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Self-Care after Traumatic Injury and
the Use of the Therapeutic Self-Care Scale in Trauma Populations

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Abstract

Aim: This paper is a report of a correlational study of the relationship between gender, age, severity of injury, length of hospital stay and self-care behaviour in patients with traumatic injuries.

Background: This study may provide a foundation for targeted nursing intervention and education programs to help patients better recover from their injury, which is a fundamental aspect of nursing.

Design: A longitudinal cohort study

Method: This study of patients hospitalised for traumatic injury was conducted from May 2006 until November 2007. The Therapeutic Self Care Scale (TSCS) along with demographic and clinical data, were completed at three and six months after hospital discharge. Using data from the three-month survey, the validity and reliability of the scale was calculated. Multiple regression was used to identify predictors of self-care at three and six months.

Finding: Patients (n=125) completed the questionnaire at three months and 103 patients completed it at six. Self-care was high on both occasions and high self-care at three months was related to high self-care at six months. Older patients reported higher self-care at three months compare to younger patients. Factor analysis of the TSCS revealed three clear components; taking medication, recognition and managing symptoms and managing changes in health conditions, which explained a total of 59.7% of the variance. The 10 items revised scale was reliable, with a Cronbach's alpha of 0.85.

Conclusion: The findings indicate that self-care remains fairly high and stable in the first six months after trauma. The revised TSCS was valid and reliable in the trauma population.

Keywords
Self-care, Traumatic Injury, Recovery, Measurements, Nursing

What is already known about this topic

- Patients that have experienced a traumatic injury frequently report a compromised health, yet measures for evaluation of self-care in this population are limited.
- Age and gender predicts self-care in various groups such as patients with diabetes, heart failure and chronic lung disease.
- Severity of injury is associated with recovery in patients who have experienced a traumatic injury but their self-abilities are poorly understood.

What this papers adds

- After trauma, many patients report relatively high level of self-care behaviour in their first six months of recovery.
- At three months after hospitalisation, older people who have had a traumatic injury report more self-care behaviour than younger people.
- The revised Therapeutic Self Care Scale is a valid measure that can be used in the trauma population.

Implications for practice and/or policy

- If nurses are able to understand patients' ability to self-care, they may be better able to recommend appropriate support and community services.
- The Therapeutic Self Care Scale is short and amenable for use in the clinical setting.
- The theory of self-care can be used as a foundation in the rehabilitation process.

Introduction

Traumatic injury is not only the leading cause of death for people less than 45 years of age (Peden *et al*. 2002, World Health Organisation 2008), but is also a major contributor to the overall burden of disease (Peden, McGee *et al*. 2002). Individuals who sustain moderate to severe traumatic injuries are likely to report compromised health (Sluys *et al*. 2005, Ringdal *et al*. 2009, Vles *et al*. 2005), quality of life (Aitken *et al*. 2007) and ability to return to work (Brenneman *et al*. 1997, Ringdal *et al*. 2006). They are likely to experience a variety of symptoms such as pain, fatigue and weight loss in the months (Lee *et al*. 2008) and even years after their injuries (Ringdal *et al*. 2010). Consequently, many injured people are likely to require long term health and social services and may experience frequent readmissions to hospital (Cameron *et al*. 2006).

The theory of self-care (Orem 1985, 2001) can be used as a foundation for nursing care in the rehabilitation process. After people experience a traumatic injury, their ability to take care of themselves may be compromised (Vles *et al*. 2005). Although the ability to self-care following injury is an outcome that is potentially sensitive to nursing intervention (Sidani 2003), it is poorly understood. Consequently, it is usually overlooked in acute care treatment regimes. Accurate measurement of self-care is a prerequisite to understanding and responding to individuals' needs for services following injury.

Understanding self-care is fundamental to successful management of both acute and chronic conditions as well as the long-term promotion of health (Sidani 2003, Wilkinson and Whitehead 2009). In defining self-care, Sidani concluded that it was the individual's 'perceived ability and/or actual performance of the actions or behaviours related to health maintenance and promotion, disease prevention and self-care treatment' (2003 p.69). Although several other definitions of self-care can be found in the nursing literature (for example see Braden 1993 and Denyes *et al*. 2001), they commonly include a focus on

individuals' ability to use their initiative to maintain their own health, take responsibility for promoting well-being and seek treatment or other necessary support when needed. Thus, self-care is comprised of two interrelated concepts; self-care ability and actual self-care behaviour. The first refers to the capacity to perform care by oneself for oneself and the second to the activities an individual actually performs to manage their condition. Although interrelated, these two components may not necessarily co-exist.

Background

The conceptual framework for this study was developed from a review of a literature on recovery from injury and was informed by self-care theory (Orem, 2001) and a systematic review and concept analysis of self-care (Sidani 2003). Orem's theory of self-care incorporates three different components; self-care, self-care deficit and the theory of nursing systems. The last one allows nurses to help patients when they have self-care deficit. Orem's theory focuses on the patient as an individual person. The theory of nursing systems includes the nurse's ability to assist the individual when needed to archive independence. These nursing actions are necessary for the patients to recover from injury and trauma (Orem 2001). For patients with physical trauma, severity of injury can be an issue. Hospital and ICU-stay may also reflect the impact of trauma severity. We hypothesised that gender, age, severity of injury and length of hospital stay (LOS) would predict self-care.

In the past several years, self-care has been studied in a variety of contexts, including people with diabetes (Bai *et al*. 2009, Wang and Tak-Ying Shiu 2004, Gatt and Sammut 2008), heart failure (Shuldham *et al*. 2007, Holst *et al*. 2007) and chronic lung disease (Kara Kasikci and Alberto 2007, Rootmenson 2008). Much of this research has shown that both gender and age can affect self-care. However, the findings in relation to age have been equivocal. For instance, younger people have been found to be more likely to exhibit self-care

behaviours (Andersson *et al*. 1999) and to express greater preference to participate in medical decisions than older people (Gibson *et al*. 1995, Hamann *et al*. 2007). However, there are studies where older patients have demonstrated higher levels of self-care behaviour. For instance, older diabetic patients have been found to be more likely to monitor glucose levels (Albright *et al*. 2001), use a home blood pressure monitor, take medication (Ryan *et al*. 2009); and seek help from a doctor (Andersson *et al*. 1999).

In addition to age, gender has been consistently found to impact on self-care behaviours (Verbrugge 1985, Mahalik *et al*. 2007). Female heart failure patients have been found to have a greater knowledge of self-care (Ni *et al*. 1999) and be more likely to use complementary and alternative therapists (Ryan *et al*. 2009), over-the-counter medicines, (Ryan *et al*. 2009), home blood pressure monitoring devices (Ryan *et al*. 2009 andersson *et al*. 1999), prescribed medicines (Andersson *et al*. 1999) and have a higher preference to participate in medical decision-making (Hamann *et al*. 2007). Males, however, are more likely to undertake exercise as instructed (Albright *et al*. 2001).

Additionally, it seems self-evident that clinical factors such as severity of illness or injury may influence self-care behaviours. In the traumatic injury population, severity is measured by the Injury Severity Scale (ISS) (Baker *et al*. 1974) which has been associated with both recovery (Weninger *et al*. 2008) and quality of life (Ringdal *et al*. 2010). Yet, despite the assertion that self-care is an important construct for nursing practice, it remains poorly understood in the traumatic injury population.

The study

Aim

The aim of this study was to examine the relationship between gender, age, severity of injury, length of hospital stay and self-care behaviour in people with traumatic injuries.

Design

The study employed a longitudinal correlational design, with data collection at three and six months following hospital discharge.

Sample

The settings consisted of two metropolitan teaching hospitals in Queensland, Australia. Patients who were admitted to the hospital following a traumatic injury were invited to participate in the study. They were eligible participate if they resided in Australia, were 18 years of age or older and had a hospital length of stay of 24 hours or greater. Patients were excluded if they were transferred within 24 hours to another ward for unrelated treatment or remained an inpatient for more than 24 hours due to causes other than acute treatment of injury. Burns, hangings, poisonings and other injuries not caused by force (e.g. pathological fracture) were excluded. Potential participants were identified in the Emergency Department by the Trauma Registry Nurse. Once patients were admitted to hospital and stable, a staff member told them about the study. If patients agreed a member of the research team then visited the patient and was provided with a detailed explanation about the study and an information summary sheet was provided to them. If they agreed to participate, patients signed a consent form.

Data Collection

Data were collected from May 2006 - November 2007. Consenting patients completed a demographic questionnaire at discharge and clinical data (e.g., length of stay, illness severity) were collected from hospital records. Length of stay represented the time in days from admission to discharge. The ISS were used to assess injury severity. At three and six months

following discharge, participants completed a mailed questionnaire that included further demographic questions and the Therapeutic Self Care Scale (TSCS) (Doran *et al*. 2002). Non-responders were telephoned up to five times following one written reminder, but if they still did not respond, they were considered to have withdrawn from the study.

The self-administered 12-item TSCS (Doran *et al*. 2002) was comprised of four subscales; Taking Medications (3 items), Recognising and Managing Symptoms (4 items), Managing Changes in Health Conditions (3 items) and Activities of Daily Living (ADL) (2 items). Responses were rated on a six-point likert scale ranging from 0 (low self-care) - 5 (high self-care) and a mean total scale score was calculated in addition to the sub-scale scores. In previous research, the Cronbach's alpha reliability of the TSCS was 0.88 (Doran *et al*. 2002) and its four subscales were 0.66-0.89 respectively.

Ethical considerations

The study was approved by the Ethics Committees at the university and the two participating hospitals. All participants consented to be involved in the study.

Data Analysis

The 12 items of the TSCS were subjected to Principal Components Analysis (PCA) with varimax rotation using data from the three-month survey. This time point was selected as it represented the follow-up point with the highest response rate and reflected the experiences of participants following a reasonable period at home. Prior to the performing PCA the suitability of data for factor analysis was assessed. Inspection of the correlation matrix revealed the presence of several negative correlations associated with item 11 from the ADL subscale (Do you perform your regular activities such as bathing, shopping, preparing meals, visiting with friends?) and its anti-image correlation was below 0.5. Thus, the item was

removed. Item 8 from the ADL subscale (Do you do things or activities to look after yourself and to maintain your health in general?) produced very low correlations in the anti-image correlation so was also removed. The remaining 10 items had a KMO value of 0.70 and supporting the factorability of the correlation matrix (Polit 1996, Pett *et al.* 2003). The reliability of the total scale (10 items) and the subscales was calculated using the Cronbach's alpha.

Descriptive statistics were used to summarise the sample characteristics and scores on the TSCS. A paired sample t-test was used to identify changes in scores for TSCS and its subscales from three to six months. Multiple linear regression analysis was used to explore the relationships between gender, age, severity and length of stay and the dependent variable, self-care, at three months. A similar regression analysis was undertaken at six months, after controlling for three-month self-care. SPSS version 17 was used for all analyses. Statistical significance was defined as a p value <0.05 in all analyses. For this study, an *a priori* power analysis was used to estimate the required sample size. The alpha was set at 0.05. To achieve power of 0.80 and a medium effect size (f^2 =0.15) with five predictors in the regression model, a minimum sample size of 91 participants was required for an R^2 of 0.05.

Results

A total of 194 participants completed the discharge survey, 125 (65%) completed the TSCS at three months and 103 (53%) completed it at six months. In total 65 (34%) were lost to follow-up, 10 (5%) withdrew and four (2%) had died, however 12 (6%) others did not have complete TSCS data and were subsequently excluded from the analysis. Participants who completed the six month data collection were similar to those who did not complete it in regards to ISS, hospital length of stay, marital status and income at baseline, however completers were significantly older than non completers (mean age 47 versus 38 years, p =

0.002). As shown in Table 1 about two thirds of the sample were male and about half were married. Although age varied considerably, on average, participants were in their mid to late 40's. Mean ISS was about 11. Just under half of the sample wasnvolved in road traffic crashes and about three quarters required surgery. The majority of participants did not require admission to the intensive care unit.

The TSCS PCA revealed the presence of three clear components (i.e. no mixed loadings), each with eigenvalues exceeding 1. The items that loaded on the three factors corresponded to the *a priori* subscales 'Taking Medications', 'Recognising and Managing Symptoms' and 'Managing Changes in Health Conditions'. The two items that constituted the fourth *a priori* subscale, ADL, had already been removed. The three factor solution explained a total of 59.7% of the variance. Table 3 displays the Cronbach's alpha reliabilities of the 10-item scale at both three and six months. To note, the total scale and two subscales showed reasonable reliability (range 0.70–0.85), however the Managing Changes in Health Conditions subscale was low at both time points.

Self-care scores were high at both three and six months (Table 3), with no significant difference between the two time periods on the total scale or any of the sub-scales. At three months post discharge, multiple regression analysis revealed a significant relationship between age and self-care, with older people having higher total self-care scores (Table 4). Age explained 7% of the variance in self-care scores with the variables age, length of stay, ISS and gender explaining 10% of the variance. None of the independent variables were related to self-care scores at six months post-injury other than three-month self-care scores. As expected, higher scores at three months were related to higher scores at six months, but only 35% of the variance was explained by the variables of age, length of stay, gender, ISS and three-month TSCS scores (Table 4), indicating that other factors may contribute to the longer-term prediction of self-care.

Discussion

Orem (2001) suggests that normally, adults are able to care for themselves but due to illness or injury, they may have self-care deficits and need the assistance of nurses. In this study, at three and six months after moderate to severe traumatic injuries, patients did not appear to have self-care deficits that would require nursing interventions. However, it is possible that patients may have benefited from nursing assistance during the more acute phase of their recovery. Importantly, the revised TSCS appears to be a short and simple tool that accurately measures self-care. The TSCS has not been used in this population before to our knowledge. Our analysis showed that after deleting the two-item ADL subscale, the PCA results at three months after hospital discharge were consistent with the three remaining subscales, Taking Medications (3 items), Recognising and Managing Symptoms (4 items) and Managing Changes in Health Conditions. This solution supported the construct validity of the revised 10-item scale.

Overall, the TSCS scale was reliable (i.e. internally consistent) in our sample. However, the subscale, Managing Changes in Health Conditions was least reliable at both points in time. It is likely that at this early stage in the recovery process following traumatic injury, physical changes in health remain unpredictable and erratic. Thus, this subscale may not be useful in this population until such time as the physical recovery trajectory has stabilised. However, given that Cronbach's alpha coefficients are influenced by the number of items contained in each scale, it is possible that reliability would improve with the inclusion of more items. That is, currently the subscales are relatively short, consisting of three to four items each.

We found that at three and six months following discharge from hospital, individuals with traumatic injury reported consistently high self-care scores. This finding may indicate a

ceiling effect for this population, which is not surprising for several reasons. Following traumatic injury, people focuses on their physical recovery which may artificially inflate the relevance of self-care items to their life. They are may be undergoing an intense rehabilitation program of some kind, during which they are actively reporting to therapists on their physical progress, plotting their recovery trajectory and focusing on gains and losses in physical capacity. This focus may temporarily enhance their perception that they are engaging in self-care behaviour.

It is also possible that these individuals have yet to face some of the significant daily health problems that can be experienced following a serious injury (e.g., long-term pain, chronic fatigue and issues around medication adherence and accessing services). There is some evidence that by six months post-discharge, many of these difficulties may not yet have become apparent (Hodgkinson *et al*. 2000, Gabbe *et al*. 2007) and participants are still receiving high levels of support from family and friends (Foster and Chaboyer 2003). Thus, early self-care ratings may be inherently vulnerable to ceiling effects simply because participants may not be fully aware of the difficulties that will require management in the long-term (Holtslag, van Beeck *et al* 2007).

A phenomenon known as response shift (Hawkins and Osborne 2005, Osborne *et al*. 2006) may also account for these findings. This effect has been found among individuals with chronic disease in that following attendance at a self-care training program, individuals appeared to decline (or at least not improve) in their level of self-care despite the fact that interventions were designed to increase their capacity. It was concluded that this effect reflected elevated self-care scores prior to intervention. Indeed, a feature of the intervention was to raise awareness about opportunities for self-care that had not previously been evident to participants. For those with diseases created by lifestyle factors, this response shift was considered to be a desirable outcome (i.e., a realisation that they were not actually self-caring

adequately prior to the intervention despite rating themselves highly). Given the newly injured status of our participants, it is not surprising to find high levels of self-reported self-care at this point in time. For this population, there may have not been the opportunity for them to explore the limits of their self-care behaviour or fully appreciate the impact of their injury on their daily lives.

Finally, it is possible that the response format of the self-care items precipitated a response bias. For instance, as the items focused on questions such as 'do you know how to ……' or 'do you understand ……', participants may have been encouraged to represent themselves positively. This potential bias might have been exacerbated by the fact that most were still receiving physical rehabilitation and were actively involved in their medical treatment. At this stage of rehabilitation, people may feel well informed about their condition and what is required of them. However, without the structures and supports of the rehabilitation system, it is less clear as to whether or not they would put this self-care knowledge into practice. In future versions of the Therapeutic Self-care Scale, consideration could be given to using alternative phrases that reflect actual performance as well as knowledge. This effect may be particularly important in the current population given that participants are likely to be well informed, but still physically dependent (i.e., high on self-care knowledge, but lower self-care behaviour).

It was interesting to note that the only explanation of self-care at three months was age, with older participants reporting higher scores. This finding suggests that younger people may require additional assistance to self-care during their rehabilitation. However, age was no longer a significant explanation of self-care at six month after three month self-care was entered into the equation. Indeed, only three month self-care scores predicted subsequent self-care, suggesting that, over time, prior self-care behaviour may become more important than other factors. This finding indicates the importance of an early rehabilitation focus on

improving self-care capacity. Given the protracted recovery period that is often associated with traumatic injury and the move towards the promotion of self-management among those with chronic conditions, this study may provide a foundation for targeted nursing interventions and patient education programs in the future.

Study limitations

This study has several limitations created by the small sample size, however a post-hoc power analysis was done to calculate alpha. Based on R^2 of 0.10 a sample size of 125 an alpha of 0.05 a power of 80% was achieved. We lost 22 participants (12%) at the six month follow-up although this is reasonable small for clinical populations and reflective of the traumatic injury population (e.g., Begg *et al*. 2007, Harth *et al*. 2008, Cameron *et al*. 2005). However, it is possible that these participants were those who were self-caring adequately that further engagement in the study was not considered necessary. Alternatively, it may be possible that those who dropped out of the study were experiencing difficulties with self-care. With a larger sample, it may have been possible to distinguish smaller differences in self-care over time and may also have identified other factors associated with self-care. However, the current findings indicate that self-care is likely to remain fairly stable until later in the recovery trajectory, supporting the need for longer-term follow-up studies in the injury field.

Conclusion

This study has identified the fact that self-care three month after discharge from hospital is an important explanation of eventual self-care in a longer perspective. When injured people are no longer accessing the structured support provided by the rehabilitation and outpatient environment, they are likely to be at risk of declining self-care. However, if self-care is promoted at the early stage of recovery, then our data suggests that we may have provided a

good grounding for longer-term self-care. Thus, understanding the self-care abilities and behaviours of various patient groups may assist nurses and other health professionals in considering the types of services they provide at discharge. To achieve this, however, a slightly different set of skills may be required of physicians and nurses in the acute setting.

Conflict of interest

The authors confirm that there are no conflicts of interest in this current study.

References

Aitken L.M., Davey T.M., Ambrose J., Connelly L.B., Swanson C. & Bellamy N. (2007) Health outcomes of adults 3 months after injury. *Injury,* **38**(1), 19-26.

Albright T.L., Parchman M., Burge S.K. & RRNeST Investigators (2001) Predictors of self-care behavior in adults with type 2 diabetes: An RRNeST study. *Family Medicine,* **33**(5), 354-60.

Andersson H.I., Goran E., Ido L. & Bengt S. (1999) Impact of chronic pain on health care seeking, self care and medication. Results from a population-based Swedish study. *Journal of Epidemiology and Community Health,* **53**(8), 503.

Bai Y.L., Chiou C.P. & Chang Y.Y. (2009) Self-care behaviour and related factors in older people with Type 2 diabetes. *Journal of Clinical Nursing,* **18**(23), 3308-15.

Baker S.P., O'Neill B., Haddon W., Jr. & Long W.B. (1974) The injury severity score: a method for describing patients with multiple injuries and evaluating emergency care. *Journal of Trauma,* **14**(3), 187-96.

Begg S., Vos T., Barker B., Stevenson C., Stanley L. & Lopez A.D. (2007) *The burden of disease and injury in Australia 2003. PHE 82.,* AIHW, Canberra.

Braden C.J. (1993) Research program on learned response to chronic illness experience: self-help model. *Holistic Nursing Practioner,* **8**(1), 38-44.

Brenneman F.D., Redelmeier D.A., Boulanger B.R., McLellan B.A. & Culhane J.P. (1997) Long-term outcomes in blunt trauma: who goes back to work? *Journal of Trauma,* **42**(5), 778-81.

Cameron C.M., Purdie, D.M., Kliewer E.V. & McClure R.J. (2005) Long-term mortality following trauma: 10 year follow-up in a population-based sample of injured adults. *Journal of Trauma,* **59**(3), 639-46.

Cameron C.M., Purdie D.M., Kliewer E.V. & McClure R.J. (2006) Ten-year health service use outcomes in a population-based cohort of 21,000 injured adults: the Manitoba injury outcome study. *Bull World Health Organ,* **84**(10), 802-10.

Denyes M.J., Orem D.E., Bekel G. & SozWiss (2001) Self-care: a foundational science. *Nursing Science Q,* **14**(1), 48-54.

Doran D.I., Sidani S., Keatings M. & Doidge D. (2002) An empirical test of the Nursing Role Effectiveness Model. *Journal of Advanced Nursing,* **38**(1), 29-39.

Foster M., Chaboyer W. (2003) Family carers of ICU survivors: a survey of the burden they experience. *Scandinavian journal of caring sciences* **17**(3), 205-14

Gabbe B.J., Sutherland A.M., Williamson O.D. & Cameron, P.A. (2007) Use of health care services 6 months following major trauma. *Australien Health Review,* **31**(4), 628-32.

Gatt S. & Sammut R. (2008) An exploratory study of predictors of self-care behaviour in persons with type 2 diabetes. *International Journal of Nursing Studies,* **45**(10), 1525-33.

Gibson P.G., Talbot P.I. & Toneguzzi R.C. (1995) Self-management, autonomy and quality of life in asthma. *Chest,* **107**(4), 1003-08.

Hamann J., Neuner B., Kasper J., Vodermaier A., Loh A., Deinzer A., Heesen C., Kissling W., Busch R., Schmieder R., Spies C., Caspari C. & Harter M. (2007) Participation preferences of patients with acute and chronic conditions. *Health Expectations,* **10**(4), 358-63.

Harth A., Germann G. & Jester A. (2008) Evaluating the effectiveness of a patient-oriented hand rehabilitation programme. *The Journal of Hand Surgery (European),* **33E**(6), 771-78.

Hawkins M. & Osborne R.H. (2005) Response shift: The measurable and desired outcome of chronic disease self-management programs that violates pre-post assessment. *Preventing Chronic Disease,* **2**(2), 1-2.

Hodgkinson A., Veerabangsa A., Drane D. & McCluskey A. (2000) Service utilization following traumatic brain injury. *Journal of Head Trauma Rehabilily,* **15**(6), 1208-26.

Holst M., Willenheimer R., Martensson J., Lindholm M. & Stromberg A. (2007) Telephone follow-up of self-care behaviour after a single session education of patients with heart failure in primary health care. *European Journal of Cardiovascular Nursing,* **6**(2), 153-59.

Kara Kasikci M. & Alberto J. (2007) Family support, perceived self-efficacy and self-care behaviour of Turkish patients with chronic obstructive pulmonary disease. *Journal of Clinical Nursing,* **16**(8), 1468-78.

Lee B.O., Chaboyer W. & Wallis M. (2008) Predictors of health-related quality of life 3 months after traumatic injury. *Journal of Nursing Scholarship,* **40**(1), 83-90.

Mahalik J.R., Burns S.M. & Syzdek M. (2007) Masculinity and perceived normative health behaviors as predictors of men's health behaviors. *Social Science & Medicine,* **64**(11), 2201-09.

Ni H., Nauman D., Burgess D., Wise K., Crispell K. & Hershberger R.E. (1999) Factors influencing knowledge of and adherence to self-care among patients with heart failure. *Archives of Internal Medicine,* **159**(14), 1613-19.

Orem D.E. (1985) A concept of self-care for the rehabilitation client. *Rehabilitation Nursing* **10**(3), 33-36.

Orem D.E. (2001) Nursing: Concepts of practice, 6th edn. Mosby, St. Louis.

Osborne R.H., Hawkins M. & Sprangers M.A. (2006) Change of perspective: a measurable and desired outcome of chronic disease self-management intervention programs that violates the premise of preintervention/postintervention assessment. *Arthritis and Rheumatism,* **55**(3), 458-65.

Peden M., McGee K. & Krug E. (2002) *Injury: A leading cause of the global burden of disease, 2000,* World Health Organisation, Geneva.

Pett M., Lackey N. & Sullivan J. (2003) *Making sense of Factor Analysis,* Sage Publications, Thousends Oaks.

Polit D. (1996) *Statistics and Data Analysis for Nursing Research,* Julir Leving Alexander.

Ringdal M., Johansson L., Lundberg D. & Bergbom I. (2006) Delusional memories from the intensive care unit - Experienced by patients with physical trauma. *Intensive Critical Care Nursing,* **22**(6), 346-54.

Ringdal M., Plos K., Lundberg D., Johansson L. & Bergbom I. (2009) Outcome following injury: Memories, Health-Related Quality of Life, Anxiety and symptoms of Depression after Intensive Care. *Journal of Trauma,* **66** (4), 1226-33.

Ringdal M., Plos K., Ortenwall P. & Bergbom I. (2010) Memories and health-related quality of life after intensive care: a follow-up study. *Critical Care Medicine,* **38**(1), 38-44.

Rootmenson G.N., van Keimpema A. R. J., Looysen E. E., van der Shaaf L., de Haan R. J., & Jansen H. M. (2008) The effects of additional care by a pulmonary nurse for asthma and COPD patients at a respiratory outpatient clinic: Results from a double blind, randomized clinical trial. *Patient Education & Counseling,***70,** 179-186.

Ryan A., Wilson S., Taylor A. & Greenfield S. (2009) Factors associated with self-care activities among adults in the United Kingdom: a systematic review. *BMC Public Health,* **9**, 96.

Shuldham C., Theaker C., Jaarsma T. & Cowie M.R. (2007) Evaluation of the European Heart Failure Self-care Behaviour Scale in a United Kingdom population. *Journal of Advanced Nursing,* **60**(1), 87-95.

Sidani S. (2003) Self Care. In *Nursing-sensitive outcome state of the science* Doran, D. ed. Jones and Barlett, Boston, pp. 65-113.
Sluys K., Haggmark T. & Iselius L. (2005) Outcome and quality of life 5 years after major trauma. *Journal of Trauma,* **59**(1), 223-32.
Wang J.Q. & Tak-Ying Shiu A. (2004) Diabetes self-efficacy and self-care behaviour of Chinese patients living in Shanghai. *Journal of Clinical Nursing,* **13**(6), 771-72.
Weninger P., Aldrian S., Koenig F., Vecsei V. & Nau T. (2008) Functional recovery at a minimum of 2 years after multiple injury-development of an outcome score. *Journal of Trauma,* **65**(4), 799-808; discussion 808.
Verbrugge L.M. (1985) Gender and health: An update on hypotheses and evidence. *Journal of Health and Social Behavior,* **26**(3), 156-82.
Wilkinson A. & Whitehead L. (2009) Evolution of the concept of self-care and implications for nurses: a literature review. *International Journal of Nursing Studies,* **46**(8), 1143-47.
Vles W.J., Steyerberg E.W., Essink-Bot M.L., van Beeck E.F., Meeuwis J.D. & Leenen L.P. (2005) Prevalence and determinants of disabilities and return to work after major trauma. *Journal of Trauma,* **58**(1), 126-35.
World Health Organisation (2008) *The global burden of disease: 2004 update,* WHO Press, Geneva.

Table 1: Characteristics of the Sample

Characteristic	3 Months n = 125 Frequency (%)	6 Months n = 103 Frequency (%)
Male	83 (66)	66 (64)
Married or 'de facto'	69 (55)	58 (56)
Mechanism of Injury		
Traffic accident	59 (47)	45 (44)
Falls	34 (27)	31 (30)
Animal related accident	6 (5)	6 (6)
Other	26 (21)	21 (19)
Required Surgery	92 (74)	75 (73)
Admitted to an Intensive Care Unit	10 (5)	7 (4)
	Mean (SD)	Mean (SD)
Age	45.0 (17.5)	48.9 (16.6)
Injury Severity Score	11.3 (8.0)	10.4 (7.1)
Hospital Length of Stay	13.7 (14.0)	13.6 (13.1)

Table 2: PCA Component Matrix with Varimax Rotation

Item (Item Number)	Factor 1 Taking Medications	Factor 2 Changes in Symptoms	Factor 3 Managing Changes in Health
Do you know what medication you have to take? (1)	0.863		
Do you understand the purpose of the medications prescribed to you (that is, do you know what the medications do for your health condition)? (2)	0.804		
Do you take the medications as prescribed? (3)	0.783		
Do you know what to do (things or activities) to control these changes in your body (symptoms)? (6)		0.758	
Do you carry out the treatments or activities you have been taught to manage these changes in your body (symptoms)? (7)		0.754	
Do you know and understand why you experience some changes in your body (symptoms) related to your illness or health condition? (5)		0.722	
Can you recognise the changes in your body (symptoms) that are related to your illness or health condition? (4)		0.510	
Do you know whom to contact to get help in carrying out your daily activities? (9)			0.745
Do you know who to contact in case of a medical emergency? (10)			0.723
Do you adjust your regular activities when you experience body changes (symptoms) related to your injury? (12)			0.507
Percent of variance explained	21.9%	21.1%	16.8%

Table 3: Summary of Therapeutic Self Care at Three and Six Months

Subscale	3 Months n = 125		6 Months n = 103	
	Cronbach's alpha	Mean (SD)	Cronbach's alpha	Mean (SD)
Taking Medications	0.80	4.7 (0.73)	0.79	4.7 (0.78)
Changes in Body Symptoms	0.71	4.2 (0.84)	0.70	4.2 (0.84)
Managing Changes in Body Functions	0.48	4.0 (1.01)	0.50	4.2 (0.95)
Total Scale	0.76	4.3 (0.65)	0.85	4.3 (0.75)

Table 4: Multiple regression analysis of Therapeutic Self Care at Three and Six Months

	B	Beta	95% CI		Part Correlation	R^2	P-value
3-Months self-care							
Age	.011	.276	.003	.019	.267		.007
Gender	.094	.067	-.187	.375	.067		.508
Hospital LOS	.007	.137	-.003	.017	.135		.182
ISS	-.004	-.043	-.023	.015	-.043		.672
Constant	3.644						
						.103	
6-Months self-care							
3-month TSCS score	.592	.553	.408	.775	.524		<.001
Age	.000	.010	-.007	.008	.010		.907
Gender	.159	.106	-.099	.417	.100		.224
Hospital LOS	.005	.085	-.005	.014	.079		.335
ISS	-.005	.051	-.023	.012	-.049		.555
Constant	1.642						
						.348	

B= unstandardized coefficient, Beta=standardized coefficient,
TSCS Therapeutic Self Care Scale, LOS Length of Stay, ISS Injury Severity Score