting in 325 screening questionnaires in total being distributed to the identified population of call centre workers. One hundred and forty two questionnaires were returned which is a return rate of 43.69%. Thirteen of the returned questionnaires were incomplete thus the final number of questionnaires analysed was 129 for 39.69% of participants.

The analysis of the screening questions indicated that 39 participants met the criteria for RSI of the upper extremity indicating a point prevalence of 30.23% for the one month the data was collected.

No demographic data on the screened sample was collected.

4.2 RESULTS OF PHASE 3

The 39 participants who met the inclusion criteria from the analysis of questionnaire in Phase 1 were included in Phase 3. The "Working conditions and health at call centres" questionnaire was handed out at the initial measurement session and again at Time 2. Although 39 questionnaires handed out initially, only 38 were returned which is a return rate of 97.43%. Two of the 38 questionnaires were incomplete and could not be analysed. Only 37 of the 39 participants were available to be assessed at baseline (T0).

The drop out of 3 more participants (5 participants in total) occurred before T1 assessments so 34 participants were assessed at this stage and 34 questionnaires were handed out. This represented a loss to follow up of 12.82%. Another 4 participants did not complete the pain VAS assessments at T2 with a resultant sample of 30 for the final assessments. This was a total loss to follow at T2 was 23.07%.

Only 28 of the 34 questionnaires were returned so the total loss to follow up after Time 2 for the questionnaires was 28.20%.

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Table 4.1 Loss to follow up of participants over time

	Questionnaire returned	VAS	Assessment
T0	38 (2 incomplete)	37	37
T1	0	34	34
T2	28	30	32

4.2.1 Demographics

Demographics of the experimental and control groups were compared to establish whether the groups were homogeneous.

Table 4.2 Demographics of the experimental and control groups

		Total Sample n=37	Experimental Group n= 20	Control group n=17	p value
GENDER	Male	16	7	9	
	Female	21	13	8	0.14
AGE	20-25	17	10	7	
	26-30	13	5	8	0.15
	31-35	6	4	2	
	36-40	1	1	0	
HANDEDNESS		**n=36**	**n=19**	**n= 17**	
	Right	30	14	16	0.15
	Left	6	5	1	
	Ambidextrous	0	0	0	
HAVE CHILDREN UNDER SEVEN YEARS		**n=36**	**n=19**	**n= 17**	
	Yes	12	**9**	**3**	0.005*
	No	24	**10**	**14**	

*significance p≤0.05

The discrepancy in the numbers in the handedness and children under seven years of age categories is explained by incomplete answers on the questionnaires.

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Table 4.2 indicates that of the 37 participants a total of 21 were females and 16 were males with ages ranging from 20 to 40 years. The majority were between 20 and 25 years and most were right handed.

The experimental and control groups did not differ significantly for these variables but significantly more of experimental group participants did not have children under the age of seven years at home.

Table 4.3 Work demographics of the experimental and control groups at Baseline

		Total Sample	Experimental Group	Control group	p value
DURATION OF EMPLOYMENT IN CURRENT POSITION		**n=33**	**n=20**	**n= 13**	0.50
	0-20 mnths	18	12	6	
	21-50 mnths	12	7	5	
	51-70 mnths	3	1	2	
Mean(SD)		11.00(7.25)	6.67(5.51)	4.33(2.08)	
NUMBER OF HOURS WORKED PER WEEK		**n=34**	**n=20**	**n= 14**	0.76
	7-8.5 hours	1	1	0	
	25-38 hours	2	1	1	
	40-43 hours	31	18	13	
Mean (SD)		11.33(17.04)	6.67(9.81)	4.07(7.23)	
AVERAGE NUMBER OF HOURS OVER TIME WORKED PER MONTH		**n=14**	**n=9**	**n= 5**	0.52
	None	0	0	0	
	1-10 hours	8	6	2	
	11-20 hours	1	1	0	
	21-30 hours	4	2	2	
	31-40 hours	1	0	1	
Mean (SD)		3.50(3.32)	2.25(2.62)	1.25(0.96)	

*significance p≤0.05

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The discrepancy in the numbers is due to incomplete answers on all aspects of the questionnaires. The majority of the population had worked in their current workplace in their current work position for between nought to twenty months. The normal working hours per week was 40-42.5 hours. The maximum average overtime worked per month was one to five hours with a maximum of 31-40 hours. (Table 4.3)
There was no significant difference between the experimental and control group for the duration of service at the call centre, the hours worked or the average hours of overtime worked.
The two groups were therefore homogeneous and can be compared as they did not differ except for the number of young children at home. Thus there was a baseline similarity for both the control and experimental groups.

4.2.2 Physical Outcomes Measurements

The affected/symptomatic limb was assessed for: range of motion at the wrist, pinch and grip strength and pain at three points, namely T0 (initiation of intervention), T1 (three weeks) and T2 (six weeks, end of the intervention).This was done to establish the effectiveness of the ergonomics programme.

Analysis of variance was used to establish the difference over the three measures for the experimental and control group.

4.2.2.1 Range of Motion of the Wrist

Wrist Flexion

A comparison of wrist flexion was made between the two groups, experimental and control, as well as over time for each group.
The difference between the groups and time was also considered for significance.
No statistically significant changes were noted in testing between the groups, and between times or for the groups and times combined. (Table 4.4) The ranges for wrist flexion fell below the normal average range of 80-70 degrees expected for this movement (Cambridge-Keeling, 2002).

Table 4.4 Results for range of motion of wrist flexion over three measurements

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	Baseline Measurement degrees	Time 1 degrees	Time 2 degrees	p value between groups
Experimental Group Mean(SD)	23.10 (8.19)	24.70 (8.58)	23.05 (6.46)	0.95
Control group Mean (SD)	25.05 (9.71)	23.88 (8.72)	21.93 (5.57)	
p value between times	0.53			p value between groups and times 0.65

*significance p≤0.05

Figure 4.1 shows however, that there was a trend in that the control group showed a continuous decrease in wrist flexion, whilst the experimental group showed a very small shift in the range measurements.

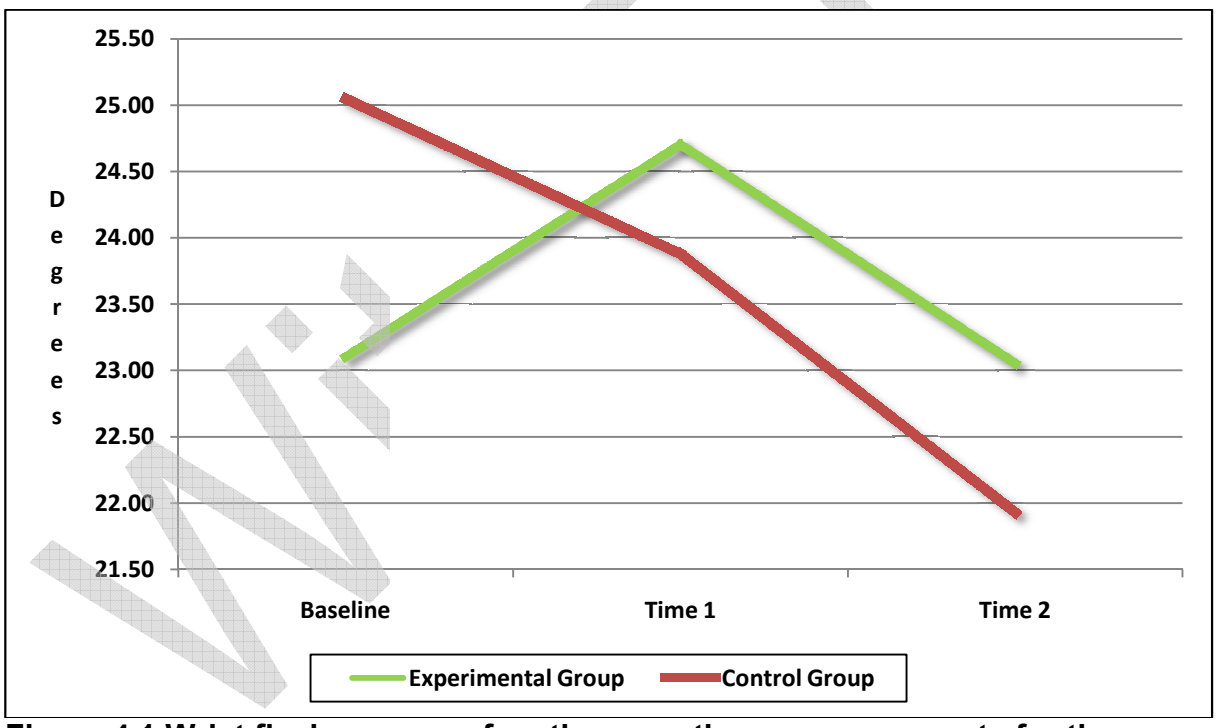


Figure 4.1 Wrist flexion range of motion over three measurements for the control and experimental groups

Wrist Extension

A comparison of wrist extension showed no statistically or clinically significant changes between the groups, between times or for the groups and times combined. (Table 4.5)

Table 4.5 Results for range of motion of wrist extension over three measurements

	Baseline Measurement degrees	**Time 1 degrees**	**Time 2 degrees**	p value between groups
Experimental Group Mean(SD)	45.89 (13.78)	38.29 (13.22)	45.17 (15.40)	0.23
Control group Mean (SD)	38.22 (16.30)	37.88 (13.46)	42.13 (13.71)	
p value –between times	0.24			p value between groups and times 0.58

*significance p≤0.05

The ranges for wrist extension fell below the normal average range of 53-60 degrees expected for this movement in adults (Cambridge-Keeling, 2002).

Radial Deviation

A very high first reading at initial measurement was noted for both the experimental and control groups.

Table 4.6 Results for range of motion of wrist radial deviation **over three measurements**

	Baseline Measurement degrees	**Time 1 degrees**	**Time 2 degrees**	p value between groups
Experimental Group Mean(SD)	36 (10.29)	15.76 (6.55)	16.17 (6.66)	0.60
Control group Mean (SD)	41.44 (10.55)	12.23 (6.29)	17.26 (8.63)	
p value –between times	0.000*			p value between groups and times 0.07

*significance p≤0.05

This could be accounted for by a measurement error ($p<0.00$). (Table 4.6 and Figure 4.2) The average range for radial deviation for adults is 20 degrees and the range of motion for this movement at T1 and T2 was lower than the expected average (Cambridge-Keeling, 2002).

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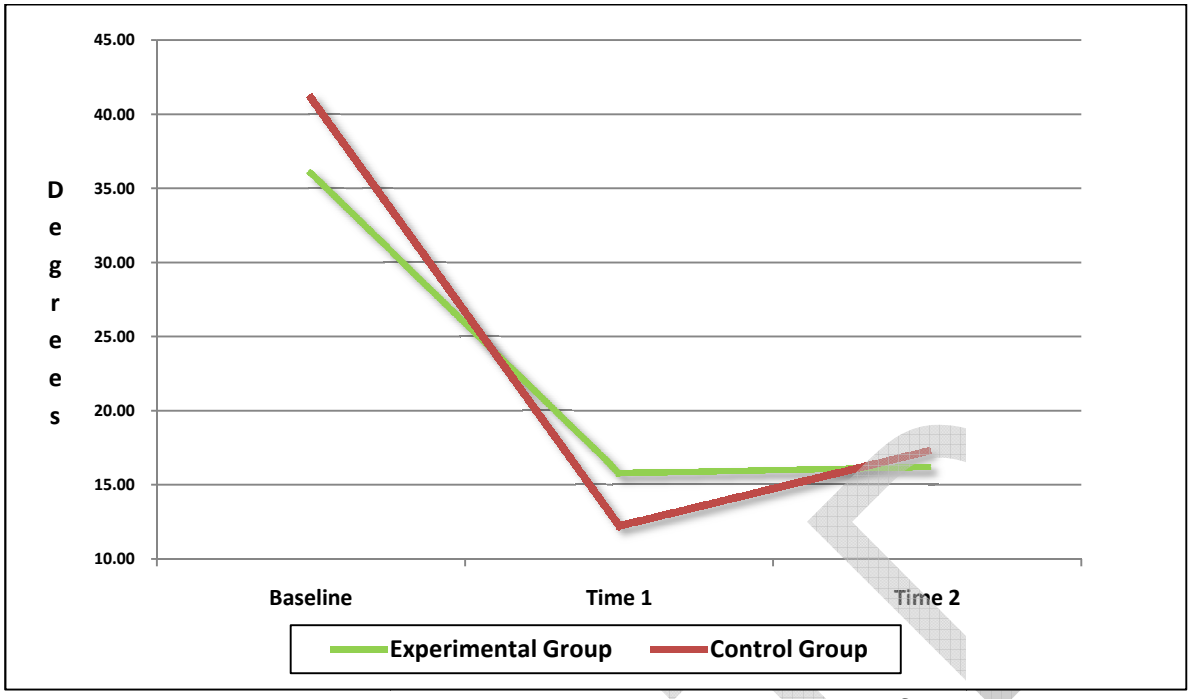


Figure 4.2 Wrist radial deviation over three measurements for control and experimental groups

Ulnar Deviation

Table 4.7 Results for range of motion of wrist ulnar deviation over three measurements

	Baseline Measurement degrees	Time 1 degrees	Time 2 degrees	p value between groups
Experimental Group Mean(SD)	43.94 (9.94)	38.41 (11.5)	38.82 (12.85)	0.18
Control group Mean (SD)	38.11 (10.35)	34.41 (11.13)	37.46 (16)	
p value between times	0.20			p value between groups and times 0.52

significance p≤0.05

Table 4.7 indicates that no statistically significant changes were noted for the range of ulnar deviation between the groups, between times or for the groups and times combined. The range for ulnar deviation was the only range that was similar to or greater than the average range for adults of between 30-31 degrees (Cambridge-Keeling, 2002).

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Therefore no statistically significant changes were seen in the range of motion at the wrist either over time within the groups or between the experimental and control group, except in the case of radial deviation which appears to be due to measurement error. A clinical difference in terms of wrist flexion continuing to deteriorate was noted for wrist flexion in the control group only.

4.4.2.2 Pinch and Grip Strength

Pinch and grip strength assessments were also compared for the affected upper limb between the experimental and control groups as well as over time for each group. The difference between the groups and time was also considered for significance.

Pinch Strength

No statistically or clinically significant changes were noted: between the two groups, between times and between the groups and time. (Table 4.8)

Table 4.8 Results for pinch strength over three measurements:

	Baseline Measurement kilograms	**Time 1 kilograms**	**Time 2 kilograms**	p value between groups
Experimental Group Mean(SD)	6.18 (1.89)	6.11 (2.02)	6.59 (1.75)	0.84
Control group Mean (SD)	6,74 (2.17)	6.35 (2.05)	6.84 (2.81)	
p value between times	0.34			p value between groups and times 0.46

significance p≤0.05

From table 4.8 it can be seen that both groups showed a decrease from the initial measurement to T1 then an increase in measured average pinch strength from T1 to T2. The experimental group showed slightly lower pinch strength than the control group. This was consistent over time. All values fell below the average for lateral pinch expected for adults 20-40 years of between 8-11.8kgs (Mathiowetz *et al*., 1985).

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Grip Strength

A statistically significant difference over time was noted between the control and experimental groups over time for grip strength.

In Table 4.9 it can be seen that the experimental group showed a slight decline in average measured grip strength between the baseline initial measurement and T1 but then increased to T2.

Table 4.9 Results for grip strength over three measurements:

	Baseline Measurement kilograms	**Time 1 kilograms**	**Time 2 kilograms**	p value between groups
Experimental Group Mean(SD)	14.14 (8.97)	13.41 (10.31)	14.44 (8.99)	0.31
Control group Mean (SD)	13.81 (10.65)	10.86 (5.36)	9.83 (7.61)	
p value between times	0.05*			p value between groups and times 0.11

significance p≤0.05

However the control group showed a constant and significant decrease between the initial measurement and T2. The p value was significant for a comparison within the groups over time for the control group. (p≤0.05).

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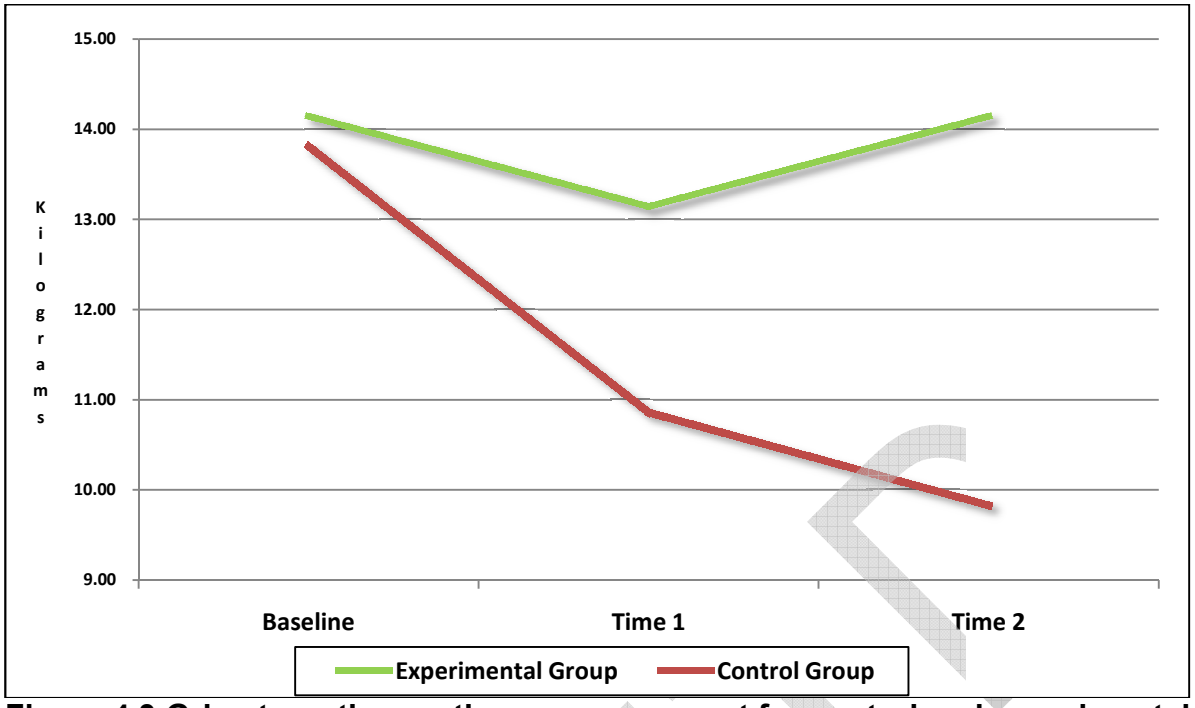


Figure 4.3 Grip strength over three measurement for control and experimental groups

There was a significant decrease in grip strength between times in the control group with the experimental group remaining almost constant. The grip strength of both groups throughout the study fell below the norms for the average range for adults between 20-40 years. The range for females and males in this age group is between 28.5 and 52.75kgs (Werle, Goldhahn, Simmen, Sprott and Herren, 2009).

4.2.2.3 Pain

Visual Analogue Scale – Pain on Resistance

A statistically significant difference was noted when comparing the experimental and control groups for an interaction between group and time. The p value obtained was $p<0.04$. (Table 4.10)

The experimental group showed a peak in pain on resistance between the initial measurement and T1 with a marked decrease between T1 and T2. (Figure 4.4)

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Table 4.10 Results for Visual Analogue Scale – pain on resistance over three measurements:

	Baseline Measurement VAS Scale	**Time 1 VAS Scale**	**Time 2 VAS Scale**	p value between groups
Experimental Group Mean(SD)	3.72 (3.04)	4.50 (3.24)	2.41 (2.41)	0.50
Control group Mean (SD)	4.52 (2.18)	3.8 (2.65)	3.87 (2.35)	
p value –between times	0.18			p value between groups and times 0.04*

*significance p≤0.05

The control group showed a decrease in pain between the initial measurement and T1 and then a levelling off with no real change in the VAS scores recorded.

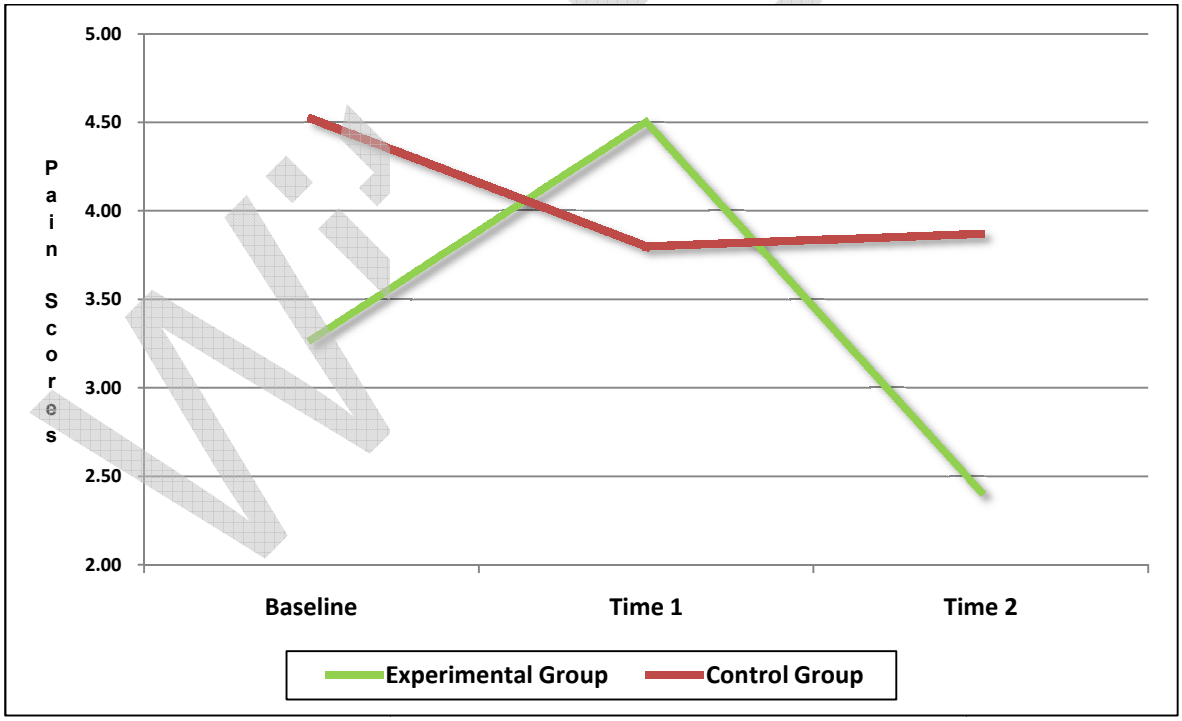


Figure 4.4 Pain score on the Visual Analogue Scale for pain on resistance over three measurements for control and experimental groups

Visual Analogue Scale-Pain on Movement

Both the experimental and control groups showed a decrease in pain on movement over the three time periods. The experimental group showed a significant decrease in pain over time with a p value of: $p<0.004$. (Table 4.11)

Table 4.11 Results for Visual Analogue Scale – pain on movement over three measurements:

	Baseline Measurement VAS Scale	**Time 1 VAS Scale**	**Time 2 VAS Scale**	p value between groups
Experimental Group Mean(SD)	4.43 (2.46)	4.04 (2.76)	2.11 (2.02)	0.86
Control group Mean (SD)	4.17 (1.96)	3.44 (2.2)	3.09 (2.69)	
p value –between times	0.0004*			p value between groups and times 0.26

significance $p\leq0.05$

Although the control group's pain did decrease slightly there was no significant difference between the groups for pain scores. (Figure 4.5)

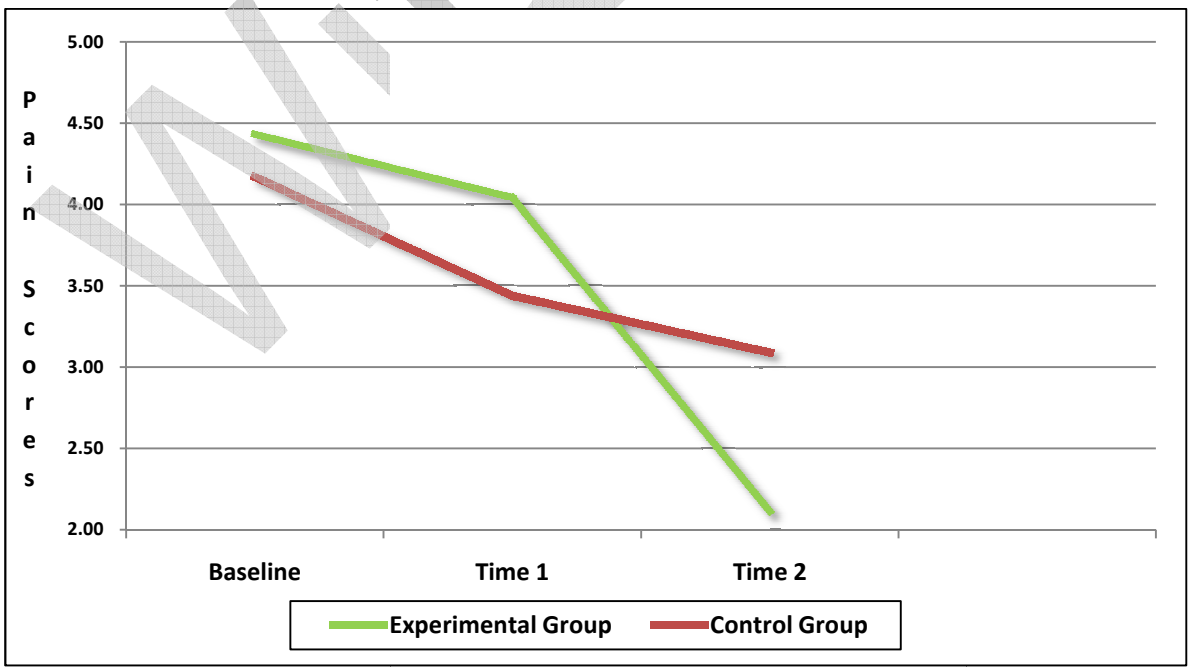


Figure 4.5 Pain score on a Visual Analogue Scale for pain on movement over three measurements for control and experimental groups

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Visual Analogue Scale- Pain at Rest

No statistically significant differences were noted for pain on rest between the groups, between times or for groups and time. However, both groups showed a decreasing VAS score for pain at rest. (Table 4.12)

Table 4.12 Results for Visual Analogue Scale – pain at rest over three measurements

	Baseline Measurement VAS Scale	**Time 1 VAS Scale**	**Time 2 VAS Scale**	p value between groups
Experimental Group Mean(SD)	2.31 (2.77)	2.20 (2.20)	0.85 (1.11)	0.47
Control group Mean (SD)	2.32 (2.09)	2.01 (2.00)	2.1 (2.40)	
p value –between times	0.20			p value between groups and times 0.34

significance p≤0.05

The control group's decrease in pain at rest was relatively small and remains relatively stable. (Figure 4.6)

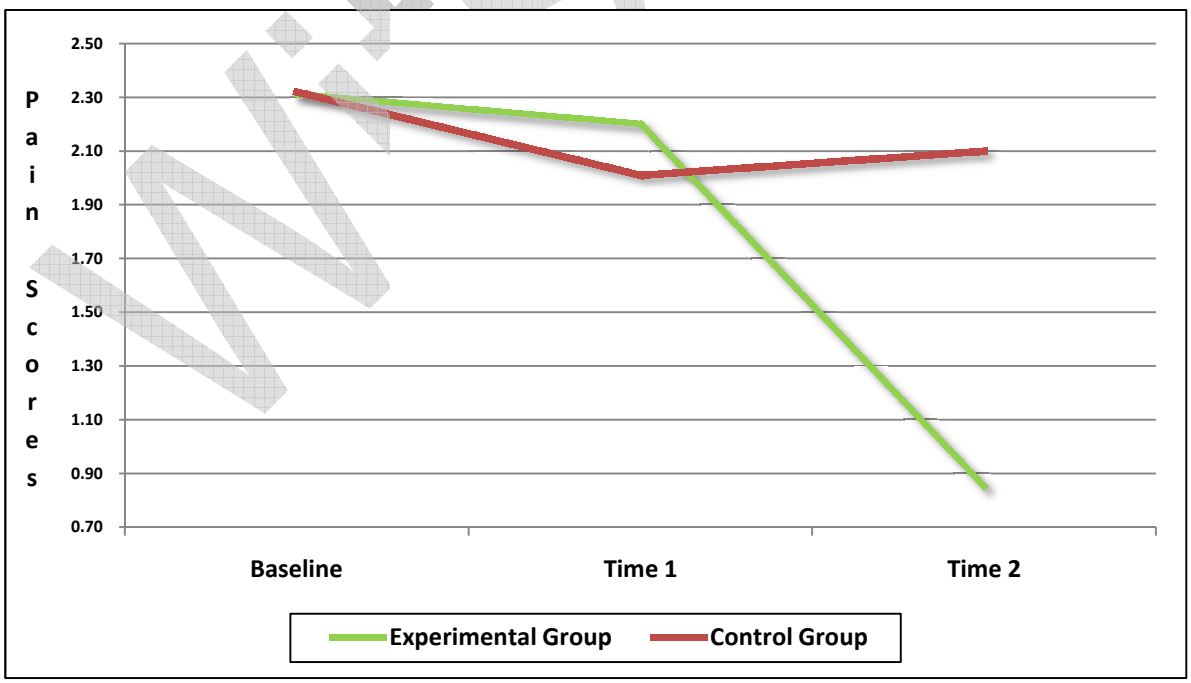


Figure 4.6 Pain score on a Visual Analogue Scale for pain at rest over three measurements for control and experimental groups

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The experimental group shows a more consistent decreasing pain score, similar to that seen for pain on movement but this was not statistically significant, only a clinical trend.

Visual Analogue Scale - Worst Pain

A statistically significant difference was found when comparing the two groups for a difference between times ($p<0.006$) and the interaction between group and time ($p<0.06$) (Table 4.13)

Thus it is clear in terms of the worst pain felt that the experimental group had a statistically significant reduction in worst pain ever felt over time and this differed significantly from the control group's level of worst pain over the time of the study. This result is reflected in Figure 4.7.

Table 4.13 Results for Visual Analogue Scale – worst pain over three measurements:

	Baseline Measurement VAS Scale	**Time 1 VAS Scale**	**Time 2 VAS Scale**	p value between groups
Experimental Group Mean(SD)	6.63 (3.00)	5.31 (3.15)	3.54 (2.85)	0.62
Control group Mean (SD)	5.85 (2.82)	5.81 (3.08)	5.15 (3.05)	
p value between times	0.006*			p value between groups and times 0.06*

*significance p≤0.05

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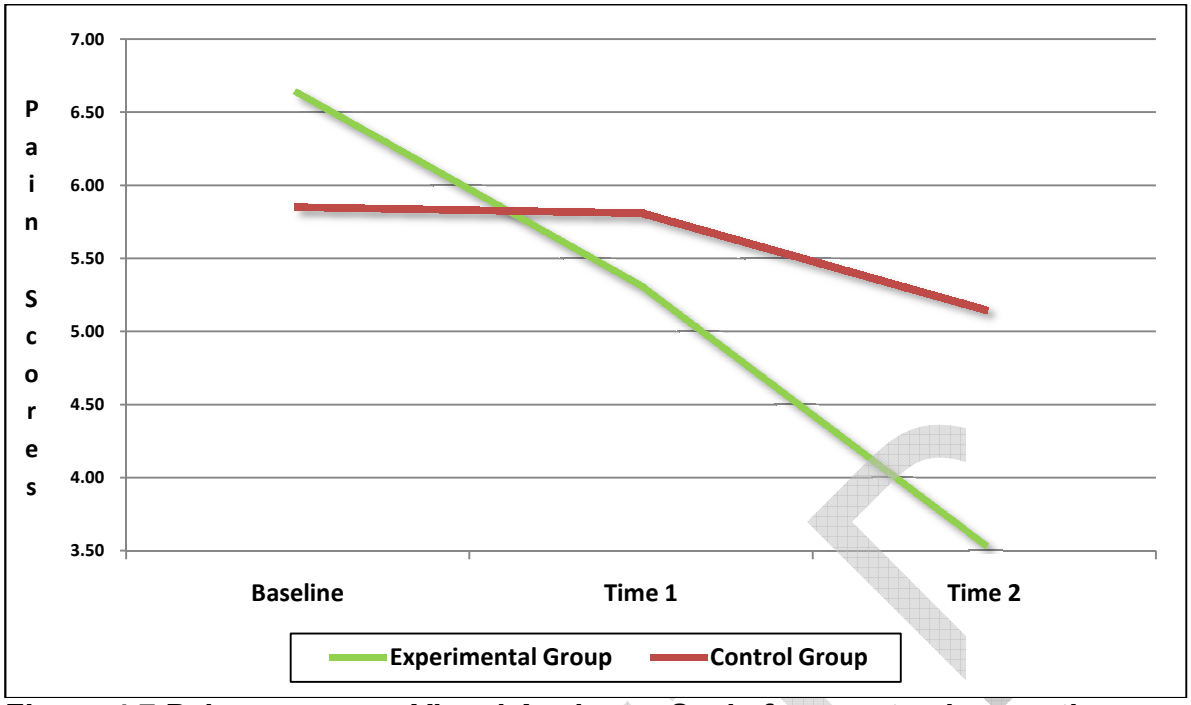


Figure 4.7 Pain score on a Visual Analogue Scale for worst pain over three measurements for control and experimental groups

Pain showed the greatest difference between the measurements over time with the experimental group having significantly less pain on movement as well as when reporting their worst pain on a VAS scale.

There was a significant difference for pain on resistance when difference for the groups and time were combined

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4.2.3 Results for "Working conditions and health at call centres" Questionnaire

On analysis very few of the questions revealed statistically significant results. Only the questions with statistically significant results or those with a strong trend in one group are detailed below. Since scores were one to five the differences between T0 and T2 could be scored from + four to – four.

The questionnaires of the 28 participants who completed the questionnaire at T2 , were found to have significant changes in the sections of computer work (question 34-38), stress and tiredness (question 48), winding down and recovery (question 51-52) and health (question 58-68).

The number of participants in each group who answered the questions at baseline (T0) and T2 differed for each question. The number of respondents analysed for each question is indicated in the figures.

4.2.3.1 Ergonomics Training

Question 37

This question fell under Computer work and asks whether or not the participant has received information and training on ergonomics when using a computer. It is scored on a five point scale with 1 being "No -hardly any information at all", 4 being "Yes, quite sufficient" and 5 "Don't know"

The Stuart-Maxwell test result shows a statistically significant difference in how the question was answered the first time and the second time when both groups were analysed together ($p<0.05$). There was no significant change within the groups when they were analysed separately. There was also no statistically significant difference over time ($p<0.32$) between the experimental and control group for this question.

Figure 4.8 shows that that scores changed in the combined group indicating fewer "No" answers. Approximately 35% of participants in both groups changed their answers to "Yes" thus indicating that they felt they had now received ergonomic information.

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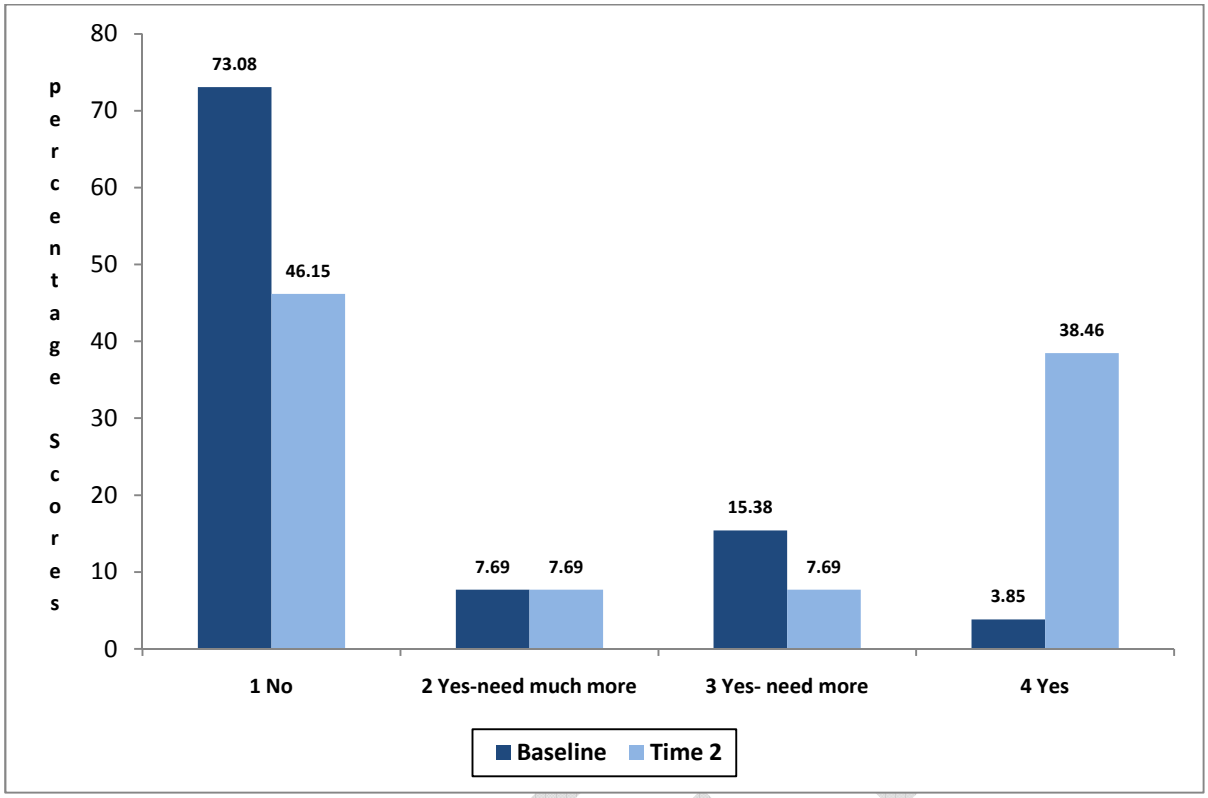


Figure 4.8 Change in scores from Baseline to Time 2 for the combined groups for Question 37

4.2.3.2 Work Space Design

Question 38

This question fell under Work space design and dealt specifically with satisfaction with work space design. The scoring for the question ranged from 1 “Very Dissatisfied” to 5 for “Very Satisfied”

Question 38f

The only aspect of interest was point f, which dealt with workspace in and on the desk. The McNemar test indicated a significant change within the control group ($p<0.05$). The scores for the experimental group ($p<0.33$) and Fisher’s exact ($p<0.78$) scores were not significant, showing no statistically significant difference within the experimental group or between the groups over the two occasions on which they answered the question.

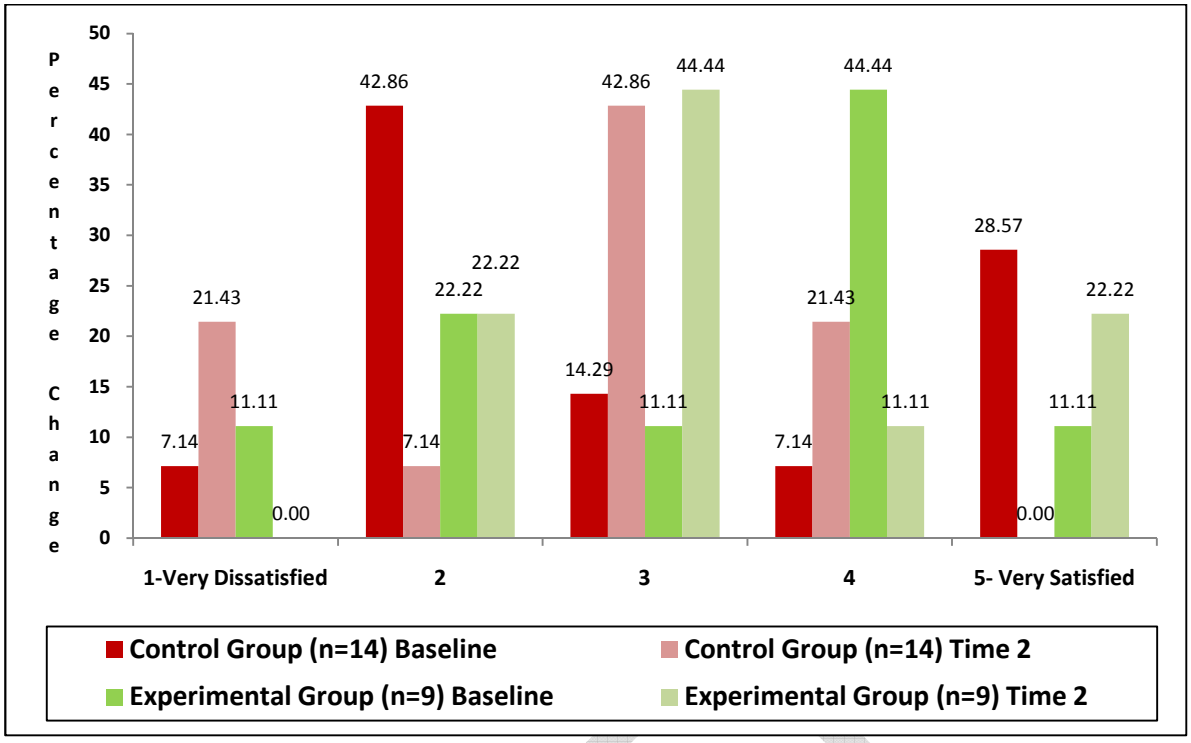


Figure 4.9 Change in scores from Baseline to Time 2 for the experimental and control groups for Question 38f

Figure 4.9 indicates that both groups had a shift toward a score of 3 (neither satisfied nor dissatisfied). The dispersion of change in this question indicated no specific trend overall.

4.2.3.3 Effect of Work on Stress and Energy Levels

Question 48

This question set fell under “Stress and tiredness” and dealt with feelings of tiredness and stress at the end of each typical work day. The participants could choose between a range from 1 “not at all” to 6 which was “very very”. Items varied between positive and negative emotions and behaviours.

Question 48e

This sub question e dealt with feelings of inefficiency. The Fisher’s exact score ($p0<03$) indicates a significant difference between the experimental and control groups in the answers on the two occasions they filled in the questionnaire.

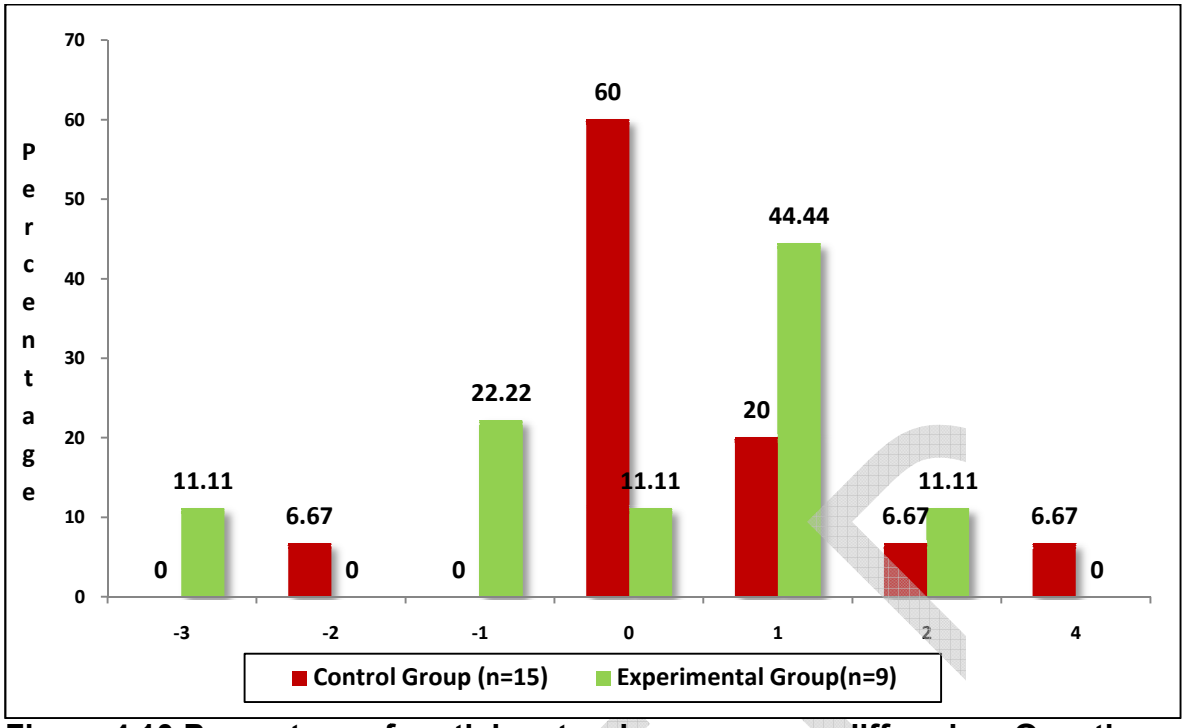


Figure 4.10 Percentage of participants whose answers differed on Question 48e

The experimental group answers moved one score to the positive side (Figure 4.10) indicating they felt slightly more inefficient at the end of the day. More than 33.33% of participants in the experimental group and only 6.67% of the control group did move in the negative direction towards "not at all" in terms of inefficiency. The McNemar test values obtained were: control group ($p<0.55$) and the experimental group ($p<0.15$).

Question 48g

This sub question g, of the main question described above, g dealt with feeling under pressure. The Fisher's exact score ($p>0.01$) indicates a statistically significant difference between the two groups in answering this question on two occasions.

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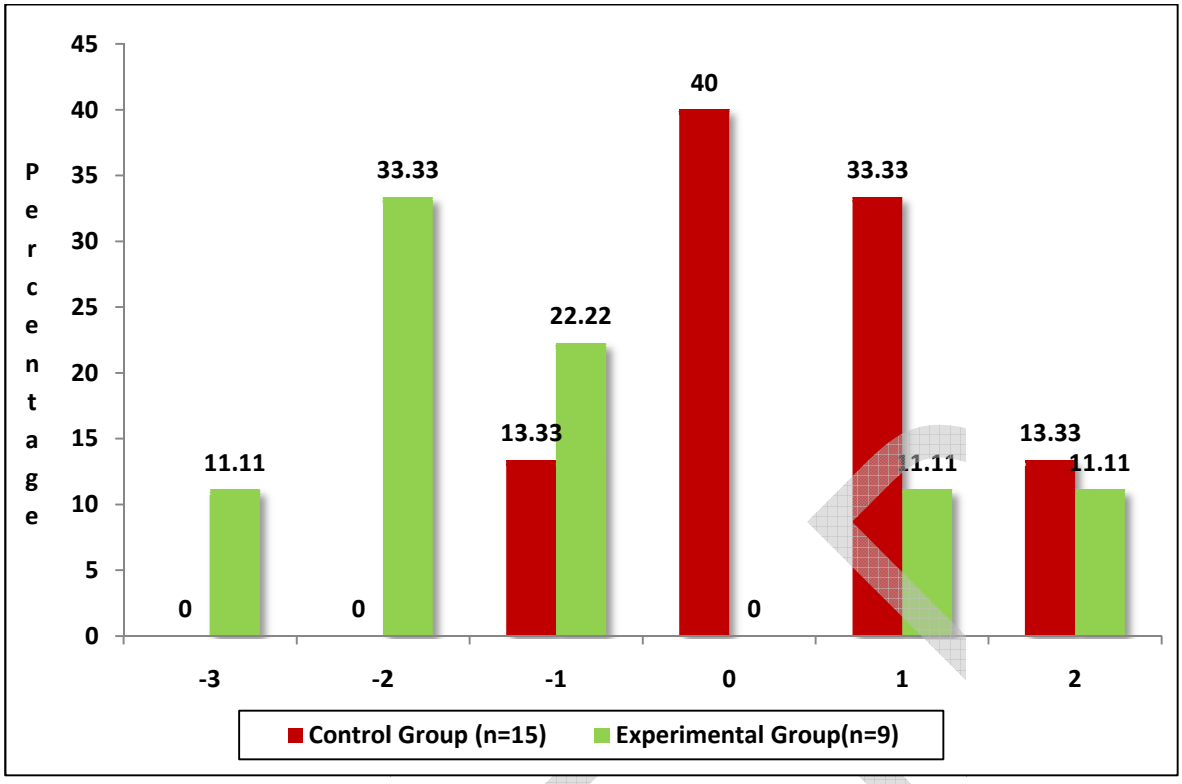


Figure 4.11 Percentage of participants whose answers differed on Question 48g

Figure 4.11 indicates that the experimental group moved statistically significantly to the negative side, while the control group moved toward the positive side. A lower answer in this range of questions indicates a move to "not at all". Thus the experimental group felt less pressurised at the end of the day than the control group. The McNemar test values for within group scores obtained were not significant with the control group ($p<0.41$) and the experimental group ($p<0.42$).

Question 48s

This sub question dealt with feeling depressed. The Fisher's exact score ($p<0.02$) indicates that again there was a significant difference between the groups in their responses to this question.

A move to the positive scores by the control group and a statistically significant move to the negative scores by the experimental group are indicated in Figure 4.12. Forty percent of the experimental group moved towards "not at all" in terms of depression and 40% moved down by one point towards "fairly".

The control group moved towards the positive side and greater feelings of depression.

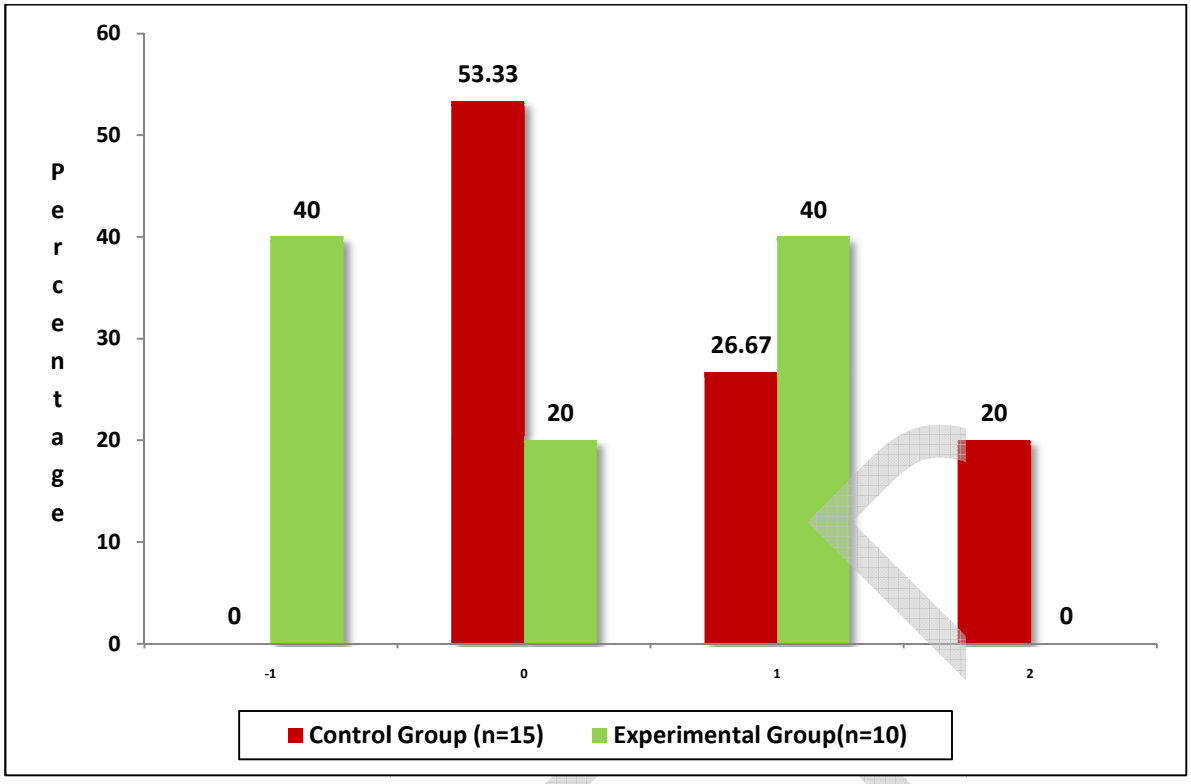


Figure 4.12 Percentage of participants whose answers differed on Question 48s

The McNemar test values obtained showed no significant change within the groups and were: control group ($p<0.13$) and the experimental group ($p<0.72$).

Question 53

This is under the section of Work/life balance. This set of questions deals with the impact of work on time and energy levels in private life. The scale for this question ranged from 1 “no impact” to 4 “no time energy at all”. The score of 5 was “Don’t know or irrelevant”

Question 53b

This particular sub question deals with the performance of hobbies. Although the results were not statistically significant (Fisher’s exact score $p<0.08$), they did represent a shift in the experimental group to negative scores indicating a lower score.

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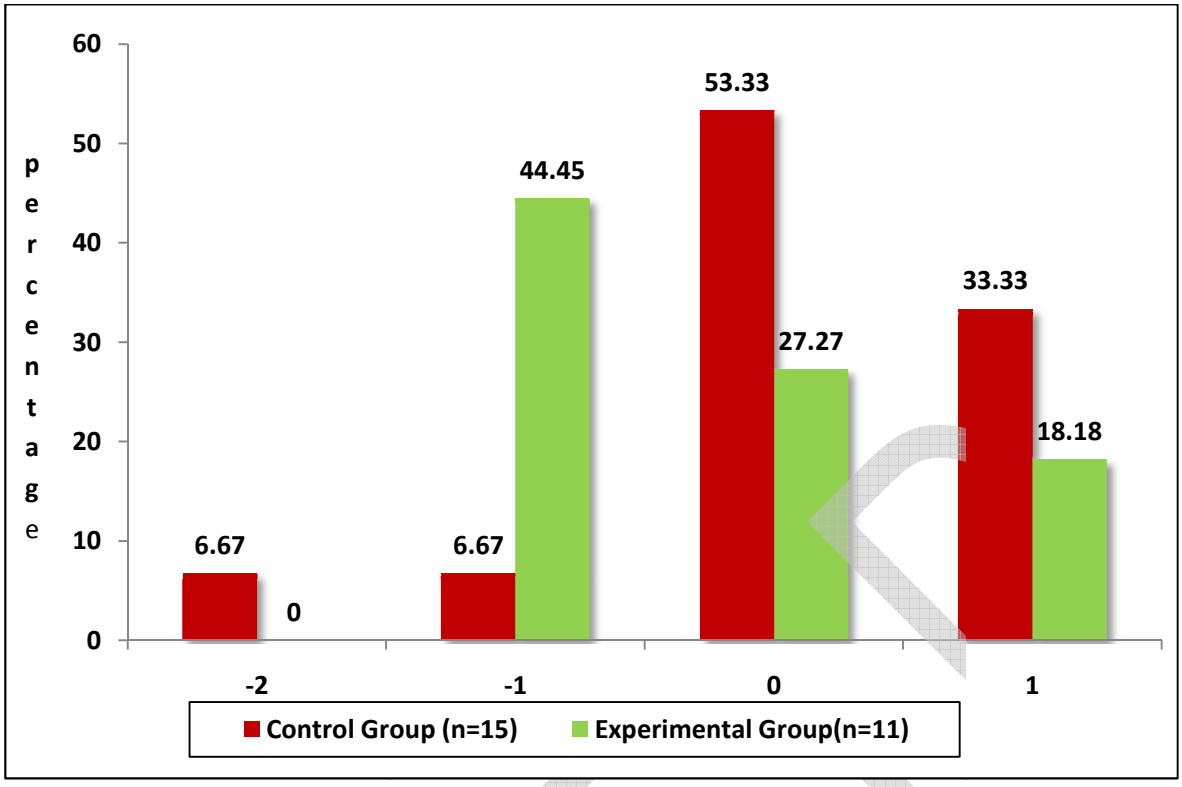


Figure 4.13 Percentage of participants whose answers differed on Question 53b

In this question the lower the score the lower the impact work has on the individual performance of leisure interests in their private time. (Figure 4.13) The control group stayed stable with more than half the group indicating no change. The experimental group moved to the negative side indicating that work had less impact on their time and energy for hobbies, music, TV, radio, reading, cinema etc. The McNemar test values obtained were: control group ($p<0.28$) and the experimental group ($p<0.25$).

4.2.3.4 Health and Pain in the Individual

Question 58

This question deals with the health of the participants and asks about problems with various body parts. Answers are either “No”=1 or “Yes”=2.

Question 58f

The sub question f deals specifically with numbness in the hands, as a problem in general and as a work related problem. The Stuart-Maxwell test and the non-parametric McNemar test result ($p<0.04$) show a statistically significant difference

when analysed, in how the question was answered between the first time and the second time when analysed. The answers for both groups combined indicated a statistically significant change in the score on hand numbness in general.

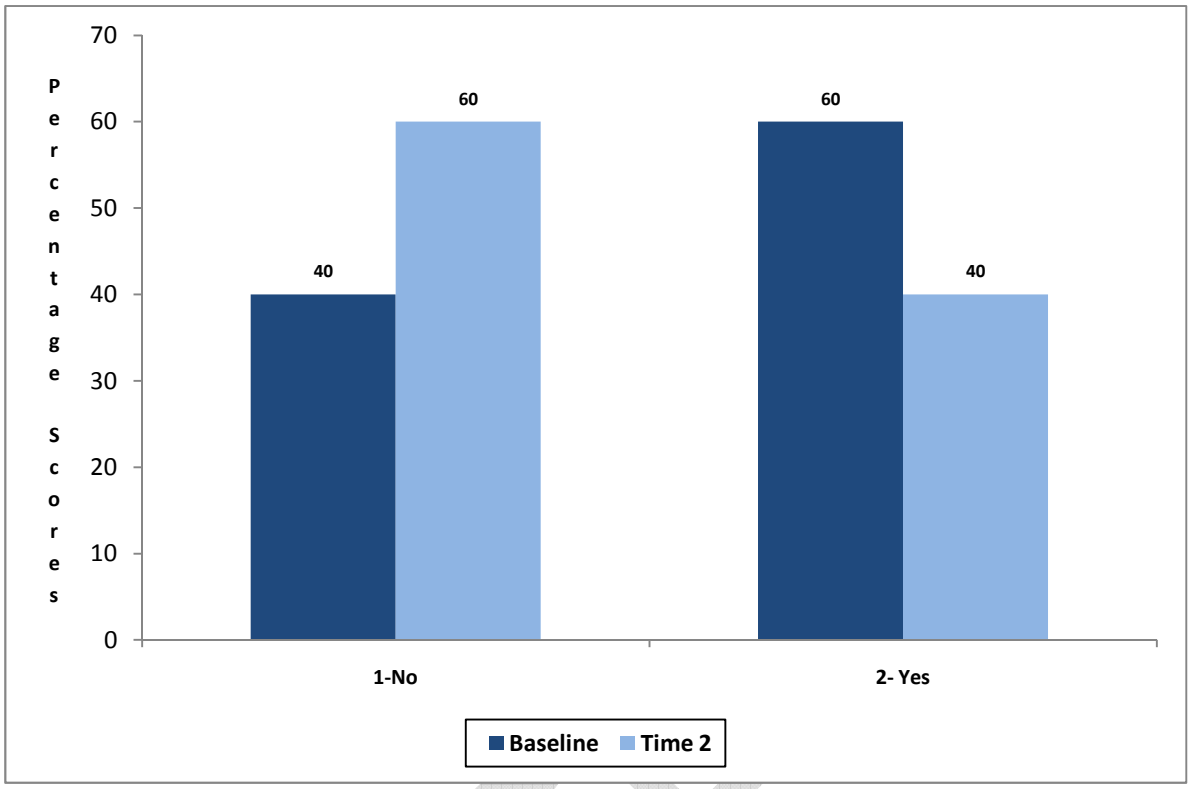


Figure 4.14 Change in scores from Baseline to Time 2 for the combined groups for Question 58f

The trend in Figure 4.14 indicates that the groups felt less numbness in their hands generally at T2 but there was no significant difference between the two groups in answering the questions. The McNemar test values obtained were: control group ($p<0.15$) and the experimental group ($p<0.15$) and there were no significant results for hand numbness related to work activities.

Question 59

This question fell under Health and asks about problems with aches and pains in specific body parts. Scoring is the same as for Question 59 with scores for general problems and problems related to work.

Question 59i

This sub question, 59i, deals specifically with pain in the right wrist in general. This question was only answered by nine (45%) of the experimental group but 13 (76.4%) of the control group on both occasions, which may have influenced the results.

The result of the Stuart-Maxwell test and the non-parametric McNemar test ($p<0.05$) show a statistically significant difference in how the question was answered by the control group over two occasions.

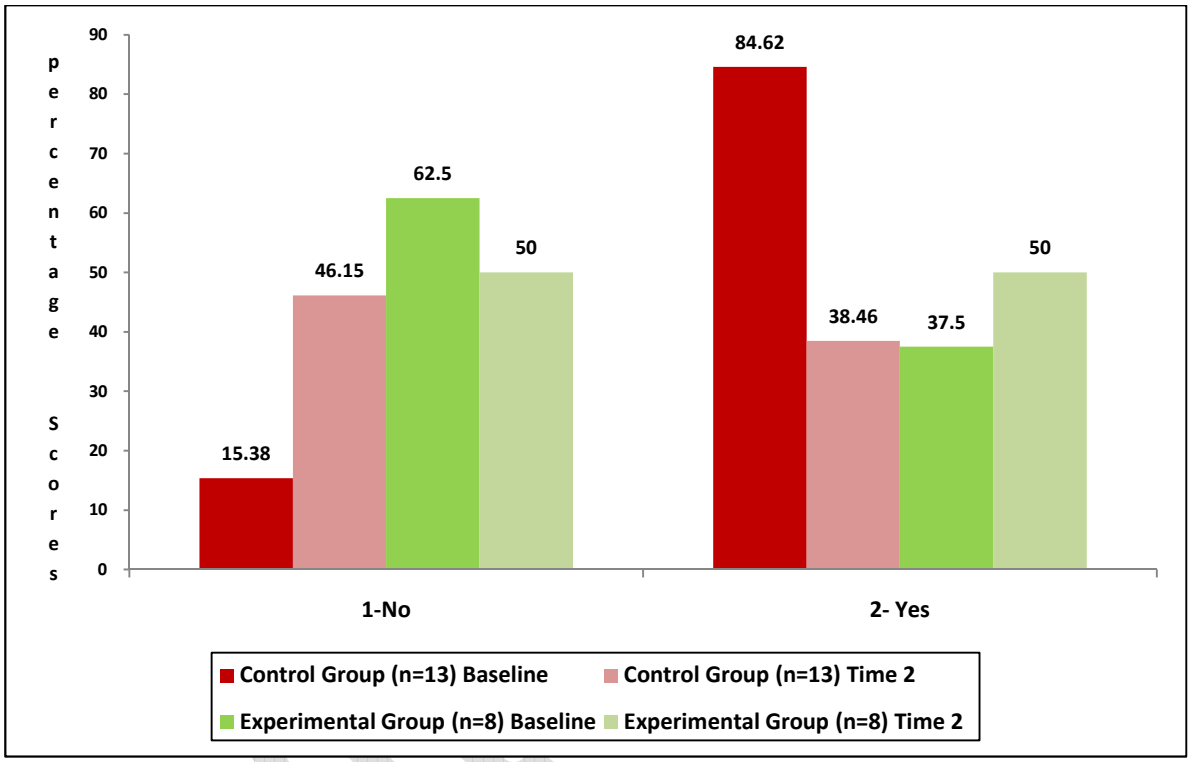


Figure 4.15 Percentage Change in scores from Baseline to Time 2 for the experimental and control groups for Question 59

The control group had a greater problem with right wrist pain at baseline that resolved by T2. The low level of right wrist pain in the experimental group was higher at T2 although there was no significant change within this group.
There was no significant difference between the groups with Fisher's exact score being p=0.10.

Question 60

This question deals with the measures during the past month to reduce RSI symptoms/problems. Answers are either "No"=1 or "Yes"=2. This question was only

answered if RSI symptoms were present thus participants who had no problems did not answer these questions on both occasions.

Question 60k

Sub question k, deals specifically with altering methods of work and working posture (with unchanged tasks) to deal with the problems.

A statistically significant difference was found in the answers between the two groups with Fisher's exact test scores ($p<0.048$). The control group answers remained stable at "No" as seen in Figure 4.16 while the experimental group moved towards the negative side indicating that 44.44% of those who answered indicated that they had not changed their method of working to reduce symptoms, while 22% had changed.

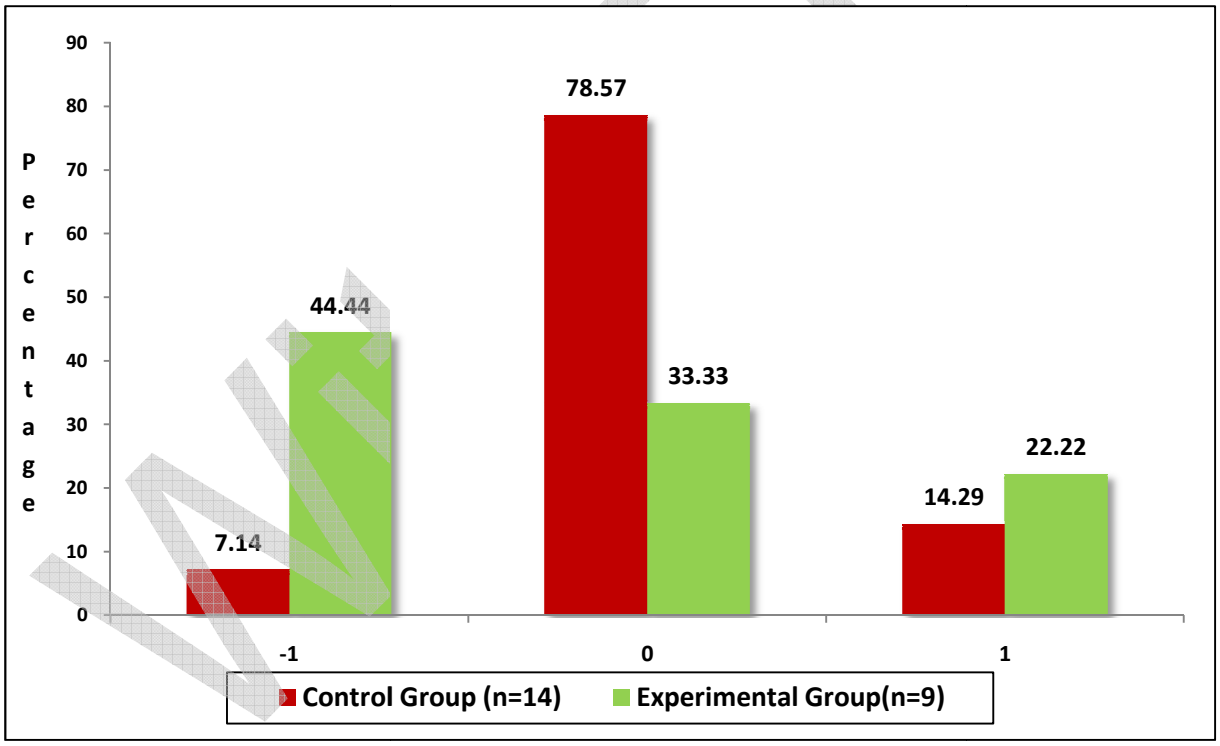


Figure 4.16 Percentage of participants whose answers differed on Question 60k

The McNemar test values obtained were: control group ($p<0.56$) and the experimental group ($p<0.41$) indicating a statistically significant change within the experimental group. More participants in those that answered now said they had not altered the ways in which work tasks were performed to help decrease the symptoms of RSI.

Question 60l

Sub question l deals with altered equipment including the chair, desk, computer, headset etc.

Figure 4.17 also indicates a move to the negative scores by the experimental group while the control remained essentially the same in their attitude. The Fisher's exact score ($p<0.42$) is significant; indicating a significant difference between the two groups. Thus although there was not a significant change within the experimental group, 33.33% of those who answered the question changed their answer to "No" in terms of changing their work equipment to reduce RSI symptoms, while 22.22% had changed their answer from "No" to "Yes".

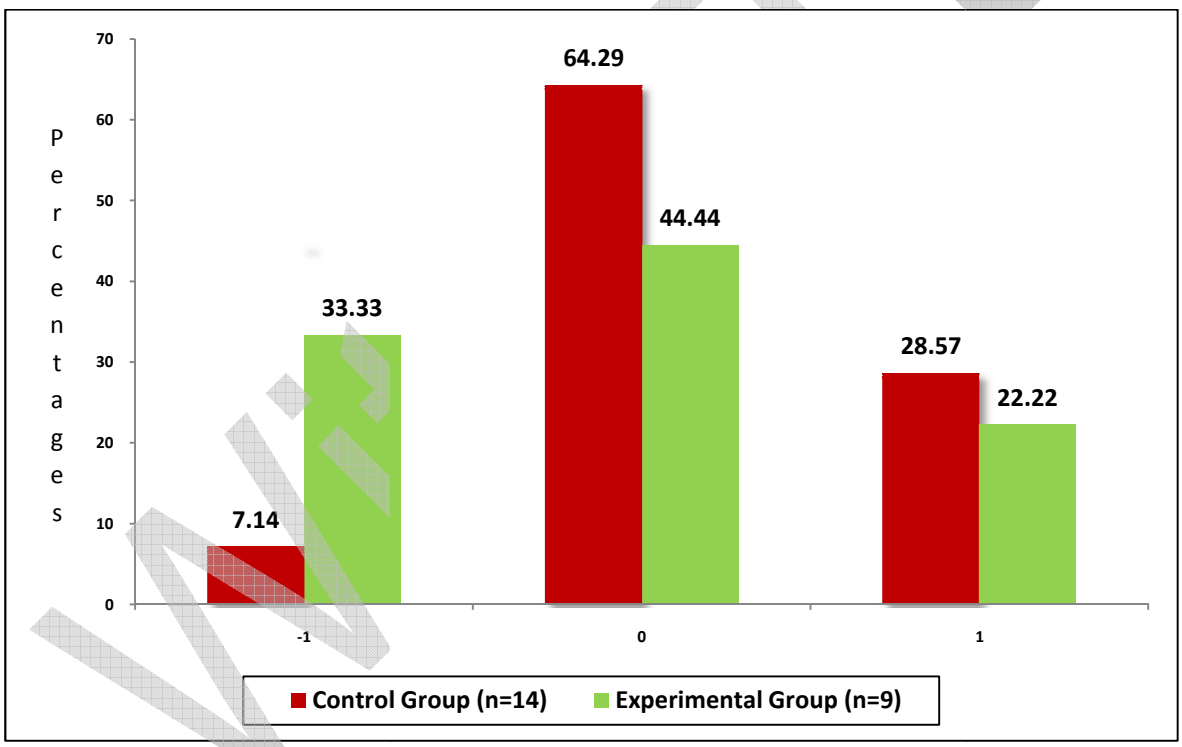


Figure 4.17 Percentage of participants whose answers differed on Question 60l

Question 61

This question deals with how the symptoms/problem affects work capacity and life in general. This was scored from 1 "unaffected" to 4 "hardly managed at all" and 5 "don't know".

Question 61a

The sub point considered, deals specifically with work capacity in the call centre. The Stuart-Maxwell test showed an overall statistically significant change (p = 0.05) for the groups combined in terms of the answers from the initial assessment to the second assessment. (Figure 4.18). The combined groups moved towards managing with effort from reduced quantity or quality related to symptoms/problems affecting their work capacity. The Fisher's exact score (p<0.76) is not significant; indicating no significant difference between the two groups.

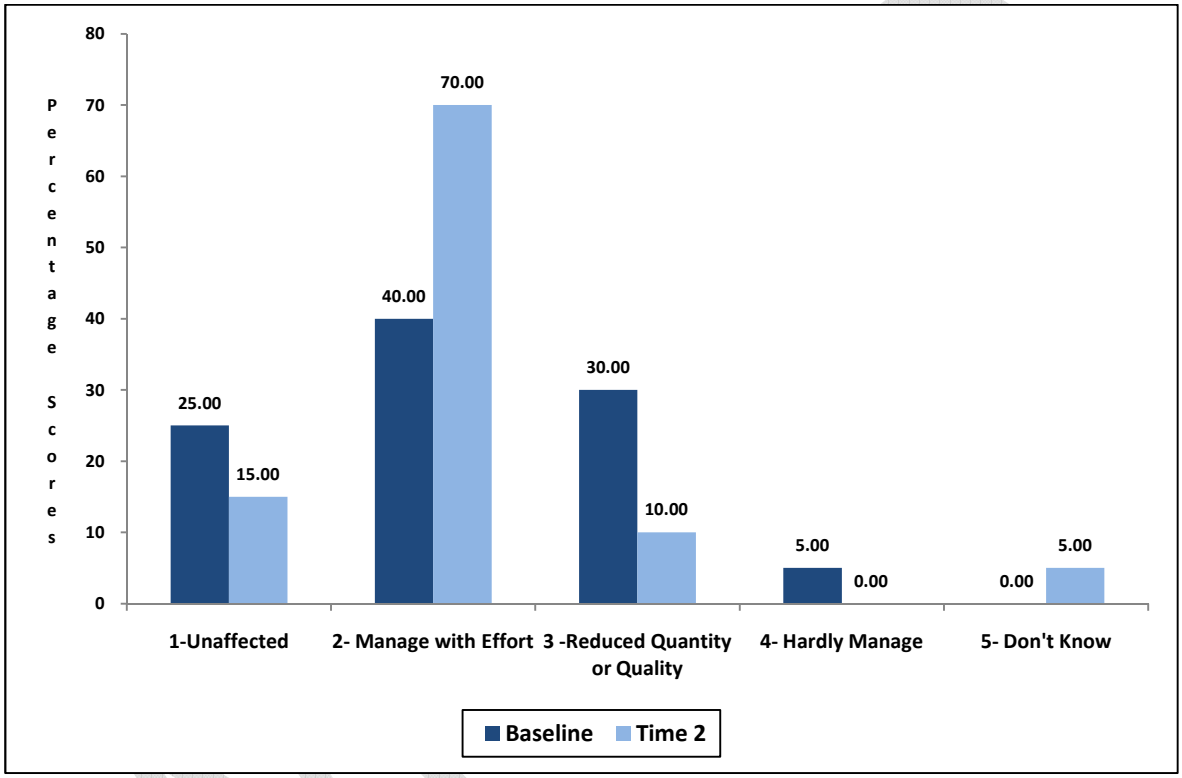


Figure 4.18 Percentage Change in scores from baseline to Time 2 for the combined groups for Question 61a

Question 64

Question 64b

This question deals with time taken off work due to "own illness". The Fisher's exact score for the difference between the experimental and control groups (p<0.85) is not significant. The Stuart-Maxwell test result and the McNemar test (p<0.04) indicate a statistically significant difference for the combined groups when comparing the answers at baseline and T2. (Figure 4.19)

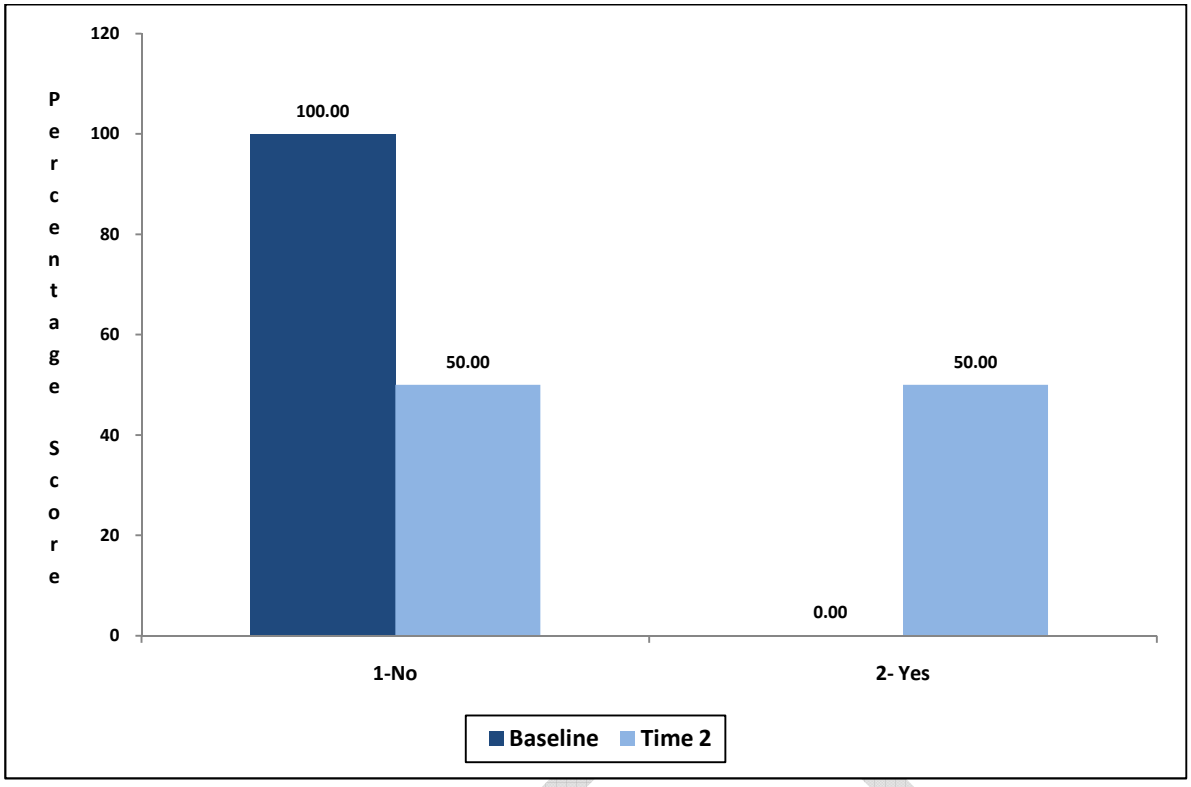


Figure 4.19 Change in scores from baseline to Time 2 for combined groups for Question 64b

Only eight respondents out of a possible 37 answered this question and this question concerned illnesses other than work related illness.

4.3 Summary

Results for Phase 1

Of the 325 questionnaires handed out, in seven call centres at one medical aid company, 142 (43.69%) were returned. Thirteen of these questionnaires were incomplete, thus the final number of questionnaires analysed was 129 (39.69%). Due to a design flaw and oversight, no meaningful demographic data was obtained from the entire screening population. However prevalence was calculated as 30.23%

Results for Phase 3

The demographics of the research population indicated that of the 37 participants, 21 were female, 16 were male with the age ranging between 20 to 40 years (with the majority being between 20 and 25 years), right dominant and did not have children under the age of seven in the house.

The minimum duration of employment in their current position was three months, the maximum duration of employment was 68 months and the mean duration of employment in the current position was 22.54 months. The majority of the population had worked in their current workplace in their current work position for between nought to ten months. The normal number of working hours per week was 40-42.5 hours. The minimum overtime worked per month was one to five hours with a maximum of 31-40 hours.

The null hypothesis of the research stated that:-
the implementation of an education-based-ergonomic intervention programme will not decrease the symptoms of upper extremity RSI in the experimental group or the control group, and when they are compared with each other.

The null hypothesis was accepted for range of motion at the wrist and pinch strength. No statistically significant changes, between the groups and between the times or for the groups and times combined, were noted for: wrist flexion, wrist extension, radial and ulnar deviation. The statistically significant measurement for radial deviation appeared to be due to a measurement error. The only clinical difference noted was that the wrist flexion measurements continued to deteriorate for the control group and not for the experimental group. This finding was also true for pinch strength and pain at rest and the null hypothesis was accepted for these symptoms as well.
The null hypothesis was rejected in terms of grip strength, as a statistically significant difference over time was noted between the control and experimental groups. The control group showed a steady decrease in grip strength measurements between the measurement sessions. The null hypothesis was also rejected for pain on resistance, pain on movement and worst pain measured on a VAS. Pain on resistance showed a significant difference for an interaction between group and time, with the experimental group showing a decrease in pain.
Pain on movement and worst pain showed the greatest difference between the measurements over time within the experimental group when there was a significant decrease in pain

“The Working conditions and health at call centres” questionnaire was handed out to 39 participants at T0, but only 38 were returned (97.4% return rate); however two

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were incomplete. Only 28 questionnaires were returned at T2 limiting the number of questionnaires that could be compared from T0 to T2.

The second part of the null hypothesis stated that:
the implementation of an education-based-ergonomic intervention programme will not change the attitude of call centre workers related to ergonomics and lifestyle factors in the experimental group or the control group, and when they are compared with each other.

The null hypothesis was accepted for all sections of the questionnaire except questions 37 and 38f in the computer work section, questions 48e, g and s dealing with stress and tiredness, question 53b in the winding down and recovery section and questions 58f, 59i, 60k, 60l, 61a and 64b in the health section. The null hypothesis is rejected for these aspects of the questionnaire dealing with knowledge of ergonomics and a change in attitude in participants to workspace on and around the desk. The experimental group showed a statistically significant change for feelings of inefficiency, pressure at the end of the day and depression. They also had more time and energy to pursue hobbies, they altered ways in which work tasks were performed less and their work capacity at the call centre was less affected, by the end of the study.
Both groups indicated a significant decrease in numbness in their hands generally as well as a change in work capacity when working in the call centre.

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