CHAPTER 5

DISCUSSION

The discussion will consider the prevalence of UE RSI found in the screened population as well as the demographics of the sample who participated in the occupational therapy education-based-ergonomic intervention. The effectiveness of the intervention on the symptoms of RSI and its effect on the attitude of the participants as measured by the "The Working conditions and health at call centres" questionnaire will be included. The implication of the results in terms of the assessment findings and effects of the programme will also be presented.

The initial screening study was completed on 129 participants which was the number of questionnaires returned of the 325 handed out. The sample accessed was representative of the population of interest.

The return rate of 43, 69% and the nonresponse bias of more than 50% may be a limitation in the calculated prevalence of UE RSI in this study of 30.23%. A response rate of 60% for most survey research is usually the accepted level (Draugalis, Coons, Plaza, 2008).

However the prevalence found in this study when compared to the literature reflects the prevalence reported by several authors, which ranges 24% to 44% (Ijmker *et al*., 2006, Blatter and Bongers, 2002, Attaran. Wargo,1999, Sanders, 2004, Williams *et al*., 2004, Lacerda *et al*., 2005). Thus it can be accepted that the results of this study are supported by other international research and may be considered reflective of the prevalence of RSI amongst call centre workers in Gauteng, who worked for more than six hours a day at the computer. The confirmation of development of RSI in participants who use the computer for an average of six hours a day supports and confirms the dose response theory: the more exposure to computer use the higher the risk for development of RSI (Bongers and Blatter, 2002).

The initial loss to follow up in Phase 3 of the study of 12, 82% at T1, meets the criterion expected of studies with repeated measures, as key outcomes were measured on more than 85% of participants for at least one post-treatment assessment .The larger loss to follow up at T2 of 20% may be a potential source of

bias, as bias increases with the proportion of participants lost to follow up. (OT Seeker) (Table 4.1)

The participants lost to follow up, did not formally give reasons for not wanting to continue with the research. The questionnaires were either not handed back (T2) or were handed back incomplete (T1), with no reason attached. Several of the participants were on leave (sick and annual) and some were on a work organised course when the assessment sessions took place. Every effort was made to assess all available participants on the same day. Due to the courses organised, despite notification in advance of the assessment dates, those able to attend the assessment after hours on the assessment day were accommodated.
The lower loss to follow up in attendance at the assessment sessions in comparison to the questionnaire completion, may have been the effect of time allowed off work to attend assessments, as opposed to participants having to complete the questionnaire in own time. The very long questionnaire used for the study could also have resulted in loss to follow up.

Tittiranonda *et al*. (1999), state that survivor bias may affect results and make them look more favourable than they necessarily would be. To control for this factor, even though there was an acceptable loss to follow up, an intention to treat analysis was followed and the last available data for each participant for each measurement was used in all analyses. This resulted in the number of participants in each analysis being different.

Other demographic variables for the study sample were compared to the literature, with that of gender bias in RSI being considered first. The literature states that there is a definite bias towards females being more frequently diagnosed. The gender make up of this study showed a similar bias with 21 female to 16 male participants (Table 2.2) (Blatter and Bongers,2002, Alexander and Currie,2004, Tittiranonda *et al*.,1999, Galinsky *et al*., 2007 and Lacerda *et al*., 2005). According to Cole *et al*. 2005 other demographic variables are to be considered: the hand or wrist is more affected than other body parts, a higher level of education is more associated with RSI reporting than lower education levels and full time workers (more than 30 hours per week) are more affected than part time workers. The study sample matches

these criteria. Bohr, (2000) further expands on this to suggest a mean age of 42.5 years and an average length of employment of 11.3 years to be representative of her population of RSI sufferers. The majority of the sample in this study fell between the ages of 20-25 years and in the present employment for between 0-20 months. (Table 4.2 and Table 4.3) Thus the findings of this study differ in these respects to the accepted literature, but comparisons cannot really be made due to the lack of demographic data for the screened population.

5.1 Effect of the Intervention Programme on Symptoms of Repetitive Strain Injury

The first objective of Phase 3 of the study was to evaluate the effect of an occupational therapy interactive education based ergonomic programme on UE RSI symptoms of call centre workers. The symptoms of RSI assessed, using physical outcomes measures, in this research were: range of movement at the wrist, grip strength, pinch strength and pain. All these symptoms are interrelated and it is well documented that the symptoms of RSI are fluctuant, slow to progress and episodic (Pascarelli and Hsu, 1991). The associated decreased functional ability experienced by the sufferer is mostly attributed to pain. Pain may arise from tissue inflammation and hence oedema, which may be the result of chronic micro trauma to the involved structure. It follows that if inflammation exists, pain is a symptom resulting in decreased functional use and thus decreased strength and range of motion. Whether the tissue damage is solely attributed to the chronic micro trauma (repetitive movement associated with a work activity) or exacerbated by the fact that tendons have less restorative abilities than other tissues due to a low metabolic rate is not relevant when determining the consequence – RSI (Nathan and Meadows, 2002, Sanders, 2004 and Palmer, 2003).

5.1.1 Physical outcome measures

5.1.1.a ROM

There was no significant change in the range of motion at the wrist over the three assessments for either the experimental or control groups. However, very high radial deviation measurements at baseline, for both the control and experimental groups, resulted in a statistically significant difference over time for both groups. Since the individual values were uniformly high and figures showed no interaction or outliers to affect the results, it can extrapolated that the result found for radial deviation at baseline was a measurement error. (Table 4.6) The error resulted despite the fact that the same tester, test method and test equipment were used on all participants for all measurements. The reliability of the measurements has been stated to be good when one tester using the same test instrument and a standardised method performs all the measurements. Armstrong *et al*. (1998) also state that the intra-tester error average for ROM assessment in the wrist and forearm does not exceed five degrees. As a blinded third party performed all the assessments in the prescribed manner it can be assumed that all the other measurements obtained are reliable (Armstrong *et al*., 1998 and Cambridge-Keeling, 2002).

Whilst the results for wrist flexion were not statistically significant, the control group showed a continuing decrease in ROM over the three assessment periods whilst the experimental group stayed relatively constant. (Figure 4.1)These changes do however fall into the five degree measurement error expected using manual measurement techniques at the wrist joint (Armstrong *et al*., 1998).

All the range of movement assessments at the wrist were below the normative average values. Wrist flexion ranged between 21.93^0 and 25.05^0 (Table 4.4) which fell below the normal range of $70\text{-}80^0$ with a similar result being found for wrist extension (Table 4.5) (Cambridge-Keeling, 2002).

This loss of range at the wrist agrees with the findings of Pascarelli and Hsu (1991) who also found a decrease in wrist range of motion associated with RSI. Although the findings for this study for wrist extension are similar to the ± 46° they found, their findings for wrist flexion of ± 68° were not nearly as restricted as the findings in this study. The amount of wrist flexion restriction in an RSI will be dependent on the severity of the symptoms, tissue inflammation and damage. It can be extrapolated

that this sample may have had more acute RSI than participants in the study by Pascarelli and Hsu (1991).

It is difficult to comment on radial deviation in this study due to the problem with measurements described previously but unlike Pascarelli and Hsu (1991) who found the ulnar and radial deviation to be generally within normal range, ulnar deviation was found to be greater than the normal range in this study. (Table 4.7) This finding may reflect the finding that all computer mouse users work with extreme ulnar deviation of the wrist (Karlqvist, Hagberg, Selin, 1994).

The decreased range of movement may be due to pain. Continuous limited excursion of muscle may lead to a decrease in the ability of the muscle/tendon unit to stretch resulting in a decreased active and passive range of movement. Thus the decreased range of movement may be attributed to pain as well as a structural change in the tissue. This inability to move through the full excursion at the wrist might also limit the ability to exert maximal pinch and grip strength.
The grip strengths and pinch strengths of the participants also showed a decreased value in comparison to normative data. When reviewing the demographic data of the research sample, the majority (81%) fell in the 20 to 30 age bands. According to Mathiowitz *et al*., (1984) this is the age group in which grip strength peaks, thus the reduced pinch and grip strength is of concern and since it occurs in both groups it can be associated with RSI. When assessing grip and pinch strength in terms of normative data; age and gender specific grip and pinch reference values vary across populations (Werle *et al*., 2009). No normative data for the South African population was obtainable but Pascarelli and Hsu (1991) found grip strength was weaker in American computer users, with the majority achieving ±47lbs (21,36kgs). This was higher than the average 13.99kgs found for the experimental group in this study.

5.1.1.b Pinch and Grip strength

There was no trend between pinch and grip strengths for the two groups. There was no significant difference in the pinch strength between the experimental and control groups or over time, while the average grip strength showed a statistically significant difference between the groups over time. (Table 4.8 and Table 4.9) Both groups

showed a slight improvement in pinch strength with the experimental group showing a slightly lower pinch strength overall in comparison to the control group. (Table 4.8) Pinch strength is derived mainly from the small intrinsic musculature of the hand whilst grip strength is derived from the strong forearm muscles. RSI generally affect the larger forearm muscles causing an inflammation in the tendons at wrist level. This may account for the lack of statistical significance in the pinch strength.

The control group showed a decrease in average grip strength whilst the experimental group showed a relatively stable grip strength. (Figure 4.3) Thus it can be assumed that the intervention was instrumental in maintaining the grip strength in the experimental group since the work conditions for the two groups were stable and both were exposed to the same workloads and environmental conditions. The decreasing strength as shown in the control group cannot be attributed to an external cause. A literature search was performed to see the effect of an ergonomic intervention programme on grip strength. Whilst all articles pertaining to the subject of RSI and grip strength agree that grip strength is adversely affected in RSI sufferers, no article found specifically assessed the effect of a programme on grip strength in computer call centre workers. However a general trend is that intervention programmes should address the decreased grip strength and remediate and ensure maintenance of grip strength in RSI sufferers.

5.1.1.c Pain

Many factors including pain and restricted motion can influence the strength of the grip (Incel, Ceceli, Durukan, Erdem and Yorgancioglu, 2002). Therefore limited grip strength can be associated with limited range of motion and with pain. Thus pain was assessed on a VAS scale with pain on resistance, pain on movement, pain at rest and worse pain being considered.

The experimental group showed a statistically significant decrease in pain on resistance and worst pain. (Table 4.10 and Table 4.13) The scores for pain at rest were lower than other pain scores and a similar trend was found with the experimental group reporting a reduction to a score of less than 1. (Figure 4.6) Thus

it would appear that the intervention programme was instrumental in effecting a reduction in pain in the experimental group.

There was no statistically significant reduction for both groups for pain on movement over time (Table 4.11 Figure 4.5). The possible explanation for this similar decrease in the pattern of pain on movement for both groups may be attributed to the insidious nature of the disease and the fluctuant nature of symptom severity and progression (Saunders, 2004).

It was assumed that pain on resistance and on movement would result in lower grip strength scores. However the significant reduction of pain in the experimental group did not result in higher grip strength scores at T2. In fact the trend that was seen indicated that grip strength remained nearly constant with a reduction in pain and in the control group, where pain scores remained high, there was a further reduction in grip strength. Grip strength therefore appears to be affected by the presence of pain and it would appear that other or longer intervention is required, focussing on the normalisation of grip strength in order to return grip strength to normal levels once pain has been resolved.

In terms of physical outcome measures, pain was the symptom most effectively reduced by the implementation of the education based ergonomic intervention programme. Prevention, in terms of maintenance of grip strength (experimental group) was also achieved but there was little effect on range of movement at the wrist or pinch strength. It is of concern that most of the values obtained in this assessment were below the international normative average values for these outcomes indicating a result problem with both range and strength in the participants' hands. Mention must be made that no South African normative values were available to compare.

5.1.1.d Ergonomic Training

Both Amick III *et al*.(2003) and Greene, DeJoyb and Olejnikc (2005) found ergonomic training reduced the intensity of pain in office and computer workers. This is supported by Bohr, (2000), Herbert *et al*. (2001) and Amick III *et al*. (2003). All their research involved ergonomic education with or without adjustable ergonomic

furniture. All groups irrespective of the manner in which the education was imparted showed a decrease in symptom growth throughout the day and a general decrease in pain and lower musculoskeletal risk (Robertson *et al*., 2007). Thus all evidence reviewed supports the notion that imparting ergonomic education and giving the participants the perception of control over their work environment decreases the pain and improves the perception of their health status. This further supports the theory that relatively cost effective intervention methods have positive results in treatment of RSI symptoms.

5.1.1.e Computer Software

Although van den Heuvel, de Looze, Hildebrandt, and Thé (2003) found that computer workers with symptoms in the upper limbs who use break-stimulating software perceive greater recovery from their complaints, than those who do not , it was not possible in this study to tell how effective the use of computer break software was.

The introduction of the computer break software was intended as an accessory to the intervention booklet. It has been stated that passive interventions, such as this booklet, are less effective than one-on-one intervention sessions or computer warnings that are used in conjunction with these sessions (Visschers *et al*., 2004)

The changes seen in a number of the RSI symptoms measured over the six week period can also be considered in the light of the placebo effect rather than the sole effect of the intervention. Tittiranonda *et al*. (1999) explain the sudden and sometimes marked improvement may be experienced in the early phase of an intervention. This may be borne out where changes were found in both groups after symptoms were assessed and had had attention drawn to them. Research suggests that a period longer than 12 weeks is necessary to rule out this placebo effect and to ascertain whether changes can be attributed to the effect of the intervention alone. The time period of this study may have therefore been too short to assess the effects of the intervention effectively but in terms of time available to these participants it was considered as the longest time they could realistically spare to participate.

5.2 Effect of the Intervention Programme on Attitude of Participants

The second objective of Phase 3 of the study was to assess the change, in the attitudes of call centre workers to ergonomics and lifestyle factors, in the experimental group, the control group, and when they are compared with each other.

"The Working conditions and health at call centres" questionnaire was used to establish the change of attitude in the participants in various aspects. Only the questions in the computer work section, questions dealing with stress and energy levels, the winding down and recovery section as well as questions in the health section were found to have results showing a significant difference between the first and second time the questionnaire was filled in.

The important statistically significant differences between the responses given by the control groups when answering the questions at baseline and T2 are those that indicate the effectiveness of the intervention.

Significant differences were found for questions in the lifestyle and health sections including stress and tiredness, winding down, work and life balance as well as change in work method and equipment to reduce RSI symptoms.

Results indicate that the experimental group, when compared to the control group felt significantly less pressurised and less depressed at the end of the working day. Although they indicated they also had more time and energy for hobbies and other interests they did feel significantly more inefficient.

When considering the change in work method and equipment to reduce RSI only 22.2% of the experimental group indicated a change from "No" to "Yes". Significantly more members of the control group did not change their answers but between 33.3% and 44.4% of the experimental group changed their answer from "Yes" to "No".

Thus it would seem that the intervention had a positive effect on negative feelings associated with work and participants in the experimental group indicated they felt better at the end of the working day and had time for activities outside of work.

This finding supports those of Bernaards *et al*., (2006) that other aspects of lifestyle which impact on the development and progression of RSI can be affected by the implementation of an education based occupational therapy ergonomics programme.

The decreased feelings of efficiency in the experimental group, compared to the control group are difficult to explain and other factors such as increased work demands need to be considered. However it is unlikely that the work demands increased for the experimental group alone. However the extra work of the booklet and checklist submission may have contributed to feelings of inefficiency. The relative inexperience of the experimental group in which 60% of them had worked in the job for less than 20 months (Table 4.3) and more of whom were female with more children under the age of seven years (Table 4.2), may have attributed to feelings of inefficiency once they had received education on balance in their lifestyles.

The intervention had little effect on the attitude of the participants in the experimental group in terms of changing their work and equipment to resolve their RSI symptoms. This may indicate that the experimental group no longer felt it was necessary to make changes as they understood what RSI was and what caused it and with the intervention had, had a resolution of symptoms, particularly pain.

This finding also concurs with the opinion of Bohr (2000) who felt that the use of traditional paper education booklets does not provide participatory education and the opportunity to practice. Thus it is less likely that what is being taught will be translated into behavioural change in terms of the workers ergonomic set up.

It had been hoped that the introduction of computer break software would be able to attract and maintain the participants' attention and thus there would be better transference of knowledge resulting in positive changes based on the new knowledge (Visschers *et al*., 2004).

When considering the differences in attitudes found within the groups either for combined groups, or the experimental or control groups alone, results were statistically significant for the sections on computer work, workplace design and health.

Changes within the groups included significant change within the control group for Question 38f, which dealt with work space design on and around the desk. In further analysis of this question, it showed that both groups demonstrated a shift towards the centre, which was neither satisfied nor dissatisfied. (Figure 4.9) No real trend

could be identified for this question. Since education on this aspect of ergonomic set up suitable for call centres was not included in the programme, this change cannot be attributed to the intervention. The reduction in pain in the right wrist changed significantly within the control group. This result probably relates to the high percentage of participants in this group reporting pain in this wrist at baseline. (Figure 4.15) and cannot be associated with the intervention.

When considering the significant change within the combined experimental and control groups, the computer work section (question 37) indicated there was a significant change in attitude in terms of having sufficient good ergonomic information and training. This result as well as those obtained for significant decrease in numbness in the hand and their improved work capacity in the call centre may have been elicited by an increased awareness of ergonomics in the participants of both groups as a result of the assessment procedures and the questionnaire. This may have had an impact on the thought processes of all the participants. Questions referring to ergonomics and health may have made the participants more aware of ergonomics and related health factors, influencing their response to the same question the second time the questionnaire was presented to them.

There was also a significant change within the combined groups indicating they had taken more time off work. Question 64b on the amount of time taken off work was unfortunately only answered by a few respondents, and referred to illness other than work related illness, so the results need to be viewed in that light, as this is probably unrelated to the intervention programme.

Factors such as individual mood, personal lifestyle, work load, inter office relationships may also have affected the way in which questions are answered and the perception of the RSI symptoms and causality (Alexander and Currie, 1999, van Tulder *et al*., 2007, Ijmker *et al*., 2006 and Bernaards *et al*., 2006). These psychosocial and individual risk factors are difficult to assess, measure and document (Povlsen and Rose, 2008). In this study other aspects in the questionnaire showed no change over the duration of the study and were therefore assumed not to have been affected by the intervention in this study. These included the relationship between the participant, management, colleagues, social support, the perceived

effects of call logging and being monitored by management, and private leisure activity participation.

5.3 Evaluation of the Effectiveness of the Intervention

This study looked at a cost effective education based occupational therapy intervention that minimised the time workers needed to be involved because of time pressures at call centres. This is important since these workers are at high risk for RSI and the value of this type of intervention needs to be evaluated carefully.

In terms of RSI symptoms the intervention was effective in reducing pain at rest, on resistance and worst pain. In the experimental group this appears to be related to maintenance of grip strength but had little effect on the range of movement over time. This may be related to a suggestion made by several authors that increased ergonomic training is associated with decreased RSI symptoms severity and a general improvement in the perception of the participants' health status and control over their environments (Robertson *et al*., 2007, Bohr, 2000, Herbert *et al*., 2001, Amick III *et al*., 2003 and Greene *et al*., 2005).

It is difficult to assess the effectiveness of the booklet and /or the break software in this research as both were offered to the experimental group. The checklists that formed part of the intervention booklet were also not handed in consistently, but the poor hand in rate does not mean they were inconsistently completed. The researcher again had no control over the process of checklist hand in and feels that if it had been better managed the participation levels would then have been higher. Close monitoring and involvement of the researcher to effect this would make the intervention more costly and thus would defeat the aim of providing a simple cost effective non therapeutic ergonomic intervention to computer users

A factor affecting compliance in this study may have been that the participants were not offered time off work to complete the questionnaire or the intervention. They also did not receive any support from work to facilitate their participation. This may have affected the compliance and attention to the intervention. This may lend credence to the fact that passive interventions do not require sustained attention and participation

and thus are not as successful in long term compliance or in the behaviours of change exhibited by participants (Campbell *et al*., 2001, Visschers *et al*., 2004, Amick III *et al*., 2003, Bohr, 2000 and Robertson *et al*., 2007).

Thus there was no change in knowledge of ergonomics specific to the experimental group and no carry over behaviours in adapting their work positions or work equipment. There appears to have been a better understanding of what ergonomic adaptations are and the participants were better able to evaluate whether they had done this (Figure 4.16 and Figure 4.17) Research does say that education alone is not as effective as combining education with participatory adaptations and the provision of ergonomic furniture (Bohr, 2000, Herbert *et al*., 2001, Amick III *et al*., 2003, Robertson *et al*., 2007). The situation in call centres makes this added intervention difficult due to expense and loss of work time so it needs to be accepted that the effectiveness of this intervention also resulted in a decrease in negative emotional lifestyle factors resulting in participants feeling less pressurised and depressed at work with more energy and time for leisure activities.

The increased feeling of inefficiency may also be related to a better understanding of a balanced lifestyle from the booklet as well as some differences between the experimental and control groups, which were not statistically significant.

This result reflects the occupational therapy principles of a better balance in lifestyle and achieves a result that reflects a change in both work and leisure. There was no indication of any change in attitude to personal management activities in the questionnaire in this study.

Limitations:

A serious limitation of this research design was the exclusion of a demographics question page for the screening participants. It was deemed necessary to only include the chosen pages in the screening pack as these would identify at risk individuals and as a result no demographic data was obtained from them. This has no effect on the results obtained in the research and implementation of the intervention. It does not allow the opportunity of ascertaining data for the comparison of demographic data related to RSI for the entire sample as a means of comparing a South African sample against international figures.

The use of self report questionnaires as a screening tool also warrants discussion as the efficacy of self reported questionnaires can affect reliability of the results. It has been found that only individuals with a pre-existing knowledge base or a predisposition toward the diagnosis studied generally complete such questionnaires, biasing the sample (Ijmker *et al*., 2006).

A limitation of the study may be the use of a self reported measurement questionnaire. Self report assessment measures have more measurement error than objective observational measurement tools such as clinical observation and range of movement measurement (Ijmker *et al*., 2006). It cannot be assumed that all participants filled out the questionnaire accurately for each question and the length of the questionnaire may have resulted in fatigue or disinterest. The chosen questionnaire, although designed specifically for call centre workers, was very long

and assessed many factors. It is difficult to ascertain the specific effect of the intervention on the ergonomics due to the interaction of so many factors. As the questionnaire also elicits subjective answers or interpretations, to be truly accurate all participants should have undergone a clinical screening to ascertain whether the answers on the questionnaire matched their physical symptoms.

Some participants may have answered questions in such a manner that they were excluded from the study, even though they had symptomatology consistent with UE RSI. The opposite may be said too for individuals answering in the affirmative. However should they have been included in the intervention sample they would have been excluded during the assessment process in Phase 3 had their clinical presentation not have matched the questionnaire.

A further limitation in this study was the manner in which the computer break software was rolled out to each experimental group participant, which affected not only the implementation of the study but the effectiveness of the intervention. It was very poorly managed by the company involved. The programme was not rolled out onto each participant's computer simultaneously nor was it at the start of the appointed and agreed upon week of the intervention. This made the intervention look flawed and unprofessional. It too did not encourage use of the programme. This was

made worse by the fact that many of the participants only had it available for one week and the programme often did not run properly during that time period. It must be stated that this was not a flaw of the programme but rather of the way it was handled by the company's IT department. The firewalls at the company involved did not allow access to the programme due to a possible safety breach. This problem was anticipated by the researcher and ample time was given to the IT department, to assess and make a decision about the ability of the system to accommodate the programme. Other programmes were offered as alternatives should the chosen programme have proven problematic.

Another possible limitation in this research is the fact that the researcher had no control over how the research introduction process was handled. There was an agreed upon manner in which the research would be introduced, how the information and consent forms were to be handed out and collected. However the researcher had no direct input or access to this process. The handing out and collection of questionnaires did not happen as simultaneously as planned, with some participants receiving theirs much later than others. The participants had no contact with the researcher other than in the physical assessment sessions. They could not ask questions regarding the research nor the questionnaire. This may have resulted in a poor understanding of what was required and thus a poorer response. It has been noted that compliance is greater in a one to one setting where the subject or patient feels a sense of loyalty or responsibility to the researcher or therapist. This can increase level of participation and thus the effectiveness of the intervention. This could not have affected the efficacy of the programme but rather the initial level of participation and interest in the study (Fenety and Walker, 2002).

5.4 Summary

Thus in summary the South African incidence figures, in this research, for RSI among call centre workers mirrors those reported internationally. An intervention

programme combining education and active participatory environmental adaptations to be effected by the participants proved effective in decreasing symptoms of UE RSI reported in this sample. Symptoms showing a statistical improvement included: pain, numbness and perceptions of health status and control over the work environment.
The strengths of the study include the random allocation of participants. Both groups had a baseline similarity and there was no significant difference in the proportion of respondents reporting pain between the two groups. The intention to treat analysis and results for more than 85% of participants on one follow up of the physical outcome measures with the use of a blinded assessor lends support to the results obtained as being valid and representative of the South African sample. (O T Seeker)

A further noteworthy point is that although Randomised Controlled Trials yield the highest level of evidence, as seen in the discussion above, they are not always applicable to all situations. Especially situations where there are many uncontrollable variables.