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# A brief cognitive therapy intervention to reduce the fear of falling and enhance daily living amongst older adults undergoing rehabilitation after hip fracture.

Watts, Geoffrey Douglas

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# A Brief Cognitive Therapy intervention to reduce the Fear of Falling and enhance daily living amongst Older Adults undergoing rehabilitation after hip fracture.

Geoffrey D Watts B Sc (Hons) Ph D

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**Abstract**

Of all the injuries resulting from falls, hip fractures are often the most stressful and produce high levels of disability. The costs of hip fracture for Older Adults are considerable. These include risks of mortality, immediate morbidity associated with surgery, the loss of independence and long term deterioration in levels of functioning. In addition to any loss of function related to physical trauma, psychological trauma i.e. fear of falling, may also produce a decline in levels of physical and social activity which is self imposed.

This study investigated the efficacy of a brief cognitive intervention in improving outcome amongst older adults after hip fracture. Two groups of participants were investigated with one group receiving the cognitive intervention and the other group treatment as usual.

No significant effect was found in reducing fear of falling. However significant differences were found post-study in cognitive function, instrumental activities and duration of hospital stay suggesting that the intervention was effective in enhancing the outcome of rehabilitation.

These results are discussed in relation to self-efficacy theory.

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Large scale research project.

**A Brief Cognitive Therapy intervention to reduce the Fear of Falling and enhance daily living amongst Older Adults undergoing rehabilitation after hip fracture.**

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## Introduction

The Health of the Nation strategy document (Department of Health, 1992), pinpoints accidents amongst older adults as a significant cause of disability and death. Reinsch, Mac Rae, Lachenberg and Tobis (1992) report that one in three of the population over the age of 65, sustains at least one fall per year and 6% of all falls result in fractures (El Faizy and Reinsch, 1994) with hip fractures accounting for 40% of all nursing home admissions in the United States (Reinsch et al, 1992). Svensson, Rundgren and Landahl (1992) claim that falls are the leading cause of accidental death amongst those over the age of 65 years in Sweden and various other countries including the United Kingdom. Unintentional injuries represent the sixth leading cause of death for the over 65 age group, with the majority of these deaths being attributed to the injuries and complications associated with falls (Sattin, 1992). The risk of dying after a fall increases with age with death rates for those over 65 years being reported as being between 10 – 150 times higher than those who have not fallen (Tideiksaar 1998). Fall related mortality is either the direct result of injuries sustained or related to comorbid conditions e.g. pneumonia, heart failure or pulmonary disease.

The risk of falling increases with age from an annual rate of 47 falls per 100 people in the 70- 74 age group to 121 falls per 100 people in the 80+ age group (Overstall, 1992). Tinetti, Doucette, Claus and Marotti (1995) claim that injury from falls represent a common and potentially preventable cause of morbidity and mortality amongst older adults. Most of the suffering and functional loss associated with falls, results from nonfatal injuries which include fractures (including hip fractures), joint dislocations, head injuries, severe lacerations and soft tissue damage. Tinetti et al (1985) state that 7% of people over the age of 75 years visit hospital casualty departments every year as a direct result of injuries sustained by falling. Allegrante, Mc Kenzie, Robbins and Cornell (1991) report that the incidence of all falls resulting in fractures has been

reported in the literature at between 6 and 40% with the most frequently occurring fracture injury being hip fracture. It is suggested that the number of older adults suffering hip fracture will continue to increase as the population ages. Allegrante et al (1991) report that the incidence of hip fracture increases with age but it is also claimed that the increase cannot be fully explained by age related decreases in bone density and is better understood as the combination of decreased bone density and increased risk of trauma occurring.

Lord and Sinnett (1986) project an increase of hospital bed occupancy due to hip fractures between 1986 and 2015, of 83% from data based on a large Australian population study. Tideiksaar (1998) stresses that despite popular myth to the contrary, falls are neither accidental nor random events but are the predictable outcome of person and environmentally related factors that can occur either singularly or in conjunction with each other. As such, these factors are potentially amenable to intervention.

Despite the evidence to suggest that falls are associated with increased risks of functional decline, the question remains as to whether falling has a causal relationship in the incidence of functional decline or is merely a marker for frailty and increased disability. Tinetti and Williams (1998) investigated 1103 community dwelling older adults over a three year period. Information was collected on concurrent medical conditions, age, Mental State, occurrence of falls and activities of daily living. Participants who fell were reported as older, having more comorbid conditions, more depressive symptoms, poorer physical function and lower scores on the mini mental state examination. Tinetti and Williams suggest that the mechanism, which links falls and functional decline, is the loss of physical capability and self-efficacy in performing daily tasks.

Further evidence for the relationship between self-efficacy and decline in activities of daily living is reported by Mendes de Leon, Seeman, Baker, Richardson and Tinetti

(1996). In an investigation of 1103 older adults aged 72 or older (the same study population as that reported above by Tinetti and Williams, 1998) these authors found significant interactions between self-efficacy and changes in physical performance. It was suggested that low self-efficacy was predictive of functional decline amongst older adults and it was proposed that self-efficacy has a buffering effect on the decline of physical function in the event of reduced physical capacity.

**Factors associated with falls.**

Before one can set out to develop strategies to prevent or reduce the occurrence of falls it is crucial to understand the factors which contribute to their occurrence. Steinmetz and Hobson, (1994) categorise the factors influencing falls as **extrinsic** and **intrinsic.**

**Extrinsic factors** are responsible for more than one third of all falls amongst older adults (Cutson, 1994). Tideiksaar (1998) claims that environmental obstacles and design features are associated with increased risk of falls occurring. Extrinsic factors include environmental constraints such as poor lighting, polished floors, loose rugs, items of furniture as well as devices such as zimmer frames, types of clothing and footwear.

Some studies have been reported to support the effectiveness of environmental modification in the reduction of falls. Walker and Howland (1991) interviewed a random sample of 115 people over the age of 62 years. Fifty three percent of these people reported falling "in recent years". Of this group, 46% reported falling within the home. Despite reports of falls in the kitchen, bedroom and living room, none of the respondents reported falls in the bathroom and this was attributed to the fact that 85% of the sample had grab rails already fitted. Cutson (1994) discusses environmental safety measures to reduce fall risk, these include the removal of clutter, securing of carpets and stair treads, replacing unstable furniture, installing grab rails and increasing illumination. Extrinsic

factors are a greater contributor to falls amongst older adults who are mobile, rather than those who are frail, as mobile older adults are usually involved in activities at the time of the fall (Cutson, 1994).

Steinmetz and Hobson (1994) claim that the importance of environmental constraints on mobility declines with advancing age and that the age related increases in the risk of falls are predominately associated with intrinsic factors.

**Intrinsic factors** include age related changes e.g. vision, hearing, gait and psychomotor speed, and also risk factors associated with disease processes. Overstall (1992) describes the " final straw" syndrome where a frail elderly person copes until an additional factor, such as a chest infection or the prescription of an hypnotic drug, tips the balance and the person sustains a fall. Factors which are associated with recurrent falls include the use of sedative drugs, cognitive impairment, Parkinson's disease, history of stroke, prescription of 4 or more drugs and use of a zimmer frame or crutches (Overstall, 1992).

Salgado, Lord, Packer and Ehrick (1994) investigated factors associated with falls in an elderly acute hospital setting. Two groups of 44 elderly age matched participants (44 fallers and 44 non-fallers) were investigated and 7 factors were found to be associated with falls. These factors were cognitive impairment as demonstrated by Mini mental state examination score < 20, disorientation to time and place, previous stroke, incoordination, balance, inability to turn 180 degrees and the use of psychoactive drugs. It was claimed that these results show broad agreement with the results of community based studies. It is suggested that while some participants may have been suffering from dementia prior to admission, others demonstrated acute confusion as a result of acute infections and the confusion may well have been exacerbated by environmental change.

Depression has also been cited as a particular risk factor for the occurrence of falls. Asada, Kariya, Kitajima, Kakuma and Yoshioka (1993) conducted a one-year prospective study of 102 community dwelling elderly mentally ill clients that were compared with a healthy control group (n=100). The client group that consisted of older adults with either dementia or depression demonstrated 216 falls while the control group demonstrated 54 falls. These differences were highly significant. Multiple regression analyses were also performed using selected medical and demographic variables with the combined group. Both depression and dementia were found to be significant predictors of falls.

In another study, Luukinen, Koski, Kivela and Laippala (1996) report the results of a survey of 1016 community dwelling older adults to define risk factors for recurrent falls. Poor health, poor functional ability, poor mobility and many depressive symptoms are associated with falling.

It has been suggested that depression is a risk factor for falls and a consequence of both the experience of having fallen and the fear of falling which leads to a reduction in the activities of daily living and potential institutionalisation. Simpson (1997) suggested that older adults who have experienced falls require the opportunity to discuss their concerns and the consequences of falling.

The use of medication has also been discussed as a causal factor for the occurrence of falls. Overstall (1992) reports the use of 4 or more drugs as predictive of falls. However, given the relationship between falls and ill health the total number of drugs may well be merely an index of the range of disorders.

Particular drugs have been repeatedly implicated in the occurrence of falls. Asada et al (1993) report significant relationships to falls for neuroleptic, antidepressant and hypnotic medications. Significant relationships are also reported between the rate of falls and the administration of PRN medication for agitation i.e. neuroleptic drugs. Cooper (1994) also found that the administration of Thioridazine increases the risk of falls. The use of antidepressant drugs is also claimed to increase the risk of falling by some authors ( Adasa et al, 1993; Overstall, 1992; Ruthazer and Lipsitz, 1993) while other authors have not found any significant relationship (Aisen, Deluca and Lawlor, 1992).

El Faizy and Reinsch (1994) stress that falls are not part of normal ageing but rather the result or one or several interacting factors such as illness, environmental hazards, poor nutrition and medications. Given that no one factor can account for the problem, risk assessment must focus upon factors that may result in confusion and agitation and intervention upon their neutralisation.

Van Dijk et al (1993) stresses the need for special efforts to be made immediately after admission and identify this time as a period of high fall risk. It is pointed out that admission often follows deterioration of mental state at home and the adjustment to the unfamiliar environment may be the precipitant of increased confusion and the incidence of falls. Strategies suggested to cope with this period of adjustment include additional staff input to facilitate orientation and the encouragement of relatives to remain as often as possible with the patient during this risk period.

**Hip fracture as a consequences of falls.**

Of all the injuries resulting from falls, hip fractures are often the most stressful and produce high levels of disability (Roberto and Bartmann, 1993). The costs of hip fracture for those suffering these injuries and their families are considerable. These

include risks of mortality, immediate morbidity associated with surgery, the loss of independence and long term deterioration in the overall levels of functioning. Koval, Skovron, Aharonhoff and Zuckerman (1998) report that the incidence of hip fractures has continued to increase over several decades due to demographic changes in the general population. Tideikaar (1998) also claims that 4% of people admitted to hospital after hip fracture die before discharge and a further 23% die within 12 months of the injury. It is stated that a high rate of comorbidity exists within this population and many never regain premorbid levels of mobility.

However, more optimistic recovery figures are reported by Koval et al (1998). Although hip fracture has been associated with increased mortality, Koval et al (1998) stress that 70 –90% of people who sustain a hip fracture survive for at least one year. However, a large proportion of these people fail to recover their premorbid levels of functioning. Koval et al (1998) discuss the targeting of individuals who are at risk of failing to recover premorbid functioning levels. It was suggested that focussing upon these individuals with intensive medical, nursing and rehabilitation interventions during acute hospitalisation could lead to functional outcome improvement amongst these individuals.

The factors influencing mortality are reported by El Banna, Raynal and Gerebtzof (1984). In a study involving 224 older adults with hip fractures, age, number of prior medical conditions and the number of complications following surgery were predictive of death after hip fracture. Allegrante et al (1991) also claim that post-operative complications occur in as many as 60% of those who undergo surgery for hip repairs with inpatient mortality rates being between 2 and 14%.

In addition to the immediate risk of mortality, a further 20% of this population die within one year of fracture and this rate rises to as high as 35% after 2 years. These figures demonstrate significantly higher levels than the 9% mortality reported in the general population of older adults (Allegrante et al, 1991).

Death is only one of the negative outcomes that follow hip fracture. Borkan and Quirk (1992) state that less than one third of the survivors recover their full levels of functioning and for a large number of people, hip fracture marks the end of independent living. This claim is also supported by Roberto and Bartmann (1993) who claim that less than half of older adults who suffer from a hip fracture, regain their prefracture levels of functioning. Of people who were functionally independent at the time of the fracture, 15- 25 % remain in long term care for at least one year post fracture and the same percentage return home but depend either on other people or mechanical aids for assistance with mobility.

**Factors related to outcome after hip fracture.**

Factors that have been associated with positive outcomes after hip fracture include the presence of a spouse and social contact outside the home (Cummings, Kelsey, Nevitt and O'Dowd, 1985). Borkan and Quirk (1992) claim that poorer outcomes of rehabilitation and increased mortality are related to cognitive impairment, high post surgery levels of depression, and external locus of control. Allegrante et al (1991) also suggest that personal factors such as self confidence, and social factors i.e. social support, are critical in determining outcome after hip fracture.

Cummings, Philips, Wheat and Black (1988) found that people with more social supports achieved a fuller recovery of functioning than people with reduced social networks. They interviewed and examined 111 older adults who had suffered hip

fracture prior to discharge from hospital and again at a 6-month follow-up. It was reported that for those over the age of 60 years, a greater number of social supports were significantly related to a more complete recovery. The association between social support and the fullness of recovery remained significant even after other significant factors i.e. arm strength and mental status were adjusted for in the analyses.

Roberto and Bartmann (1993) also demonstrated the role of family members and friends in recovery after hip fracture. In this retrospective study, 101 older women who had recently suffered hip fracture participated in structured interviews which examined physical function, help from informal networks and use of formal services, both at the time of the interview and one month prior to the injury. The participants also completed a 24 item scale to measure locus of control. Stepwise regression analyses were used to determine which factors predicted the recovery of the participants. It was reported that the amount of assistance provided by family and friends, post fracture, is significantly increased but the strongest predictors of recovery were higher levels of function prior to the fracture and internal locus of control. Less reliance on formal services also predicted improved physical function and it was suggested that minimal formal input provided concrete evidence to the older person as to their level of recovery. Although no evidence was found in this study to suggest that increased levels of family and social input is predictive of recovery, it is proposed that knowing help and support are available if required is just as important as the quantity of such support.

Another factor that is related to outcome after hip fracture is the level of cognitive impairment (Borkan and Quirk, 1992; Jabourian, De Jaeger, Findji and Armenian, 1994). Jabourian et al (1994) assessed 120 older adults who had been hospitalised following fall-related fractures using the mini mental state examination. It is claimed that only 12% of the study population had normal mini mental state examination scores

and the mean scores were close to the scores expected in dementia. The level of cognitive impairment has been related to both the occurrence of falls (Asada et al, 1993; Salgado et al, 1994) and a poor outcome after discharge ( Borkan and Quirk, 1992).

Lizardi, Wolfson and Whipple (1989) propose that a major cause of impairment to mobility and the propensity to fall are abnormalities within the motor system that controls gait and reflexes. It is claimed that different neurological disorders impair this system at different points with Alzheimer's disease, Parkinson's disease, Frontal lobe disease and sub-cortical white matter changes all being proposed to effect the motor system at different points.

**The emotional consequences of falls and fractures for older adults.**

Borkan and Quirk (1992) claim that there is a high level of awareness amongst older adults about the treatment and outcome of hip fracture. It is reported that one of the common anecdotes heard amongst older adults is that a friend or relative fell and broke her hip and "that was it, she died soon after". Clinicians have observed that following hip fracture many people develop an immobilising fear and loss of confidence in their own abilities and their capacity to return to independent living (Allegrante et al, 1991).

Falls may result in a loss of confidence and a reduction in both physical and social activity, even when no serious injury occurs. Tinetti et al (1990) claim that in addition to any loss of function related to physical trauma, psychological trauma i.e. fear of falling, may also produce a decline in levels of physical and social activity which is self imposed.

The risks of immobility are discussed by Selikson, Damus and Hamerman (1988). Immobility amongst older adults is claimed to have long term health consequences for the individual and financial consequences for society. It is claimed that muscle

weakness, contractures, incontinence, mental confusion and the desire to die are potentially reversed or prevented by the maintenance of ambulation. These authors conducted a retrospective study in which 34 immobile nursing home residents were compared to a control group consisting of 12 ambulatory and independent residents. Factors including hip fracture, poor vision and severe dementia were shown to be significantly related to immobility amongst this population

Tinetti, Speechley and Ginter (1988) investigated 336 older adults living in the community, 108 people reported falling at least once over a 12 month period and of this group, 48% admitted having a fear of falling and 26% admitted to avoiding activities as a result of this fear. Of the people who had not fallen, 27% also admitted to a fear of falling implying that the experience of a fall is not essential in the development of the fear. Howland, Peterson, Levin, Fried, Pordon and Bak (1993) assessed the incidence of falls and the prevalence of fear of falling amongst 196 older adults who were resident in housing developments for the elderly. It was reported that 43% of these people reported having fallen in the past and 28% within the last year. Of those who had recently fallen, 15% had required hospitalisation and 44% had required medical help. Of this population, 26% also expressed a fear of falling which compared with 17% who were afraid of being mugged, 12% who feared financial problems, 8% who were afraid of forgetting important appointments and 5% who fear losing a cherished item. In addition, a subgroup of 81 people from one complex was also asked about their concerns about contracting serious health problems in the next year. From this group 15% expressed this fear. The authors claim that the fear of falling for these people was significantly associated with the presence of other fears and may be related to the expression of more generalised anxiety. However this view must be noted with caution, given the prevalence of fear of falling in relation to other fears.

Tinetti and Powell (1993) describe fear of falling as " a lasting concern about falling which leads to an individual avoiding activities that he or she remains capable of performing". Fear of falling is differentiated from appropriate avoidance of activities that are unsafe. It is the avoidance of activities that are within the capabilities of the individual. Thus fear of falling may constitute an independent risk factor in the development of disability.

Burker, Wong, Sloane and Mattingly (1995) examined the role of physical health in the development of fear of falling. This study examined the incidence of fear of falling in a group of 60 older adults with chronic dizziness. Within this group, 47% expressed a fear of falling that was compared to a control group of healthy older adults who reported fear of falling in only 3% of cases. Fear of falling amongst those suffering from dizziness was predicted by three factors; activity of daily living scores, depression scores and stability when standing. It was claimed that fear of falling has multiple determinants and psychological factors play a major role in influencing the individuals response to illness. Vetter and Ford (1989) also give support for this view. These authors report a study in which 674 older adults were interviewed to determine the annual occurrence of falls, physical state, anxiety and depression scores and the consumption of medication. Relationships were reported between frequent falls, physical state, medication use, anxiety and depression scores and it is suggested that falls, anxiety and depression are interrelated via intervening variables which include age, fractures and disability.

The relationship between fear of falling and disability was examined by Franzoni, Rozzini, Boffelli and Frisoni (1994). A group of 54 residents of a nursing home were assessed and residents with and without fear of falling were compared in terms of levels of function, balance and gait and the consumption of psychotrophic medications.

Residents reporting fear of falling had lower levels of function, poorer balance and gait and used more drugs. The residents were reassessed after 24 months and fear of falling was also predictive of a significant decline in the activities of daily living.

Arfken, Lach, Birge and Miller (1994) also report that amongst those who experience a fear of falling, this fear is associated with increased age and frailty, actual experience of falling and levels of depression.

Tinetti et al (1990) discusses fear of falling within the conceptual framework of self-efficacy.

**Self-efficacy, falls and rehabilitation.**

The concept of self-efficacy is defined by Bandura (1977). The concept is conceived as the person's perceived ability to cope with specific situations. Thus cognitive processes are part of psychopathology in that these processes involve expectancies and self-perceptions which lead to anxiety and avoidance behaviour in the face of threatening stimuli. Thus effective therapeutic interventions aim to alter these self-perceptions and expectancies.

Bandura (1977) proposes that the persons expectations of efficacy determine whether or not coping responses are initiated, the amount of energy that is expended and the duration of the coping response in the face of obstacles and adverse experiences. The enhancement of self-efficacy depends upon the exposure to the individual of self-efficacy information (Allegrante et al, 1991). The source of this self-efficacy information is, according to Bandura (1977), past and present achievements, vicarious experience of the effective behaviour of others, persuasion, and physiological feedback regarding the actual performance of tasks and the individuals actual capabilities. Allegrante et al (1991) claim that interventions which have been specifically designed to improve the individual

perception of self efficacy also enhance motivation, confidence and the initiation and maintenance of behaviours which improve health.

Allegrante et al (1991) suggested that self-efficacy is an important determinant for outcome following hip fracture and it is proposed that improving an individual's sense of self-efficacy improves the belief and expectation that coping behaviour can be initiated in the face of adverse experience. Thus perceived self-efficacy improves individual competence and the importance of the relationship between competence and independent living has been stressed by Abler and Fretz (1988). Tinetti and Powell (1993) refer to the individual's self-efficacy as the person's perception of demands within a range of activities and thus they describe the efficacy of the individual as the amount of self-confidence in their ability to function within a specific domain. Thus fear of falling would be the direct result of reduced self-efficacy in relation to falls or "falls efficacy". Falls efficacy would be the result of the cognitive appraisal of efficacy information based upon the experience of falling, beliefs about outcome after falls, vicarious experience of the recovery of others, physiological feedback e.g. pain while tasks are performed, and actual performance on daily living tasks.

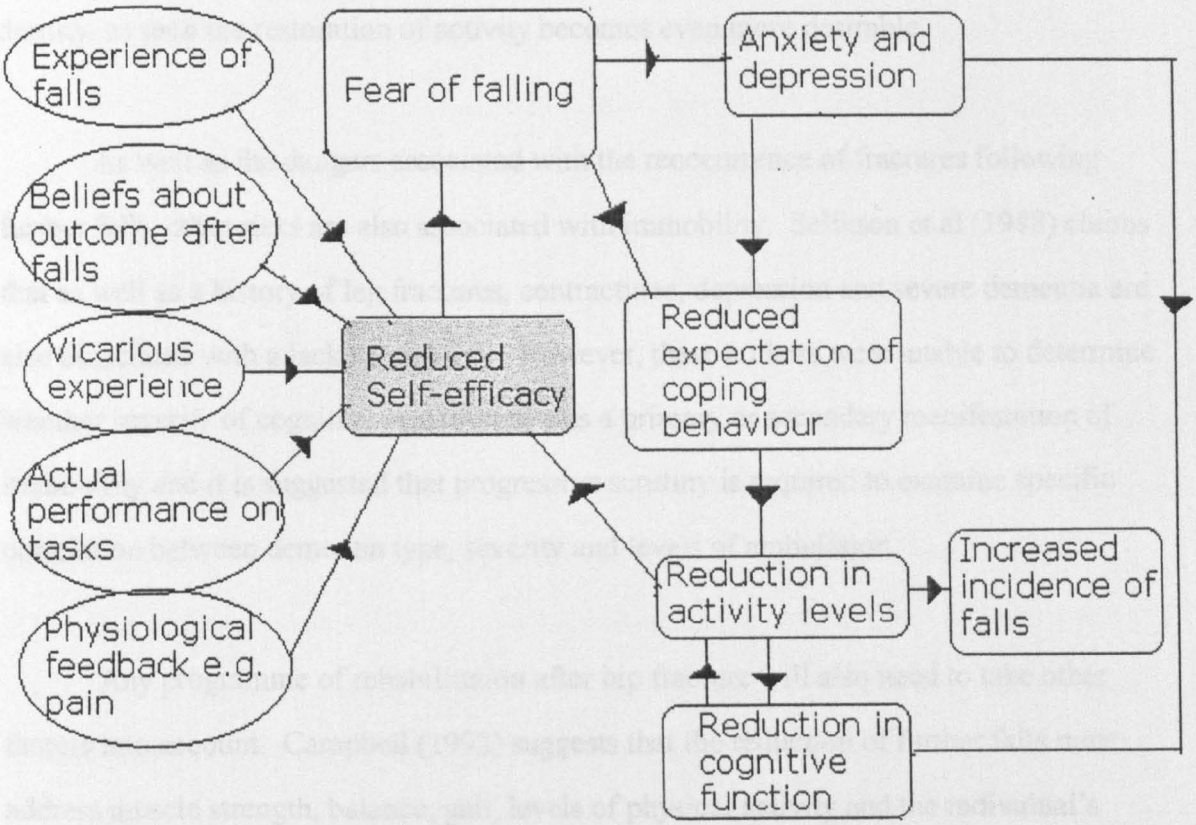
The loss of confidence in a person's ability after falls is also discussed by Campbell (1992). This loss of confidence is described as leading to a loss of previous levels of physical and social function and an increased perception of their general health as poor. It is also claimed that the levels of depressive symptoms are associated with poorer outcomes after hip fracture.

As well as the direct effects of falls upon the individual, Liddle and Gilleard (1995) also report the emotional consequences of falls for the families of those who are hospitalised after falling. These authors report a study in which a consecutive series of

62 older people who were admitted to hospital after falling, together with 42 of their carers were interviewed. It is claimed that while 25% of the patients had a significant fear of falling, 58% of these carers also expressed a "great fear" that the person might fall again. It is proposed that fear of falling amongst the carers was primarily associated with the patients emotional rather than physical state. The participants were re-interviewed after one month and it was noted that although fear of falling amongst the patients had fallen to 19%, the number of carers who were afraid of the patient falling again had risen to 66%. Thus the experience of falling also impacts upon the beliefs, expectancies and perceptions of carers as well as amongst those actually experiencing falls.

The importance of self-efficacy in the development of fear of falling is shown in diagram one. In this diagram, self-efficacy is shown as a central concept in the development of the fear of falling. Thus levels of self-efficacy are proposed as relating directly to reductions in activities of daily living and cognitive function as well as increases in the levels of anxiety and depression and increased likelihood of further falls occurring. Enhancing individual self-efficacy amongst those who have fallen becomes a main target of psychological intervention.

**Diagram 1. The cognitive model for the development of Fear of falling.**




**Rehabilitation after hip fracture.**

As already discussed, hip fracture for older adults represent a terrifying experience which often results in loss of independence, major loss of functioning (Tinnetti et al, 1995) and all too often, a premature death. (Svensson et al, 1992). Amongst those who do survive the initial trauma and hospitalisation for surgery, there remains the goal of assisting these people to recover as higher level of function as possible. Campbell (1992) stresses the importance of lack of mobility in the likelihood of further falls. Factors including weakness of leg muscles increasing risk during transfer or walking up or down stairs, loss of muscle bulk and soft tissue around the hips making hip fracture more likely after a fall, reductions in grip strength, and reduction in

flexibility all increase the individuals risk of falls and further hip fracture. Physical activity and muscle strength are also claimed to be important determinants of femur bone density, as such the restoration of activity becomes even more desirable.

As well as the dangers associated with the reoccurrence of fractures following further falls, other risks are also associated with immobility. Selikson et al (1988) claims that as well as a history of leg fractures, contractures, depression and severe dementia are also associated with a lack of mobility. However, these authors were unable to determine whether severity of cognitive impairment was a primary or secondary manifestation of immobility and it is suggested that progressive scrutiny is required to examine specific correlation between dementia type, severity and levels of ambulation.

Any programme of rehabilitation after hip fracture will also need to take other factors into account. Campbell (1992) suggests that the reduction of further falls must address muscle strength, balance, gait, levels of physical activity and the individual's environmental conditions. Campbell also stresses the potential for harm in rehabilitation programmes. Asking older adults to get up early in the morning to attend day hospital may increase fatigue and increase the risk of accidents in the evening or reorganising the home environment may lead to accidents with unexpected furniture. An additional caution is that although rehabilitation may reduce the individual liability to fall, the increased activity levels may increase the opportunity for accidents to occur.

Given the number of factors associated with falling and fractures, rehabilitation must include the careful assessment of all contributing factors. However, the ability of the individual to participate in a programme of exercise and physical activity (Steinmetz and Hobson, 1994) or training of coping strategies i.e. how to get up after falling (Simpson, 1995), or strategies to decrease risky behaviour (Steinmetz and Hobson, 1994),

is dependent on the person's capacity to understand, accept and be motivated to participate in any programme. Thus rehabilitation must address the emotional aspects of falls and loss of function. These include negative expectations of outcome of hip fracture (Borkan and Quirk, 1992), loss of confidence in the persons abilities to perform activities of daily living (Allegrante et al, 1991), the desire to die (Selikson et al, 1988), and the fear of falling (Tinetti et al, 1990).

Simpson (1995) reports a study where older adults who are at risk of falls were identified and offered a programme in which they would be taught to get up off the floor after falls. Physiotherapists selected 105 people who were judged to be at risk of falls due to unstable gait, history of previous falls and the inability to turn around without staggering. All those selected were assessed as being physically capable of getting up, could remember falling well enough to describe the trauma, were able to understand and co-operate in the programme and were expected to return to their place of residence. Of this group, 63% agreed to be taught to get up, 14% reluctantly agreed and 23% refused to be taught. Willingness to be taught was not related to factors such as age, memory test score, or the length of time the person spent on the floor after the last fall. However, willingness to participate was related to the confidence in their own ability to get up. No relation was found between the confidence in the individual ability and actual performance during practice. Simpson suggests that many older adults hold unrealistic beliefs about their own competence to apply coping strategies.

The goal of rehabilitation must be to enhance self-confidence and self-efficacy through the provision of information, discussion, individual planning and problem solving. Allegrante et al (1991) suggest that the aims of a rehabilitation programme would include the provision of increased information about the medical aspects of hip fracture and the environmental conditions which place them at future risk. The aim is

also to encourage the person to engage in activities that will provide exposure to self-efficacy information through accomplishment, vicarious experience, persuasion and physiological changes. Further aims would also include an increase in confidence to resume a normal active life.

**Cognitive Behaviour Therapy as a model for intervention.**

Cognitive Behaviour Therapy (CBT) has become one of the major therapeutic interventions for emotional disorders (King and Barrowclough, 1991). This model of therapy has been well established in the literature as an effective treatment for older adults with depression (Dick, Gallagher-Thompson and Thompson, 1996). C.B.T. has also been successfully applied to older adults with anxiety problems (King and Barrowclough, 1991).

Salkovskis (1996) describes three major components involved in the maintenance of anxiety. These include selectively attending to stimuli that are consistent with the perceived danger, the physiological experience of danger and behavioural changes (increased avoidance behaviour). In the case of fear of falling one would expect avoidance of any activities perceived as risky and an increase in functional decline (Tinetti and Williams, 1998).

Fall reduction programmes based on Cognitive behavioural strategies have also been shown as efficacious in producing either behavioural or environmental changes which decrease the likelihood of falling (Ryan and Spellbring, 1996) and are cost effective (Rizzo, Baker, McAvay, and Tinetti, 1996). However, brief interventions with individual clients have also been found to be efficacious in the reduction of distress associated with hip fracture. Houldin and Hogan-Quigley (1995) describe a brief psychological intervention with a mixed group of older adults who had suffered hip

fracture or hip replacement. The intervention incorporated discussion of the expected psychological reactions to hip fracture and cognitive/ behavioural strategies to reduce stress over two 45 minute sessions. Reductions were reported in depression scores (as measured by the Geriatric Depression Scale) between experimental and control groups and a trend was also noted in state anxiety reduction (as measured by the Spielberger State Trait Anxiety Inventory) although this did not reach statistical significance. This was attributed by the authors as a lack of power because of the small sample size (Two groups of 12 and 8).

**The role of carer support.**

In addition to the aspects of rehabilitation associated to the emotional state of participants in a rehabilitation programme, other factors associated with outcome need also to be taken into account.

Thus factors such as the level of cognitive functioning of the individual (Borkan and Quirk, 1992) and the level of family and social support (Roberto and Bartmann, 1993) can either facilitate or impinge upon the abilities of the individual to develop and maintain strategies to cope with the trauma of hip fracture. However, in the case of cognitive impairment in particular, given the improvements in outcome reported with the involvement of family and social support (Cummings et al, 1988; Roberto and Bartmann, 1993) it seems probable that the involvement of carers in the rehabilitation process may enhance recovery.

Rehabilitation must provide information, for both the individual and significant others involved in the care and support of that person and should support the individual to engage in activities that provide the information and experiences to enhance self-efficacy. The provision of accurate and realistic information as to personal performance and the means by which to retain muscle strength and rapidly regain the ability to

perform the activities of daily living at as high a level as possible for that individual are necessary to facilitate a return to independent function.

## Aims of the present research.

This study aims to evaluate the efficacy of a brief application of individual cognitive therapy in reducing fear of falling amongst older adults who have undergone surgery after hip fracture. It is also aimed to demonstrate increases in the performance of activities of daily living, reductions in hospital stay and increased survival after hospital discharge which are related to changes in self-perception and expectations associated with rehabilitation.

## Hypotheses.

1. It is hypothesised that the self-efficacy of the group of participants undergoing the brief cognitive therapy intervention (as measured by the Falls Efficacy Scale) will be significantly higher than that for the treatment as usual group, three months after surgery.

2. It is predicted that the participants undergoing cognitive therapy will demonstrate significantly lower levels of anxiety and depression than the treatment as usual group (as measured by the Hospital Anxiety and Depression scale), three months after surgery.

3. The group undergoing cognitive therapy is predicted to demonstrate significant improvements in physical function (as measured by the Barthel Index), 3 months after surgery when compared to the treatment as usual group.

4. The cognitive therapy treatment group is predicted to show significant improvements in memory functioning (as measured by the Kendrick Object Learning Test) when compared to the treatment as usual group, 3 months post-study.

5. It is hypothesised that the participants undergoing cognitive therapy will demonstrate higher levels of daily living functioning (as measured by the Instrumental Activities of Daily Living Scale) when compared to the treatment as usual group after 3 months.

6. It is also predicted that the participants undergoing the brief cognitive intervention will spend fewer days in hospital after surgery than the treatment as usual group.

7. It was also predicted that survival after three months would be significantly increased for those undergoing the cognitive intervention when compared to the treatment as usual group.

## Method.

### Participants.

The participants for this study were people over the age of 60 years who had been admitted to a General Hospital after falls that had resulted in a fractured neck of femur. The information sheet and consent form were given to all participants on the surgical wards who were admitted after sustaining hip fractures, discussed and informed consent was obtained. 19 participants (1 male and 18 females) were recruited. One participant, who was assigned to the control group, died during the course of the study and data from this participant was removed from the analyses. All were inpatients and were interviewed on the ward within three days of surgical hip repair. All participants who fulfilled the criteria for inclusion were assessed on all measures (except I.A.D.L. as this

was only performed at follow-up) and then allocated randomly to either of two groups (experimental or treatment as usual). These groups were balanced for age using a system of stratified sampling. This was achieved by using 4 population subgroups based on age. These were 60-69 years, 70-79 years, 80-89 years and 90+ years. Participants were allocated within these subgroups to either treatment group by tossing a coin.

. **Exclusion criteria**.

- Age < 60 years.
- Participants with a cognitive impairment of sufficient severity to impair the ability to understand the assessments and the process of the therapy. In practice this was operationalized by using the Mini Mental State Examination (Folstein, Folstein and McHugh, 1975). The cut off score for inclusion was 24.

- Lack of informed consent. (See appendix one for information sheet and informed consent form).

**Group one:** This group of participants underwent two sessions of individual cognitive therapy within seven days of surgery and a final follow-up therapy session within 2 days of discharge or transfer from hospital. A reassessment was conducted after three months. **Structure of the therapy:** The focus of therapy was upon enhancing individual self-efficacy using the methods of information provision, discussion, individual planning and problem-solving as described by Allegrante et al (1991). The initial therapy session entailed increasing client knowledge through discussion of the medical aspects of hip fracture including the process of rehabilitation within the ward environment. This discussion included factors such as pain, fear of falling, the role of avoidance behaviour in increasing disability, and the role of physiotherapy in facilitating a return to optimal functioning. The process of therapy was individualised and depended upon the particular information needs and health beliefs of individual participants. The circumstances

associated with the fall were also discussed which included the identification of environmental factors with the participant, that may have precipitated the fall and were potentially modifiable by that person or their carers.

The second session focussed upon helping the person explore self-efficacy enhancing information through recognising the progress made since admission and the goals already achieved e.g. steadily increasing mobility, resuming of self-care. These sessions also focussed upon helping the person problem-solve issues that potentially restricted a return home e.g. problems with stairs and the need for increased help and supervision. The final session addressed anxieties about returning home including how to ask family members and other carers for what was required. The session also included discussing issues such as Occupational Therapy home visits and future involvement of health care professionals. Several clients saw this assessment process not as facilitating a safe return but rather as an attempt to facilitate nursing home placement. These issues were addressed during the sessions.

**Group two:** This group was a treatment as usual control group. After assessment and randomisation, these participants had normal Nursing, Physiotherapy and Occupational Therapy input. Reassessment was conducted after three months.

Throughout the period of hospitalisation and after discharge, both groups of participants underwent treatment as usual with a range of professionals including nursing and medical staff, Physiotherapists and Occupational Therapists.

**Measures**

All participants were assessed using the following measures:

**Falls Efficacy Scale F.E.S.** (Tinetti et al, 1990). This measure has been shown to be a reliable and valid measure of Fear of Falling based upon the definition of fear of falling

described by Tinetti et al (1990) as "low perceived self-efficacy in avoiding falls during essential, non-hazardous activities of daily living." Tinetti et al (1990) reports test-retest reliability for the scale over a 4-7 day interval of .71. While Hill, Schwarz, Kalogeropoulos and Gibson (1996) report a test-retest reliability of .93 and high internal consistency (.95). Koch, Gottschalk, Baker, Palumbo and Tinetti (1994) also report "excellent inter-rater reliability" (.91).

**Hospital Anxiety and Depression Scale. H.A.D.** (Zigmond and Snaith, 1983) This scale represents a measure of anxiety and depression and was included to measure more general mood state in contrast to the specific self efficacy measurements from the F.E.S. Herrmann (1997) states that there have been over 200 studies reported using the H.A.D. and this scale has been demonstrated as reliable, valid and sensitive to change both in relation in the process of disorder and in response to psychological and pharmacological interventions. Sevard, Laberge, Gauthier, Ivers and Bergeron (1998) reported that the scale demonstrated a bilateral factor structure that corresponded to the subscales and also reported excellent test-retest reliability (.83).

**Barthel Index** (Mahoney and Barthel, 1965; Shah, Vanclay and Cooper, 1989) This scale represents a valid measure of the Activities of Daily living which is empirically derived and which has proven inter rater and test-retest reliability (Shah et al, 1989). These authors report reliability coefficients of .93 between both skilled and unskilled raters. The scale measures individual performance on 10 activities of daily living.

**Kendrick Object Learning Test (K.O.L.T)** (Kendrick, 1985; Kendrick and Watts, 1999). This test is a brief, visually presented measure of memory function that is sensitive to changes in the level of cognitive function associated with mood and dementia (Watts, 1995). This test has been reported to have high reliability and good construct

validity. Kendrick and Watts (1999) report between form reliability of .91 and test-retest reliability of .92. Inter-rater reliability coefficients of .73 are also reported by Wright, Findlay, and Ballinger (1988). Three scores were derived from this measure, KOLT raw score, KOLTQ (age adjusted quotients) and the perseveration score which represents intrusion errors from previous cards of the KOLT.

**Short Hardiness Scale (S.H.S)** (Mc Neil, Kozma, Stones and Hannah, 1986). This scale represents a measure of psychological hardiness amongst older adults. Mc Neil et al (1986) describes psychological hardiness as the personality traits that work to diminish the impact of stressful life events through optimistic appraisal and decisive coping actions. The scale was claimed to yield three factors, commitment, control and challenge. Commitment is the tendency to be involved in ongoing activity i.e. purposeful as opposed to indifference. Control represents a belief in personal power i.e. ability to influence life events. Challenge represents a perception of change as usual and necessary rather than as a threat. Test-retest reliability was reported at 0.7 while internal consistency of the scale was also reported in the range of 0.6-0.7 (McNeil et al, 1986). Given that this represents a trait rather than state measure, this assessment was not repeated at follow-up.

**Instrumental Activities of Daily Living (I.A.D.L)** (Lawton and Brody, 1969). This scale represents a measure of everyday functional competence and assesses areas of function not covered by the Barthel Index. This measure includes items such as shopping, housekeeping, laundry and modes of transportation in contrast to the personal care focus of the Barthel Index. Green, Mohs, Schmeidler, Aryan and Davis (1993) report high correlations for both test-retest and inter-rater reliability.
As all participants were hospital bound at the time of initial assessment, this scale was only used at three-month follow-up.

**Additional Data**. Data was also collected for age, gender, length of hospital stay, accommodation after discharge and mortality over the study period.

**Procedure**.

After an initial introduction to the study during which the information sheet was given and discussed, participants who fulfilled the criteria for participation were invited to sign the consent form. The form was available in both English and Welsh languages. Those who agreed to participate were screened for suitability using the M.M.S.E. and an appointment was made to complete the first assessment session as soon as possible. All participants were then randomly assigned to either the experimental or control groups using the system of stratified sampling previously described. Age was used as a matching variable.

The assessment session took approximately 15 minutes. This began with the collection of demographic data and proceeded with the assessments in the following order: F.E.S, H.A.D, K.O.L.T, S.H.S, and Barthel Index. Additional data were also collected from casenotes and through discussion with ward staff.

Participants assigned to group one were given a brief cognitive therapy intervention as previously discussed. Arrangements were made for follow-up in three months. Participants assigned to group two were seen to arrange three-month follow-up. All participants were reassessed at three-months using the same battery of tests with the exception of the S.H.S., which was not repeated, and the I.A.D.L that was only performed at follow-up. Two parallel versions of the K.O.L.T were also used, version A at screening and version B at follow-up. Another rater (Qualified Clinical Psychologist) who was blind to the group allocations conducted all follow-up assessments.

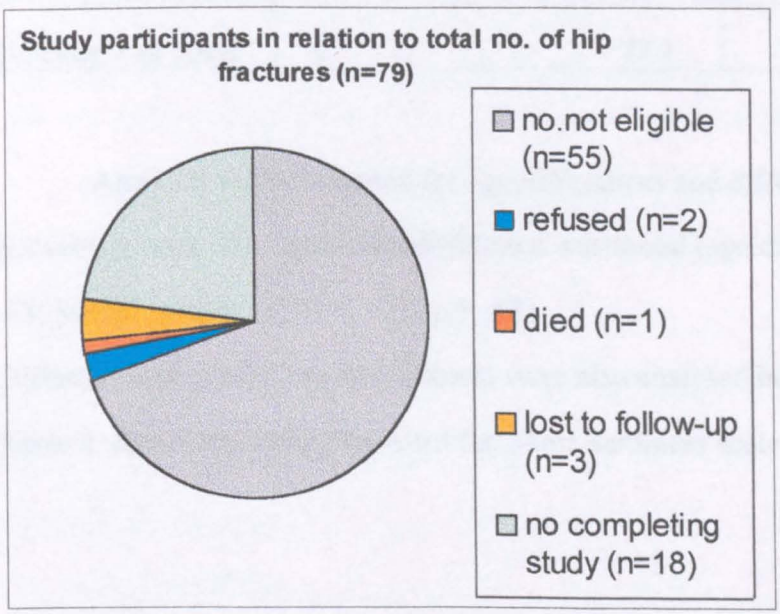
## Results

Throughout the results section, the statistics have been produced by the statistics package Statview (v 1.03, 1988). Data were analysed using analyses of variance for repeated measures using group as the independent variable. T tests were also used for comparisons between independent means and within groups. The selected level of significance was 0.05 for all measures.

### Characteristics of the sample.

During the period of recruitment, 79 people (66 females and 13 males) were admitted to the General Hospital for surgery after falls that resulted in a fractured neck of femur. Figure one shows the study participants in relationship to the entire population of those suffering hip fracture.

**Figure 1.**




Of the population of those suffering hip fracture, 55 people were excluded because they did not fulfil the criteria for inclusion. In all cases, these people had levels of cognitive

function below the specified cut-off of 24 on the M.M.S.E. Three participants were also lost to follow-up, two from the treatment as usual group and one from the group undergoing cognitive therapy. In two cases (one from each group) the participants declined to be reassessed and in the third case, one member of the treatment as usual group was moved to a nursing home, out of the area, by her family. The ages and sex of both groups are shown in table one. There were nine participants in each group for all analyses.

**Table 1. Age, sex and MMSE scores of the groups.**

| Group | Sex | | Age | S.D. | MMSE | S.D. |
|---|---|---|---|---|---|---|
| | M | F | | | | |
| Intervention | 1 | 8 | 74.4 | 8.4 | 27.2 | 1.6 |
| Treatment as usual | 0 | 9 | 77.1 | 7.3 | 27.3 | 1.6 |

Analyses were computed for age differences and differences in MMSE scores between groups. No significant difference was found (age differences: $t(16) = -.72$, $p = .48$; MMSE scores: $t(16) = -.72$, $p = .48$).

Differences in psychological hardiness were also analysed between groups.

Table 2. shows the mean scores for the Short hardiness scale (SHS).

**Table 2. Psychological hardiness of participant groups.**

| Group | SHS total | | Subscale 1. Commitment | | Subscale 2. Challenge | | Subscale 3. Control | |
|---|---|---|---|---|---|---|---|---|
| | Mean | S.D. | Mean | S.D. | Mean | S.D. | Mean | S.D. |
| Intervention | 20.3 | 7.1 | 2.9 | 3.3 | 10.7 | 4.4 | 6.8 | 2.7 |
| Control | 18.9 | 7.04 | 3 | 3.2 | 8.9 | 3.9 | 7 | 5.5 |

(N.B. lower scores = increased hardiness)

An analysis was computed for differences in hardiness between groups. No significant difference was found (Short Hardiness Scale: $t(16) = .43$; $p = .67$). No significant difference were found between groups on any of the subscales of the S.H.S. (Commitment: $t(16) = -.07$; $p = .9$; Challenge: $t(16) = .9$; $p = .4$; Control: $t(16) = -.1$; $p = .9$). Comparisons were also made between groups for all study measures at baseline. Mean scores and standard deviations of all measures are shown in table 3.

**Table 3: Means and standard deviations of all measures at baseline.**

| Measure | Intervention | S.D. | Treatment as usual | S.D. |
|---|---|---|---|---|
| Falls Efficacy Scale | 81.89 | 18.61 | 80 | 14.97 |
| H.A.D.- Anxiety | 4.88 | 3.48 | 4.44 | 4.36 |
| H.A.D.- Depression | 2.66 | 1.93 | 3.44 | 2.96 |
| Barthel Index | 22.22 | 11.63 | 26.44 | 16.53 |
| K.O.L.T. raw score | 28.33 | 5.19 | 29.66 | 6.32 |
| K.O.L.T. age quotients | 84.44 | 9.48 | 89.33 | 9.79 |
| Perseveration score | 2.89 | 1.61 | 3.56 | 2.96 |

Analyses were conducted with these data to determine whether any differences existed between groups before the intervention was conducted. No significant differences were found between groups at baseline (F.E.S: $t(16) = .24$, $p = .82$; H.A.D.- Anxiety: $t(16) = .24$, $p = .81$; H.A.D.- Depression: $t(16) = -.66$, $p = .52$; Barthel Index: $t(16) = -.63$, $p = .54$; K.O.L.T. R.S: $t(16) = -.49$, $p = .63$; K.O.L.T.Q: $t(16) = -1.08$, $p = .3$; Perseveration: $t(16) = -.59$, $p = .56$).

**Post study assessments.**

The scores derived from all measures administered before and after the intervention were analysed using Analyses of variance for repeated measures and further a priori measures were conducted using appropriate t tests.

**Fear of falling.**

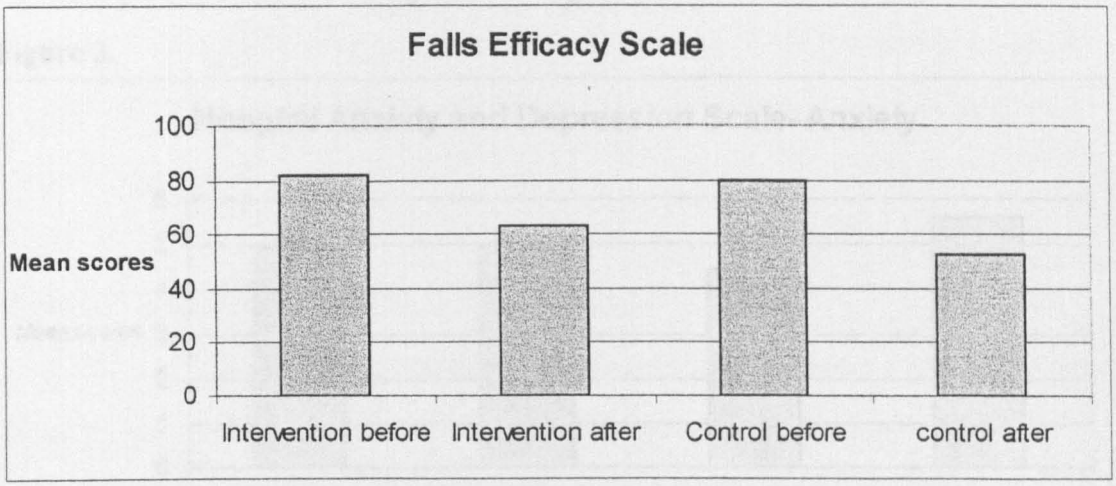
The mean scores and standard deviations for the F.E.S. are shown in table 4.

**Table 4: Mean scores and standard deviations for the F.E.S. pre and post study.**

| Group | F.E.S. mean score | S.D. |
|---|---|---|
| Intervention - before | 81.89 | 18.61 |
| Intervention - after | 63.33 | 26.62 |
| Treatment as usual - before | 80 | 14.97 |
| Treatment as usual - after | 52.78 | 18.38 |

These scores are illustrated in figure 2.

**Figure 2.**




Performance on the FES was analysed using analysis of Variance for repeated measures. There was no significant between group effect ($F(1,16) = .58$; $p = .46$) but there was a significant effect of time within groups, $F(1,16) = 23.25$, $p > .0002$. No significant interaction effect was found ($F(1,16) = .83$; $p = .37$ ). Further analyses were performed within groups over time, using t tests for paired samples (Intervention group: $t(8) = 2.76$, $p = .012$; control group: $t(8) = 4.1$, $p = .002$). No support was found for hypothesis 1.

**Pre and post study levels of anxiety and depression.**

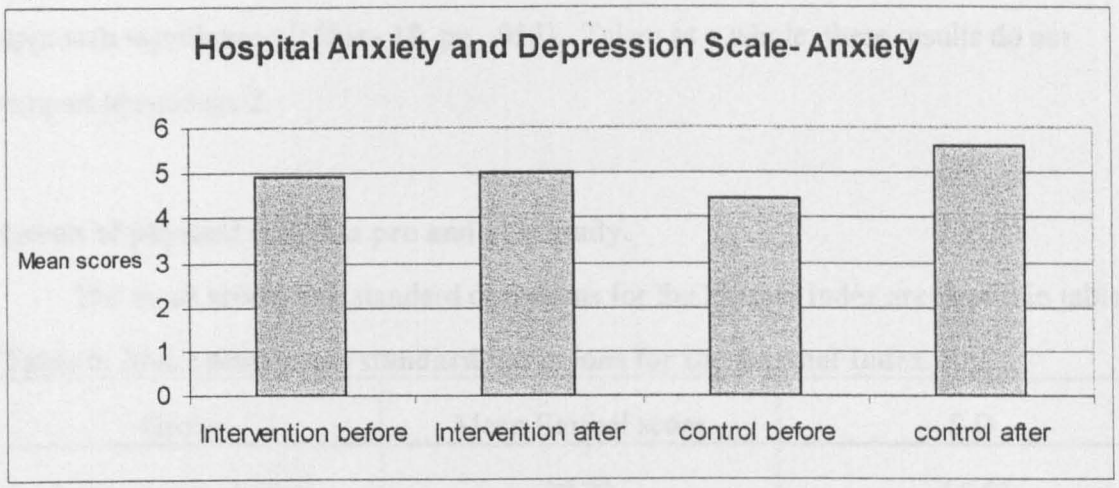
The mean scores and standard deviations for the Hospital Anxiety and Depression Scale are shown in table 5.

**Table 5**: Mean scores and standard deviations for H.A.D anxiety and depression scales.

| Group | H.A.D Anxiety | S.D. | H.A.D. Depression | S.D. |
|---|---|---|---|---|
| Intervention before | 4.89 | 3.48 | 2.67 | 1.94 |
| Intervention after | 5 | 3.57 | 3.89 | 2.57 |
| Treatment as usual- before | 4.44 | 4.36 | 3.44 | 2.96 |
| Treatment as usual- after | 5.56 | 3.54 | 5.67 | 3.67 |

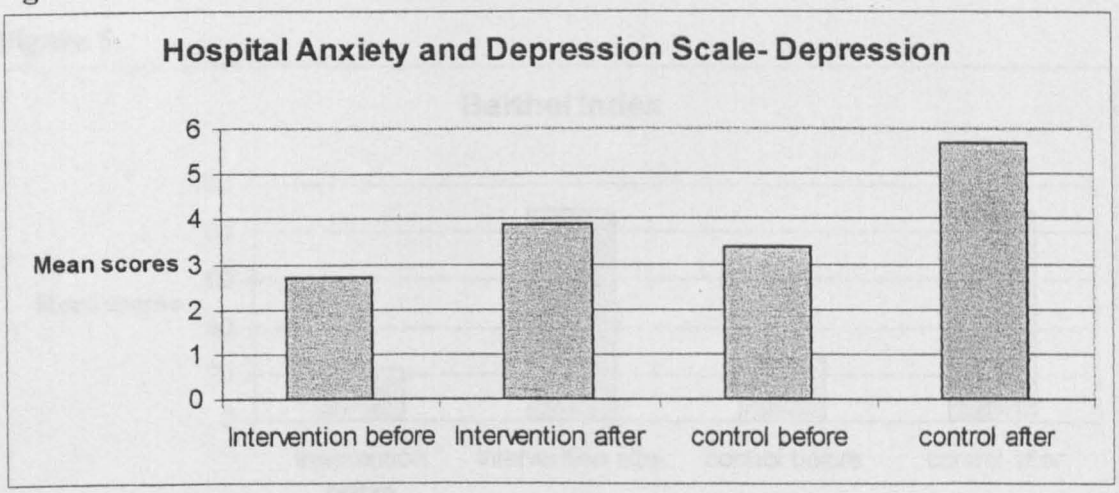
These scores are illustrated in figure 3 and figure 4.

**Figure 3.**




Performance on the Anxiety scale of the H.A.D. was analysed using analysis of Variance for repeated measures. No significant differences between groups were found ($F(1,16)= .001$; $p = .97$ ns). No significant change over time within groups were found, ($F(1,16) = .54$, n.s.) and there was no significant interaction effect ($F(1,16) = .36$; $p = ..56$, ns).

**Figure 4.**




Performance on the Depression scale of the H.A.D. was analysed using Analysis of Variance for repeated measures. No significant differences were found between groups ($F(1,16)= .1.4$; $p= .26$ ns) and no significant interaction effect was found, $F(1,16) = ..41$, $p=.53$, ns). Significant differences within groups were found, $F(1,16) = 4.82$, $p = .043$).

Further analyses were performed within groups using paired t tests and no significant differences were found within groups, however the analysis for the control group did approach significance (t (8)=-.18; p= ..053). Taken as a whole, these results do not support hypothesis 2.

**Levels of physical function pre and post study.**

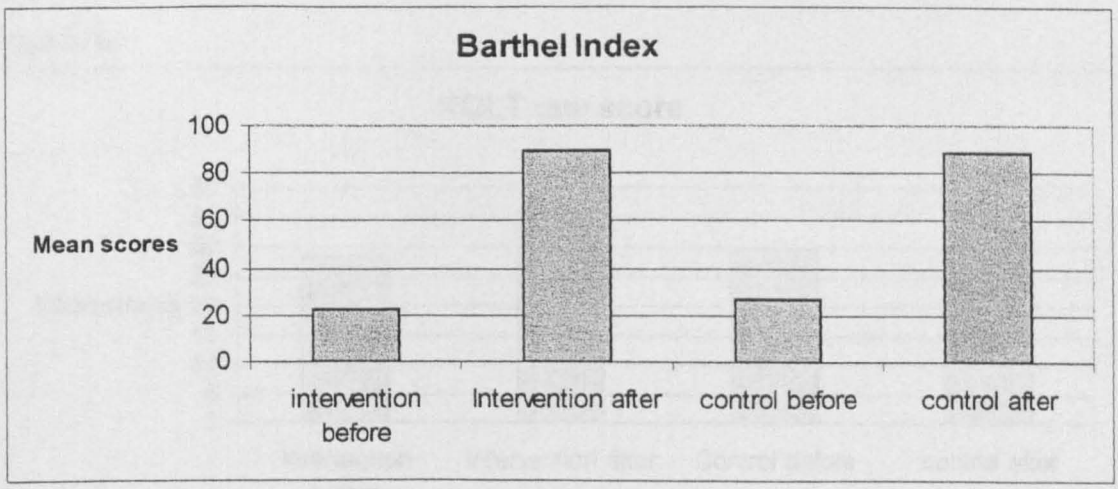
The mean scores and standard deviations for the Barthel Index are shown in table 6.

**Table 6: Mean scores and standard deviations for the Barthel Index.**

| Group | Mean Barthel score | S.D. |
|---|---|---|
| Intervention - before | 22.22 | 11.63 |
| Intervention - after | 89.67 | 10.89 |
| Treatment as usual - before | 26.44 | 16.53 |
| Treatment as usual - after | 88.78 | 10.57 |

These scores are illustrated in figure 5.

**Figure 5.**




These data were analysed using analysis of variance for repeated measures. No significant differences were found between groups (F(1,16)= .15; p= .71). Significant

change over time was found. (F (1, 16) = 257.45, p = .0001). No significant group x time interaction effect was found (F(1,16) = .40; p= ..54). Hypothesis 3 was not supported.

**Memory function pre and post study.**

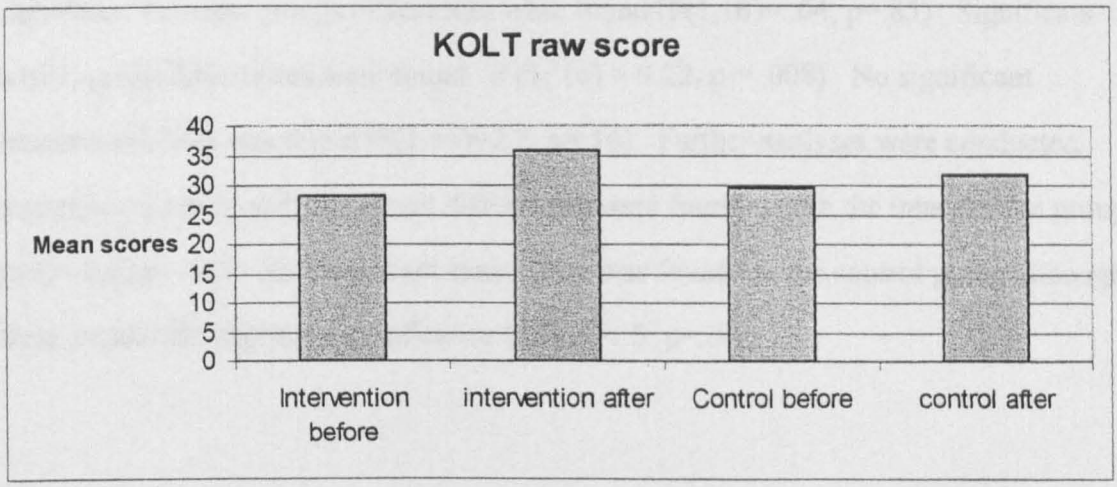
The mean scores and standard deviations for the Kendrick Object Learning Test are shown in table 7.

**Table 7: Mean scores and standard deviations for the K.O.L.T, KOLTQ and perseveration score.**

| Group | K.O.L.T. | S.D. | KOLT.Q | S.D. | Pers | S.D. |
|---|---|---|---|---|---|---|
| Intervention - before | 28.33 | 5.19 | 84.44 | 9.49 | 2.89 | 1.62 |
| Intervention - after | 35.67 | 10.85 | 96.78 | 12.94 | 1.33 | 1.41 |
| Control - before | 29.67 | 6.32 | 89.33 | 9.79 | 3.56 | 2.96 |
| Control- after | 31.56 | 7.28 | 93.56 | 11.17 | 3.78 | 2.91 |

These scores are illustrated in figures 6 – 8.

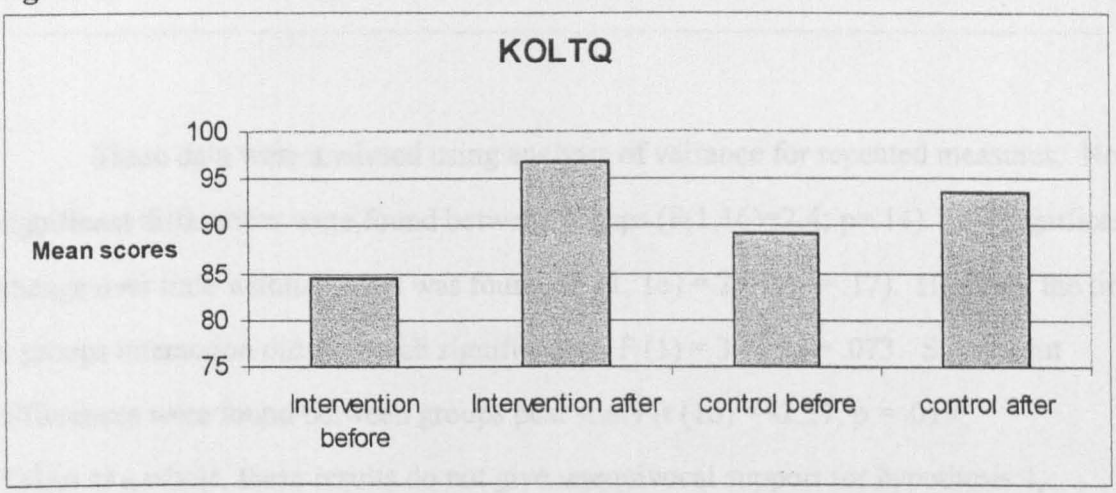
**Figure 6.**




These data were analysed using analysis of variance for repeated measures. No significant differences were found between groups (F(1,16)= .18; p= .68). Significant

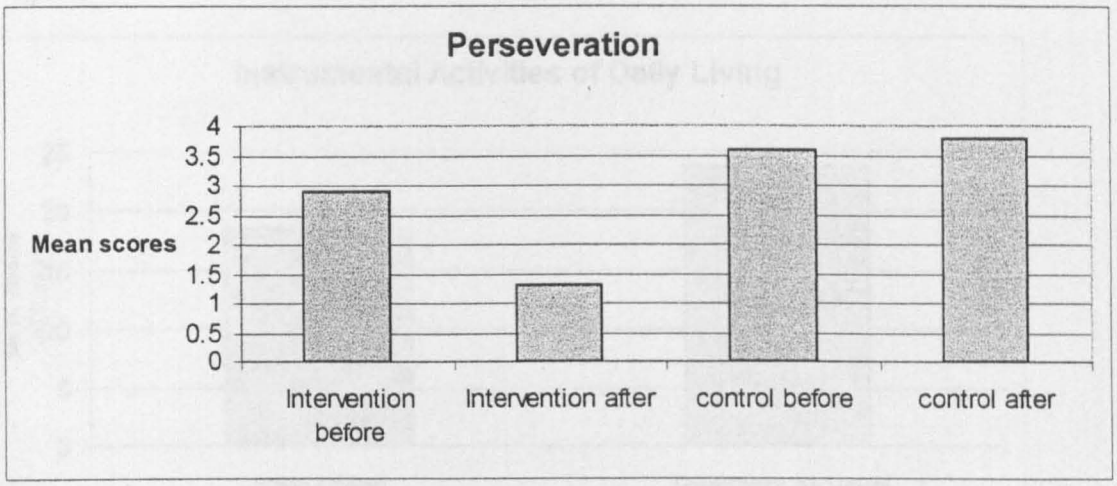
change over time was found. F (1, 16) = 8.76, p = .009. Further analyses within groups were performed using paired t tests. Significant increases in KOLT scores were found for the intervention group (t (8)= -2.8; p= .01). No significant change was found for the control group (t(8)= -1.1; p= .15). No significant group x time interaction effect was found but these results did approach significance (F(1,16)= 3.05; p= .099). No differences were found between groups post study (t (16) = .94; p= .18).

**Figure 7.**




These data were analysed using analysis of variance for repeated measures. No significant between groups differences were found (F(1,16)= .04; p=.85). Significant within group differences were found. F (1, 16) = 9.22, p = .008). No significant interaction effect was found (F(1,16)=2.2; p=.16). Further analyses were conducted using paired t tests and significant differences were found within the intervention group (t(8)=-2.6; p= .02). No significant time effect was found for the control group although these results did approach significance (t(8)= .-1.5; p=.08).

**Figure 8.**




These data were analysed using analysis of variance for repeated measures. No significant differences were found between groups ($F(1,16)=2.4$; $p=.14$). No significant change over time within groups was found. ($F(1, 16) = 2.07$, $p = .17$). However the time x groups interaction did approach significance. $F(1) = 3.68$, $p = .073$. Significant differences were found between groups post study ($t(16) = -2.27$, $p = .019$.

Taken as a whole, these results do not give unequivocal support for hypothesis 4, however there is a trend in the hypothesised direction for all three measures.

**Instrumental Activities of Daily Living.**

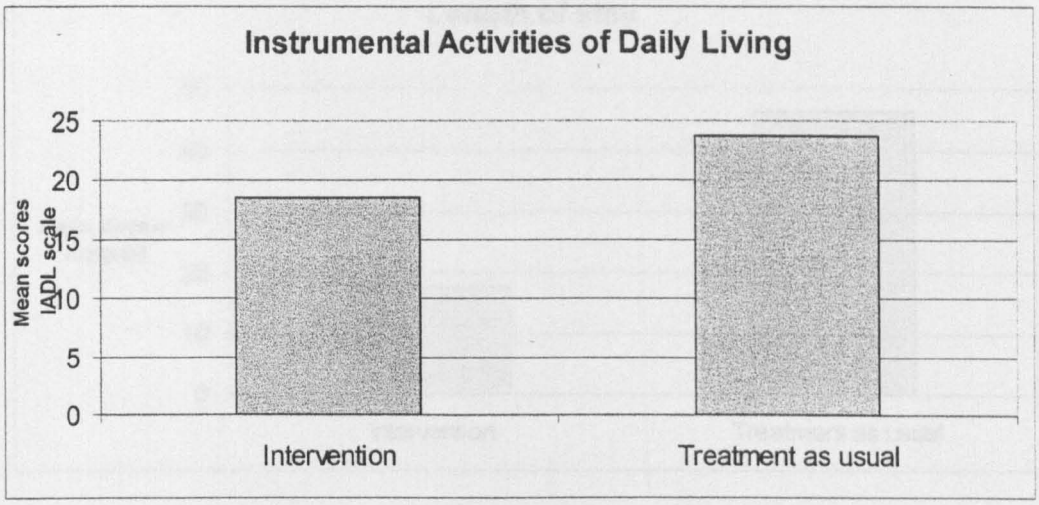
The mean scores and standard deviations for the Instrumental Activities of Daily Living scale are shown in table 8.

**Table 8. Mean scores and standard deviations for I.A.D.L. scale 3 months post intervention.**

| Group | Mean | S.D. |
|---|---|---|
| Intervention | 18.56 | 4.72 |
| Treatment as usual. | 23.67 | 4.5 |

These scores are illustrated in figure 9.

**Figure 9.**




(n.b. higher scores are equivalent to poorer functioning).

These data were analysed using t test for independent groups and significant differences were found between the intervention and treatment as usual groups. ($t(16) = -2.35$, $p = .016$). These results support hypothesis 5.

**Length of hospital stay.**

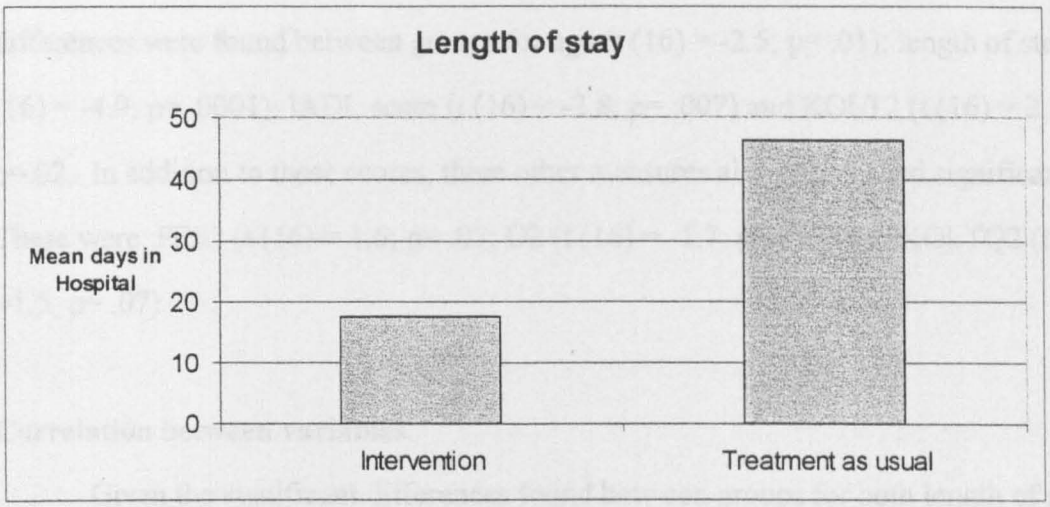
The length of hospital stay was analysed for both groups. Table 9 shows mean days in hospital and standard deviations for both groups.

**Table 9. Mean hospital stay and standard deviations.**

| Group | Mean | S.D. |
|---|---|---|
| Intervention | 17.78 | 8.32 |
| Treatment as usual | 46.33 | 30.09 |

These results are illustrated in figure 10.

**Figure 10.**




These data did not fulfil the criteria for parametric analysis and nonparametric statistics were used. Differences in the length of hospital stay for both groups were analysed using Mann- Whitney U test. Significant differences were found (U-prime = 70; p = .009), strongly supporting hypothesis 6.

Differences were also analysed between groups for those transferred to other hospitals for further rehabilitation and those discharged directly home from the surgical ward. The percentage of the intervention group transferred was 14.29% while for the treatment as usual group, the percentage was 85.71%. The nominal data were analysed using chi square analysis and significant differences were found between groups. $X^2(1) = 5.84$, p = .016.

**Factors related to delayed discharge.**

Given the rather striking differences in length of stay between groups, further analyses were performed to determine which factors were different for people who were discharged home and those who were transferred for further rehabilitation. From the total sample, 11 were discharged and 7 people were referred to other hospitals for further rehabilitation. Differences were analysed using t tests for independent samples. The independent variable was hospital transfer.

Analyses were performed using age, the S.H.S and all post-study variables. Significant differences were found between groups for age (t (16) = -2.5; p= .01); length of stay (t (16) = -4.9; p= .0001); IADL score (t (16) = -2.8; p= .007) and KOLT2 (t (16) = 2.2; p=.02. In addition to these scores, three other measures also approached significance. These were: FES2 (t (16) = 1.6; p= .07; D2 (t (16) = -1.7; p=.057) and KOLTQ2 (t (16) =1.5; p= .07).

**Correlation between variables.**

Given the significant differences found between groups for both length of stay and IADL scores, a Pearson correlation matrix was also computed to examine the possibility of other factors being involved in the outcome (see appendix 4), significant correlations for length of stay, IADL scores and Fear of Falling are shown in table 10.

**Table 10. Significant Correlations for Post study Fear of Falling, Instrumental Activities of Daily Living and Length of hospital stay (p< .05)**

| Variable | F.E.S (Post Study) | Length of stay | I.A.D.L (Post study) |
|---|---|---|---|
| F.E.S- baseline | .52 | | |
| F.E.S-post study | | -.40 | -.53 |
| Barthel index- post study | .63 | | -.62 |
| Depression- baseline | | | .52 |
| Depression- post study | -.56 | | .43 |
| Anxiety- post study | -.48 | | |
| I.A.D.L- post study | -.53 | .42 | |
| K.O.L.T.- post study | | | -.62 |
| K.O.L.T.Q.- post study | | | -.6 |
| Length of stay | -.4 | | .42 |
| Commitment (SHS) | -.45 | | |

Significant correlations were also found between psychological hardiness and both anxiety and depression scores at baseline (Anxiety: r (18) = .67; p = .001; Depression: r(18) = .53; p = .01). A significant correlation was also found between psychological hardiness and depression at follow up (r (18) = .47; p =.02). On examination of the subtest scores, significant correlations were also found between Commitment and anxiety at baseline (r (18) =.7; p= .001) and between commitment and poststudy depression scores (r (18) = .62; p=.003). Significant correlations were also found between the control subscore and anxiety scores at baseline (r (18) = .44; p= .04) and between control and both baseline and poststudy perseveration scores (Baseline: r (18) = .4; p= .05; Poststudy: r (18) = .45; p= .03). The poststudy perseveration score was also found to correlate significantly with poststudy anxiety scores (r (18) = .43; p= .04).

**Social variables and delayed discharge.**

The demographic data was also examined to determine whether other social factors might have been related to the differences in hospital stay between groups. All participants from both groups reported having fallen on a previous occasion, however no participant had sustained a serious injury previously i.e. fracture.

Patterns of care were also investigated and participants were coded as to the type of care they received. These codings were: 1 – spouse or sibling as carer, 2 – son or daughter who worked during the day as carer and 3 – lived alone. No differences were found between groups in the distribution of these categories. Significant correlations were found between pattern of care and the post study scores on the Barthel Index (r (18) = .54; p = .01); IADL (r (18) = -.43; p = .04) and age (r (18) = .44; p = .03). These results suggest that there is a relationship between increased independence and day to day functioning.

**Mortality after hip fracture.**

Initially, it was planned to investigate potential differences in mortality between study groups. However, no mortality occurred in either group after hospital discharge and hypothesis 7 was rejected. One member of the treatment as usual group died during her stay in hospital but, given the small sample size and the relatively short follow-up period, it was decided not to analyse this data further and this data was excluded from all analyses.

## Discussion.

**Characteristics of the study sample.**

The participants for this study represent only 30% of the total population of those undergoing surgery for hip fracture. The remaining 70% did not fulfil the criteria for inclusion. In almost all cases this was due to the existence of cognitive impairment. This finding is consistent with the findings of Jabourian et al (1994) and Salgado et al (1994) that cognitive impairment, as measured by the M.M.S.E. is an important factor in the occurrence of falls which result in hip fracture. Given the importance of the MMSE in the selection of the study sample, the correlations between this measure and other variables were examined. Significant correlations are shown in appendix 4.
On examination of these correlations, the appropriateness of this measure and the cutoff score used are called into question. Highly significant correlations were shown between this measure and increasing age ($r = -.57$). This suggests that some people may have been excluded because of normal ageing rather than cognitive impairment. Further support for this view is also demonstrated by the fact that the MMSE significantly correlates with both KOLT1 and KOLT2 raw scores but fails to significantly correlate with the age adjusted quotients (KOLTQ and KOLTQ2). More research is necessary to determine what level of cognitive function is necessary for psychotherapeutic interventions to be effective.

The large percentage of people who were not eligible also raises questions as to how future interventions could be designed to include those with cognitive impairment. Roberto and Bartmann (1993) discuss the importance of family and social networks in rehabilitation. Given the number of people not eligible for the individual psychotherapeutic intervention, an alternative approach may be work through carers in a more systems focussed way to develop strategies to reduce risk in the environment after discharge. Such alternative approaches require further investigation as the current investigation only addresses the needs of a minority of those who fall. However, the study population does represent a sizeable minority and as such there is merit in applying the current intervention to this group.

The results shown in table 1 and subsequent analyses establish that that there were no significant differences in age or cognitive function between the intervention group and the treatment as usual group at baseline. The results in table 2 and the subsequent analysis also show no significant differences in psychological hardiness between groups. These results rule out the possibility of the differences found between groups being related to hardiness rather than the intervention. Significant correlations were found between reduced hardiness (as measured by the S.H.S.) and increases in both anxiety ($r = .65$) and depression ($r = .5$) scores at baseline suggesting a relationship between hardiness and the emotional reaction to trauma. A significant correlation was also found with post study depression scores ($r = .47$) suggesting a relationship between lower hardiness and the development of depression after trauma.

**The efficacy of the intervention in reducing Fear of Falling.**

No significant effect was found in reducing fear of falling and the first hypothesis was rejected. Both groups showed highly significant decreases in self-efficacy, as

measured by the falls efficacy scale. The results on the F.E.S. are rather different than expected when the study was planned. What becomes clear from the results in figure 2. is that the participants did not show increased fear of falling at baseline. Indeed, the baseline investigations demonstrate relatively high levels of self-efficacy. However, both groups demonstrated decreased self-efficacy after 3 months. These changes are consistent with the model of self-efficacy proposed by Bandura (1977). The participants, when initially assessed were still confined to bed after surgery and had no experience of trying to walk or perform daily living functions since the occurrence of their injuries. This lack of feedback from actual physical performance would account for relatively normal level of F.E.S. performance at baseline. However, by 3 months, all participants had considerable experience and feedback from their experience of the process of rehabilitation, perceptions of pain and knowledge of the extent of any disability.

On examination of the data presented in figure 2 there is a tendency for the participants in the intervention group to show less decline in F.E.S. scores but the difference between groups was not significant. One possible reason for this failure to reach significance may be the smaller than planned sample size. The sample size indicated by prestudy power analysis was 15 participants per group but due to difficulties in recruitment and time restrictions, it was necessary to restrict the sample to 9 participants per group. A poststudy power analysis indicated that a study size of 16 per group was required to potentially reach significance. Another factor may also be the relatively short period to follow-up. Given the results shown in figure 9, the participants demonstrated enhanced functioning in activities of daily living, and one would expect the improvements to provide feedback which enhances self efficacy. However, only further long term follow-up will answer this question.

Significant correlations were found between F.E.S. scores and both personal (Barthel index: r = .63) and instrumental activities of daily living (I.A.D.L. scale: r = .53). These results are consistent with the claims of Tinetti et al (1990) that the fear of falling relates to decreases in physical and social activities. Further significant correlations between F.E.S. and both anxiety (r = -.48) and depression (r =- .56) are consistent with the claims of Burker et al (1995) that depression is significantly related to the development of fear of falling. The findings of Vetter and Ford (1989) that both anxiety and depression are significant factors in the occurrence of falls are also supported by these results.

**The development of Anxiety and Depressive symptoms.**

The results shown in table 5 and figure 3 do not support hypothesis 2. No significant changes in the levels of anxiety (as measured by the H.A.D.), again possibly as a result of the small sample size. However, the significant correlation with F.E.S. scores, which was discussed in the previous section, is suggestive of a relationship between anxiety symptoms and the development of fear of falling. Future interventions could be designed to include strategies to reduce anxiety levels e.g. Relaxation training. Such an approach is advocated in a programme designed for rehabilitation after heart attack in the "Heart Manual" (Edinburgh Healthcare NHS Trust, 1994).

Changes in the level of depressive symptoms are also shown in table 5 and figure 4. The analysis of these results demonstrated significant increases in depression scores over the course of the study ($p < .043$). Despite the tendency for this increase in levels of depressive symptoms to be within the control group (see figure 4) no significant differences were found within the groups and again do not support hypothesis 2. Although these results do not reach statistical significance, the trend seen on figures figures 3 and 4 are consistent with the findings of the study reported by Houldin and

Hogan-Quigley (1995) where significant reductions in depression and a trend in anxiety reduction were found after a brief cognitive intervention.

Significant correlations were also found between depression scores and psychological hardiness (r =.47), anxiety (r =.7) and F.E.S. scores (r = -.56). These results are consistent with the claims of Vetter and Ford (1989) that both anxiety and depression are important and interrelated variables in the occurrence of falling in older adults and the claim of Borkan and Quirk 1992) that the occurrence of depression is associated with poorer outcome after falls. The increases noted in depression scores are consistent with Burker et al (1995) who claim that the development of depression is predictive of the occurrence of fear of falling. The associations reported between both anxiety, depression and fear of falling provide evidence for the relationship between mood state and self-efficacy are consistent with the claim of Campbell (1992) that reductions in self-efficacy after falls are related to poorer outcome and increased incidence of depression.

**Levels of physical function**.

Physical functioning was examined pre and post study. These results were shown in table 6 and illustrated in figure 5. Highly significant improvements were found in physical function for both study groups (p>.0001). No significant differences were found between groups. On perusal of the results in figure 5 one can see a rather steep improvement for both groups. This suggests that the intervention had no effect upon level of basic physical functioning and hypothesis 3 is not supported. These results contrast sharply with those shown in figure 9, even though significant correlation exists between Barthel index and IADL (r = -.62). These results could potentially be explained by the enhanced ability of the intervention group to perceive positive changes in physical function.

However, significant correlations were found between reduced physical functioning and poststudy falls efficacy scores (r =.63) supporting the assertion of Tinetti et al (1990) that the level of physical functioning after falling is effected by the experience of fear of falling in addition to any physical restrictions.

**Changes in Cognitive function.**

The results shown in table 7 and illustrated in figure 6 show highly significant improvements in cognitive function (p> .009). Within group analyses of the results shown in figures 6 show a significant improvement in the intervention group (p=.01) but no significant change for the control group. The interaction effect was not significant but this result did approach significance (p=.09). However, no significant differences were found between groups post study. Overall, these results are suggestive of a trend toward the hypothesised improvements in cognitive function post therapy and reinforce the need for further investigations. Further support for this proposal is found on perusal of the results shown in table 8 and figure 7. When the results were adjusted for age (K.O.L.T.Q) the same pattern emerges with significant improvement over time (p > .008). Again, significant within group differences are found only in the experimental group (p=.02), however, it should be noted that the control group also approached significance (p=.08). Significant correlations were also found between both KOLT and KOLTQ and performance on the I.A.D.L. scale (see table 10). Significant differences were also found in the occurrence of perseverative memory errors. The results shown in figure 8. contained significant differences post intervention, with the intervention group showing significant improvement (p>.008) and differing significantly from the treatment as usual group (p=.019).

Taken as a whole, these results do demonstrate some significant post study improvements and given the relative equivalence of the groups at baseline, are supportive of the claim of Kendrick and Watts (1999) that the level of cognitive function (as measured by the K.O.L.T.) is related to activity levels with more active people performing significantly higher on tests of cognitive function. Thus, although hypothesis 4 is not supported, there is a trend in the hypothesised direction. The continued occurrence of perseverative errors post study, in the treatment as usual group, is however, more difficult to explain and may be the result of improved vigilance and the tendency for smaller increases of anxiety and depression scores in the intervention group. The perseverative error score was also found to correlate significantly with post study anxiety levels ($r = .43$). One could hypothesise further that reduced vigilance in the treatment as usual group could be associated with the risk of further falls.

**Activity levels at 3 months post study.**

Significant differences were found between groups on the I.A.D.L scale after 3 months (see table 8). These results are demonstrated pictorially in figure 9. The mean score for the intervention group was found to be significantly lower than that of the treatment as usual group ($p > .016$) which supports the view that the brief cognitive treatment was effective in producing significant improvements in outcome for those undergoing rehabilitation after falls resulting in hip fracture. Thus hypothesis 5 was supported. These findings are consistent with the results reported by Ryan and Spellbring (1996) who report the efficacy of a group based C.B.T. programme and Houldin and Quigley (1995) who found significant effects from an individually based brief cognitive intervention. Given the relatively short time scale between assessments (3 months), this result is particularly interesting when viewed with the rather modest tendency to changes in self-efficacy between groups.

The results are consistent with the model described by Bandura (1977). From this model, one would expect behavioural changes to precede changes in self-efficacy as the changes in behaviour provide an important source of efficacy enhancing information. The differences previously reported in memory function are, however, consistent with the claims of Kendrick and Watts (1999) that improvements in physical function are accompanied by changes in cognitive performances. Improvements in both memory and attention as previously described could provide evidence for the cognitive processes that enhance learning and facilitate the more effective use of efficacy information. Significant correlations are also shown in table 10. These results show strong relationships between I.A.D.L. scores, physical function (Barthel Index) and fear of falling (F.E.S.). This interrelationship provides some support to the claim of Tinetti and Powell (1993) that fear of falling is related to decreases in the level of social interaction and the avoidance of activities that are potentially within the individuals capabilities.

The differences in I.A.D.L. scores also provide support for a mechanism to produce the modest changes found on other measures. Bandura (1977) discusses the role of exposure to self- efficacy information in enhancing motivation and initiating of health improving behaviour. This exposure can be the result of past experience, vicarious experience of other people, persuasion and the physiological feedback from actually performing tasks. In this study, persuasion, evaluation of actual performance on physical tasks and vicarious experience of others recovery were all used within the framework of the therapy as was the self evaluation of physical performance over the course of rehabilitation.

**Time spent in hospital after surgery.**

Significant differences were found in the duration of hospital stay between the intervention group and the treatment as usual group (see table 9). These results are also

illustrated in figure 10. These results show significant reductions in the duration of hospital stay for the people undergoing the cognitive intervention. This finding lends support to the findings of Rizzo et al (1996) who found a group based C.B.T. rehabilitation to be cost effective and raises the possibility of similar cost benefits for individually tailored brief C.B.T interventions due to potential reductions in the cost of inpatient care.

Despite the significant differences in stay between groups, other factors may have been involved in this outcome. A chi square analysis was computed to determine whether there were differences between groups for the number of people transferred to other hospitals. Highly significant differences were found between groups with the treatment as usual group being significantly more likely to be transferred to other hospitals for further rehabilitation. These transfers account for most of the differences in stay between groups.

The examination of these groups showed significant differences in the characteristics of those who were transferred for further rehabilitation. This group were older, spent longer in hospital, had poorer IADL scores after discharge and had lower levels of cognitive function as measured poststudy by the KOLT. In addition to these factors, both, poststudy FES scores ($p = .07$) and depression scores ($p = .057$) also approached significance. Previous incidences of falling and injury were also investigated via the self reporting of the participants and it was found that although all participants had previously fallen, none had sustained a serious injury (i.e. fracture). Patterns of carer support were also investigated and no differences were found in the types of care for both groups. However, correlations were found between reduced carer input and physical function (Barthel Index: $r = .54$), IADL ($r = -.43$) and age ($r = .43$). These correlations

provide additional support for the view that the additional activity required when carers are not always available is instrumental in enhancing recovery.

However the point remains that the intervention group were able to return home significantly earlier and were more likely to be discharged home without the perceived need for further rehabilitation. Thus the increases in the availability of self-efficacy enhancing information may have been instrumental in the participants decision-making as to the perceived need of further hospital treatment. However this remains speculation and the final decision also included the perceptions of medical, nursing staff and family members of the competence of the person. The length of hospital stay was also shown to correlate significantly correlation with I.A.D.L. ($r = .42$) and F.E.S. poststudy ($r = .4$). These results are consistent with the model of self-efficacy discussed in the previous section, with participants displaying enhanced motivation to return directly home and the belief that they will be able to cope in their home environment.

**Clinical implications of the results of this study.**

Although the present study was not able to demonstrate significant changes in the levels of fear of falling or mood, amongst those receiving psychological intervention, there is some evidence to suggest that the intervention was efficacious in the goal of improving outcome amongst this group. The improvements found in activities of daily living, post intervention, as well as reductions in length of hospital stay provide some support for the use of C.B.T to enhance rehabilitation. The intervention was easy to administer and well accepted by the client group. Although many of the results did not reach the required levels of statistical significance, a perusal of the results presented in figures 2-10 show a general trend for all results to be in the hypothesised direction with the notable exception of F.E.S. It is argued that despite decreases in self-efficacy (as measured by the F.E.S.) the results are consistent with the model of Bandura (1977). It

was proposed that the proposed changes in F.E.S. scores would lag behind the measured changes in behaviour indicating the need for longer term assessment. Given the significant relationship found between anxiety and fear of falling, and the proposed role of behavioural change in enhancing self-efficacy, future clinical application of the treatment model could also include training in strategies such as relaxation.

Given the relatively small sample of people, who were eligible for the intervention, further work must also address the needs of the large proportion of the population with cognitive impairment who may also benefit from psychological intervention, although probable of a different type. Also, given the questionable effectiveness of the MMSE in differentiating the effects of age from cognitive impairment, it is important to develop more effective screening procedures.

In addition to the potential benefits of the intervention in enhancing rehabilitation, there are also benefits associated with reduced time spent in hospital. It is demonstrated that as well as improving the quality of life of those undergoing psychological intervention, there are potential cost benefits for N.H.S. Trusts to involve Clinical Psychology in improving the health of Older Adults.

**Methodological issues.**

This study provided a brief opportunity to investigate the efficacy of a brief intervention designed to improve the health of Older Adults after surgery for hip fracture. Although there were some results from which it was possible to draw conclusions as to the effectiveness of the intervention, the study suffered from a number of limitations that restrict the ability to draw firm conclusions from the results.

The sample size for the study was small consisting only of two groups of 9 people. This sample was significantly smaller than that indicated by a power analysis conducted during the planning of the study. This analysis indicated a sample of 15 people per group for the possibility of changes in the F.E.S. to be significant. The restrictions in sample size were the result of a slow referral rate and restrictions placed on the time available to complete this study by the clinical psychology course. A much larger sample would also be necessary to investigate other factors that may potentially be related to outcome. It was impossible to draw any firm conclusions about the effect of age on outcome given the small number of people within each age range of the sample.

Another limitation of the study was the rather brief timespan between the original intervention and follow-up (3 months). This period of time proved too short to investigate factors such as mortality and residual levels of disability. Questions were also raised, given the fact that reduced self-efficacy was not immediately evident and developed over the course of the study. It seems probable that a longer timespan would be necessary to investigate potential improvements in self-efficacy which were found to lag behavioural change. Future work could repeat the assessment again after 12 months. This longer timespan is consistent with the assessment intervals reported by Tideikaar (1998) who reported mortality at around 23% after one year. No analyses of mortality measures were possible, as there was only one death (in the control group) over the 3 months of the study.

Another potential variable was that the study design restricted the ability to measure the effect of different patterns of care. All but four participants (two in each group) lived with carers who were either a spouse or other family members. It was possible to conduct rather limited investigations of the possible effects of different care situations on rehabilitation which showed some evidence of relationships between

patterns of care, physical functioning, activities of daily living and age. These relationships are interesting in that they are suggestive of a positive effect of continued independence amongst those who sustain hip fractures. Some people returned home to a partner providing full time care while for others the carer was a son or daughter who worked during the day. For the four participants, who lived alone, care was provided as required, by professional carers.

Although no differences were found in the group characteristics, significant differences were found between those who returned home and those who received extended hospital care. Those who remained in hospital for continued rehabilitation were significantly older and had significantly lower level of physical and activity of daily living functioning after discharge. Poststudy depression scores for these groups also approached significance ($p = .057$). Given that there was no significant difference in patterns of care, these results do not demonstrate any added benefit for those who received extended hospital care and indeed these results are suggestive of benefits associated with earlier discharge. Further research is needed to explore these relationships further.

**Conclusion**

This study sought to evaluate the efficacy of a brief application of C.B.T. in reducing fear of falling in older adults after surgery for hip fracture. The study also sought to demonstrate improvements in mood, cognitive function, activities of daily living, reductions in hospital stay and reductions in mortality for the therapy group.

No significant differences were found in the development of fear of falling for both the intervention group and the control group but significant correlation was found between fear of falling and poorer activities of daily living skills. No significant improvements were found in mood but some differences were found for memory

functioning and perseveration scores post intervention. Perseveration was also found to correlate significantly with anxiety. Significant differences were found between groups for both I.A.D.L. scores and length of hospital stay providing support for the efficacy of the cognitive intervention. It was argued that the pattern of results is consistent with the model of self-efficacy proposed by Bandura (1977).

Although the reduced sample size and relatively short interval between baseline and follow-up restricted the possibility of demonstrating significant differences in fear of falling, significant correlations were reported which demonstrate the relationship of fear of falling to a number of variables including anxiety, depression and I.A.D.L. Significant relationships were also found between performance on the I.A.D.L. and current cognitive functioning which were consistent with the findings reported by Kendrick and Watts (1999). Factors associated with extended hospitalisation were also explored and significant relationships were reported with poorer outcomes after three months suggesting the need to maintain levels of independence after hip fracture.

Given the results of this study, the use of C.B.T. in the process of rehabilitation after hip fracture has been shown to be effective in improving outcome after 3 months. The intervention also has the potential of reducing costs related to hospital stay given the significant differences found in the length of hospital stay between groups. Thus the intervention described in this study requires further evaluation but has much to recommend it.

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## Appendices.

Appendix 1. Ethics Approval, Participant Consent Forms and Measures.

Appendix 2. Mean scores and standard deviations for all data.

Appendix 3. Statistics: Repeated measures ANOVAS, and t tests.

Appendix 4. Correlational data.

# Appendix 1.

## Ethics approval, participant consent forms and measures.

c.c. Professor Bob Woods

Prifysgol Cymru · University of Wales
BANGOR

Ysgol Seicolog
Prifysgol Cymru Bangor
Bangor, Gwynedd LL57 2DG
Ffôn: Bangor (01248) 382211
Ffôn Rhyngwladol: +44 1248 382211
Ffacs: (01248) 382599
Ffacs Rhyngwladol: +44 1248 382599

School of Psychology
University of Wales Bangor
Bangor, Gwynedd LL57 2DG
Tel: Bangor (01248) 382211
International Tel: +44 1248 382211
Fax: (01248) 382599
International Fax: +44 1248 382599

e-mail: pss029@bangor.ac.uk.
http://www.psych.bangor.ac.uk/

October 5, 1998

Dr. G.Watts
North Wales Clinical Psychology Course
School of Psychology
University of Wales
Bangor
Gwynedd LL57 2DG

Dear Dr. Watts

**Hip fracture amongst older adults: Cognitive intervention to facilitate rehabilitation**

Your research proposal (referred to above and on the attached sheet) has been reviewed by the School of Psychology Research Ethics Committee and they are satisfied that the research proposed accords with the relevant ethical guidelines. If you wish to make any substantial modifications to the research project please inform the committee in writing before proceeding. Please also inform the committee as soon as possible if research participants experience any unanticipated harm as a result of participating in your research.

You should now forward the proposal to the Wrexham Ethics committee, North Wales Health Authority. They expect one of the investigators to make an oral presentation in support of the proposal at their meeting. You will be contacted by their committee with details as to the date and place of the meeting at which your proposal will be considered.

You may not proceed with the research project until you are notified of the approval of the Wrexham Ethics Committee.

Yours sincerely

Kath Chitty

Kath Chitty
Coordinator - School of Psychology Research Ethics Committee

*Awdurdod Iechyd Gogledd Cymru*
*North Wales Health Authority*
*Wrexham Ethics Committee*



Ysbyty Maelor Wrecsam
Ffordd Croesnewydd
Wrecsam
LL13 7TD
Ffôn Llinell Uniongyrchol 01978 725368

Wrexham Maelor Hospital
Croesnewydd Road
Wrexham
LL13 7TD
Tel Direct Line 01978 725368

---

Ein cyf/ Our ref:
Eich cyf/ Your ref:

Gofynnwch am/ Ask for:

Dr G D Watts
Trainee Clinical Psychologist
Park Street Clinic
Park Street
Newtown

5th October 1998

Dear Dr Watts,

**RE: HIP FRACTURE AMONGST OLDER ADULTS: COGNITIVE INTERVENTION TO FACILIATATE REHABILITATION**

Thank you for attending the meeting of the Wrexham Ethics Committee on 23rd September.

The Committee felt that the wording of the information sheet should be altered to read - "the purpose of this study is to evaluate the effectiveness of a brief psychological treatment (cognitive therapy) which is designed to help you overcome any fear of falling you may have".

We also felt that the design of the study would be improved by the involvement of an independent assessor to carry out the final assessments to avoid any possible bias.

Subject to receiving written confirmation of your compliance with the above amendments, approval is given for your study to proceed.

Yours sincerely,

**MR P RICHARDS**
**Associate Specialist - Surgery**
**Secretary - Wrexham Ethics Committee**

**Information Sheet.**

**Hip fracture amongst older adults: Cognitive intervention to facilitate rehabilitation.**

Investigators

Dr Geoff Watts Trainee Clinical Psychologist
Univ of Wales. Bangor

Professor Robert Woods Professor of Clinical Psychology for Older Adults
Institute of Medical and Social Care Research
Univ of Wales. Bangor.

(See end for contact addresses.)

**About this study.**

Some people who have suffered a fractured hip have a fear that they may fall. This fear of falling may affect rehabilitation and recovery. . The purpose of this study is to evaluate the effectiveness of a brief psychological treatment (Cognitive Therapy) which is designed to help you overcome any fear of falling you may have.

**What it involves.**

Information will be collected by an interview and the completion of assessments and questionnaires. The initial assessment will take about 15 minutes. Some of those who take part will also be seen on two subsequent occasions by the researcher while they are in hospital.
You will also be seen after 3 months to see how you are getting along and to repeat the initial assessment.

**Possible effects of involvement.**

The study will not affect or interfere in any way with your normal treatment during or after your stay in hospital. Should any person become distressed as a result of the study , arrangements will be made for further help if wanted by the person. Any information given will be assigned an anonymous identification number, retained in a confidential location and will be inaccessible to anyone not directly involved in the study.

**Confidentiality**

At any time during the study you retain the right to request to withdraw from the study without explanation and also request the removal of your information without in any way affecting your future medical care.

**Further Information.**

Further information regarding the study will be provided , where possible, by Dr Watts.
Comments concerning the content or procedure of this study may be addressed to Prof. Fergus Lowe, Dept of Psychology, Univ. of Wales . Bangor or the Chief Executive , Clwydian Community Care (NHS) Trust. (Addresses attached). In addition, you may contact the British Psychological Society (BPS) at any time for confirmation of the statutory rights of research participants. The BPS is the professional body which governs the professional conduct of psychologists in the UK.

**Hip Fracture amongst Older Adults: Cognitive intervention to facilitate rehabilitation.**

## Consent Form for participants.

Have you read the information sheet? yes / no.

Have you received satisfactory answers to all your questions? yes / no.

Have you received enough information about the study? Yes / no.

Who have you spoken to? Dr.....

Do you understand that you are free to withdraw:

- At any time
- without having to give a reason
- and without affecting your future medical care Yes / No

Do you agree to take part in the study? Yes / No

Signed Date

Name in block letters

Signature of Witness. Date

# Taflen Wybodaeth

## Torri'r Glun - Pobl Hŷn : Ymyrraeth wybyddol er mwyn hwyluso adferiad

Ymchwilwyr

Dr Geoff Watts Seicolegydd Clinigol dan Hyfforddiant
Prifysgol Cymru, Bangor

Yr Athro Robert Woods Athro Seicoleg Glinigol
Sefydliad Ymchwil Meddygol a Gofal Cymdeithasol
ar gyfer Oedolion Hŷn
Prifysgol Cymru, Bangor.

(Cyfeiriadau ar y diwedd)

**Ynglŷn â'r astudiaeth hon.**

Bydd gan rai pobl sydd wedi torri eu cluniau ofn eu bod am syrthio. Gall yr ofn hwn effeithio ar adferiad a gwellhad. Diben yr astudiaeth hon yw pwyso a mesur pa mor effeithiol yw triniaeth fer i leddfu effeithiau bod ofn syrthio.

**Yr hyn mae'n ei olygu.**

Cesglir gwybodaeth mewn cyfweliad a thrwy asesiadau a holiaduron. Bydd yr asesiad cychwynnol yn cymryd tua 15 munud. Bydd ambell un o'r rhai sy'n cymryd rhan yn cael eu gweld ar ddau achlysur arall hefyd gan yr ymchwilydd tra'u bod yn yr ysbyty. Fe'ch gwelir hefyd ar ôl 3 mis i weld sut yr ydych yn dod yn eich blaen ac i ailadrodd yr asesiad cychwynnol.

**Yr hyn a all ddigwydd wrth gymryd rhan.**

Ni fydd yr astudiaeth yn effeithio nac yn ymyrryd â'ch triniaeth arferol yn ystod eich cyfnod yn yr ysbyty nac wedyn. Pe bai unrhyw un yn cael loes o ganlyniad i'r astudiaeth, gwneir trefniadau i gael rhagor o gymorth os yw'r person dan sylw yn dymuno hynny. Bydd unrhyw wybodaeth a gyflwynir yn cael di chadw'n gwbl gyfrinachol ac ni fydd unrhyw un nad ydyw'n ymwneud â'r astudiaeth yn cael mynd ar ei chyfyl.

**Cyfrinachedd**

Ar unrhyw adeg yn ystod yr astudiaeth mae gennych yr hawl i dynnu'n ôl o'r astudiaeth heb eglurhad, a'r hawl hefyd i ofyn am y wybodaeth a roddwyd gennych yn ôl, heb i hynny effeithio mewn unrhyw fodd ar eich gofal meddygol yn y dyfodol.

**Gwybodaeth Bellach**

Rhoddir rhagor o wybodaeth ynglŷn â'r astudiaeth gan Dr Watts, pan fo hynny'n bosib.

Gellir cyfeirio sylwadau ynglŷn â chynnwys neu drefn yr astudiaeth hon at yr Athro Fergus Lowe, Adran Seicoleg, Prifysgol Cymru, Bangor neu at y Prif Weithredwr, Gofal Ymddiriedolaeth Cymuned Clwydian (GIG). (Mae'r cyfeiriadau ynghlwm.) Hefyd, gallwch gysylltu â'r Gymdeithas Seicolegol Brydeinig (BPS) ar unrhyw adeg i gael cadarnhad ynglŷn â hawliau cyfreithiol y rhai sy'n cymryd rhan. Y BPS yw'r corff proffesiynol sy'n goruchwylio ymddygiad proffesiynol seicolegwyr yng Ngwledydd Prydain.

**Torri'r Glun - Pobl Hŷn : Ymyrraeth wybyddol er mwyn hwyluso adferiad**

**Ffurflen Gydsynio ar gyfer cymryd rhan**

A ydych wedi darllen y daflen wybodaeth? Do / Naddo

A ydych wedi cael atebion boddhaol i'ch holl gwestiynau? Do / Naddo

A ydych wedi derbyn digon o wybodaeth ynglŷn â'r astudiaeth? Do / Naddo

Gyda phwy wnaethoch chi siarad? Dr .....

A ydych yn deall y cewch dynnu'n ôl:

- Ar unrhyw adeg
- heb orfod rhoi rheswm
- a heb effeithio dim ar eich gofal meddygol yn y dyfodol? Ydw / Nac ydw

A ydych yn cytuno i gymryd rhan yn yr astudiaeth? Ydw / Nac ydw

Arwyddwyd ..... Dyddiad .....

Enw mewn priflythrennau .....

Llofnod tyst ..... Dyddiad .....

## Falls Efficacy Scale

" How confident are you that you can perform these activities without falling?....

| Activity | 1. no confidence at all | 2. | 3. | 4. | 5. | 6. | 7. | 8. | 9. | 10 extremely confident |
|---|---|---|---|---|---|---|---|---|---|---|
| Take a bath or shower | | | | | | | | | | |
| Reach into cupboards or wardrobes | | | | | | | | | | |
| Prepare meals not requiring carrying heavy or hot objects | | | | | | | | | | |
| Walk around the house. | | | | | | | | | | |
| Get in and out of a bed | | | | | | | | | | |
| Answer the door or telephone | | | | | | | | | | |
| Get in or out of a chair. | | | | | | | | | | |
| Get dressed or undressed | | | | | | | | | | |
| Perform light housework e.g. bedmaking and dusting. | | | | | | | | | | |
| Do simple shopping | | | | | | | | | | |
| Total | | | | | | | | | | |

| BARTHEL | | | | | |
|---|---|---|---|---|---|
| **ITEMS** | **1. Unable to perform task** | **2. Attempts task but unsafe** | **3. Moderate help required** | **4. Minimal help required** | **5. Fully independent** |
| **Personal hygiene** | | | | | |
| **Bathing self** | | | | | |
| **Feeding** | | | | | |
| **Toilet** | | | | | |
| **Stair climbing** | | | | | |
| **Dressing** | | | | | |
| **Bowel control** | | | | | |
| **Bladder control** | | | | | |
| **Ambulation** | | | | | |
| **Wheelchair*** | | | | | |
| **Chair/ bed transfers** | | | | | |
| **Total** | | | | | |

*** Score only if ambulation coded one.**

fold along dashed line

A
3
2
1
0

D
0
1
2
3

A
3
2
1
0

# The Hospital Anxiety and Depression Scale

Name . . . . . Date . . . . . .

Clinicians are aware that emotions play an important part in most illnesses. If your clinician knows about these feelings she or he will be able to help you more.

This questionnaire is designed to help your clinician to know how you feel. Ignore the numbers printed on the left of the questionnaire. Read each item and **underline** the reply which comes closest to how you have been *feeling in the past week.*

Don't take too long over your replies; your immediate reaction to each item will probably be more accurate than a long thought-out response.

**I feel tense or 'wound up':**

Most of the time

A lot of the time

From time to time, occasionally

Not at all

**I still enjoy the things I used to enjoy:**

Definitely as much

Not quite so much

Only a little

Hardly at all

**I get a sort of frightened feeling as if something awful is about to happen:**

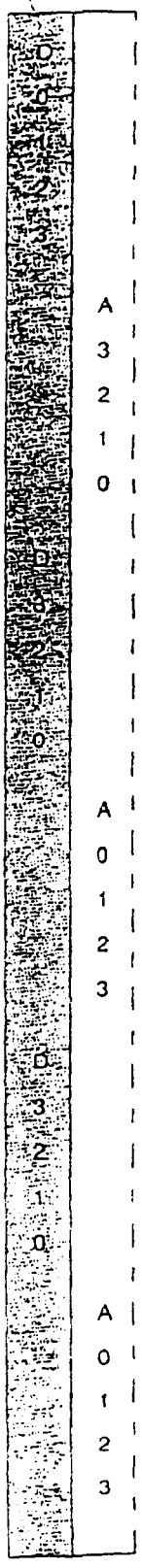
Very definitely and quite badly

Yes, but not too badly

A little, but it doesn't worry me

Not at all

*(continued overleaf)*




**I can laugh and see the funny side of things:**

As much as I always could

Not quite so much now

Definitely not so much now

Not at all

**Worrying thoughts go through my mind:**

A great deal of the time

A lot of the time

From time to time but not too often

Only occasionally

**I feel cheerful:**

Not at all

Not often

Sometimes

Most of the time

**I can sit at ease and feel relaxed:**

Definitely

Usually

Not often

Not at all

**I feel as if I am slowed down:**

Nearly all the time

Very often

Sometimes

Not at all

**I get a sort of frightened feeling like 'butterflies' in the stomach:**

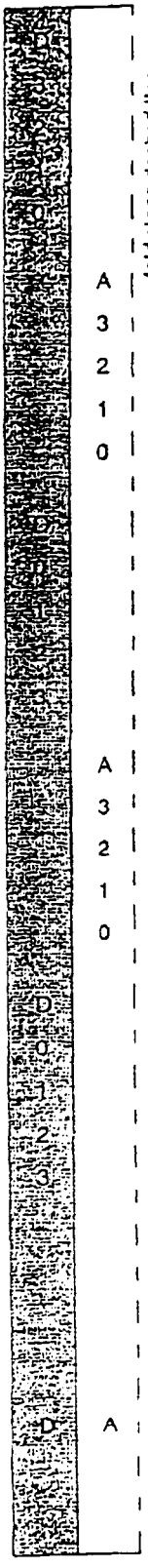
Not at all

Occasionally

Quite often

Very often

*(continued overleaf)*




**I have lost interest in my appearance:**

Definitely

I don't take as much care as I should

I may not take quite as much care

I take just as much care as ever

**I feel restless as if I have to be on the move:**

Very much indeed

Quite a lot

Not very much

Not at all

**I look forward with enjoyment to things:**

As much as ever I did

Rather less than I used to

Definitely less than I used to

Hardly at all

**I get sudden feelings of panic:**

Very often indeed

Quite often

Not very often

Not at all

**I can enjoy a good book or radio or TV programme:**

Often

Sometimes

Not often

Very seldom

**Now check that you have answered all the questions**

For office use only:

D : ☐ Borderline 8–10

A : ☐ Borderline 8–10

**Short Hardiness Scale.**

| Attitude | Never | Seldom | Often | Always |
|---|---|---|---|---|
| 1. Most of life is wasted and meaningless | | | | |
| 2. I find it difficult to imagine enthusiasm concerning work | | | | |
| 3. It doesn't matter if people work hard at their jobs, only a few bosses profit | | | | |
| 4. Ordinary work is too boring to be worth doing. | | | | |
| 5. The belief in individuality is only justifiable to impress others. | | | | |
| 6. Unfortunately, people don't seem to know that they are only creatures after all. | | | | |
| 7. The young owe the old complete economic security. | | | | |
| 8. A retired person should be free of all taxes. | | | | |
| 9. New laws should not be passed if they damage ones income. | | | | |
| 10. There are no conditions which justify endangering the health, food, and shelter of one's family or one's self. | | | | |
| 11. Pensions large enough to provide for dignified living are the right of all when age or illness prevents one from working. | | | | |
| 12. Those who work for a living are manipulated by the bosses. | | | | |
| 13. Thinking of yourself as a free person leads to great frustration and difficulty. | | | | |
| 14. Often I do not really know my own mind. | | | | |

| | |
|---|---|
| 15.A. Becoming a success is a matter of hard work, luck has little or nothing to do with it. | B. Getting a good job depends mainly on being at the right place at the right time. |
| 16.A As far as work affairs are concerned, most of us are victims of forces we can neither understand nor control | B. By taking an active part in political and social events the people can control world events. |

| | |
|---|---|
| 17. A Most people do not realise the extent to which their lives are controlled by accidental happenings. | B. There is really no such thing as luck. |
| 18. A. Sometimes I do not understand how supervisors arrive at work evaluations | B. There is a direct connection between how hard I work and the evaluations I get. |
| 19. A. Many times I feel that I have little influence over the things that happen to me. | B. It is impossible for me to believe that chance or luck plays an important role in my life. |
| 20. A. What happens to me is my own doing. | B. Sometimes I feel that I don't have enough control over the direction my life is taking. |

# KOLT
## Form A

### Card 1
30 seconds

| | | | | |
|---|---|---|---|---|
| Cat | | Bed | Watch | |
| Key | | | Banana | Horse |
| | | Specs | | News-paper |
| | | | | Spoon |
| | Jug | | | |

*Other responses:*

_____
_____
_____
_____
_____

No. correct ☐

### Card 2
45 seconds

| | | | | |
|---|---|---|---|---|
| Crab | Gun | Bed | Doll | |
| Key | | | Banana | Fly |
| Tree | | Specs | Umbrella | Scissors |
| | Car | | | Spoon |
| | Jug | Lion | | |

*Other responses:*

_____
_____
_____
_____
_____

No. correct ☐

### Card 3
60 seconds

| | | | | |
|---|---|---|---|---|
| Fish | Aero-plane | Bed | Coin | |
| Key | | Flag | Banana | Snake |
| Candle | | Specs | Matches | Pen |
| Playing card | Tele-phone | | Hen | Spoon |
| Sauce-pan | Jug | Baboon | Violin | |

*Other responses:*

_____
_____
_____
_____
_____

No. correct ☐

### Card 4
75 seconds

| | | | | |
|---|---|---|---|---|
| Mouse | Tooth-brush | Bed | Vase of flowers | Mug |
| Key | Suit-case | Ship | Banana | Pig |
| Envelope | Cow | Specs | Baby | Kettle |
| Bush | Neck-lace | Wine glass | Elephant | Spoon |
| Ball | Jug | Fox | House | Paint-brush |

*Other responses:*

_____
_____
_____
_____
_____

No. correct ☐

**TOTAL CORRECT** ☐

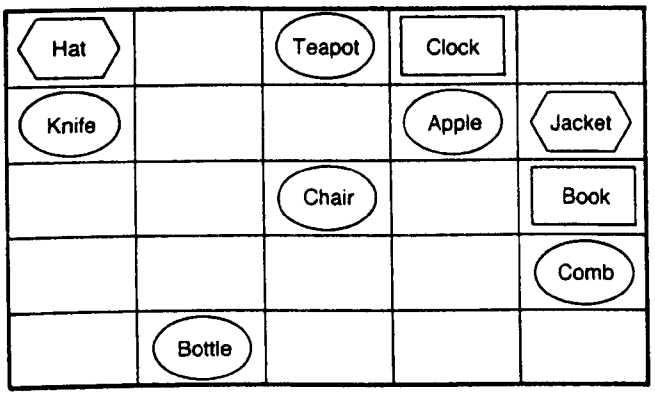
Sub-test scores:

Concept items correct ⬡

Repeat items correct ⬭ Filler items correct ☐

# KOLT
## Form B

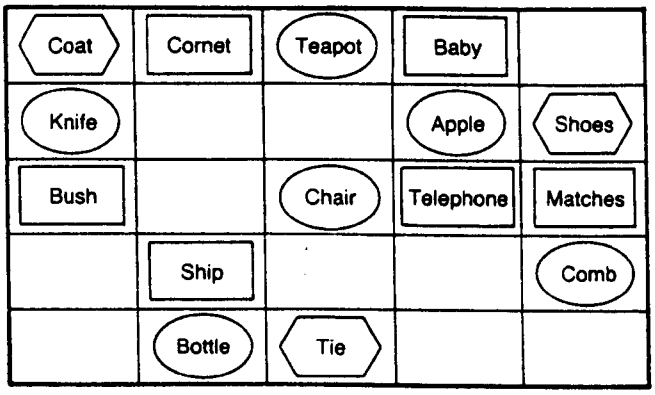
### Card 1
30 seconds




*Other responses:*

No. correct ☐

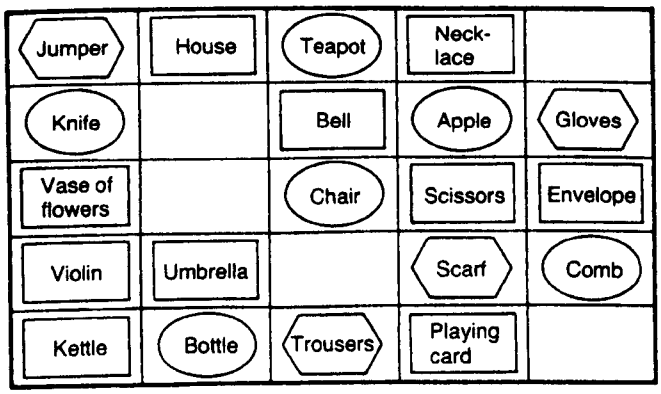
### Card 2
45 seconds




*Other responses:*

No. correct ☐

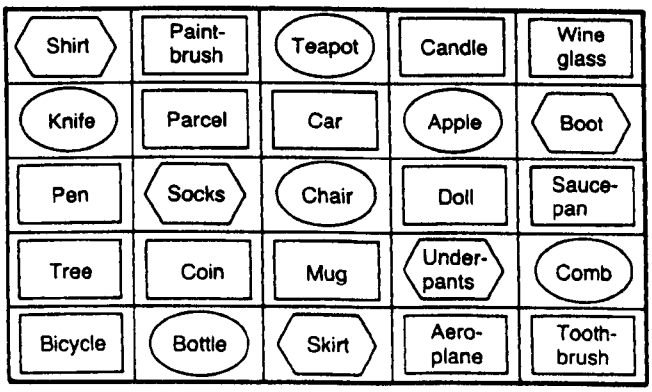
### Card 3
60 seconds




*Other responses:*

No. correct ☐

### Card 4
75 seconds




*Other responses:*

No. correct ☐

**TOTAL CORRECT** ☐

Sub-test scores:

Concept items correct ⬡

Repeat items correct ⬭ Filler items correct ☐

## Instrumental Activities of Daily Living.

**A. Ability to use the telephone.**
1. Operates telephone on own initiative- looks up numbers etc
2. Dials a few well known numbers
3. Answers telephone but does not dial.
4. Does not use telephone at all

**B. Shopping**
1. Takes care of all shopping needs
2. Shops independently for small purchases
3. Needs to be accompanied on any shopping trip.
4. Completely unable to shop.

**C. Food preparation.**
1. Plans, prepares and serves adequate meals independently.
2. Prepares adequate meals if supplied ingredients
3. Heats and serves prepared meals or prepares meals but does not maintain adequate diet.
4. Needs to have meals prepared and served.

**D. Housekeeping.**
1. Maintains house alone or with occasional assistance eg heavy work- domestic help.
2. Performs light daily tasks such as dishwashing, bedmaking.
3. Performs light daily tasks but cannot maintain an acceptable level of cleanliness
4. Needs help with all home maintenance tasks.
5. Does not participate in any housekeeping task.

**E. Laundry**
1. Does personal laundry completely
2. Launders small items- rinses socks, stocking etc
3. All personal laundry must be done by others.

**F. Modes of transportation**
1. Travels independently on public transport or drives own car
2. Arranges own travel via taxi, but does not otherwise use public transport.
3. Travels on public transport when assisted or accompanied by another
4. Travel limited to taxi or automobile with assistance of another

**G. Responsibility for own medications**
1. Is responsible for taking medication in correct dose at correct time.
2. Takes responsibility if the medication is prepared in advance in separate doses.
3. Is not capable of dispensing own medication.

**H. Ability to handle finances.**
1. Manages financial matters independently budgets, writes cheques, pays rent, bills, goes to bank collects and keeps track of income.
2. Manages day to day purchases but needs help with banking major purchases etc.
3. Incapable of handling money

## Appendix 2.

## Mean scores and standard deviations for all data.

Exp.

$X_1$: age1

| Mean: | Std. Dev.: | Std. Error: | Variance: | Coef. Var.: | Count: |
|---|---|---|---|---|---|
| 74.44444 | 8.35331 | 2.78444 | 69.77778 | 11.22086 | 9 |
| **Minimum:** | **Maximum:** | **Range:** | **Sum:** | **Sum of Sqr.:** | **# Missing:** |
| 61 | 84 | 23 | 670 | 50436 | 0 |

$X_2$: mmse1

| Mean: | Std. Dev.: | Std. Error: | Variance: | Coef. Var.: | Count: |
|---|---|---|---|---|---|
| 27.22222 | 1.64148 | .54716 | 2.69444 | 6.02991 | 9 |
| **Minimum:** | **Maximum:** | **Range:** | **Sum:** | **Sum of Sqr.:** | **# Missing:** |
| 25 | 29 | 4 | 245 | 6691 | 0 |

$X_3$: fes1

| Mean: | Std. Dev.: | Std. Error: | Variance: | Coef. Var.: | Count: |
|---|---|---|---|---|---|
| 81.88889 | 18.61078 | 6.20359 | 346.36111 | 22.72687 | 9 |
| **Minimum:** | **Maximum:** | **Range:** | **Sum:** | **Sum of Sqr.:** | **# Missing:** |
| 45 | 98 | 53 | 737 | 63123 | 0 |

$X_4$: a1

| Mean: | Std. Dev.: | Std. Error: | Variance: | Coef. Var.: | Count: |
|---|---|---|---|---|---|
| 4.88889 | 3.4801 | 1.16003 | 12.11111 | 71.18391 | 9 |
| **Minimum:** | **Maximum:** | **Range:** | **Sum:** | **Sum of Sqr.:** | **# Missing:** |
| 0 | 12 | 12 | 44 | 312 | 0 |

$X_5$: d1

| Mean: | Std. Dev.: | Std. Error: | Variance: | Coef. Var.: | Count: |
|---|---|---|---|---|---|
| 2.66667 | 1.93649 | .6455 | 3.75 | 72.61844 | 9 |
| **Minimum:** | **Maximum:** | **Range:** | **Sum:** | **Sum of Sqr.:** | **# Missing:** |
| 0 | 5 | 5 | 24 | 94 | 0 |

$X_6$: barth1

| Mean: | Std. Dev.: | Std. Error: | Variance: | Coef. Var.: | Count: |
|---|---|---|---|---|---|
| 22.22222 | 11.62731 | 3.87577 | 135.19444 | 52.32292 | 9 |
| **Minimum:** | **Maximum:** | **Range:** | **Sum:** | **Sum of Sqr.:** | **# Missing:** |
| 10 | 38 | 28 | 200 | 5526 | 0 |

cap

**$X_7$: kolt1**

| Mean: | Std. Dev.: | Std. Error: | Variance: | Coef. Var.: | Count: |
|---|---|---|---|---|---|
| 28.33333 | 5.19615 | 1.73205 | 27 | 18.33936 | 9 |
| **Minimum:** | **Maximum:** | **Range:** | **Sum:** | **Sum of Sqr.:** | **# Missing:** |
| 25 | 41 | 16 | 255 | 7441 | 0 |

**$X_8$: pers1**

| Mean: | Std. Dev.: | Std. Error: | Variance: | Coef. Var.: | Count: |
|---|---|---|---|---|---|
| 2.88889 | 1.61589 | .53863 | 2.61111 | 55.93477 | 9 |
| **Minimum:** | **Maximum:** | **Range:** | **Sum:** | **Sum of Sqr.:** | **# Missing:** |
| 1 | 6 | 5 | 26 | 96 | 0 |

**$X_9$: shs1**

| Mean: | Std. Dev.: | Std. Error: | Variance: | Coef. Var.: | Count: |
|---|---|---|---|---|---|
| 20.33333 | 7.14143 | 2.38048 | 51 | 35.12178 | 9 |
| **Minimum:** | **Maximum:** | **Range:** | **Sum:** | **Sum of Sqr.:** | **# Missing:** |
| 6 | 30 | 24 | 183 | 4129 | 0 |

**$X_{10}$: Ls1**

| Mean: | Std. Dev.: | Std. Error: | Variance: | Coef. Var.: | Count: |
|---|---|---|---|---|---|
| 17.77778 | 8.31832 | 2.77277 | 69.19444 | 46.79055 | 9 |
| **Minimum:** | **Maximum:** | **Range:** | **Sum:** | **Sum of Sqr.:** | **# Missing:** |
| 10 | 38 | 28 | 160 | 3398 | 0 |

**$X_{11}$: iadl1**

| Mean: | Std. Dev.: | Std. Error: | Variance: | Coef. Var.: | Count: |
|---|---|---|---|---|---|
| 18.55556 | 4.71993 | 1.57331 | 22.27778 | 25.43677 | 9 |
| **Minimum:** | **Maximum:** | **Range:** | **Sum:** | **Sum of Sqr.:** | **# Missing:** |
| 10 | 26 | 16 | 167 | 3277 | 0 |

**$X_{12}$: koltq**

| Mean: | Std. Dev.: | Std. Error: | Variance: | Coef. Var.: | Count: |
|---|---|---|---|---|---|
| 84.44444 | 9.4883 | 3.16277 | 90.02778 | 11.23614 | 9 |
| **Minimum:** | **Maximum:** | **Range:** | **Sum:** | **Sum of Sqr.:** | **# Missing:** |
| 63 | 96 | 33 | 760 | 64898 | 0 |

Cap

$X_{13}$: fes2

| Mean: | Std. Dev.: | Std. Error: | Variance: | Coef. Var.: | Count: |
|---|---|---|---|---|---|
| 63.33333 | 26.62705 | 8.87568 | 709 | 42.04272 | 9 |
| **Minimum:** | **Maximum:** | **Range:** | **Sum:** | **Sum of Sqr.:** | **# Missing:** |
| 24 | 100 | 76 | 570 | 41772 | 0 |

$X_{14}$: a2

| Mean: | Std. Dev.: | Std. Error: | Variance: | Coef. Var.: | Count: |
|---|---|---|---|---|---|
| 5 | 3.57071 | 1.19024 | 12.75 | 71.41428 | 9 |
| **Minimum:** | **Maximum:** | **Range:** | **Sum:** | **Sum of Sqr.:** | **# Missing:** |
| 0 | 10 | 10 | 45 | 327 | 0 |

$X_{15}$: d2

| Mean: | Std. Dev.: | Std. Error: | Variance: | Coef. Var.: | Count: |
|---|---|---|---|---|---|
| 3.88889 | 2.57121 | .85707 | 6.61111 | 66.11678 | 9 |
| **Minimum:** | **Maximum:** | **Range:** | **Sum:** | **Sum of Sqr.:** | **# Missing:** |
| 0 | 8 | 8 | 35 | 189 | 0 |

$X_{16}$: barth2

| Mean: | Std. Dev.: | Std. Error: | Variance: | Coef. Var.: | Count: |
|---|---|---|---|---|---|
| 89.66667 | 10.89725 | 3.63242 | 118.75 | 12.15306 | 9 |
| **Minimum:** | **Maximum:** | **Range:** | **Sum:** | **Sum of Sqr.:** | **# Missing:** |
| 71 | 100 | 29 | 807 | 73311 | 0 |

$X_{17}$: kolt2

| Mean: | Std. Dev.: | Std. Error: | Variance: | Coef. Var.: | Count: |
|---|---|---|---|---|---|
| 35.66667 | 10.85127 | 3.61709 | 117.75 | 30.42411 | 9 |
| **Minimum:** | **Maximum:** | **Range:** | **Sum:** | **Sum of Sqr.:** | **# Missing:** |
| 22 | 60 | 38 | 321 | 12391 | 0 |

$X_{18}$: pers2

| Mean: | Std. Dev.: | Std. Error: | Variance: | Coef. Var.: | Count: |
|---|---|---|---|---|---|
| 1.33333 | 1.41421 | .4714 | 2 | 106.06602 | 9 |
| **Minimum:** | **Maximum:** | **Range:** | **Sum:** | **Sum of Sqr.:** | **# Missing:** |
| 0 | 4 | 4 | 12 | 32 | 0 |

Cap

$X_{19}$: koltq2

| Mean: | Std. Dev.: | Std. Error: | Variance: | Coef. Var.: | Count: |
|---|---|---|---|---|---|
| 96.77778 | 12.94003 | 4.31334 | 167.44444 | 13.37087 | 9 |
| **Minimum:** | **Maximum:** | **Range:** | **Sum:** | **Sum of Sqr.:** | **# Missing:** |
| 82 | 125 | 43 | 871 | 85633 | 0 |

$X_{20}$: chal

| Mean: | Std. Dev.: | Std. Error: | Variance: | Coef. Var.: | Count: |
|---|---|---|---|---|---|
| 10.66667 | 4.4441 | 1.48137 | 19.75 | 41.66341 | 9 |
| **Minimum:** | **Maximum:** | **Range:** | **Sum:** | **Sum of Sqr.:** | **# Missing:** |
| 3 | 15 | 12 | 96 | 1182 | 0 |

$X_{21}$: commit

| Mean: | Std. Dev.: | Std. Error: | Variance: | Coef. Var.: | Count: |
|---|---|---|---|---|---|
| 2.88889 | 3.29562 | 1.09854 | 10.86111 | 114.07915 | 9 |
| **Minimum:** | **Maximum:** | **Range:** | **Sum:** | **Sum of Sqr.:** | **# Missing:** |
| 0 | 10 | 10 | 26 | 162 | 0 |

$X_{22}$: Control

| Mean: | Std. Dev.: | Std. Error: | Variance: | Coef. Var.: | Count: |
|---|---|---|---|---|---|
| 6.77778 | 2.68225 | .89408 | 7.19444 | 39.57412 | 9 |
| **Minimum:** | **Maximum:** | **Range:** | **Sum:** | **Sum of Sqr.:** | **# Missing:** |
| 3 | 10 | 7 | 61 | 471 | 0 |

$X_{23}$: gender1

| Mean: | Std. Dev.: | Std. Error: | Variance: | Coef. Var.: | Count: |
|---|---|---|---|---|---|
| 1.88889 | .33333 | .11111 | .11111 | 17.64706 | 9 |
| **Minimum:** | **Maximum:** | **Range:** | **Sum:** | **Sum of Sqr.:** | **# Missing:** |
| 1 | 2 | 1 | 17 | 33 | 0 |

Control

$X_1$: age1

| Mean: | Std. Dev.: | Std. Error: | Variance: | Coef. Var.: | Count: |
|---|---|---|---|---|---|
| 77.11111 | 7.28774 | 2.42925 | 53.11111 | 9.45096 | 9 |
| **Minimum:** | **Maximum:** | **Range:** | **Sum:** | **Sum of Sqr.:** | **# Missing:** |
| 66 | 86 | 20 | 694 | 53940 | 0 |

$X_2$: mmse1

| Mean: | Std. Dev.: | Std. Error: | Variance: | Coef. Var.: | Count: |
|---|---|---|---|---|---|
| 27.33333 | 1.58114 | .52705 | 2.5 | 5.78465 | 9 |
| **Minimum:** | **Maximum:** | **Range:** | **Sum:** | **Sum of Sqr.:** | **# Missing:** |
| 25 | 30 | 5 | 246 | 6744 | 0 |

$X_3$: fes1

| Mean: | Std. Dev.: | Std. Error: | Variance: | Coef. Var.: | Count: |
|---|---|---|---|---|---|
| 80 | 14.97498 | 4.99166 | 224.25 | 18.71872 | 9 |
| **Minimum:** | **Maximum:** | **Range:** | **Sum:** | **Sum of Sqr.:** | **# Missing:** |
| 62 | 100 | 38 | 720 | 59394 | 0 |

$X_4$: a1

| Mean: | Std. Dev.: | Std. Error: | Variance: | Coef. Var.: | Count: |
|---|---|---|---|---|---|
| 4.44444 | 4.36208 | 1.45403 | 19.02778 | 98.14689 | 9 |
| **Minimum:** | **Maximum:** | **Range:** | **Sum:** | **Sum of Sqr.:** | **# Missing:** |
| 0 | 13 | 13 | 40 | 330 | 0 |

$X_5$: d1

| Mean: | Std. Dev.: | Std. Error: | Variance: | Coef. Var.: | Count: |
|---|---|---|---|---|---|
| 3.44444 | 2.96273 | .98758 | 8.77778 | 86.01478 | 9 |
| **Minimum:** | **Maximum:** | **Range:** | **Sum:** | **Sum of Sqr.:** | **# Missing:** |
| 0 | 8 | 8 | 31 | 177 | 0 |

$X_6$: barth1

| Mean: | Std. Dev.: | Std. Error: | Variance: | Coef. Var.: | Count: |
|---|---|---|---|---|---|
| 26.44444 | 16.53868 | 5.51289 | 273.52778 | 62.54121 | 9 |
| **Minimum:** | **Maximum:** | **Range:** | **Sum:** | **Sum of Sqr.:** | **# Missing:** |
| 10 | 61 | 51 | 238 | 8482 | 0 |

Control

$X_7$: kolt1

| Mean: | Std. Dev.: | Std. Error: | Variance: | Coef. Var.: | Count: |
|---|---|---|---|---|---|
| 29.66667 | 6.32456 | 2.10819 | 40 | 21.31873 | 9 |
| **Minimum:** | **Maximum:** | **Range:** | **Sum:** | **Sum of Sqr.:** | **# Missing:** |
| 19 | 40 | 21 | 267 | 8241 | 0 |

$X_8$: pers1

| Mean: | Std. Dev.: | Std. Error: | Variance: | Coef. Var.: | Count: |
|---|---|---|---|---|---|
| 3.55556 | 2.96273 | .98758 | 8.77778 | 83.32682 | 9 |
| **Minimum:** | **Maximum:** | **Range:** | **Sum:** | **Sum of Sqr.:** | **# Missing:** |
| 0 | 9 | 9 | 32 | 184 | 0 |

$X_9$: shs1

| Mean: | Std. Dev.: | Std. Error: | Variance: | Coef. Var.: | Count: |
|---|---|---|---|---|---|
| 18.88889 | 7.04352 | 2.34784 | 49.61111 | 37.2892 | 9 |
| **Minimum:** | **Maximum:** | **Range:** | **Sum:** | **Sum of Sqr.:** | **# Missing:** |
| 9 | 31 | 22 | 170 | 3608 | 0 |

$X_{10}$: Ls1

| Mean: | Std. Dev.: | Std. Error: | Variance: | Coef. Var.: | Count: |
|---|---|---|---|---|---|
| 46.33333 | 30.08737 | 10.02912 | 905.25 | 64.93678 | 9 |
| **Minimum:** | **Maximum:** | **Range:** | **Sum:** | **Sum of Sqr.:** | **# Missing:** |
| 16 | 99 | 83 | 417 | 26563 | 0 |

$X_{11}$: iadl1

| Mean: | Std. Dev.: | Std. Error: | Variance: | Coef. Var.: | Count: |
|---|---|---|---|---|---|
| 23.66667 | 4.5 | 1.5 | 20.25 | 19.01408 | 9 |
| **Minimum:** | **Maximum:** | **Range:** | **Sum:** | **Sum of Sqr.:** | **# Missing:** |
| 14 | 30 | 16 | 213 | 5203 | 0 |

$X_{12}$: koltq

| Mean: | Std. Dev.: | Std. Error: | Variance: | Coef. Var.: | Count: |
|---|---|---|---|---|---|
| 89.33333 | 9.78519 | 3.26173 | 95.75 | 10.95357 | 9 |
| **Minimum:** | **Maximum:** | **Range:** | **Sum:** | **Sum of Sqr.:** | **# Missing:** |
| 68 | 102 | 34 | 804 | 72590 | 0 |

$X_{13}$: fes2

| Mean: | Std. Dev.: | Std. Error: | Variance: | Coef. Var.: | Count: |
|---|---|---|---|---|---|
| 52.77778 | 18.37646 | 6.12549 | 337.69444 | 34.81856 | 9 |
| **Minimum:** | **Maximum:** | **Range:** | **Sum:** | **Sum of Sqr.:** | **# Missing:** |
| 33 | 96 | 63 | 475 | 27771 | 0 |

$X_{14}$: a2

| Mean: | Std. Dev.: | Std. Error: | Variance: | Coef. Var.: | Count: |
|---|---|---|---|---|---|
| 5.55556 | 3.53946 | 1.17982 | 12.52778 | 63.71028 | 9 |
| **Minimum:** | **Maximum:** | **Range:** | **Sum:** | **Sum of Sqr.:** | **# Missing:** |
| 0 | 12 | 12 | 50 | 378 | 0 |

$X_{15}$: d2

| Mean: | Std. Dev.: | Std. Error: | Variance: | Coef. Var.: | Count: |
|---|---|---|---|---|---|
| 5.66667 | 3.67423 | 1.22474 | 13.5 | 64.83943 | 9 |
| **Minimum:** | **Maximum:** | **Range:** | **Sum:** | **Sum of Sqr.:** | **# Missing:** |
| 1 | 13 | 12 | 51 | 397 | 0 |

$X_{16}$: barth2

| Mean: | Std. Dev.: | Std. Error: | Variance: | Coef. Var.: | Count: |
|---|---|---|---|---|---|
| 88.77778 | 10.56856 | 3.52285 | 111.69444 | 11.90451 | 9 |
| **Minimum:** | **Maximum:** | **Range:** | **Sum:** | **Sum of Sqr.:** | **# Missing:** |
| 69 | 100 | 31 | 799 | 71827 | 0 |

$X_{17}$: kolt2

| Mean: | Std. Dev.: | Std. Error: | Variance: | Coef. Var.: | Count: |
|---|---|---|---|---|---|
| 31.55556 | 7.28202 | 2.42734 | 53.02778 | 23.07682 | 9 |
| **Minimum:** | **Maximum:** | **Range:** | **Sum:** | **Sum of Sqr.:** | **# Missing:** |
| 21 | 40 | 19 | 284 | 9386 | 0 |

$X_{18}$: pers2

| Mean: | Std. Dev.: | Std. Error: | Variance: | Coef. Var.: | Count: |
|---|---|---|---|---|---|
| 3.77778 | 2.90593 | .96864 | 8.44444 | 76.92175 | 9 |
| **Minimum:** | **Maximum:** | **Range:** | **Sum:** | **Sum of Sqr.:** | **# Missing:** |
| 0 | 8 | 8 | 34 | 196 | 0 |

Control

$X_{19}$: koltq2

| Mean: | Std. Dev.: | Std. Error: | Variance: | Coef. Var.: | Count: |
|---|---|---|---|---|---|
| 93.55556 | 11.1704 | 3.72347 | 124.77778 | 11.93985 | 9 |
| **Minimum:** | **Maximum:** | **Range:** | **Sum:** | **Sum of Sqr.:** | **# Missing:** |
| 71 | 106 | 35 | 842 | 79772 | 0 |

$X_{20}$: chal

| Mean: | Std. Dev.: | Std. Error: | Variance: | Coef. Var.: | Count: |
|---|---|---|---|---|---|
| 8.88889 | 3.8873 | 1.29577 | 15.11111 | 43.73214 | 9 |
| **Minimum:** | **Maximum:** | **Range:** | **Sum:** | **Sum of Sqr.:** | **# Missing:** |
| 3 | 13 | 10 | 80 | 832 | 0 |

$X_{21}$: commit

| Mean: | Std. Dev.: | Std. Error: | Variance: | Coef. Var.: | Count: |
|---|---|---|---|---|---|
| 3 | 3.20156 | 1.06719 | 10.25 | 106.71874 | 9 |
| **Minimum:** | **Maximum:** | **Range:** | **Sum:** | **Sum of Sqr.:** | **# Missing:** |
| 0 | 8 | 8 | 27 | 163 | 0 |

$X_{22}$: Control

| Mean: | Std. Dev.: | Std. Error: | Variance: | Coef. Var.: | Count: |
|---|---|---|---|---|---|
| 7 | 5.54527 | 1.84842 | 30.75 | 79.21812 | 9 |
| **Minimum:** | **Maximum:** | **Range:** | **Sum:** | **Sum of Sqr.:** | **# Missing:** |
| 0 | 16 | 16 | 63 | 687 | 0 |

$X_{23}$: gender1

| Mean: | Std. Dev.: | Std. Error: | Variance: | Coef. Var.: | Count: |
|---|---|---|---|---|---|
| 2 | 0 | 0 | 0 | 0 | 9 |
| **Minimum:** | **Maximum:** | **Range:** | **Sum:** | **Sum of Sqr.:** | **# Missing:** |
| 2 | 2 | 0 | 18 | 36 | 0 |

# Appendix 3.

## Statistics: Repeated measures ANOVAs and t tests.

Anova table for a 2-factor repeated measures Anova.

| Source: | df: | Sum of Squares: | Mean Square: | F-test: | P value: |
|---|---|---|---|---|---|
| group (A) | 1 | 348.44444 | 348.44444 | .57514 | .4593 |
| subjects w. groups | 16 | 9693.55556 | 605.84722 | | |
| Repeated Measure (B) | 1 | 4715.11111 | 4715.11111 | 23.24942 | .0002 |
| AB | 1 | 169 | 169 | .83331 | .3749 |
| B x subjects w. groups | 16 | 3244.88889 | 202.80556 | | |

There were no missing cells found.

The AB Incidence table

| Repeated Mea... | | fes1 | fes2 | Totals: |
|---|---|---|---|---|
| group | level 1 | 9<br>81.88889 | 9<br>63.33333 | 18<br>72.61111 |
| | level 2 | 9<br>80 | 9<br>52.77778 | 18<br>66.38889 |
| Totals: | | 18<br>80.94444 | 18<br>58.05556 | 36<br>69.5 |

Anova table for a 2-factor repeated measures Anova.

| Source: | df: | Sum of Squares: | Mean Square: | F-test: | P value: |
|---|---|---|---|---|---|
| group (A) | 1 | .02778 | .02778 | .00126 | .9721 |
| subjects w. groups | 16 | 351.44444 | 21.96528 | | |
| Repeated Measure (B) | 1 | 3.36111 | 3.36111 | .53838 | .4737 |
| AB | 1 | 2.25 | 2.25 | .3604 | .5567 |
| B x subjects w. groups | 16 | 99.88889 | 6.24306 | | |

There were no missing cells found.

The AB Incidence table

| Repeated Mea... | | a1 | a2 | Totals: |
|---|---|---|---|---|
| group | level 1 | 9<br>4.88889 | 9<br>5 | 18<br>4.94444 |
| | level 2 | 9<br>4.44444 | 9<br>5.55556 | 18<br>5 |
| Totals: | | 18<br>4.66667 | 18<br>5.27778 | 36<br>4.97222 |

Anova table for a 2-factor repeated measures Anova.

| Source: | df: | Sum of Squares: | Mean Square: | F-test: | P value: |
|---|---|---|---|---|---|
| group (A) | 1 | 14.69444 | 14.69444 | 1.36252 | .2602 |
| subjects w. groups | 16 | 172.55556 | 10.78472 | | |
| Repeated Measure (B) | 1 | 26.69444 | 26.69444 | 4.82309 | .0432 |
| AB | 1 | 2.25 | 2.25 | .40652 | .5328 |
| B x subjects w. groups | 16 | 88.55556 | 5.53472 | | |

There were no missing cells found.

The AB Incidence table

| Repeated Mea... | | d1 | d2 | Totals: |
|---|---|---|---|---|
| group | level 1 | 9<br>2.66667 | 9<br>3.88889 | 18<br>3.27778 |
| | level 2 | 9<br>3.44444 | 9<br>5.66667 | 18<br>4.55556 |
| Totals: | | 18<br>3.05556 | 18<br>4.77778 | 36<br>3.91667 |

Anova table for a 2-factor repeated measures Anova.

| Source: | df: | Sum of Squares: | Mean Square: | F-test: | P value: |
|---|---|---|---|---|---|
| group (A) | 1 | 25 | 25 | .14502 | .7083 |
| subjects w. groups | 16 | 2758.22222 | 172.38889 | | |
| Repeated Measure (B) | 1 | 37895.11111 | 37895.11111 | 257.44933 | .0001 |
| AB | 1 | 58.77778 | 58.77778 | .39932 | .5364 |
| B x subjects w. groups | 16 | 2355.11111 | 147.19444 | | |

There were no missing cells found.

The AB Incidence table

| Repeated Mea... | | barth1 | barth2 | Totals: |
|---|---|---|---|---|
| group | level 1 | 9<br>22.22222 | 9<br>89.66667 | 18<br>55.94444 |
| | level 2 | 9<br>26.44444 | 9<br>88.77778 | 18<br>57.61111 |
| Totals: | | 18<br>24.33333 | 18<br>89.22222 | 36<br>56.77778 |

Anova table for a 2-factor repeated measures Anova.

| Source: | df: | Sum of Squares: | Mean Square: | F-test: | P value: |
|---|---|---|---|---|---|
| group (A) | 1 | 17.36111 | 17.36111 | .17889 | .678 |
| subjects w. groups | 16 | 1552.77778 | 97.04861 | | |
| Repeated Measure (B) | 1 | 191.36111 | 191.36111 | 8.76184 | .0092 |
| AB | 1 | 66.69444 | 66.69444 | 3.05374 | .0997 |
| B x subjects w. groups | 16 | 349.44444 | 21.84028 | | |

There were no missing cells found.

The AB Incidence table

| Repeated Mea... | | kolt1 | kolt2 | Totals: |
|---|---|---|---|---|
| group | level 1 | 9<br>28.33333 | 9<br>35.66667 | 18<br>32 |
| | level 2 | 9<br>29.66667 | 9<br>31.55556 | 18<br>30.61111 |
| Totals: | | 18<br>29 | 18<br>33.61111 | 36<br>31.30556 |

Anova table for a 2-factor repeated measures Anova.

| Source: | df: | Sum of Squares: | Mean Square: | F-test: | P value: |
|---|---|---|---|---|---|
| group (A) | 1 | 6.25 | 6.25 | .03631 | .8513 |
| subjects w. groups | 16 | 2754.22222 | 172.13889 | | |
| Repeated Measure (B) | 1 | 616.69444 | 616.69444 | 9.22351 | .0078 |
| AB | 1 | 148.02778 | 148.02778 | 2.21396 | .1562 |
| B x subjects w. groups | 16 | 1069.77778 | 66.86111 | | |

There were no missing cells found.

The AB Incidence table

| Repeated Mea... | | koltq | koltq2 | Totals: |
|---|---|---|---|---|
| group | level 1 | 9<br>84.44444 | 9<br>96.77778 | 18<br>90.61111 |
| | level 2 | 9<br>89.33333 | 9<br>93.55556 | 18<br>91.44444 |
| Totals: | | 18<br>86.88889 | 18<br>95.16667 | 36<br>91.02778 |

Anova table for a 2-factor repeated measures Anova.

| Source: | df: | Sum of Squares: | Mean Square: | F-test: | P value: |
|---|---|---|---|---|---|
| group (A) | 1 | 21.77778 | 21.77778 | 2.42349 | .1391 |
| subjects w. groups | 16 | 143.77778 | 8.98611 | | |
| Repeated Measure (B) | 1 | 4 | 4 | 2.07194 | .1693 |
| AB | 1 | 7.11111 | 7.11111 | 3.68345 | .073 |
| B x subjects w. groups | 16 | 30.88889 | 1.93056 | | |

There were no missing cells found.

The AB Incidence table

| Repeated Mea... | | pers1 | pers2 | Totals: |
|---|---|---|---|---|
| group | level 1 | 9<br>2.88889 | 9<br>1.33333 | 18<br>2.11111 |
| | level 2 | 9<br>3.55556 | 9<br>3.77778 | 18<br>3.66667 |
| Totals: | | 18<br>3.22222 | 18<br>2.55556 | 36<br>2.88889 |

Unpaired t-Test $X_1$: group $Y_1$: age1

| DF: | Unpaired t Value: | Prob. (2-tail): |
|---|---|---|
| 16 | -.72166 | .4809 |

| Group: | Count: | Mean: | Std. Dev.: | Std. Error: |
|---|---|---|---|---|
| Group 1 | 9 | 74.44444 | 8.35331 | 2.78444 |
| Group 2 | 9 | 77.11111 | 7.28774 | 2.42925 |

Unpaired t-Test $X_1$: group $Y_2$: mmse1

| DF: | Unpaired t Value: | Prob. (2-tail): |
|---|---|---|
| 16 | -.14625 | .8855 |

| Group: | Count: | Mean: | Std. Dev.: | Std. Error: |
|---|---|---|---|---|
| Group 1 | 9 | 27.22222 | 1.64148 | .54716 |
| Group 2 | 9 | 27.33333 | 1.58114 | .52705 |

Unpaired t-Test $X_1$: group $Y_3$: fes1

| DF: | Unpaired t Value: | Prob. (2-tail): |
|---|---|---|
| 16 | .23722 | .8155 |

| Group: | Count: | Mean: | Std. Dev.: | Std. Error: |
|---|---|---|---|---|
| Group 1 | 9 | 81.88889 | 18.61078 | 6.20359 |
| Group 2 | 9 | 80 | 14.97498 | 4.99166 |

Unpaired t-Test $X_1$: group $Y_4$: a1

| DF: | Unpaired t Value: | Prob. (2-tail): |
|---|---|---|
| 16 | .23894 | .8142 |

| Group: | Count: | Mean: | Std. Dev.: | Std. Error: |
|---|---|---|---|---|
| Group 1 | 9 | 4.88889 | 3.4801 | 1.16003 |
| Group 2 | 9 | 4.44444 | 4.36208 | 1.45403 |

Unpaired t-Test $X_1$: group $Y_5$: d1

| DF: | Unpaired t Value: | Prob. (2-tail): |
|---|---|---|
| 16 | -.65923 | .5191 |

| Group: | Count: | Mean: | Std. Dev.: | Std. Error: |
|---|---|---|---|---|
| Group 1 | 9 | 2.66667 | 1.93649 | .6455 |
| Group 2 | 9 | 3.44444 | 2.96273 | .98758 |

Unpaired t-Test $X_1$: group $Y_6$: barth1

| DF: | Unpaired t Value: | Prob. (2-tail): |
|---|---|---|
| 16 | -.62654 | .5398 |

| Group: | Count: | Mean: | Std. Dev.: | Std. Error: |
|---|---|---|---|---|
| Group 1 | 9 | 22.22222 | 11.62731 | 3.87577 |
| Group 2 | 9 | 26.44444 | 16.53868 | 5.51289 |

Unpaired t-Test $X_1$: group $Y_7$: kolt1

| DF: | Unpaired t Value: | Prob. (2-tail): |
|---|---|---|
| 16 | -.48868 | .6317 |

| Group: | Count: | Mean: | Std. Dev.: | Std. Error: |
|---|---|---|---|---|
| Group 1 | 9 | 28.33333 | 5.19615 | 1.73205 |
| Group 2 | 9 | 29.66667 | 6.32456 | 2.10819 |

Unpaired t-Test $X_1$: group $Y_8$: pers1

| DF: | Unpaired t Value: | Prob. (2-tail): |
|---|---|---|
| 16 | -.59264 | .5617 |

| Group: | Count: | Mean: | Std. Dev.: | Std. Error: |
|---|---|---|---|---|
| Group 1 | 9 | 2.88889 | 1.61589 | .53863 |
| Group 2 | 9 | 3.55556 | 2.96273 | .98758 |

Unpaired t-Test $X_1$: group $Y_1$: koltq

| DF: | Unpaired t Value: | Prob. (2-tail): |
|---|---|---|
| 16 | -1.07606 | .2979 |

| Group: | Count: | Mean: | Std. Dev.: | Std. Error: |
|---|---|---|---|---|
| Group 1 | 9 | 84.44444 | 9.4883 | 3.16277 |
| Group 2 | 9 | 89.33333 | 9.78519 | 3.26173 |

Unpaired t-Test $X_1$: group $Y_1$: shs1

| DF: | Unpaired t Value: | Prob. (2-tail): |
|---|---|---|
| 16 | .43202 | .6715 |

| Group: | Count: | Mean: | Std. Dev.: | Std. Error: |
|---|---|---|---|---|
| Group 1 | 9 | 20.33333 | 7.14143 | 2.38048 |
| Group 2 | 9 | 18.88889 | 7.04352 | 2.34784 |

Unpaired t-Test $X_1$: group $Y_2$: chal

| DF: | Unpaired t Value: | Prob. (2-tail): |
|---|---|---|
| 16 | .90329 | .3798 |

| Group: | Count: | Mean: | Std. Dev.: | Std. Error: |
|---|---|---|---|---|
| Group 1 | 9 | 10.66667 | 4.4441 | 1.48137 |
| Group 2 | 9 | 8.88889 | 3.8873 | 1.29577 |

Unpaired t-Test $X_1$: group $Y_3$: commit

| DF: | Unpaired t Value: | Prob. (2-tail): |
|---|---|---|
| 16 | -.07255 | .9431 |

| Group: | Count: | Mean: | Std. Dev.: | Std. Error: |
|---|---|---|---|---|
| Group 1 | 9 | 2.88889 | 3.29562 | 1.09854 |
| Group 2 | 9 | 3 | 3.20156 | 1.06719 |

Unpaired t-Test $X_1$: group $Y_4$: Control

| DF: | Unpaired t Value: | Prob. (2-tail): |
|---|---|---|
| 16 | -.10823 | .9152 |

| Group: | Count: | Mean: | Std. Dev.: | Std. Error: |
|---|---|---|---|---|
| Group 1 | 9 | 6.77778 | 2.68225 | .89408 |
| Group 2 | 9 | 7 | 5.54527 | 1.84842 |

Unpaired t-Test $X_1$: group $Y_1$: fes2

| DF: | Unpaired t Value: | Prob. (1-tail): |
|---|---|---|
| 16 | .9788 | .1711 |

| Group: | Count: | Mean: | Std. Dev.: | Std. Error: |
|---|---|---|---|---|
| Group 1 | 9 | 63.33333 | 26.62705 | 8.87568 |
| Group 2 | 9 | 52.77778 | 18.37646 | 6.12549 |

Unpaired t-Test $X_1$: group $Y_2$: a2

| DF: | Unpaired t Value: | Prob. (1-tail): |
|---|---|---|
| 16 | -.3315 | .3723 |

| Group: | Count: | Mean: | Std. Dev.: | Std. Error: |
|---|---|---|---|---|
| Group 1 | 9 | 5 | 3.57071 | 1.19024 |
| Group 2 | 9 | 5.55556 | 3.53946 | 1.17982 |

Unpaired t-Test $X_1$: group $Y_3$: d2

| DF: | Unpaired t Value: | Prob. (1-tail): |
|---|---|---|
| 16 | -1.18927 | .1258 |

| Group: | Count: | Mean: | Std. Dev.: | Std. Error: |
|---|---|---|---|---|
| Group 1 | 9 | 3.88889 | 2.57121 | .85707 |
| Group 2 | 9 | 5.66667 | 3.67423 | 1.22474 |

Unpaired t-Test $X_1$: group $Y_4$: barth2

| DF: | Unpaired t Value: | Prob. (1-tail): |
|---|---|---|
| 16 | .17567 | .4314 |

| Group: | Count: | Mean: | Std. Dev.: | Std. Error: |
|---|---|---|---|---|
| Group 1 | 9 | 89.66667 | 10.89725 | 3.63242 |
| Group 2 | 9 | 88.77778 | 10.56856 | 3.52285 |

Unpaired t-Test $X_1$: group $Y_1$: kolt2

| DF: | Unpaired t Value: | Prob. (1-tail): |
|---|---|---|
| 16 | .94377 | .1796 |

| Group: | Count: | Mean: | Std. Dev.: | Std. Error: |
|---|---|---|---|---|
| Group 1 | 9 | 35.66667 | 10.85127 | 3.61709 |
| Group 2 | 9 | 31.55556 | 7.28202 | 2.42734 |

Unpaired t-Test $X_1$: group $Y_2$: pers2

| DF: | Unpaired t Value: | Prob. (1-tail): |
|---|---|---|
| 16 | -2.26913 | .0187 |

| Group: | Count: | Mean: | Std. Dev.: | Std. Error: |
|---|---|---|---|---|
| Group 1 | 9 | 1.33333 | 1.41421 | .4714 |
| Group 2 | 9 | 3.77778 | 2.90593 | .96864 |

Unpaired t-Test $X_1$: group $Y_3$: koltq2

| DF: | Unpaired t Value: | Prob. (1-tail): |
|---|---|---|
| 16 | .56548 | .2898 |

| Group: | Count: | Mean: | Std. Dev.: | Std. Error: |
|---|---|---|---|---|
| Group 1 | 9 | 96.77778 | 12.94003 | 4.31334 |
| Group 2 | 9 | 93.55556 | 11.1704 | 3.72347 |

Unpaired t-Test $X_1$: group $Y_4$: Ls1

| DF: | Unpaired t Value: | Prob. (1-tail): |
|---|---|---|
| 16 | -2.74431 | .0072 |

| Group: | Count: | Mean: | Std. Dev.: | Std. Error: |
|---|---|---|---|---|
| Group 1 | 9 | 17.77778 | 8.31832 | 2.77277 |
| Group 2 | 9 | 46.33333 | 30.08737 | 10.02912 |

Mann-Whitney U  $X_1$: group  $Y_1$: Ls1

| | Number: | Σ Rank: | Mean Rank: |
|---|---|---|---|
| Group 1 | 9 | 56 | 6.22222 |
| Group 2 | 9 | 115 | 12.77778 |

| | | |
|---|---|---|
| U | 11 | |
| U-prime | 70 | |
| Z | -2.60491 | p = .0092 |
| Z corrected for ties | -2.61437 | p = .0089 |
| # tied groups | 4 | |

Unpaired t-Test $X_1$: group $Y_9$: iadl1

| DF: | Unpaired t Value: | Prob. (1-tail): |
|---|---|---|
| 16 | -2.35126 | .016 |

| Group: | Count: | Mean: | Std. Dev.: | Std. Error: |
|---|---|---|---|---|
| Group 1 | 9 | 18.55556 | 4.71993 | 1.57331 |
| Group 2 | 9 | 23.66667 | 4.5 | 1.5 |

Exp

Paired t-Test $X_1$: fes1 $Y_1$: fes2

| DF: | Mean X - Y: | Paired t value: | Prob. (1-tail): |
|---|---|---|---|
| 8 | 18.55556 | 2.75751 | .0124 |

Paired t-Test $X_2$: a1 $Y_2$: a2

| DF: | Mean X - Y: | Paired t value: | Prob. (1-tail): |
|---|---|---|---|
| 8 | -.11111 | -.08796 | .466 |

Paired t-Test $X_3$: d1 $Y_3$: d2

| DF: | Mean X - Y: | Paired t value: | Prob. (1-tail): |
|---|---|---|---|
| 8 | -1.22222 | -1.24351 | .1245 |

Paired t-Test $X_4$: barth1 $Y_4$: barth2

| DF: | Mean X - Y: | Paired t value: | Prob. (1-tail): |
|---|---|---|---|
| 8 | -67.44444 | -10.60839 | .0001 |

Paired t-Test $X_5$: kolt1 $Y_5$: kolt2

| DF: | Mean X - Y: | Paired t value: | Prob. (1-tail): |
|---|---|---|---|
| 8 | -7.33333 | -2.78839 | .0118 |

Paired t-Test $X_6$: pers1 $Y_6$: pers2

| DF: | Mean X - Y: | Paired t value: | Prob. (1-tail): |
|---|---|---|---|
| 8 | 1.55556 | 4.12837 | .0016 |

Paired t-Test $X_7$: koltq $Y_7$: koltq2

| DF: | Mean X - Y: | Paired t value: | Prob. (1-tail): |
|---|---|---|---|
| 8 | -12.33333 | -2.62121 | .0153 |

Control

Paired t-Test $X_1$: fes1 $Y_1$: fes2

| DF: | Mean X - Y: | Paired t value: | Prob. (1-tail): |
|---|---|---|---|
| 8 | 27.22222 | 4.06461 | .0018 |

Paired t-Test $X_2$: a1 $Y_2$: a2

| DF: | Mean X - Y: | Paired t value: | Prob. (1-tail): |
|---|---|---|---|
| 8 | -1.11111 | -1.02329 | .168 |

Paired t-Test $X_3$: d1 $Y_3$: d2

| DF: | Mean X - Y: | Paired t value: | Prob. (1-tail): |
|---|---|---|---|
| 8 | -2.22222 | -1.81818 | .0533 |

Paired t-Test $X_4$: barth1 $Y_4$: barth2

| DF: | Mean X - Y: | Paired t value: | Prob. (1-tail): |
|---|---|---|---|
| 8 | -62.33333 | -12.46667 | .0001 |

Paired t-Test $X_5$: kolt1 $Y_5$: kolt2

| DF: | Mean X - Y: | Paired t value: | Prob. (1-tail): |
|---|---|---|---|
| 8 | -1.88889 | -1.13082 | .1454 |

Paired t-Test $X_6$: pers1 $Y_6$: pers2

| DF: | Mean X - Y: | Paired t value: | Prob. (1-tail): |
|---|---|---|---|
| 8 | -.22222 | -.26261 | .3998 |

control

Paired t-Test $X_7$: koltq $Y_7$: koltq2

| DF: | Mean X - Y: | Paired t value: | Prob. (1-tail): |
|---|---|---|---|
| 8 | -4.22222 | -1.53387 | .0818 |

Coded Chi-Square $X_1$: group $Y_1$: accomodation1

Summary Statistics

| | | |
|---|---|---|
| DF: | 1 | |
| Total Chi-Square: | 5.84416 | p = .0156 |
| G Statistic: | 6.32071 | |
| Contingency Coefficient: | .49507 | |
| Phi: | .5698 | |
| Chi-Square with continuity correction: | 3.74026 | p = .0531 |

Observed Frequency Table

| | 1 | 2 | Totals: |
|---|---|---|---|
| 1 | 8 | 3 | 11 |
| 2 | 1 | 6 | 7 |
| Totals: | 9 | 9 | 18 |

Percents of Row Totals

| | 1 | 2 | Totals: |
|---|---|---|---|
| 1 | 72.73% | 27.27% | 100% |
| 2 | 14.29% | 85.71% | 100% |
| Totals: | 50% | 50% | 100% |

Percents of Column Totals

| | 1 | 2 | Totals: |
|---|---|---|---|
| 1 | 88.89% | 33.33% | 61.11% |
| 2 | 11.11% | 66.67% | 38.89% |
| Totals: | 100% | 100% | 100% |

Expected Values

| | 1 | 2 | Totals: |
|---|---|---|---|
| 1 | 5.5 | 5.5 | 11 |
| 2 | 3.5 | 3.5 | 7 |
| Totals: | 9 | 9 | 18 |

Post-Hoc Cell Contributions

| | 1 | 2 |
|---|---|---|
| 1 | 2.42 | -2.42 |
| 2 | -2.42 | 2.42 |

Unpaired t-Test $X_1$: accomodation1 $Y_1$: Ls1

| DF: | Unpaired t Value: | Prob. (1-tail): |
|---|---|---|
| 16 | -4.97639 | .0001 |

| Group: | Count: | Mean: | Std. Dev.: | Std. Error: |
|---|---|---|---|---|
| Group 1 | 11 | 16.36364 | 3.61311 | 1.08939 |
| Group 2 | 7 | 56.71429 | 26.98589 | 10.19971 |

Unpaired t-Test $X_1$: accomodation1 $Y_2$: iadl1

| DF: | Unpaired t Value: | Prob. (1-tail): |
|---|---|---|
| 16 | -2.77466 | .0067 |

| Group: | Count: | Mean: | Std. Dev.: | Std. Error: |
|---|---|---|---|---|
| Group 1 | 11 | 18.81818 | 4.97631 | 1.50041 |
| Group 2 | 7 | 24.71429 | 3.1997 | 1.20937 |

Unpaired t-Test $X_1$: accomodation1 $Y_3$: fes2

| DF: | Unpaired t Value: | Prob. (1-tail): |
|---|---|---|
| 16 | 1.57507 | .0674 * |

| Group: | Count: | Mean: | Std. Dev.: | Std. Error: |
|---|---|---|---|---|
| Group 1 | 11 | 64.54545 | 26.63968 | 8.03217 |
| Group 2 | 7 | 47.85714 | 9.88987 | 3.73802 |

Unpaired t-Test $X_1$: accomodation1 $Y_4$: a2

| DF: | Unpaired t Value: | Prob. (1-tail): |
|---|---|---|
| 16 | -.69548 | .2483 |

| Group: | Count: | Mean: | Std. Dev.: | Std. Error: |
|---|---|---|---|---|
| Group 1 | 11 | 4.81818 | 3.40053 | 1.0253 |
| Group 2 | 7 | 6 | 3.69685 | 1.39728 |

Unpaired t-Test $X_1$: accomodation1 $Y_5$: d2

| DF: | Unpaired t Value: | Prob. (1-tail): |
|---|---|---|
| 16 | -1.67203 | .057 |

| Group: | Count: | Mean: | Std. Dev.: | Std. Error: |
|---|---|---|---|---|
| Group 1 | 11 | 3.81818 | 2.48267 | .74855 |
| Group 2 | 7 | 6.28571 | 3.81725 | 1.44279 |

Unpaired t-Test $X_1$: accomodation1 $Y_6$: barth2

| DF: | Unpaired t Value: | Prob. (1-tail): |
|---|---|---|
| 16 | .80586 | .2161 |

| Group: | Count: | Mean: | Std. Dev.: | Std. Error: |
|---|---|---|---|---|
| Group 1 | 11 | 90.81818 | 10.98925 | 3.31338 |
| Group 2 | 7 | 86.71429 | 9.72478 | 3.67562 |

Unpaired t-Test $X_1$: accomodation1 $Y_7$: kolt2

| DF: | Unpaired t Value: | Prob. (1-tail): |
|---|---|---|
| 16 | 2.23227 | .0201 |

| Group: | Count: | Mean: | Std. Dev.: | Std. Error: |
|---|---|---|---|---|
| Group 1 | 11 | 37.09091 | 9.70005 | 2.92467 |
| Group 2 | 7 | 28.14286 | 5.1455 | 1.94482 |

Unpaired t-Test $X_1$: accomodation1 $Y_8$: pers2

| DF: | Unpaired t Value: | Prob. (1-tail): |
|---|---|---|
| 16 | -.96771 | .1738 |

| Group: | Count: | Mean: | Std. Dev.: | Std. Error: |
|---|---|---|---|---|
| Group 1 | 11 | 2.09091 | 1.97254 | .59474 |
| Group 2 | 7 | 3.28571 | 3.30224 | 1.24813 |

Unpaired t-Test $X_1$: accomodation1 $Y_1$: age1

| DF: | Unpaired t Value: | Prob. (1-tail): |
|---|---|---|
| 16 | -2.46341 | .0128 |

| Group: | Count: | Mean: | Std. Dev.: | Std. Error: |
|---|---|---|---|---|
| Group 1 | 11 | 72.63636 | 7.18711 | 2.167 |
| Group 2 | 7 | 80.71429 | 6.04743 | 2.28571 |

Unpaired t-Test $X_1$: accomodation1 $Y_9$: koltq2

| DF: | Unpaired t Value: | Prob. (1-tail): |
|---|---|---|
| 16 | 1.53412 | .0722 * |

| Group: | Count: | Mean: | Std. Dev.: | Std. Error: |
|---|---|---|---|---|
| Group 1 | 11 | 98.45455 | 11.95294 | 3.60395 |
| Group 2 | 7 | 90 | 10.40833 | 3.93398 |

Unpaired t-Test $X_1$: accomodation1 $Y_{10}$: chal

| DF: | Unpaired t Value: | Prob. (1-tail): |
|---|---|---|
| 16 | -.28944 | .388 |

| Group: | Count: | Mean: | Std. Dev.: | Std. Error: |
|---|---|---|---|---|
| Group 1 | 11 | 9.54545 | 4.43539 | 1.33732 |
| Group 2 | 7 | 10.14286 | 3.97612 | 1.50283 |

Unpaired t-Test $X_1$: accomodation1 $Y_{11}$: commit

| DF: | Unpaired t Value: | Prob. (1-tail): |
|---|---|---|
| 16 | -.66191 | .2587 |

| Group: | Count: | Mean: | Std. Dev.: | Std. Error: |
|---|---|---|---|---|
| Group 1 | 11 | 2.54545 | 3.14209 | .94738 |
| Group 2 | 7 | 3.57143 | 3.30944 | 1.25085 |

Unpaired t-Test $X_1$: accomodation1 $Y_{12}$: Control

| DF: | Unpaired t Value: | Prob. (1-tail): |
|---|---|---|
| 16 | -1.25324 | .114 |

| Group: | Count: | Mean: | Std. Dev.: | Std. Error: |
|---|---|---|---|---|
| Group 1 | 11 | 5.90909 | 3.56243 | 1.07411 |
| Group 2 | 7 | 8.42857 | 4.99524 | 1.88802 |

Unpaired t-Test $X_1$: accomodation1 $Y_1$ 3: shs1

| DF: | Unpaired t Value: | Prob. (1-tail): |
|---|---|---|
| 16 | -1.25922 | .113 |

| Group: | Count: | Mean: | Std. Dev.: | Std. Error: |
|---|---|---|---|---|
| Group 1 | 11 | 18 | 6.95701 | 2.09762 |
| Group 2 | 7 | 22.14286 | 6.5429 | 2.47298 |

# Appendix 4.

# Correlational data.

Appendix 4.

**Significant correlations with the MMSE (p<.05)**

| Variable | KOLT1 | KOLT2 | Age | A1 | A2 | Commit |
|---|---|---|---|---|---|---|
| MMSE | .43 | .58 | -.57 | .51 | .45 | .49 |

- - Correlation Coefficients - -

| | KOLTQ | KOLTQ2 | LS1 | MMSE | PERS1 | PERS2 |
|---|---|---|---|---|---|---|
| FES1 | -.3661 | -.0472 | -.1492 | .0877 | -.3197 | -.0822 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .068 | P= .426 | P= .277 | P= .365 | P= .098 | P= .373 |
| FES2 | .1955 | .3665 | -.4035 | -.1584 | -.2643 | -.0672 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .218 | P= .067 | P= .048 | P= .265 | P= .145 | P= .395 |
| GENDER | .6157 | .1299 | .2120 | -.2747 | .0237 | .1523 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .003 | P= .304 | P= .199 | P= .135 | P= .463 | P= .273 |
| GROUP | .2598 | -.1400 | .5657 | .0365 | .1466 | .4934 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .149 | P= .290 | P= .007 | P= .443 | P= .281 | P= .019 |
| IADL | -.0091 | -.5976 | .4194 | .0177 | .2933 | .2752 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .486 | P= .004 | P= .042 | P= .472 | P= .119 | P= .134 |
| KOLT1 | .5166 | .6603 | -.3412 | .4254 | -.0444 | .0000 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .014 | P= .001 | P= .083 | P= .039 | P= .431 | P= .500 |
| KOLT2 | .0074 | .8866 | -.3661 | .5753 | -.0367 | -.0880 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .488 | P= .000 | P= .068 | P= .006 | P= .443 | P= .364 |
| KOLTQ | 1.0000 | .3957 | -.0065 | -.1998 | .1284 | .1242 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= . | P= .052 | P= .490 | P= .213 | P= .306 | P= .312 |
| KOLTQ2 | .3957 | 1.0000 | -.2643 | .3593 | .0050 | -.0188 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .052 | P= . | P= .145 | P= .072 | P= .492 | P= .470 |
| LS1 | -.0065 | -.2643 | 1.0000 | -.3131 | -.1512 | -.0369 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .490 | P= .145 | P= . | P= .103 | P= .275 | P= .442 |
| MMSE | -.1998 | .3593 | -.3131 | 1.0000 | .2713 | .3278 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .213 | P= .072 | P= .103 | P= . | P= .138 | P= .092 |

- - Correlation Coefficients - -

| | KOLTQ | KOLTQ2 | LS1 | MMSE | PERS1 | PERS2 |
|---|---|---|---|---|---|---|
| A1 | -.1230 | -.0130 | -.0423 | .5066 | .3823 | .3811 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .313 | P= .480 | P= .434 | P= .016 | P= .059 | P= .059 |
| A2 | .0220 | .0002 | .0764 | .4521 | .4858 | .4283 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .465 | P= .500 | P= .382 | P= .030 | P= .020 | P= .038 |
| AGE | .4423 | -.2098 | .3480 | -.5736 | .1785 | .2485 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .033 | P= .202 | P= .079 | P= .006 | P= .239 | P= .160 |
| ACCOM | .0579 | -.3581 | .7794 | -.2956 | -.0278 | .2351 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .410 | P= .072 | P= .000 | P= .117 | P= .456 | P= .174 |
| BARTH1 | .4430 | .2169 | -.2316 | .2098 | -.2853 | .0274 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .033 | P= .194 | P= .178 | P= .202 | P= .126 | P= .457 |
| BARTH2 | -.0207 | .4014 | -.0802 | .0357 | -.3494 | -.0116 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .467 | P= .049 | P= .376 | P= .444 | P= .078 | P= .482 |
| CHALL | .1383 | -.1798 | .1709 | -.2887 | -.4365 | -.2767 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .292 | P= .238 | P= .249 | P= .123 | P= .035 | P= .133 |
| COMMIT | -.2604 | -.0076 | .1272 | .4923 | .2330 | .0700 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .148 | P= .488 | P= .307 | P= .019 | P= .176 | P= .391 |
| CONTROL | .0385 | -.2029 | -.1371 | .0672 | .4010 | .4537 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .440 | P= .210 | P= .294 | P= .396 | P= .050 | P= .029 |
| D1 | .2126 | -.2324 | -.0203 | -.0654 | .3756 | .0792 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .199 | P= .177 | P= .468 | P= .398 | P= .062 | P= .377 |
| D2 | .2150 | -.1847 | .3735 | .2122 | .3594 | .2101 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .196 | P= .232 | P= .063 | P= .199 | P= .072 | P= .201 |

- - Correlation Coefficients - -

| | KOLTQ | KOLTQ2 | LS1 | MMSE | PERS1 | PERS2 |
|---|---|---|---|---|---|---|
| PERS1 | .1284 | .0050 | -.1512 | .2713 | 1.0000 | .6289 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .306 | P= .492 | P= .275 | P= .138 | P= . | P= .003 |
| PERS2 | .1242 | -.0188 | -.0369 | .3278 | .6289 | 1.0000 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .312 | P= .470 | P= .442 | P= .092 | P= .003 | P= . |
| SHS1 | -.0121 | -.2353 | .0767 | .0921 | .0892 | .1430 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .481 | P= .174 | P= .381 | P= .358 | P= .362 | P= .286 |

(Coefficient / (Cases) / 1-tailed Significance)

" . " is printed if a coefficient cannot be computed

## - - Correlation Coefficients - -

| | CHALL | COMMIT | CONTROL | D1 | D2 | FES1 |
|---|---|---|---|---|---|---|
| A1 | .1355 | .6991 | .4367 | .2140 | .5958 | -.3190 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .296 | P= .001 | P= .035 | P= .197 | P= .005 | P= .099 |
| A2 | -.0978 | .3412 | .2194 | .0602 | .6997 | -.3404 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .350 | P= .083 | P= .191 | P= .406 | P= .001 | P= .083 |
| AGE | .1322 | -.2734 | .2027 | .1615 | .0738 | -.5172 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .301 | P= .136 | P= .210 | P= .261 | P= .386 | P= .014 |
| ACCOM | .0722 | .1633 | .2990 | .2674 | .3857 | -.1972 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .388 | P= .259 | P= .114 | P= .142 | P= .057 | P= .216 |
| BARTH1 | .1507 | -.0142 | -.1916 | -.1044 | .0762 | -.1587 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .275 | P= .478 | P= .223 | P= .340 | P= .382 | P= .265 |
| BARTH2 | .0800 | -.2216 | -.3105 | -.5646 | -.3800 | .6178 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .376 | P= .188 | P= .105 | P= .007 | P= .060 | P= .003 |
| CHALL | 1.0000 | .0619 | -.1255 | .1049 | .1550 | .0067 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= . | P= .404 | P= .310 | P= .339 | P= .270 | P= .489 |
| COMMIT | .0619 | 1.0000 | .2114 | .3644 | .6150 | -.3263 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .404 | P= . | P= .200 | P= .069 | P= .003 | P= .093 |
| CONTROL | -.1255 | .2114 | 1.0000 | .4926 | .1802 | -.0594 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .310 | P= .200 | P= . | P= .019 | P= .237 | P= .407 |
| D1 | .1049 | .3644 | .4926 | 1.0000 | .3592 | -.3552 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .339 | P= .069 | P= .019 | P= . | P= .072 | P= .074 |
| D2 | .1550 | .6150 | .1802 | .3592 | 1.0000 | -.4603 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .270 | P= .003 | P= .237 | P= .072 | P= . | P= .027 |

- - Correlation Coefficients - -

| | CHALL | COMMIT | CONTROL | D1 | D2 | FES1 |
|---|---|---|---|---|---|---|
| PERS1 | -.4365 | .2330 | .4010 | .3756 | .3594 | -.3197 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .035 | P= .176 | P= .050 | P= .062 | P= .072 | P= .098 |
| PERS2 | -.2767 | .0700 | .4537 | .0792 | .2101 | -.0822 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .133 | P= .391 | P= .029 | P= .377 | P= .201 | P= .373 |
| SHS1 | .5515 | .6218 | .6318 | .5298 | .4832 | -.1809 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .009 | P= .003 | P= .002 | P= .012 | P= .021 | P= .236 |

(Coefficient / (Cases) / 1-tailed Significance)

" . " is printed if a coefficient cannot be computed

## - - Correlation Coefficients - -

| | CHALL | COMMIT | CONTROL | D1 | D2 | FES1 |
|---|---|---|---|---|---|---|
| FES1 | .0067 | -.3263 | -.0594 | -.3552 | -.4603 | 1.0000 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .489 | P= .093 | P= .407 | P= .074 | P= .027 | P= . |
| FES2 | .1812 | -.4475 | .0932 | -.1266 | -.5629 | .5198 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .236 | P= .031 | P= .356 | P= .308 | P= .008 | P= .014 |
| GENDER | .1670 | -.2419 | .2296 | .0056 | -.0173 | -.2593 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .254 | P= .167 | P= .180 | P= .491 | P= .473 | P= .149 |
| GROUP | -.2203 | .0181 | .0270 | .1626 | .2850 | -.0592 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .190 | P= .472 | P= .458 | P= .260 | P= .126 | P= .408 |
| IADL | -.0097 | .1982 | .2124 | .5200 | .4325 | -.3500 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .485 | P= .215 | P= .199 | P= .013 | P= .037 | P= .077 |
| KOLT1 | -.0776 | -.1385 | -.1476 | .0254 | .0162 | .1020 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .380 | P= .292 | P= .279 | P= .460 | P= .475 | P= .344 |
| KOLT2 | -.2946 | .1066 | -.2338 | -.2948 | -.2160 | .1769 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .118 | P= .337 | P= .175 | P= .117 | P= .195 | P= .241 |
| KOLTQ | .1383 | -.2604 | .0385 | .2126 | .2150 | -.3661 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .292 | P= .148 | P= .440 | P= .199 | P= .196 | P= .068 |
| KOLTQ2 | -.1798 | -.0076 | -.2029 | -.2324 | -.1847 | -.0472 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .238 | P= .488 | P= .210 | P= .177 | P= .232 | P= .426 |
| LS1 | .1709 | .1272 | -.1371 | -.0203 | .3735 | -.1492 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .249 | P= .307 | P= .294 | P= .468 | P= .063 | P= .277 |
| MMSE | -.2887 | .4923 | .0672 | -.0654 | .2122 | .0877 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .123 | P= .019 | P= .396 | P= .398 | P= .199 | P= .365 |

- - Correlation Coefficients - -

| | A1 | A2 | AGE | ACCOM | BARTH1 | BARTH2 |
|---|---|---|---|---|---|---|
| PERS1 | .3823 | .4858 | .1785 | -.0278 | -.2853 | -.3494 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .059 | P= .020 | P= .239 | P= .456 | P= .126 | P= .078 |
| PERS2 | .3811 | .4283 | .2485 | .2351 | .0274 | -.0116 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .059 | P= .038 | P= .160 | P= .174 | P= .457 | P= .482 |
| SHS1 | .6664 | .2307 | .0786 | .3003 | -.0331 | -.2425 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .001 | P= .178 | P= .378 | P= .113 | P= .448 | P= .166 |

(Coefficient / (Cases) / 1-tailed Significance)

" . " is printed if a coefficient cannot be computed

- - Correlation Coefficients - -

| | A1 | A2 | AGE | ACCOM | BARTH1 | BARTH2 |
|---|---|---|---|---|---|---|
| A1 | 1.0000 | .5526 | -.1456 | -.0204 | -.1311 | -.1526 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= . | P= .009 | P= .282 | P= .468 | P= .302 | P= .273 |
| A2 | .5526 | 1.0000 | .0134 | .1713 | .0912 | -.3084 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .009 | P= . | P= .479 | P= .248 | P= .359 | P= .107 |
| AGE | -.1456 | .0134 | 1.0000 | .5244 | -.0649 | -.2958 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .282 | P= .479 | P= . | P= .013 | P= .399 | P= .117 |
| ACCOM | -.0204 | .1713 | .5244 | 1.0000 | -.0696 | -.1975 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .468 | P= .248 | P= .013 | P= . | P= .392 | P= .216 |
| BARTH1 | -.1311 | .0912 | -.0649 | -.0696 | 1.0000 | .0742 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .302 | P= .359 | P= .399 | P= .392 | P= . | P= .385 |
| BARTH2 | -.1526 | -.3084 | -.2958 | -.1975 | .0742 | 1.0000 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .273 | P= .107 | P= .117 | P= .216 | P= .385 | P= . |
| CHALL | .1355 | -.0978 | .1322 | .0722 | .1507 | .0800 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .296 | P= .350 | P= .301 | P= .388 | P= .275 | P= .376 |
| COMMIT | .6991 | .3412 | -.2734 | .1633 | -.0142 | -.2216 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .001 | P= .083 | P= .136 | P= .259 | P= .478 | P= .188 |
| CONTROL | .4367 | .2194 | .2027 | .2990 | -.1916 | -.3105 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .035 | P= .191 | P= .210 | P= .114 | P= .223 | P= .105 |
| D1 | .2140 | .0602 | .1615 | .2674 | -.1044 | -.5646 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .197 | P= .406 | P= .261 | P= .142 | P= .340 | P= .007 |
| D2 | .5958 | .6997 | .0738 | .3857 | .0762 | -.3800 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .005 | P= .001 | P= .386 | P= .057 | P= .382 | P= .060 |

## - - Correlation Coefficients - -

| | A1 | A2 | AGE | ACCOM | BARTH1 | BARTH2 |
|---|---|---|---|---|---|---|
| FES1 | -.3190 | -.3404 | -.5172 | -.1972 | -.1587 | .6178 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .099 | P= .083 | P= .014 | P= .216 | P= .265 | P= .003 |
| FES2 | -.1824 | -.4845 | -.2125 | -.3664 | -.0215 | .6310 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .234 | P= .021 | P= .199 | P= .067 | P= .466 | P= .002 |
| GENDER | -.0868 | -.1963 | .4773 | .1935 | .2548 | -.1623 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .366 | P= .217 | P= .023 | P= .221 | P= .154 | P= .260 |
| GROUP | -.0596 | .0826 | .1775 | .5698 | .1547 | -.0439 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .407 | P= .372 | P= .240 | P= .007 | P= .270 | P= .431 |
| IADL | .1232 | .2307 | .3234 | .5700 | -.0207 | -.6247 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .313 | P= .178 | P= .095 | P= .007 | P= .467 | P= .003 |
| KOLT1 | -.0325 | .1142 | -.4441 | -.3731 | .4896 | .2284 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .449 | P= .326 | P= .032 | P= .064 | P= .020 | P= .181 |
| KOLT2 | .0544 | .0792 | -.5864 | -.4873 | .1330 | .4170 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .415 | P= .377 | P= .005 | P= .020 | P= .299 | P= .043 |
| KOLTQ | -.1230 | .0220 | .4423 | .0579 | .4430 | -.0207 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .313 | P= .465 | P= .033 | P= .410 | P= .033 | P= .467 |
| KOLTQ2 | -.0130 | .0002 | -.2098 | -.3581 | .2169 | .4014 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .480 | P= .500 | P= .202 | P= .072 | P= .194 | P= .049 |
| LS1 | -.0423 | .0764 | .3480 | .7794 | -.2316 | -.0802 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .434 | P= .382 | P= .079 | P= .000 | P= .178 | P= .376 |
| MMSE | .5066 | .4521 | -.5736 | -.2956 | .2098 | .0357 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .016 | P= .030 | P= .006 | P= .117 | P= .202 | P= .444 |

## - - Correlation Coefficients - -

| | FES2 | GENDER | GROUP | IADL | KOLT1 | KOLT2 |
|---|---|---|---|---|---|---|
| A1 | -.1824 | -.0868 | -.0596 | .1232 | -.0325 | .0544 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .234 | P= .366 | P= .407 | P= .313 | P= .449 | P= .415 |
| A2 | -.4845 | -.1963 | .0826 | .2307 | .1142 | .0792 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .021 | P= .217 | P= .372 | P= .178 | P= .326 | P= .377 |
| AGE | -.2125 | .4773 | .1775 | .3234 | -.4441 | -.5864 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .199 | P= .023 | P= .240 | P= .095 | P= .032 | P= .005 |
| ACCOM | -.3664 | .1935 | .5698 | .5700 | -.3731 | -.4873 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .067 | P= .221 | P= .007 | P= .007 | P= .064 | P= .020 |
| BARTH1 | -.0215 | .2548 | .1547 | -.0207 | .4896 | .1330 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .466 | P= .154 | P= .270 | P= .467 | P= .020 | P= .299 |
| BARTH2 | .6310 | -.1623 | -.0439 | -.6247 | .2284 | .4170 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .002 | P= .260 | P= .431 | P= .003 | P= .181 | P= .043 |
| CHALL | .1812 | .1670 | -.2203 | -.0097 | -.0776 | -.2946 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .236 | P= .254 | P= .190 | P= .485 | P= .380 | P= .118 |
| COMMIT | -.4475 | -.2419 | .0181 | .1982 | -.1385 | .1066 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .031 | P= .167 | P= .472 | P= .215 | P= .292 | P= .337 |
| CONTROL | .0932 | .2296 | .0270 | .2124 | -.1476 | -.2338 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .356 | P= .180 | P= .458 | P= .199 | P= .279 | P= .175 |
| D1 | -.1266 | .0056 | .1626 | .5200 | .0254 | -.2948 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .308 | P= .491 | P= .260 | P= .013 | P= .460 | P= .117 |
| D2 | -.5629 | -.0173 | .2850 | .4325 | .0162 | -.2160 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .008 | P= .473 | P= .126 | P= .037 | P= .475 | P= .195 |

- - Correlation Coefficients - -

| | SHS1 |
|---|---|
| A1 | .6664 |
| | ( 18) |
| | P= .001 |
| A2 | .2307 |
| | ( 18) |
| | P= .178 |
| AGE | .0786 |
| | ( 18) |
| | P= .378 |
| ACCOM | .3003 |
| | ( 18) |
| | P= .113 |
| BARTH1 | -.0331 |
| | ( 18) |
| | P= .448 |
| BARTH2 | -.2425 |
| | ( 18) |
| | P= .166 |
| CHALL | .5515 |
| | ( 18) |
| | P= .009 |
| COMMIT | .6218 |
| | ( 18) |
| | P= .003 |
| CONTROL | .6318 |
| | ( 18) |
| | P= .002 |
| D1 | .5298 |
| | ( 18) |
| | P= .012 |
| D2 | .4832 |
| | ( 18) |
| | P= .021 |

- - Correlation Coefficients - -

| | FES2 | GENDER | GROUP | IADL | KOLT1 | KOLT2 |
|---|---|---|---|---|---|---|
| PERS1 | -.2643 | .0237 | .1466 | .2933 | -.0444 | -.0367 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .145 | P= .463 | P= .281 | P= .119 | P= .431 | P= .443 |
| PERS2 | -.0672 | .1523 | .4934 | .2752 | .0000 | -.0880 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .395 | P= .273 | P= .019 | P= .134 | P= .500 | P= .364 |
| SHS1 | -.0382 | .1302 | -.1074 | .2142 | -.1998 | -.2710 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .440 | P= .303 | P= .336 | P= .197 | P= .213 | P= .138 |

(Coefficient / (Cases) / 1-tailed Significance)

" . " is printed if a coefficient cannot be computed

- - Correlation Coefficients - -

| | FES2 | GENDER | GROUP | IADL | KOLT1 | KOLT2 |
|---|---|---|---|---|---|---|
| FES1 | .5198 | -.2593 | -.0592 | -.3500 | .1020 | .1769 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .014 | P= .149 | P= .408 | P= .077 | P= .344 | P= .241 |
| FES2 | 1.0000 | .0880 | -.2377 | -.5309 | .4123 | .3106 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= . | P= .364 | P= .171 | P= .012 | P= .045 | P= .105 |
| GENDER | .0880 | 1.0000 | .2425 | .1015 | .0882 | -.2002 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .364 | P= . | P= .166 | P= .344 | P= .364 | P= .213 |
| GROUP | -.2377 | .2425 | 1.0000 | .5068 | .1213 | -.2296 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .171 | P= .166 | P= . | P= .016 | P= .316 | P= .180 |
| IADL | -.5309 | .1015 | .5068 | 1.0000 | -.2284 | -.6181 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .012 | P= .344 | P= .016 | P= . | P= .181 | P= .003 |
| KOLT1 | .4123 | .0882 | .1213 | -.2284 | 1.0000 | .6514 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .045 | P= .364 | P= .316 | P= .181 | P= . | P= .002 |
| KOLT2 | .3106 | -.2002 | -.2296 | -.6181 | .6514 | 1.0000 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .105 | P= .213 | P= .180 | P= .003 | P= .002 | P= . |
| KOLTQ | .1955 | .6157 | .2598 | -.0091 | .5166 | .0074 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .218 | P= .003 | P= .149 | P= .486 | P= .014 | P= .488 |
| KOLTQ2 | .3665 | .1299 | -.1400 | -.5976 | .6603 | .8866 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .067 | P= .304 | P= .290 | P= .004 | P= .001 | P= .000 |
| LS1 | -.4035 | .2120 | .5657 | .4194 | -.3412 | -.3661 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .048 | P= .199 | P= .007 | P= .042 | P= .083 | P= .068 |
| MMSE | -.1584 | -.2747 | .0365 | .0177 | .4254 | .5753 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .265 | P= .135 | P= .443 | P= .472 | P= .039 | P= .006 |

- - Correlation Coefficients - -

| | SHS1 |
|---|---|
| FES1 | -.1809 |
| | ( 18) |
| | P= .236 |
| FES2 | -.0382 |
| | ( 18) |
| | P= .440 |
| GENDER | .1302 |
| | ( 18) |
| | P= .303 |
| GROUP | -.1074 |
| | ( 18) |
| | P= .336 |
| IADL | .2142 |
| | ( 18) |
| | P= .197 |
| KOLT1 | -.1998 |
| | ( 18) |
| | P= .213 |
| KOLT2 | -.2710 |
| | ( 18) |
| | P= .138 |
| KOLTQ | -.0121 |
| | ( 18) |
| | P= .481 |
| KOLTQ2 | -.2353 |
| | ( 18) |
| | P= .174 |
| LS1 | .0767 |
| | ( 18) |
| | P= .381 |
| MMSE | .0921 |
| | ( 18) |
| | P= .358 |

- - Correlation Coefficients - -

| | SHS1 |
|---|---|
| PERS1 | .0892 |
| | ( 18) |
| | P= .362 |
| PERS2 | .1430 |
| | ( 18) |
| | P= .286 |
| SHS1 | 1.0000 |
| | ( 18) |
| | P= . |

(Coefficient / (Cases) / 1-tailed Significance)

" . " is printed if a coefficient cannot be computed

## - - Correlation Coefficients - -

| | CARER | A2 | AGE | BARTH2 | CHALL | COMMIT |
|---|---|---|---|---|---|---|
| CARER | 1.0000 | -.2710 | .4436 | .5367 | .3174 | -.1436 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= . | P= .138 | P= .033 | P= .011 | P= .100 | P= .285 |
| A2 | -.2710 | 1.0000 | .0134 | -.3084 | -.0978 | .3412 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .138 | P= . | P= .479 | P= .107 | P= .350 | P= .083 |
| AGE | .4436 | .0134 | 1.0000 | -.2958 | .1322 | -.2734 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .033 | P= .479 | P= . | P= .117 | P= .301 | P= .136 |
| BARTH2 | .5367 | -.3084 | -.2958 | 1.0000 | .0800 | -.2216 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .011 | P= .107 | P= .117 | P= . | P= .376 | P= .188 |
| CHALL | .3174 | -.0978 | .1322 | .0800 | 1.0000 | .0619 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .100 | P= .350 | P= .301 | P= .376 | P= . | P= .404 |
| COMMIT | -.1436 | .3412 | -.2734 | -.2216 | .0619 | 1.0000 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .285 | P= .083 | P= .136 | P= .188 | P= .404 | P= . |
| CONTROL | .0096 | .2194 | .2027 | -.3105 | -.1255 | .2114 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .485 | P= .191 | P= .210 | P= .105 | P= .310 | P= .200 |
| D2 | -.1788 | .6997 | .0738 | -.3800 | .1550 | .6150 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .239 | P= .001 | P= .386 | P= .060 | P= .270 | P= .003 |
| FES2 | .3510 | -.4845 | -.2125 | .6310 | .1812 | -.4475 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .077 | P= .021 | P= .199 | P= .002 | P= .236 | P= .031 |
| GROUP | .0000 | .0826 | .1775 | -.0439 | -.2203 | .0181 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .500 | P= .372 | P= .240 | P= .431 | P= .190 | P= .472 |
| IADL | -.4284 | .2307 | .3234 | -.6247 | -.0097 | .1982 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .038 | P= .178 | P= .095 | P= .003 | P= .485 | P= .215 |

- - Correlation Coefficients - -

| | CARER | A2 | AGE | BARTH2 | CHALL | COMMIT |
|---|---|---|---|---|---|---|
| KOLT2 | -.0202 | .0792 | -.5864 | .4170 | -.2946 | .1066 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .468 | P= .377 | P= .005 | P= .043 | P= .118 | P= .337 |
| KOLTQ2 | .2683 | .0002 | -.2098 | .4014 | -.1798 | -.0076 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .141 | P= .500 | P= .202 | P= .049 | P= .238 | P= .488 |
| LS1 | .1911 | .0764 | .3480 | -.0802 | .1709 | .1272 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .224 | P= .382 | P= .079 | P= .376 | P= .249 | P= .307 |
| PERS2 | -.0507 | .4283 | .2485 | -.0116 | -.2767 | .0700 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .421 | P= .038 | P= .160 | P= .482 | P= .133 | P= .391 |
| SHS1 | .1308 | .2307 | .0786 | -.2425 | .5515 | .6218 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .302 | P= .178 | P= .378 | P= .166 | P= .009 | P= .003 |

(Coefficient / (Cases) / 1-tailed Significance)

" . " is printed if a coefficient cannot be computed

- - Correlation Coefficients - -

| | KOLTQ2 | LS1 | PERS2 | SHS1 |
|---|---|---|---|---|
| KOLT2 | .8866 | -.3661 | -.0880 | -.2710 |
| | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .000 | P= .068 | P= .364 | P= .138 |
| KOLTQ2 | 1.0000 | -.2643 | -.0188 | -.2353 |
| | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= . | P= .145 | P= .470 | P= .174 |
| LS1 | -.2643 | 1.0000 | -.0369 | .0767 |
| | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .145 | P= . | P= .442 | P= .381 |
| PERS2 | -.0188 | -.0369 | 1.0000 | .1430 |
| | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .470 | P= .442 | P= . | P= .286 |
| SHS1 | -.2353 | .0767 | .1430 | 1.0000 |
| | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .174 | P= .381 | P= .286 | P= . |

(Coefficient / (Cases) / 1-tailed Significance)

" . " is printed if a coefficient cannot be computed

- - Correlation Coefficients - -

| | KOLTQ2 | LS1 | PERS2 | SHS1 |
|---|---|---|---|---|
| CARER | .2683 | .1911 | -.0507 | .1308 |
| | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .141 | P= .224 | P= .421 | P= .302 |
| A2 | .0002 | .0764 | .4283 | .2307 |
| | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .500 | P= .382 | P= .038 | P= .178 |
| AGE | -.2098 | .3480 | .2485 | .0786 |
| | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .202 | P= .079 | P= .160 | P= .378 |
| BARTH2 | .4014 | -.0802 | -.0116 | -.2425 |
| | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .049 | P= .376 | P= .482 | P= .166 |
| CHALL | -.1798 | .1709 | -.2767 | .5515 |
| | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .238 | P= .249 | P= .133 | P= .009 |
| COMMIT | -.0076 | .1272 | .0700 | .6218 |
| | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .488 | P= .307 | P= .391 | P= .003 |
| CONTROL | -.2029 | -.1371 | .4537 | .6318 |
| | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .210 | P= .294 | P= .029 | P= .002 |
| D2 | -.1847 | .3735 | .2101 | .4832 |
| | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .232 | P= .063 | P= .201 | P= .021 |
| FES2 | .3665 | -.4035 | -.0672 | -.0382 |
| | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .067 | P= .048 | P= .395 | P= .440 |
| GROUP | -.1400 | .5657 | .4934 | -.1074 |
| | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .290 | P= .007 | P= .019 | P= .336 |
| IADL | -.5976 | .4194 | .2752 | .2142 |
| | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .004 | P= .042 | P= .134 | P= .197 |

- - Correlation Coefficients - -

| | CONTROL | D2 | FES2 | GROUP | IADL | KOLT2 |
|---|---|---|---|---|---|---|
| KOLT2 | -.2338 | -.2160 | .3106 | -.2296 | -.6181 | 1.0000 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .175 | P= .195 | P= .105 | P= .180 | P= .003 | P= . |
| KOLTQ2 | -.2029 | -.1847 | .3665 | -.1400 | -.5976 | .8866 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .210 | P= .232 | P= .067 | P= .290 | P= .004 | P= .000 |
| LS1 | -.1371 | .3735 | -.4035 | .5657 | .4194 | -.3661 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .294 | P= .063 | P= .048 | P= .007 | P= .042 | P= .068 |
| PERS2 | .4537 | .2101 | -.0672 | .4934 | .2752 | -.0880 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .029 | P= .201 | P= .395 | P= .019 | P= .134 | P= .364 |
| SHS1 | .6318 | .4832 | -.0382 | -.1074 | .2142 | -.2710 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .002 | P= .021 | P= .440 | P= .336 | P= .197 | P= .138 |

(Coefficient / (Cases) / 1-tailed Significance)

" . " is printed if a coefficient cannot be computed

## - - Correlation Coefficients - -

| | CONTROL | D2 | FES2 | GROUP | IADL | KOLTZ |
|---|---|---|---|---|---|---|
| CARER | .0096 | -.1788 | .3510 | .0000 | -.4284 | -.0202 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .485 | P= .239 | P= .077 | P= .500 | P= .038 | P= .468 |
| A2 | .2194 | .6997 | -.4845 | .0826 | .2307 | .0792 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .191 | P= .001 | P= .021 | P= .372 | P= .178 | P= .377 |
| AGE | .2027 | .0738 | -.2125 | .1775 | .3234 | -.5864 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .210 | P= .386 | P= .199 | P= .240 | P= .095 | P= .005 |
| BARTH2 | -.3105 | -.3800 | .6310 | -.0439 | -.6247 | .4170 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .105 | P= .060 | P= .002 | P= .431 | P= .003 | P= .043 |
| CHALL | -.1255 | .1550 | .1812 | -.2203 | -.0097 | -.2946 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .310 | P= .270 | P= .236 | P= .190 | P= .485 | P= .118 |
| COMMIT | .2114 | .6150 | -.4475 | .0181 | .1982 | .1066 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .200 | P= .003 | P= .031 | P= .472 | P= .215 | P= .337 |
| CONTROL | 1.0000 | .1802 | .0932 | .0270 | .2124 | -.2338 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= . | P= .237 | P= .356 | P= .458 | P= .199 | P= .175 |
| D2 | .1802 | 1.0000 | -.5629 | .2850 | .4325 | -.2160 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .237 | P= . | P= .008 | P= .126 | P= .037 | P= .195 |
| FES2 | .0932 | -.5629 | 1.0000 | -.2377 | -.5309 | .3106 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .356 | P= .008 | P= . | P= .171 | P= .012 | P= .105 |
| GROUP | .0270 | .2850 | -.2377 | 1.0000 | .5068 | -.2296 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .458 | P= .126 | P= .171 | P= . | P= .016 | P= .180 |
| IADL | .2124 | .4325 | -.5309 | .5068 | 1.0000 | -.6181 |
| | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) | ( 18) |
| | P= .199 | P= .037 | P= .012 | P= .016 | P= . | P= .003 |