

CHAPTER 4

RESULTS:

Introduction

This chapter describes the results found when subjects with stroke and with hypertension were compared in dressing their upper and lower bodies. The demographic results are illustrated in the form of tables. Tables depicting the perception of difficulty of tasks, the time for execution as well as the energy expenditure in tasks are also presented.

Activity profile pie charts were drawn to depict the variety of activities that subjects in the stroke group engaged in. Statements describing their satisfaction in their daily activities are illustrated.

4.1 Demographics

The experimental group consisted of 13 males and 10 females. The control group consisted of four males and nineteen females. The gender differences in the control group reflect the gender differences at the hospitals where data were collected (Stewart, 2003). Stewart (2003) showed that demographics of patients with cardiovascular dysfunction and hypertension attending South African clinics were 81% females and only 19% males. This is reflective in the patient sample.

Table 4.1 illustrates the average age, weight, height and BMI of the experimental and control groups as well as the results of the difference between them.

Table 4.1: Average age, weight, height and BMI of the Experimental and Control Groups

	EXPERIMENTAL GROUP n=23 Mean (sd)	CONTROL GROUP n=23 Mean (sd)	p value
AGE (years)	52.39 (±11.02)	57.52 (±13.52)	0.17
WEIGHT (kg)	70.57 (±13.59)	86.5 (±22.66)	0.02
HEIGHT (meters)	1.65 (±0.14)	1.62 (±0.12)	0.42
BMI (w/h ²)	26.27 (±6.59)	33.5 (±10.64)	0.01

The above table illustrates that the subjects in both the experimental and control groups were mostly middle aged. There were no significant differences in the ages and heights of the two groups.

There was a significant difference in the weight between the two groups. The BMI of the groups were in turn, affected by the differences in weight between the two groups. A BMI of 25-29.9 is considered to be overweight. The average BMI of the experimental group indicates that subjects were overweight as the average BMI is 26.27. A BMI of 30 and above is considered to be obese. This indicates that the subjects in the control group were obese.

When comparing gender within both groups, the weight of the males and females subjects were found to be significantly different ($p=0.04$) with the weight of the females being significantly greater than the weight of the males. This contributes to the differences in the mean values found in the weight and BMI.

4.2 Upper Limb Mean Values: Total Caloric Expenditure, METs and Activity Counts the three Motion Planes

Table 4.2 indicates the mean values for the caloric expenditure, METS and activity counts in three motion paths to ascertain differences in the two groups.

Table 4.2: Comparison of mean values in Caloric Expenditure, METs and Activity Counts for Experimental and Control Groups in Upper Body Dressing.

	Experimental Group n=23 Mean (sd)	Control Group n=23 Mean (sd)	Differences	p value
Total Caloric Expenditure in Kcal.	11.35 (±6.09)	7.14 (±5.20)	4.22	0.03
Total METs	5.13 (±2.84)	3.68 (±2.37)	1.45	0.03
Activity Counts: Anterio-Posterior Plane	931.70 (±699.07)	624.22 (±498.60)	307.48	0.04
Activity Counts: Vertical Plane	1098.35 (±760.27)	845.43 (±694.34)	252.91	0.12
Activity Counts: Medio-Lateral Plane	1477.26 (±935.56)	910.30 (±799.35)	566.96	0.02

The total caloric expenditure in the upper limb dressing task was significantly higher in the experimental group than the control group.

When testing for a linear association between total caloric expenditure and the time taken to dress the upper body, a positive correlation was found (adjusted r^2 -sqd=62%, $p<0.05$).

Similarly, there was a significant difference in the average METs between the two groups ($p=0.03$). The experimental group used significantly higher METs to dress the upper body than the control group.

A correlation, established from the linear regression between total energy expenditure and weight revealed that despite the weight being higher in the control group, there was little effect (adjusted r^2 -sqd=0%, $p<0.86$).

There were significant differences in motion in the anterior-posterior ($p=0.04$) and the medio-lateral axis ($p=0.02$) with the control group moving significantly more in

the diagonal and anterior motion paths than the experimental group. There were no significant differences in the activity counts in the vertical plane ($p=0.12$).

4.3 Lower Limb Mean Values: Total Caloric Expenditure, METS and Activity Counts the three Motion Planes

Table 4.3 illustrates the mean values for the caloric expenditure, METS and activity counts in three motion paths to ascertain differences in the two groups.

Table 4.3: Comparison of mean values in Caloric Expenditure, Mets and Activity Counts for Experimental and Control Groups in Lower Body Dressing.

	Experimental Group n=23 Mean (sd)	Control Group n=23 Mean (sd)	Differences	p value
Total Caloric Expenditure in Kcal.	13.97 (±8.11)	16.46 (±25.99)	-2.82	0.69
Total METS	7.12 (±3.20)	9.82 (±16.48)	-2.70	0.78
Activity Counts: Anterio-Posterior Plane	1231.91 (±589.42)	1766.74 (±3308.70)	-534.83	0.78
Activity Counts: Vertical Plane	1434.13 (+664.84)	2236.83 (+3570.16)	-802.70	0.85
Activity Counts: Medio-Lateral Plane	2080.39 (+1067.08)	2242.05 (+4069.07)	-161.65	0.57

The total caloric expenditure, total METS and activity counts in the three motion planes in the control group, when dressing the lower limb, were found to exceed those of the stroke group. There were non significant differences between the two groups.

The linear regression revealed a low correlation coefficient between total energy expenditure and weight. It was revealed that despite the weight being higher in the control group, there was very little effect (adjusted r^2 sqd=5%. $p<0.01$).

4.4 Energy Expenditure in dressing according to gender

An analysis to reveal differences in energy expenditure between males and females in each group was executed. There was no significant difference in the lower body dressing between gender but there was a significant difference in the energy expended between genders in the upper body dressing ($p=0.03$). Table 4.4 below indicates the differences.

Table 4.4: Energy Expenditure in dressing the Upper Body according to gender

	Males	Females	P value
Upper Body Dressing	12.06	7.59	0.02
Lower Body Dressing	16.26	14.34	0.53

Table 4.4 indicates that the males expended more energy in both tasks when compared to the females in the upper body dressing. Males expended more energy in the lower body dressing but the difference was not significant.

There was a significant difference in the energy expenditure between females in the upper body dressing ($p=0.04$). No differences were found in the males in the upper body dressing. Similarly, there were no differences in the energy expenditure within gender in the lower body dressing.

Furthermore, there was a significant difference in the mean total caloric expenditure ($p=0.04$) between the females in the experimental and hypertensive group but no difference between the males.

4.5 Brunnstrom Movement Scales: Experimental Group

The experimental group was evaluated for the extent of active movement present in the arm, hand and lower limb using the Brunnstrom Movement Scale. Table

4.5 indicates the percentage of subjects within the experimental group within each stage of movement in the arm, hand and lower limb respectively.

Table 4.5: Percentage of subjects in the Experimental Group presenting within the Brunnstrom Movement Scales for Arm, Hand and Lower Limb (n=23)

STAGE	ARM	HAND	LOWER LIMB
2-Movement only if facilitated reflexively	0%	4.35%	0%
3-Movement in Flexor or Extensor Synergies only	17.39%	30.43%	13.04%
4-Movement deviating from synergy	17.39%	4.35%	21.74%
5-Movement independent of synergies	34.78%	34.78%	34.78%
6-Movement Near Normal	30.43%	30.43%	30.43%

Stage 1 of the scale was excluded as this stage indicated flaccidity of the limbs. Only subjects with some active movement were included in the study. The above table shows that the levels of movement in the upper limb and lower limb appear to be concentrated in stage five and six indicating movement patterns deviating from synergy and more isolated, co-ordinated movement.

In subsequent tables it will be noted that deficits in dressing in this study were present despite high levels of skilled movement reflected in this scale. This implies that despite movement capacity being present in the subjects, they could not use this capacity to dress independently.

4.6 Analysis to establish correlation between movement in limbs and energy expenditure in dressing tasks

It was important to evaluate if increasing Brunnstrom scales, which in turn implied greater active movement was inversely correlated with greater ease of movement and less energy expenditure.

A linear regression showed no correlations between stages of movement in the arm, hand and lower limb and the total caloric expenditure in dressing the upper and lower limbs respectively.

4.7 Time for Execution of Dressing Upper Limb and Lower Limb in Experimental and Control Groups

Figure 4.1 illustrates the mean time required to dress upper and lower body in the two groups.

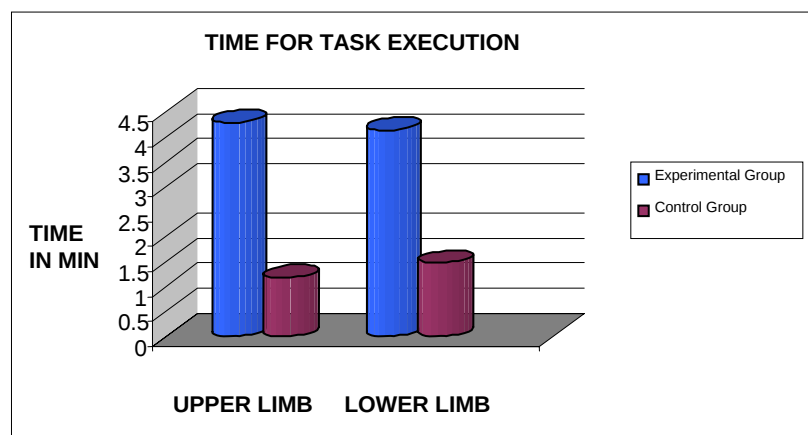


Figure 4.1: Time for dressing Upper and Lower Body in the Experimental and Control Groups.

Figure 4.1 indicates a disparity in the differences in the time taken to execute the same tasks of dressing the upper body ($p < 0.00$) and lower body ($p < 0.00$). There was an almost four-fold increase in the time taken to dress the upper and lower body by the experimental group when compared to the control group.

The time spent on dressing also differed significantly between genders. Table 4.6 indicates the differences in the time taken to dress the upper and lower body by males and females.

Table 4.6: Differences in time in dressing in males and females

	Upper Body		Lower Body	
	Mean : Males	Mean : Females	Mean : Males	Mean : Females
Experimental Group	5.0 minutes	3.9 minutes	5.0 minutes	3.2 minutes
Control Group	1.5 minutes	1.3 minutes	2.6 minutes	1.6 minutes

The above times indicate that the males in both groups took a longer time to dress than the females. Furthermore when comparing the groups according to gender and time, there was a significant difference between the females in the two groups ($p < 0.00$) as well as between the males ($p = 0.03$). The females in the experimental group took three times more time than the females in the control group to dress the upper body. The males in the experimental group however take five times more time than the males in the control group.

There was no correlation found between the time taken to dress the lower body and the total caloric expenditure (adjusted r^2 -sqd=7%, $p < 0.07$). There was strong correlation found between the time taken to dress the upper body and the total caloric expenditure (adjusted r^2 -sqd=62%, $p < 0.05$).

In the dressing of the lower body similar patterns can be found with the males and females in the experimental group taking significantly more time to dress.

4.8 Perception of Difficulty of Upper and Lower Body Dressing Tasks:

Table 4.7 indicates the percentage of subjects who rated the dressing of the shirt, pants, socks and shoes on the Likert Scale from very easy to very difficult.

It is important to note that in the perception of difficulty of dressing the upper limb and trunk, a large proportion of individuals in the experimental group rated this task as difficult (47.83%) whereas 78.26% of the control group rated the same task as easy. This indicates that there is a great difference in perception of how difficult the two groups deem this task to be.

None of the subjects in the control group rated the dressing of the lower limbs as difficult and 78.26% felt that this was easy. This was unlike the experimental group where the largest proportion of subjects considered this task to be very difficult.

The tasks of dressing socks and shoes showed similar results with the largest proportions of the experimental group reflecting these tasks to be difficult and very difficult yet the largest proportion of the control group perceived these tasks to be easy. The groups were significantly different in their perception of difficulty of dressing the shirt, pants/skirt and socks. There was no significant difference in the perception of difficulty of putting on the shoes in either group

Table 4.7: Perception of Difficulty of Dressing Tasks

	SHIRT		PANTS / SKIRT		SOCKS		SHOES	
	Exp Group	Cont Group	Exp Group	Cont Group	Exp Group	Cont Group	Exp Group	Cont Group
Very easy	0%	8.7%	8.7%	4.35%	8.70%	4.35%	13.04%	8.70%
Easy	13.04%	78.26%	26.09%	78.26%	8.70%	52.17%	17.39%	52.17%
Neutral	26.09%	8.70%	21.74%	13.04%	13.04%	17.39%	13.04%	17.39%
Difficult	47.83%	4.35%	13.04%	4.35%	21.74%	21.74%	26.09%	17.39%
Very Difficult	13.04%	0%	30.43%	0%	47.83%	4.35%	30.43%	8.70%
p value	p=0.000		p=0.001		p=0.001		p=0.075	

Exp = Experimental Cont = Control

Testing for a linear relationship between total caloric expenditure and perception of difficulty indicates a significant but not strong relationship between these variables (adjusted r^2 sqd+37%, $p<0.05$)

Testing for a linear relationship between time spent in dressing and perception of difficulty indicated a moderate association between these variables (adjusted r^2 sqd+46%, $p<0.05$)

No correlations could be found between the perception of difficulty, the time taken and the energy expended in any of the dressing tasks.

4.9 Activity Profile: Weekday

Figure 4.2 below indicates the average number of hours the experimental group spent in personal management, leisure, work, sleep and unconstructive time.

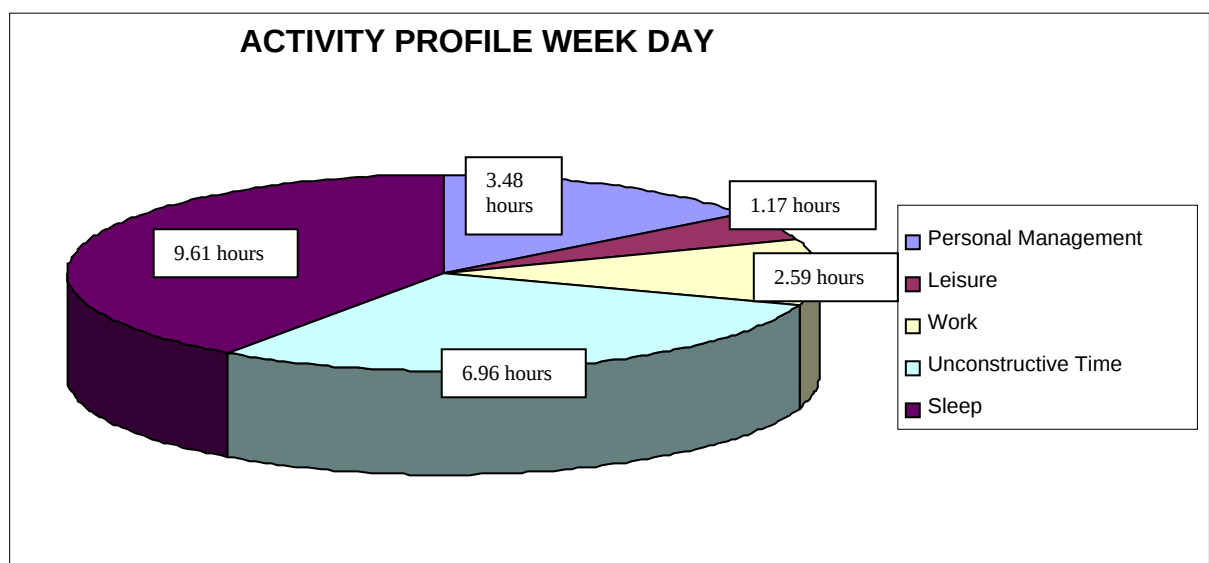


Figure 4.2: Weekday Activity Profile of Average Hours of Experimental Group

There are more hours spent on sleep and unconstructive time with fewer hours spent on leisure (1.2 hours) and work (2.6 hours) during the week day. The figure indicates more hours being spent in sleep (9.6 hours) and sedentary activity relative to unconstructive time (7 hours) within a 24 hour day.

4.10 Activity Profile: Weekend

Figure 4.3 below indicates the average number of hours of a weekend day that the subjects in the experimental group spent in personal management, leisure, work, sleep and unconstructive time.

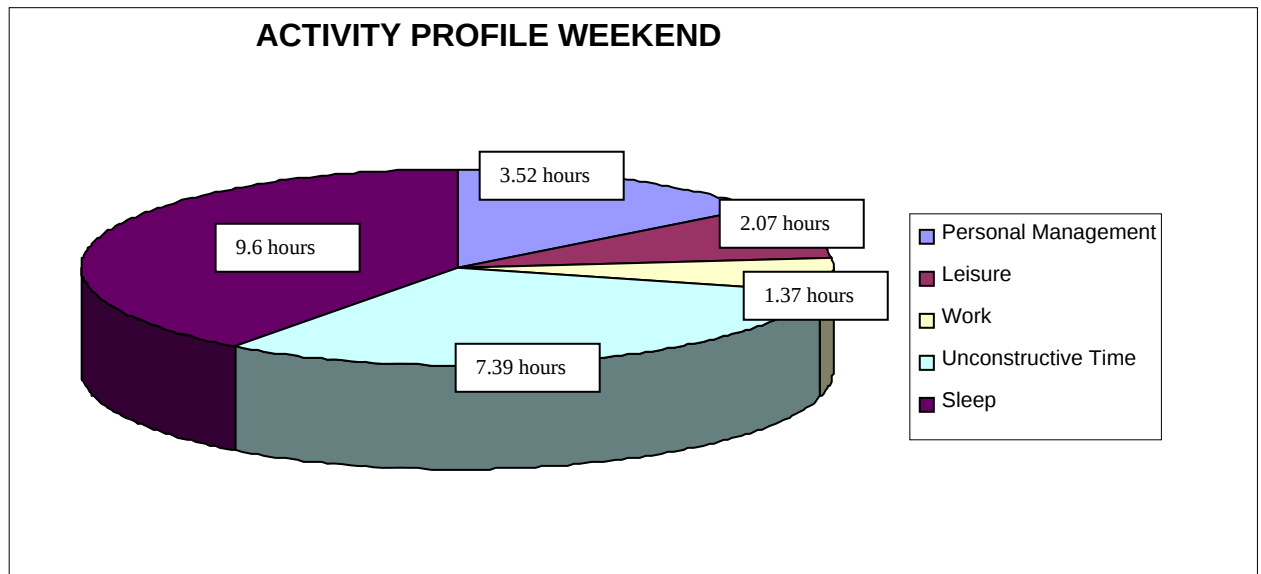


Figure 4.3: Weekend Activity Profile of Average Hours of Experimental Group

Figure 4.3 does not appear to be very different from Figure 4.3. Again, this illustrates the lack of variety of activities that the subjects in the experimental group are exposed to during the course of a week. Again the same trend was observed that there were more hours spent in sleep (9.6 hours) and unconstructive time (7.4 hours) and even fewer hours on weekends spent on work (1.4 hours). Leisure hours increased to 2.1 hours which was an expected trend.

The hours dedicated to personal management in Figure 4.2 and Figure 4.3 are similar thus indicating no change in the hours spent in the execution of tasks such as dressing.

4.11 Activities Health: Satisfaction

When subjects in the experimental group were asked to comment on how satisfied they were on spending their time as reflected in the activity profiles, only five subjects stated that they felt satisfied with the way they spent their hours. Three of these subjects had mild dysfunction and had returned to work.

Table 4.10 below illustrates the major themes that were compiled when subjects in the experimental group were asked to comment on their level of satisfaction in how they spent their days.

Table 4.8: Factors leading to poor satisfaction in how days are spent.

Frequency of Factors Reported	Factors
8	Unsatisfied because much slower, decreased strength and energy, increased time to do things
8	Unsatisfied because they do very little in the day
8	Unsatisfied because they cannot work
6	Unsatisfied because they are dependent on others
3	Unsatisfied because of lack of social interaction with others
3	Unsatisfied because cannot do what they did before
2	Unsatisfied because they cannot walk

The above table indicates that reasons for poor satisfaction are concentrated around feelings related to the first three themes. Feelings of not having the strength, increased time to do things, doing very little in the day and an inability to work appear to be important aspects in fostering a sense of dissatisfaction among the subjects in the experimental group.

Summary

The above results indicate significant differences in upper limb dressing when comparing the experimental and control groups. These findings were not similar for dressing the lower body.

Despite having high levels of active movement in the limbs, dressing is still taking increased lengths of time to execute. There are important differences between time taken and perception of the difficulty of the tasks. The activities profile and measurement of satisfaction also reiterates the difficulties in actual execution of dressing due to the increased time and energy expenditure. These will be discussed in detail in the next chapter.