CHAPTER II

REVIEW OF LITERATURE

Review of literature is an essential element of the exploration as it provides a broad consideration of the research problem. This chapter consists of two sections: Related literature of the study and conceptual framework.

2.1 RELATED LITERATURE OF THE STUDY

The related literature review is presented as follows:

2.1.1 Stroke and its prevalence
2.1.2 Knowledge on stroke
2.1.3 Stroke and functional ability
2.1.4 Stroke and quality of life
2.1.5 Stroke and caregivers’ burden
2.1.6 Stroke education program

2.1.1 Stroke and its prevalence

Charles, D.A. Wolfe, Siobhan, L. Crichton1, Peter, U. Heuschmann1, Christopher, J. McKevitt1, André, M. Toschke1, Andy, P. Grieve1, et al. (2012) carried out a population-based estimate of outcomes with a focus on disability, cognition, and psychological outcomes up to 10 years after initial stroke event in a multi-ethnic European population at south London was carried out. Data were collected from the population-based on south London stroke register, a prospective population-based register documenting all first in a lifetime strokes since 1st January
1995 in a multi-ethnic inner city population. Between 1995 and 2006, 3,373 first-ever strokes were registered: 20%–30% of survivors had a poor outcome over 10 years of follow-up. The highest rate of disability was observed 7 days after stroke and remained at around 110 per 1,000 stroke survivors from 3 months to 10 years. Rates of inactivity and cognitive impairment both declined up to 1 year (280/1,000 and 180/1,000 survivors, respectively); thereafter rates of inactivity remained stable till year eight, then increased, whereas rates of cognitive impairment fluctuated till year eight, then increased. Anxiety and depression showed some fluctuation over time, with a rate of 350 and 310 per 1,000 stroke survivors, respectively. Inactivity was higher in male at all-time points, and in whites compared to black stroke survivors, although black survivors reported better outcomes in the SF-12 physical domain. No other major differences were observed by gender or ethnicity. Increased age was associated with higher rates of disability, inactivity, and cognitive impairment. Between 20% and 30% of stroke survivors had a poor range of outcomes up to 10 years after stroke. Such epidemiological data demonstrated the socio demographic groups that were most affected for a longer term and should be used to develop longer term management strategies that would reduce the significant poor outcomes.

Roshan Ariyaratnam (2007) performed a systemic review in persons of non-European descent whether they have stroke susceptibility alleles. Odds ratios (ORs) and 95% confidence intervals (CIs) were determined for each gene–disease association using fixed and random effect models. Following a review of 500 manuscripts, eight candidate gene variants were analyzed among 32,431 individuals (12,883 cases and 19,548 controls), comprising mainly Chinese, Japanese, and
Korean individuals. Of the eight candidate genes studied, three were associated with ischemic stroke: the angiotensin I converting enzyme (ACE) insertion/deletion (I/D) polymorphism with a mean OR of 1.90 (95% CI 1.23–2.93) in the Chinese and 1.74 (95% CI 0.88–3.42) in the Japanese; the summary OR for the C677T variant of 5,10-methylenetetrahydrofolate reductase (MTHFR) was 1.18 (95% CI 0.90–1.56) in Chinese and 1.34 (95% CI 0.87–2.06) in Koreans; and the pooled OR for the apolipoprotein E (APOE) gene was 2.18 (95% CI 1.52–3.13) in Chinese and 1.51 (95% CI 0.93–2.45) in Japanese. Comparing the commonly investigated stroke genes among the Asian groups against studies in persons of European descent, they observed an absence of any substantial qualitative or quantitative interaction for ORs by ethnicity. However, the number of individuals recruited per study in the studies of persons of non-European descent was significantly smaller compared to studies of persons of European descent, despite a similar number of studies conducted per gene. The data suggested that genetic associations studied to date for ischemic stroke among persons of non-European descent were similar to those for persons of European descent. Claims of differences in genetic effects among different ethnic populations for complex disorders such as stroke could have been overstated.

Sudha Seshadri (2010) evaluated the data relating to the parental history of stroke to stroke risk in offspring at the community settings of Framingham. 3443 stroke-free Framingham offspring (53% female, mean age 48±14 years) with verified parental stroke status (by age 65 years), who attended the 1st, 3rd, 5th and/or 7th Offspring examinations, and were followed for up to 8 years after each baseline examination. Over up to 11,029 such person-observation periods (77,534 person-years), they documented 106 parental strokes by age 65, and 128 offspring
person-years), they documented 106 parental strokes by age 65, and 128 offspring strokes (74 parental and 106 offspring strokes were ischemic). Using multivariable Cox models, adjusted for age, sex, sib-ship and baseline stroke risk factors, they observed that parental stroke, both all types of stroke generally, and ischemic stroke specifically, was associated with an increased risk of incident stroke of the same type in the offspring (HR 2.79, 95% CI: 1.68–4.66; p<0.001 for all stroke, and HR 3.15, 95% CI: 1.69–5.88; p<0.001 for ischemic stroke). This was true for both maternal and paternal stroke. Study concluded that documented parental stroke by age 65 years was associated with a three-fold increase in risk of offspring stroke. This increased risk persisted after adjustment for conventional stroke risk factors. Thus, verified parental stroke may serve as a clinically useful risk marker of an individual’s propensity to stroke.

Bharti Manwani (2011) has conducted a cohort study to assess the stroke prevalence in women along with gender differences in stroke incidence and post-stroke disability in Framingham outpatient clinics. 1136 incident strokes (638 in women) over 56 years of follow-up were observed. Women were significantly (p<0.001) older (75.1 vs. 71.1 years for men) at their first-ever stroke, had a higher stroke incidence above 85 years of age, lower at all other ages and a higher lifetime risk of stroke at all ages. There was no significant difference in stroke subtype, stroke severity and case fatality rates between genders. Women were significantly (p<0.01) more disabled prior to stroke and in the acute phase of stroke in dressing (59% vs. 37%), grooming (57% vs. 34%) and transfer from bed to chair (59% vs. 35%). At 3 to 6 months post-stroke women were more disabled, more likely to be single, and 3.5 times more likely to be institutionalized (p<0.01). These results from
the Framingham Heart Study (FHS) support the existence of gender-differences in stroke incidence, lifetime risk (LTR) of stroke, age at first stroke, post-stroke disability and institutionalization rates. Pre-stroke disability and socio-demographic factors may contribute to the high rate of institutionalization and poorer outcome observed in women.

Vladimir Hachinski (2010) organized a synergium which was devised to prioritize new ways of accelerating progress in reducing the risks, effects, and consequences of stroke in Texas USA. Preliminary work was performed by 7 working groups of stroke leaders followed by a synergium (a forum for working synergistically together) with approximately 100 participants. Synergium has concentrated more on basic science, drug development and technology, stroke prevention techniques, acute stroke management, stroke care and tele stroke networks, brain recovery and rehabilitation, web, technology and communications, cooperation among stakeholders and educate and energize professionals, patients, the public and policy makers by using a ‘Brain Health’ concept that enables promotion of preventive measures. Further this article recommends by saying that to accelerate progress in stroke, we must reach beyond the current status scientifically, conceptually, and pragmatically. Advances can be made not only by doing, but ceasing to do. Significant savings in time, money, and effort could result from discontinuing practices driven by unsubstantiated opinion, unproven approaches, and financial gain. Systematic integration of knowledge into programs coupled with careful evaluation can speed the pace of progress.
Manjari Tripati and Deptivibha (2010) pointed out the prevalence of stroke. Globally stroke is the third commonest cause of mortality and fourth leading cause of disease burden. By 2050 it is anticipated that 80% of stroke events would occur in people living in developing regions of work and mainly younger people less than 60 years of age who are active in work force. Indian studies showed that 10 to 15 % of stroke below the age of 40 years. In India nearly one fifth of patients with first attack of stroke admitted to hospitals were aged less than 40 years. In Trivandrum the incidence of stroke in people aged less than 40 years was 3.8% and among aged less than 50 years the incidence was 9.5% and 18.1% among people aged less than 55years. In 2009 145/1, 00,000 populations in India suffered from stroke.

Bruce Ovbiagele (2010) discussed about the stroke epidemiology with the purpose of advancing of disease and mechanism of therapy. Stroke is the fourth killer and number one cause of adult disability in the United States. The estimated direct and indirect costs of stroke care in this country are $68.9 billion for 2009. The prevalence of stroke and its cost will undoubtedly rise as the aging population increases. In addition, stroke incidence and mortality are increasing in less developed countries in which the lifestyles and population restructuring are rapidly changing. More population-based research to assess incidence, risk factors, and outcomes are needed in these countries. Epidemiologic studies could help identify groups of individuals or regions at higher risk for stroke. They could also help in better understanding of the natural history of certain conditions and therefore push the direction of therapeutic investigations. Furthermore, the study of trends
across different time periods and different populations can help investigators to evaluate the effects of stroke care programs and treatment options.

Larry, B. Goldstein, Robert Adams, Mark, J. Alberts, Lawrence, J. Appel, Lawrence, M. Brass, Ralph, L. Sacco., et al. (2010) performed an updated meta-analysis to quantitatively summarize the strength of association between migraine and ischemic stroke risk at clinics of South Carolina, United states of America. Twenty-one (60%) of 35 studies met the selection criteria, for a total of 622,381 participants (13 case-control, 8 cohort studies) included in the meta-analysis. Study selection using a selection criteria, data extraction, and assessment of study quality were conducted independently by reviewer pairs using standardized forms. The pooled adjusted odds ratio of ischemic stroke comparing migrainers to non-migrainers using a random effects model was 2.30 (95% confidence interval [CI], 1.91-2.76). The pooled adjusted effect estimates for studies that reported relative risks and hazard ratios, respectively, were 2.41 (95% CI, 1.81-3.20) and 1.52 (95% CI, 0.99-2.35). The overall pooled effect estimate was 2.04 (95% CI, 1.72-2.43). Results were robust to sensitivity analyses excluding lower quality studies. Migraine is associated with increased ischemic stroke risk. These findings underscore the importance of identifying high-risk migrainers with other modifiable stroke risk factors. Future studies of the effect of migraine treatment and modifiable risk factor reduction on stroke risk in migrainers are warranted.

Dawn (2010) examined the temporal trends in stroke incidence and case fatality within a large, biracial population over time, by comparing stroke incidence rates from 1993/94, 1999, and 2005 within the Greater Cincinnati / Northern
Kentucky population of 1.3 million, all strokes among area residents were ascertained at all local hospitals during 7/93-6/94 and calendar years 1999 and 2005. A sampling scheme was used to ascertain cases in the out-of-hospital setting. The number of physician-confirmed first-ever strokes in patients ≥20 years of age was 1,942 in 1993/94, 2,041 in 1999, and 1,921 in 2005. In all study periods, blacks had higher stroke incidence than whites, and the case fatality rates were similar between races. In contrast to previous study periods, a significant decrease in overall stroke incidence was found in 2005. When stratified by race and stroke subtype, that change was driven by a decrease in ischemic stroke incidence among whites, while ischemic stroke incidence in blacks was unchanged. For the first time, the report showed a significant decrease in stroke incidence within the greater Cincinnati / northern Kentucky population, which was consistent with other reports in the literature. A decrease was found only among whites, which suggested worsening of the racial disparity in stroke incidence.

Hye-Young Kang, Seung-Ji Lim, Hae Sun Suh & Danny Liew (2011) compared per-person lifetime costs of stroke according to the age of stroke onset from the Korean societal perspective using an incidence – based approach. The transition probabilities for fatal and non-fatal recurrent stroke by age and gender and for non-stroke causes of death were derived from the national epidemiologic data of the Korean Health Insurance Review and Assessment Services and data from the Danish Monitoring Trends in Cardiovascular Disease study. The lifetime costs of stroke were estimated to be 200.7, 81.9, and 16.4 million Korean won (1,200 KRW is approximately equal to one US dollar) for men who suffered a first stroke at age 45, 55 and 65 years, respectively, and 75.7, 39.2, and 19.3 million KRW for women
at the same age. While stroke among Koreans aged 45 to 64 years accounted for only 30% of the total disease incidence, the age group incurred 75% of the total national lifetime costs of stroke. A higher lifetime burden and increasing incidence of stroke among younger Koreans highlighted the need for more effective strategies for the prevention and management of stroke especially for people between 40 and 60 years of age.

Mathew J Reeves (2008) detailed that age-specific stroke rates were higher in men, but, because of their longer life expectancy and much higher incidence at older ages, women have more stroke events than men. With the exception of subarachnoid hemorrhage, there was little evidence of sex differences in stroke subtype or severity. Although several reports found that women were less likely to receive some in-hospital interventions, most differences disappear after age and comorbidities were accounted for. However, sex disparities persisted in the use of thrombolytic treatment (with alteplase) and lipid testing. Functional outcomes and quality of life after stroke were consistently poorer in women, despite adjustment for baseline differences in age, pre stroke function, and comorbidities. A comprehensive review of the epidemiology, clinical presentation, medical care, and outcomes of stroke in women, were done in the study.

2.1.2 Knowledge on stroke

Thaworn Lorga, Myo Nyein Aung, Janthila Srikrajang, Nongluk Promtingkran, Suchart Kreuangchai, et al. (2012) assessed the awareness and knowledge of hypertension and stroke in an at risk population in Karen ethnic rural
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community, Thailand regarding the distribution of blood pressure across different age groups; the prevalence of hypertension and other risk factors for cardiovascular diseases (CVDs), including diabetes, smoking, sedentary lifestyle, and excess alcohol use; knowledge and awareness of hypertension as a disease; and knowledge and awareness of risk factors for hypertension among the population at risk. A cross-sectional survey of 298 rural Karen residents were interviewed. Median systolic and diastolic blood pressures were 110 (range 100–120) mmHg and 70 (range 60–80) mmHg respectively. High blood pressure was observed in more than 27% of the population, with 15% being hypertensive and 12% being pre hypertensive. Multinomial logistic regression analysis showed that people in the Karen community who were aware of hypertension were less likely to be current smokers and those with primary school education were more likely to be aware of hypertension than those who did not have a primary school education. Overall, the survey showed that less than half of the Karen community had such knowledge and awareness. It is urgently necessary to promote knowledge, awareness, and health literacy among the ethnic Karen tribes to prevent hypertension and associated CVDs.

Victor, O. Adika, Nneoma Nzewi and Franco, A. Apiyanteide (2011) determined whether knowledge could improve the quality of the care provided to the patients affected by stroke in hospital and through the continuum of the care in New Jersey using two-arm, cluster-randomized trial with hospitals and rehabilitation long-term care facilities as randomization units. 14 units will be randomized either to arm 1 (clinical pathway) or to arm 2 (no intervention, usual care). Samples included 238 in each group; it gave a power of 80 %, at 5 % significance level. The primary outcome measure is 30 days mortality. The impact of the knowledge along
the continuum of care is also analyzed by comparing the length of hospital stay, the hospital re-admission rates, the institutionalization rates after hospital discharge, the patients’ dependency levels, and complication rates. The quality of the care provided to the patients is assessed by monitoring the use of diagnostic and therapeutic procedures during hospital stay and rehabilitation, and by the use of key quality indicators at discharge. The management of patients affected by stroke involves the expertise of several professionals, which could result in poor coordination or inefficiencies in patient treatment, and knowledge could significantly improve the outcomes of the patients.

Steven, J. Hoffman, Emmanuel Guindon, John, N. Lavis, Godwin, D. N. Dossi, Eric, J.A. Osei, Mintou, F. Sidibe, et.al. (2011) assessed the health care providers knowledge and practices relating to stroke risk factors and prevention in Ghana, Tanzania. The study compared what was known about risk factors related to the knowledge and practices of healthcare providers in four low- and middle-income countries. 497 healthcare providers in Ghana (140), Laos (136), Senegal (100) and Tanzania (121) were interviewed. Ten questions tested participants' knowledge and clinical practice related to stroke prevention. Additional questions addressed their individual characteristics, working context and research-related activities. The survey achieved a 75% response rate (372/497) across Ghana (107/140), Laos (136/136), Senegal (51/100) and Tanzania (78/121). Few participating healthcare providers correctly answered all five knowledge questions about factors (13%) or self-reported performing all five clinical practices according to established evidence improving healthcare providers' knowledge and practices is an untapped opportunity for expanding risk factors utilization and preventing stroke. The study pointed out to
several strategies that would help bridge the gap between what was known from research evidence and the knowledge and practices of healthcare providers. Training on acquiring systematic reviews and facilitating internet access could be particularly helpful.

Andrzej Sloma, Lars, G. Backlund, Lars-Erik Strender and Ylva Skånér (2010) studied the primary health care patients with stroke/TIA regarding their knowledge about risk factors for having a new event of stroke/TIA, possible associations between patient characteristics and patients' knowledge about risk factors, and patients' knowledge about their preventive treatment for stroke/TIA in Denzel University Clinics, Australia. A questionnaire was distributed to 240 patients with stroke/TIA diagnoses, and 182 patients (76%) responded. 13 questions about diseases/conditions and lifestyle factors known to be risk factors and four questions regarding other diseases/conditions ("distractors") were asked. Hypertension, hyperlipidemia and smoking were identified as risk factors by nearly 90% of patients, and atrial fibrillation and diabetes by less than 50%. Few patients considered the distractors as stroke/TIA risk factors (3-6%). Patients with a family history of cardiovascular disease, and patients diagnosed with carotid stenosis, atrial fibrillation or diabetes, knew that those were stroke/TIA risk factors to a greater extent than patients without these conditions. Atrial fibrillation or a family history of cardiovascular disease was associated with better knowledge about risk factors, and higher age, cerebral hemorrhage and living alone with poorer knowledge. Only 56% of those taking anticoagulant drugs considered this as intended for prevention, while 48% of those taking platelet aggregation inhibitors thought this was for prevention. Knowledge about hypertension, hyperlipidemia and smoking as risk factors was
good, and patients who suffered from atrial fibrillation or carotid stenosis seemed to be well informed about these conditions as risk factors. However, the knowledge level was low regarding diabetes as a risk factor and regarding the use of anticoagulants and platelet aggregation inhibitors for stroke/TIA prevention. Better teaching strategies for stroke/TIA patients should be developed, with special attention focused on diabetic patients.

Jan Lecouturier, Madeleine, J. Murtagh, Richard, G. Thomson, Gary, A. Ford, Martin White, Martin Eccles, et al. (2010) reviewed the evidence base regarding the knowledge, attitudes and behaviors of stroke patients, witnesses and the public to the symptoms of stroke and the need for an urgent response at the onset of symptoms in Leeds community health centers, central London. 11 studies out of 7144 citations met the inclusion criteria. Postal survey (n = 2); interview survey (n = 6); review of hospital documentation (n = 2) and qualitative interviews (n = 1). Limited data revealed a good level of knowledge of the two commonest stroke symptoms (unilateral weakness and speech disturbance), and of the need for an emergency response among the general public and at risk patients. Despite this, less than half of patients recognized that they had suffered a stroke. Symptom recognition did not reduce time to presentation. For the majority, the first point of contact for medical assistance was a general practitioner. There was an assumption that, in the UK, public knowledge of the symptoms of stroke and of the need for an emergency response was lacking, but there were little published research to support this. Public awareness raising campaigns to improve response to the symptoms of stroke therefore may not produce an increase in desired behaviors. Further research
is needed to understand why people who experience or witness stroke symptoms frequently do not call emergency services.

Nishant Mishra & Satish Khadilkar (2010) assessed the knowledge of urgent need to develop a national program towards “Fighting Stroke” in India. Examination of published opinions of stroke clinicians and the official documents on stroke care training board were done. It was suggested that the already existing resources in India been identified and utilized to develop a national fight-stroke program. Through a review of published literature, it was noted different opinions existed on who would best manage stroke. They found that because stroke is a cardiovascular disorder of the central nervous system, its management required a multi-disciplinary approach involving clinicians with background not limited to neurology. India has very few neurologists trained in stroke medicine and they could not care for all stroke patients of the country. They proposed a mechanism that would quickly put in place a stroke care model relevant in Indian context. They recommend tapping the clinical expertise available from existing pool of non-neurologist physicians who could be trained and certified in stroke medicine (strokology). They have discussed an approach towards developing a national network for training and research in strokology hoping that our recommendations would initiate discussion amongst stroke academicians and motivate the national policy makers to quickly develop an “Indian Fight Stroke Program.”

Bernadette Boden-Albala, Joshua, Z. Willey & Olajide Williams (2009) evaluated stroke literacy among residents of Central Harlem, a predominantly African American population, in a cross-sectional study. Ten community-based sites
in Central Harlem were identified between 2005 and 2006 for administration of a stroke knowledge survey. Trained volunteers administered in-person closed-ended questionnaires focused on stroke symptoms and risk factors. A total of 1,023 respondents completed the survey. African Americans comprised 65.7 % (n = 672) of the survey cohort. The brain was correctly identified as the site where a stroke occurs by 53.7 % of respondents, whereas the heart was incorrectly identified by 20.8 %. Chest pain was identified as a symptom of stroke by 39.7 %. Hispanics were more likely to incorrectly identify chest pain as a stroke symptom, compared with whites. No associations were found between calling 911 and race/ethnicity and stroke knowledge, although women were more likely than men to call 911. Significant deficiencies in stroke literacy exist in this high-risk population, especially when compared with national means. Culturally tailored and sustainable educational campaigns should be tested in high-risk populations as part of stroke public health initiatives.

Moon Ho Park, Sangmee, A. Jo, Inho Jo, Eunkyung Kim, Su-Yong Eun, Changsu Han, et al. (2006) determined the baseline difference in stroke knowledge between Korean adherents to traditional and western medicine in South Korea’s rehabilitation outpatient departments. A total of 2,767 subjects selected randomly from the Anson geriatric study in South Korea were questioned about stroke. Their answers were compared with their socio demographic data and other variables. Only 44.8% of participants correctly identified stroke as a vascular disease in the human brain. Sudden numbness or weakness was the most frequently identified stroke warning sign (60.2%). Hypertension (66.7%) and mental stress (62.2%) were most frequently identified as stroke risk factors. The contributions of diabetes mellitus
and cardiovascular disease to stroke were underestimated; they were identified as risk factors by 28.3% and 18.6% of participants, respectively. The predictors for poor knowledge of stroke warning signs and risk factors were similar irrespective of preference for Western or oriental medical treatment, and included those with lower levels of education and inaccurate definition of stroke. Television and radio (40.3%) were the most frequent sources of stroke information for both groups. The study showed that knowledge of stroke was similar among Koreans with preferences for either Western or Oriental medical treatment and that misunderstanding about stroke were common among the Korean elderly. In order to prevent and manage stroke effectively, public health education regarding basic concepts of stroke is necessary. This should target those with a lower level of education and a misunderstanding of the definition of stroke.

2.1.3 Stroke and functional ability

Glenn Ostir, Beatriz Abreu, Kenneth Ottenbacher, Yong-fang Kuo & Timothy Elliott (2012) carried out a prospective cohort study to determine how changes in depressive symptom influence recovery of functional status in eleven inpatient medical rehabilitation facilities located across the United States. Five hundred forty-four persons with a first-time stroke were recruited for the study. Majority of persons with stroke were aged 75 and older, white, female, and married. The most prevalent stroke type was ischemic. For participants without depression at discharge, those who reported fewer depressive symptoms 12 months after stroke than before had an adjusted functional status score of 108.2, whereas those with more symptoms had an adjusted functional status score of 104.6. For participants
who were depressed at discharge, those who reported fewer depressive symptoms 12 months after stroke than before had an adjusted functional status score of 100.3, whereas those with more symptoms had an adjusted functional status score of 88.0. Tracking depressive symptom change in the hospital and after discharge is clinically relevant and is an important component of patient care and recovery of functional status.

Shamay, Phoebe, Connie, Lee Elva, Mimi & Tong (2012) examined a cross-sectional study which analyzed the effect of Walkway length, turning direction on six-minute walk test in subjects with stroke in University-based rehabilitation centre The Hong Kong Polytechnic University, Hong Kong. The subjects (N = 26) were with chronic stroke. Total distance covered and number of turns in the 6MWT with different walkway lengths (10m, 20m and 30m walkway distances) and turning directions (turning to affected side and unaffected side); rate of perceived exertion (RPE) using Borg Scale, and heart rate (HR) using handheld pulseoximeter recorded before and immediately after the test were kept as outcome measures. The distance covered and the number of turns in the 6MWT were significantly different between different walkway lengths (P < 0.05), with the longest distance covered and lowest number of turns in the 30-m walkway distance. For all walkway lengths, turning to the affected or unaffected side did not result in significant differences in the distance covered and the number of turns in the 6MWT. Significant increases were found between the pretest and posttest for the HR and RPE (P < 0.05) in all testing conditions. Different walkway distances have a significant effect on the distance covered in the 6MWT, whereas turning direction did not significantly affect the distance covered in the 6MWT.
Reddy, M.P & Reddy, V (2012) identified the stroke strategies to improve the functional outcome after stroke in Comprehensive Medical Rehabilitation Unit, Saint Mary's Regional Medical Center, Reno. Mortality and morbidity were high in elderly stroke patients. Early mobilization and prevention of stroke-related complications improved their ability to participate in a more intense and comprehensive rehabilitation program. An interdisciplinary approach to stroke rehabilitation restored functional loss, improved quality of life, and decreased long-term economic costs. Important parts of stroke rehabilitation included patient and family education, treatment of stroke-related complications, and prevention of recurrent stroke. A healthy and caring spouse, continence of bladder and bowel, and ability to feed oneself are considered to be the most positive predictors of stroke outcome.

Balaban, Tok, Yavuz, Yasar & Alaca (2011) analyzed a retrospective study which aimed to evaluate functional and early rehabilitation outcome in patients with middle cerebral artery stroke at Gulhane Military Medical Academy, Ankara, Turkey. Although important data on the prognosis and rehabilitation outcome in stroke patients have been reported, data on functional recovery according to stroke subtypes were limited. The records of stroke patients that underwent the rehabilitation program at the brain injury rehabilitation service between January 2007 and December 2008 were reviewed, and those with MCA stroke were included in the study. The study included 80 MCA stroke patients with a mean age of 63.54 years. FIM and BI scores improved significantly post rehabilitation ($P < 0.05$). Age was negatively correlated with both BI and FIM scores at admission and discharge. Length of stay was not correlated with
improvement in BI or FIM scores during hospitalization. The patients who had ≤1 month of inpatient rehabilitation had similar outcomes as those who had >1 month of inpatient rehabilitation (P > 0.05). Length of time after stroke onset was not correlated with BI or FIM scores at admission. Regardless of initial functional status, prediction of discharge functional status was misleading. Psychiatrists should keep in mind that functional improvement does not always increase with duration of inpatient therapy.

Thomassen, L., Waje-Andreassen, U., Naess, H. & Brogger, J (2011) assessed a prospective study among unselected patients admitted to an acute stroke unit with respect to daily functioning (neurological deficits), treatment and 7-day outcome in Haukeland University Sykes’s, Norway. All patients with suspected neurovascular disease were admitted to the stroke unit as emergencies. Patients with confirmed cerebrovascular disease were prospectively included in the Bergen Stroke Study in the period 1st February 2006 to 30th April 2009. 49.8 % of the patients had other diagnoses than acute stroke. Of 1101 patients with neurovascular disease, 10 % had transient ischemic attacks, 79 % had ischemic and 10 % had hemorrhagic stroke. On admission, 72 % of the patients had none or minor neurological deficits. After one week 63 % of the patients were independent, 25 % needed long-term rehabilitation and 10 % were bedridden. Most patients in study had mild deficits and first of all needed an exact diagnostic work-up, acute and prophylactic treatment. Rehabilitation was important for a minority of patients.

early post stroke phase for final ADL to identify variables that are predictive or not predictive for outcome of ADL after stroke in Department of Rehabilitation Medicine, University Medical Center, Amsterdam, Netherlands. PubMed, Ebsco / Cinahl and Embase were systematically searched for prognostic studies in which stroke patients were included ≤ 2 weeks after onset and final outcome of ADL was determined ≥ 3 months post stroke. Forty eight of 8425 identified citations were included. Most studies failed to report medical treatment applied, management of missing data, rationale for candidate determinants and outcome cut-offs, results of uni variable analysis, and validation and performance of the model, making the predictive value of most determinants indistinct. Six high-quality studies showed strong evidence for baseline neurological status, upper limb paresis, and age as predictors for outcome of ADL. Gender and risk factors such as atrial fibrillation were unrelated to this outcome. Because of insufficient methodological quality of most prognostic studies, the predictive value of many clinical determinants for outcome of ADL remained unclear. Future cohort studies should focus on early prediction using simple models with good clinical performance to enhance functional independence in stroke management.

McClure, J., Andrew Salter, Katherine Meyer, Matthew Foley, Norine Kruger, Hannah Teasell & Robert (2011) identified variables that predict length of stay (LOS) within the population of high functioning stroke patients at rehabilitation centre, Parkwood Hospital site, Ontario, Canada. Stroke patients with Functional Independence Measure (FIM) scores ≥ 100 admitted to a specialized inpatient rehabilitation programme in Ontario, Canada, from April 2005 to March 2008 were included in the study. Data from the National Rehabilitation Reporting System and
chart review were used. Associations with LOS were examined among 25 potential predictor variables using bivariate correlations. Significantly correlated (p < 0.002) variables were entered into a multiple linear regression. Twenty-four percent (n = 134) of patients admitted during the study period were identified as presenting with mild functional deficits. These patients had a mean admission age of 63.5 (SD - 14.6) years, a mean admission FIM score of 109.9 (SD - 6.6) and a mean LOS of 22.3 (SD - 10.5) days. FIM motor and cognitive subscale scores, Mini Mental State Exam scores and five single items assessing orientation, financial independence, and verbal, written and auditory communication ability were significantly correlated with LOS. The regression model, which included all eight variables, explained 60% of the variance associated with LOS (r = 0.80). For patients admitted to stroke rehabilitation programs with mild functional impairment, 60% of the variance in LOS could be explained by a small number of variables indicative of deficits in the areas of motor function, cognition and communication.

Gudrun Boysen, Lars-Henrik Krarup, Xianrong Zeng, Adam Oskedra, Janika Korv, Grethe Andersen, et al. (2009) investigated a randomized control trial to know if repeated verbal instructions about physical activity to patients with ischemic stroke could increase long term physical activity in Stroke units in Denmark, China, Poland, and Estonia. 314 patients with ischemic stroke aged 40 years and above who were able to walk (mean age 69.7 years). 157 were randomized to the intervention and 157 (mean age 69.4 years) in the control group. The estimated mean PASE scores were 69.1 in the intervention group and 64.0 in the control group. The intervention had no significant effect on mortality, recurrent stroke, myocardial infarction, or falls and fractures. Repeated encouragement and
verbal instruction in being physically active did not lead to a significant increase in physical activity measured by the PASE score. More intensive strategies seem to be needed to promote physical activity after ischemic stroke.

Dany Gagnon, Sylvie Nadeau & Vincent Tam (2006) evaluated a retrospective cohort study which analyzed the association of time to inpatient rehabilitation hospital admission and functional outcomes of patients who have had a stroke at regional IRH, USA. A sample of moderately (n = 614) and severely (n = 1294) impaired patients who had a stroke who were admitted to the facility between 2002 and 2006 were selected for the study. Change in total, motor, and cognitive Functional Independence Measure (FIM) scores between IRH admission and discharge were the outcome measures. After controlling for patient demographics and initial medical conditions and functional status, shorter periods from stroke onset to IRH admission were significantly associated with greater functional gains for these patients during IRH hospitalization. Moderately impaired patients achieved a greater total FIM gain when admitted to an IRH within 21 days of stroke. Severely impaired patients showed a gradient relationship between time to IRH admission and total FIM gain, with significantly different functional gain if admitted to an IRH within 30 and 60 days after stroke diagnosis. Earlier transfer to an IRH may lead to better functional improvement after stroke. However, certain factors such as age, race/ethnicity, initial medical conditions and functional status, and length of stay at an IRH also contributed to functional gain.

Macdonell, R.A & Dewey, H.M (2001) described about a focused multidisciplinary team approach as the key to a successful rehabilitation outcome in
Evidence on neuro rehabilitation reducing patients' disability and improving the quality of life in both acute and chronic neurological conditions are increasing. The general practitioner would be more closely involved in the rehabilitation process in the future. Patients would be discharged home earlier to complete the acute rehabilitation program. GPs will supervise function over the long term and activate community rehabilitation resources when necessary to maintain patient function. Ideally, rehabilitation services should be made available for most patients with neurological disorders, as it is difficult to predict which individual patients will not benefit.

Segal & Schall (1994) determined the functional/health status and its relation to disability in stroke survivors in Moss Rehabilitation Research Institute, Philadelphia. Thirty-eight stroke survivors were administered the measures at follow-up (median time since the stroke, 6 months). Caregivers were instructed to answer as proxies for the stroke survivors in their care. Demographics on age, sex, race, marital status, educational level, side of lesion, and relation of stroke survivor to caregiver were collected. Although Spearman coefficients between the measures were fairly high for both stroke survivors and proxy respondents, the correlation of scores was substantially weaker when the group of less severely impaired survivors (as established by FIM ratings) was considered separately. The FAI and the FIM are useful for assessing the functional/health status of stroke survivors because answers could be obtained by proxy. Future studies should examine the relations between disability and functional/health status, with explicit attention paid to variations in the level of disability in the stroke survivors.
2.1.4 Stroke and quality of life

De Weed, Rutgers, Groenier & Van Der Meer (2011) observed the wellbeing of patients who returned home immediately after discharge from hospital, one year post stroke, in comparison with the general Dutch population of the same age and to determine factors that could influence wellbeing at Department of General Practice, University Medical Centre Groningen, and Department of Neurology, Martini Hospital Groningen, Antonius Deusinglaan Netherlands. All the stroke patients from the Department of Neurology, Martini Hospital Groningen in the period from November 2006 to October 2007 were included. All the patients (N = 57) were interviewed at home using the following questionnaires: Barthel Index, SF-36, HADS (Hospital Anxiety and Depression Scale), CSI (Carers Strain Index) and a questionnaire about their way of life. 31% of the patients in this study experienced a decrease in functional status after one year. The health-related quality of life was low. Stroke patients had almost the same quality of life as the 'average' Dutch elderly population, where patients could no longer fully participate in society, their perceived quality of life was also lower. In the study there was an indication of a high prevalence of depression and anxiety disorders in stroke patients. This negatively affected the quality of life a year after stroke. The study provided valuable insight into the wellbeing of patients living at home one year post stroke. Physical functioning and quality of life were comparable to the general population of the same age, but improvements in mental functioning could be envisaged.

Fraas (2011) argued for the need to implement a phenomenological approach to explore the quality of life among stroke survivors at modern Western
survivors of stroke and their families continued to experience a poor quality of life (QOL) due to unmet health care expectations. Therefore, the need to establish a phenomenological approach to examine the issues impacting the QOL of survivors of stroke is as important as ever. The article examined 3 issues germane to the QOL of survivors of stroke that could be addressed through phenomenological methodology: (1) comprehensive-holistic treatment (2) active, problem-based coping strategies and (3) education for the general public and health care personnel. Existential responses from survivors of stroke and recent findings from narrative-based research would help to highlight these important issues.

Christine Mc Pherson, Keith Wilson, Livia Chyurlia & Charles Leclerc (2011) examined a cross-sectional study in School of Nursing, University of Ottawa, Ontario on relationships between stroke survivor quality of life (HRQOL), role, relationship satisfaction, balance and reciprocity. Specific hypotheses were made based on equity theory in social relations. Fifty-six stroke survivors completed a postal survey that included measures of HRQOL (SF-36), role (negative and positive aspects), relationship satisfaction, reciprocity and balance. Compared to a normative sample, stroke survivors' HRQOL was lower for all SF-36 domains. The study highlighted the importance of taking a broader approach in improving the quality of life.

Tang, W.K., Lu, J.Y., Chen, Y.K., Mok, V.C., Ungvari, G.S & Wong, K.S (2010) executed a cross-sectional study to identify factors associated with health-related quality of life (HRQOL) of Chinese stroke patients in departments of
Psychiatry Medicine and Therapeutics, Chinese University of Hong, China. One hundred and twenty-three stroke patients consecutively admitted to a stroke clinic were recruited. Patients HRQOLs were assessed with the Short Form 36 (SF-36). Two sub scores of the SF-36, the Physical Component Summary and the Mental Component Summary Scores served as the dependent variables. Independent variables comprised patients demographic data and physical and psychological conditions in relation to HRQOL. The severity of coexisting illnesses of patients was assessed using the Cumulative Illness Rating Scale. The Geriatric Depression Scale (GDS) was administered to rate patients and their depressive symptoms. Severity of depressive symptoms in Chinese stroke patients is an important factor associated with HRQOL. Further studies evaluating interventions on caregivers' HRQOL should also be included in the assessment and management of mood disorders.

Klinedinst (2009) predicted stroke survivor quality of life at 4 months and 1 year at Georgia State University, Atlanta. He further evaluated the factors that reduced stroke survivors' (SS) health-related quality of life (HRQOL) which were important for developing interventions to improve HRQOL after stroke. The influence of baseline caregiver and family characteristics (physical health, depressive symptoms, family communication) on five domains of SS HRQOL (physical function, memory/thinking, social activities, communication, and mood) was examined. Data were collected on 132 SS-caregiver dyads at baseline, 4 months, and 12 months. Baseline caregiver depressive symptoms predicted lower scores for SS physical function and communication at 4 months and social participation and mood at 12 months. Male gender was negatively associated with
SS HRQOL (communication and mood) at 12 months. Early intervention targeting these family characteristics, especially in stroke survivors’ depressive symptoms, could improve survivors HRQOL.

George Howard et al. (2007) aimed to find out the quality of life among stroke individual reporting no prior stroke or transient ischemic attack which revealed that the participants with symptoms had average PCS -12 scores 5.5 points lower than that of those without symptoms a difference similar to transient ischemic attack and over one half the effect of stroke. MCS -12 scores were 2.7 points lower for those with symptoms 0.5 for TIA and 1.6 for stroke .The study emphasized that individuals with clinically consistent symptoms but without stroke diagnosis have a lower quality of life than those without symptoms.

Kong, K. H. & Yang, S. Y (2006) aimed to assess the Health-related quality of life among chronic stroke survivors attending a rehabilitation clinic by Cross-sectional survey among patients who had survived one year or more after a stroke. HRQOL was assessed using the Medical Outcomes 36-Item Short-Form Health Survey (SF-36), functional status using the Modified Barthel Index (MBI), and mood using the Beck’s Depression Inventory (BDI). A total of 100 patients (63 men and 37 women, mean age 60.7 +/-10.8 years) were interviewed at an average of 22.2 +/-14.5months post-stroke. The mean MBI was 88.9 +/-17.9, and the prevalence of depression was 24%. 50 percent of patients needed varying degrees of care for their activities of daily living. The SF-36 scores of the patients were comparable to that of the general population except for the domain of physical function, which was much lower (23.9 versus 83.4). Age, sex, post-stroke duration,
MBI score and side of hemiplegia were not associated; had significantly lower SF-36 scores across all domains except for that of physical function and bodily pain (p-value is less than 0.001). A significant proportion of chronic stroke survivors attending the rehabilitation clinic continued to face limitations in their physical activities. In addition, almost 30 percent of these survivors had depression that affected their HRQOL adversely.

Jella Lepman (2003) investigated significant changes in the quality of life of elderly persons in the first year after rehabilitation from cerebral stroke. Data of 138 geriatric patients investigated on admission in a stationary rehabilitation program and one year later at home were used for this analysis in Munchen, Germany. Multivariate logistic modeling tested differences between first investigation and follow-up in several domains: IADL (Instrumental Activities of Daily Living) functionality, subjective well-being, locus of control, subjective coping with stroke, stroke-related quality of life, and social support. Age, gender, living alone and educational status were used as control variables. Compared to first investigation, subjects on follow-up showed an increased IADL functionality but a decline in subjective wellbeing and a more external locus of control. Coping with stroke has ameliorated, while stroke-related quality of life in six domains was more negatively presented. The findings suggested that recovery in IADL functionality after rehabilitation did not ensure a subsequent improvement in the subjective well-being nor did a positive trend in coping with stroke that impede the stroke-related quality of life.
2.1.5 Stroke and caregivers’ burden

Cleusa, P. Ferri, Claudia Schoenborn, Lalit Kalra, Daisy Acosta, Mariella Guerra, Yueqin Huang, et al. (2011) investigated the prevalence of self-reported stroke, stroke-related disability, dependence and care-giver strain in Latin America (LA), China and India at Health Service and Population Research Department, Section of Epidemiology, London, UK using cross-sectional surveys which were conducted on individuals aged 65 years living in specified catchment areas. The prevalence of self-reported stroke ranged between 6% and 9% across most LA sites and urban China, but was much lower in urban India (1.9%), and in rural sites in India (1.1%), China (1.6 %) and Peru (2.7%). The proportion of stroke survivors needing care varied between 20% and 39% in LA sites but was higher in rural China (44%), urban China (54%) and rural India (73%). Comorbid dementia and depression were the main correlates of disability and dependence. The prevalence of stroke in urban LA and Chinese sites is nearly as high as in industrialized countries. High levels of disability and dependence in the other mainly rural and less-developed sites suggested under ascertainment of less severe cases as one likely explanation for the lower prevalence in those settings. As the health transition proceeds, a further increase in the number of older stroke survivors could be anticipated. In addition to prevention, stroke rehabilitation and long-term care needs should be addressed.

Rose Galvin, Tara Cusack, Eleanor O’ Grady, Thomas Brendan Murphy & Emma Stokes (2011) determined the effectiveness of family mediated exercise intervention (FAME) among acute stroke patients by randomized controlled trail at
Dublin. Forty participants with acute stroke were assigned to control group who received routine care with no formal input from their family members or a FAME group, who received routine therapy and addition lower limb FAME therapy for 8 weeks. The outcome measures were assessed after three months follow-up in which the FAME group patients had significant improvement on walking and had regular follow-up (p<0.05). The family members in FAME group reported that a significant decrease in their level of caregiver strain at the follow up when compared with those of control group (p<0.02). The findings proved that FAME intervention can serve to optimize patient recovery and caregiver burden following stroke.

Baumann, Lurbe - Puerto, Alzahouri, & Aiach (2011) analyzed the associations between increased residual disability among post stroke survivors and the repercussions for the lives of informal caregivers at University of Luxembourg, Luxembourg, Belgium. 215 stroke survivors (64.5 years; 55.8% men) were recruited by one neurologist from each of the 22 French regions. Katz Index of Independence in Activities of Daily Living (Katz ADL) was mean 9.3, and 54% still had impairments in "more than two of the six neurological domains" of the American Heart Association Stroke Outcome Classification (AHASOC): motor, sensory, vision, affect, cognition, and language. The 215 caregivers (57.8 years; 72.1% women) completed a face-to-face questionnaire concerning their social (8 items), material (4 items), and emotional (8 items) repercussions. Katz ADL and AHASOC were significantly related to social repercussions for caregivers. Lack of autonomy among stroke survivors (low Katz ADL) was associated with the material difficulties, the most concern to caregivers: "I needed to move house" and "I cannot go out anymore". Being a male caregiver was strongly associated with a feeling of
injustice. A low educational level was linked to an increased feeling of fear and a greater feeling of isolation. Increased dependency following stroke lead to improvement in the caregiver's social relationships. Evaluating the emotional repercussions, particularly for men, is an important aspect of enabling survivors to continue to live at home. Innovative accompaniment and counseling services should be considered.

Aileen, L. Bergström, Gunilla Eriksson, Ena Von Koch & Kerstin Tham (2011) aimed to describe the cross-sectional study on dyads combined life satisfaction and to understand this in relationship to the perceived impact of stroke in everyday life and caregiver burden at Department of Neurobiology, Karolinska Institute, Stockholm, Sweden. The life satisfaction of persons and their informal caregivers was measured in 81 dyads one year post stroke. Their global life satisfaction measured with LiSat-11, was combined to a dyad score and the dyads were then categorized as satisfied, dissatisfied or discordant. The groups were compared and analyzed regarding levels of caregiver burden, measured with the caregiver burden scale, and the perceived impact of stroke in everyday life, measured with the Stroke Impact Scale (SIS). The satisfied dyads comprised 40%, dissatisfied 26% and those that were discordant 34%. The satisfied dyads reported a significantly lower impact of the stroke in everyday life compared with the dyads that were not satisfied. Measuring combined life satisfaction provided a unique focus and appeared to be a feasible way of attaining the dyads' perspective. The findings suggested that those dyads with a discordant life satisfaction could be vulnerable because of the caregivers' reported caregiver burden.
Van Pelt David, Schulz Richard, Chelluri Lakshmipathi & Pinsky Michael (2010) examined patient-specific predictors of post-ICU informal caregiver burden from four ICUs in a University Hospital, London using a prospective, longitudinal observational study design. 48 patient-caregiver dyads from four ICUs in a University Hospital were selected and Informal caregiver depression symptoms were measured with the center for epidemiologic studies depression scale. Lifestyle disruption was measured with the Activity Restriction Scale. Linear regression models were built to test for patient- and caregiver-specific predictors of depression symptoms and lifestyle disruption 2, 6, and 12 months after ICU admission. Patients had a mean (SD) age of 52.5 (19.7) years, 67% were men, median (interquartile range) Acute Physiology and Chronic Health Evaluation score was 52 (38.5, 65). The caregivers had a mean (SD) age of 52.8 (12.8) years, 91.2% were women, and 48% were spouses. Predictors of caregiver depression symptoms were patient gender (men) at 2 and 12 months and tracheostomy at 12 months. Predictors of lifestyle disruption were patient education (more common among high school graduates) and patient gender (men) at 2 months, and tracheostomy, functional dependency, and patient gender (men) at 12 months. The determinants of post-ICU informal caregiver burden were likely to depend on characteristics of the patients as well as the caregivers and may vary over time. Further research is necessary to understand better the longitudinal determinants of burden in order to develop more effective caregiver interventions.

Nan Greenwood & Ann Mackenzie (2010) investigated anxiety in informal carers of stroke survivors in the first three months after discharge in Faculty of Health and Social Care Sciences, St George's University of London and
Kingston University, London, UK using Prospective, longitudinal, descriptive study designs. Forty-five carers completed the Hospital Anxiety and Depression Scale on two occasions - within one month and at three months after discharge from stroke and rehabilitation units. Carers were more likely to have scores indicating anxiety than depression. In the first month, half the carers (51.1%) scored in the cut-off for anxiety and a third were in the cut-off for depression (31.1%). At three months, the picture was very similar with nearly identical proportions in the anxious and depressed categories (48.9% and 28.9%, respectively). Changes in number of cases of anxiety and depression and in mean anxiety scores were non-significant but there was a significant decrease in depression scores (\( p = 0.048 \)). Fourteen carers (31.1%) at one month and eleven (24.4%) at three months fell into both anxious and depressed categories. Anxiety was a relatively neglected emotional outcome in stroke carers. The study suggested anxiety to be an important issue very early in caring whilst other research suggested that it remained prevalent for many months. Given the significant role carers play in rehabilitation of stroke survivors, greater recognition of their emotional state is required. Further, longitudinal research with larger sample sizes from a range of geographical areas and improved understanding of factors associated with anxiety is needed.

Rittman, Hinojosa & Findley (2009) explored about subjective sleep experiences of informal caregivers of stroke survivors and to explore the relationships between subjective sleep experiences, caregiver burden, depression, and health using descriptive design at North Florida/South Georgia Veterans Health System, Rehabilitation Outcomes Research Center and Gainesville, FL, USA. A total of 276 caregivers and veterans participated in the study. Results indicate a
greater risk of depression (Center for Epidemiologic Studies-Depression Scale) among caregivers who sleep less, have difficulty achieving daytime enthusiasm, use sleep medications, and have poor sleep quality. Caregivers who slept less had difficulty achieving daytime enthusiasm and were at greater risk of poor health. Greater caregiver burden was associated with less sleep and use of sleep medications. This descriptive analysis demonstrated the important relationship between sleep, depression, health, and burden; and could lead to interventions to diagnose and treat sleep difficulties in caregivers.

Wolff, J.L., Giovannetti, E.R., Boyd, C.M., Reider, L., Palmer, S., Scharfstein, D, et al. (2009) determined whether guided care improves patients’ primary caregivers’ depressive symptoms, strain, productivity, and perceptions of the quality of care recipients’ chronic illness care in Vancouver Columbia. A cluster-randomized controlled trial of guided care was conducted within 14 PCP teams. The study sample included 196 primary caregivers who completed baseline and 18 month surveys and whose care recipients remained alive and enrolled in the guided care study for 18 months. Caregiver outcomes included the following: depressive symptoms (Center for Epidemiological Studies-Depression Scale), strain (Modified Caregiver Strain Index), the quality of care recipients’ chronic illness care [Patient Assessment of Chronic Illness Care (PACIC)], and personal productivity (Work Productivity and Activity Impairment questionnaire, adapted for caregiving). Results suggested that in multivariate regression models, between-group differences in depression, strain, work productivity, and regular activity productivity were not statistically significant after 18 months, but guided care among caregivers reported the overall quality of their recipients’ chronic illness care to be significantly higher.
Quality was significantly higher in 4 of 5 PACIC subscales, reflecting the dimensions of goal setting, coordination of care, decision support, and patient activation. Guided care improved the quality of chronic illness care received by multimorbid care recipients but did not improve caregivers’ depressive symptoms, affect, or productivity.

Jullamate et al. (2006) described the characteristics of Thai stroke caregivers and to explore their needs while providing care to their stroke relatives. Using open-ended questions, they individually interviewed 20 caregivers of stroke survivors to identify their characteristics and their own needs. Additional field notes were made during all interviews. The findings revealed that the majority of Thai informal stroke caregivers in the study were female, mostly daughters, with the exception of 2 Thai primary stroke caregivers found to be nieces. Majority of caregivers provided care to their stroke relatives 24 hours per day. The four major categories of informal rehabilitation were: physical, psychological, social, and spiritual rehabilitation activities. Assistance, information and social support were the three main needs of the caregivers. Based on these findings, appropriate nursing information and assistance focusing on rehabilitation and stroke caregivers’ needs should be provided to Thai stroke caregivers performing informal care to ensure that both patients and caregivers have the best possible quality of life.

brief interview was conducted to determine specific problem areas for caregivers. Caregiver burden (The Sense of Competence Questionnaire) and social support (The ENRICHD Social Support Inventory) were also measured. Overall sense of burden from caregiving was higher in the Korean cohort than in the Seattle cohort. The primary predictors of overall burden of the caregiver were the patients depression, and insufficient social support. The lower perceived social support among the Korean caregivers may reflect changes in Korean culture with lack of social support outside the family. American caregivers were more often troubled by lack of time for themselves. These findings could be useful for the rehabilitation nurses in planning supportive interventions for stroke survivors and their caregivers.

Yamamoto, Yosuke, Hayashino, Yasuaki, Yamazaki & Shin (2009) evaluated a cross-sectional study on the influence of violent behavior in vulnerable elderly patients on bodily pain and caregiver burden in their informal caregivers at home-care services in Northern Japan Hospitals. One hundred thirty-seven patients aged ≥40 years with limited activity and mobility in ten facilities providing home-care services in Japan were filtered as samples. Degree of caregiver-perceived violent patient behavior and caregivers’ bodily pain were derived from a self-administered questionnaire, and caregiver burden was assessed using scores from both the Burden Index of Caregivers and the Zarit Burden Interview. Caregivers who looked after violent patients experienced significantly higher odds of having bodily pain. Caregivers of violent patients also reported significant caregiver burden as assessed by the Burden Index of Caregivers and the Zarit Burden Interview. Violent behavior among older patients was associated with significant increases in both physical and psychological burden in their informal caregivers.
Van Exel, Koop Manschap, Van den Berg, Brouwer, & Van den Bos (2005) assessed the burden of informal caregiving for stroke patients and identification of caregivers at risk of adverse health effects in Institute for Medical Technology Assessment, Rotterdam, Netherlands. They studied a sample of 151 stroke survivors and their primary informal caregivers and collected data through patient and caregiver interviews 6 months after stroke. Both the level of subjective burden and the condition of feeling substantially burdened were associated with both caregiver’s and patient’s health-related quality of life, patient’s age, and the number of caregiving tasks performed. These conditions could be used in clinical practice to identify potentially vulnerable caregivers in need of support and at risk of adverse health effects. Monitoring stroke survivors as well as their family caregivers at discharge would help to prevent or alleviate caregiver burden.

Lalit Kalra (2004) evaluated the effectiveness of training care givers in reducing burden of stroke in patients and their caregivers by randomized controlled trial in stroke rehabilitation unit at Kings College Hospital, UK. 300 stroke patients and their caregivers were included for the study. The intervention was training care givers in basic nursing and facilitation of personal care techniques and the findings identified that cost of care over one year for patients whose caregiver had received training were significantly lower (p = 0.001). Trained care givers experienced less care giving burden (p = 0.0001) and anxiety (p = 0.0001) and depression (p = 0.0001) and had higher quality of life (p = 0.001). The findings stressed that training care givers during patients’ rehabilitation would reduce cost and caregiver burden.
Morimoto, Tomoko, Schreiner, Andrea S., Asano & Hitoshi (2003) did a study on care giver burden and HRQOL among Japanese stroke caregiver. Majority of care giver were women (74%) and or spouse (71%). Men caregivers were significantly older. Wives reported significantly higher burden than other caregivers. Increased burden significantly related to decreased HRQOL particularly mental health. No relationship existed between increase of burden and caregiver physical function and role physical function. Social functioning was found to be higher among Japanese care givers.

2.1.6 Stroke education programme

Judi Johnson & Valinda Pearson (2012) assessed forty-one community dwelling stroke carers who were measured on three dependent variables like depression, hope, and ways of coping through quasi-experimental, repeated-measure study in Massachusetts. The subjects were randomly assigned to a treatment group or control group. The treatment group attended a series of eight 2-hour educational classes during a 4-week period. At the end of the series of classes, the tests of depression, hope, and ways of coping were re administered to the subjects in both the groups. The results of comparing the two groups favored the treatment group; they were statistically significant for depression; for hope and approached significance for coping. The study results supported the use of structured education classes to facilitate the adaptation of stroke carers who were living in the community.
Sara Joice, Marie Johnston, Debbie Bonettia, Val Morrison & Ron Mac Walter (2012) reported the stroke survivors’ experiences and perceived usefulness of an effective self-help workbook-based intervention through cross-sectional study involving the intervention group of an earlier randomized controlled trial at the participants’ homes approximately seven weeks post-hospital discharge. Following the five-week implementation period of the intervention, stroke survivors (n = 59) completed a structured exercise designed to assess and prioritize perceived usefulness of the intervention components. Demographic, clinical and psychological measures from the original study were included. Ninety percent (n = 53) of respondents rated the stroke workbook intervention as being better than slightly useful. A factor analysis of the completed responses derived three components, which were labeled information, support and behavioral activities. Repeated measures analysis of variance (ANOVA) showed information and support to be significantly more useful than the behavioral activities (p = 0.001). Behavioral activities were more highly rated by women than men (p = 0.02) and by those without a caregiver than those with p = .02. Participants with high desire rated all three components of the intervention more useful than those with low desire (p = 0.01). Those who used the intervention generally found it useful, with information and social support being perceived as being more useful than behavioral activities. Perceiving the behavioral activities as least useful may impede the uptake of recovery-promoting activities, which may have consequences for the effect of rehabilitation and recovery.

Goldfinger, J.Z., Kronish, I.M., Fei, K., Graciani, A., Rosenfeld, P., Lorig, K, et al. (2012) used community-based participatory research to conceive and
develop the Prevent Recurrence of All Inner-city Strokes through Education (PRAISE) trial at London. Using data from focus groups with stroke survivors, they tailored a peer-led, community-based chronic disease self-management program to address stroke risk factors. PRAISE will test, in a randomized controlled trial, whether this stroke education intervention improved blood pressure control and a composite outcome of blood pressure control, lipid control, and use of antithrombotic medications. 582 survivors of stroke and TIA enrolled thus far, 81% are Black or Latino and 56% have an annual income less than $15,000. Many (33%) do not have blood pressures in the target range, and most (66%) do not have control of all three major stroke risk factors. Rates of stroke recurrence risk factors remained suboptimal in the high risk, urban, predominantly minority communities who were studied. With a community-partnered approach, PRAISE has recruited a large number of stroke and TIA survivors to date, and could prove successful in engaging those to control risk for stroke and reducing disparities in stroke outcomes in inner-city communities.

Batchelor, Hill, Mackintosh, Said & Whitehead (2012) determined whether a multifactorial falls prevention program reduced falls in people with stroke at risk of recurrent falls and whether this program led to improvements in gait, balance, strength, and fall-related efficacy through a randomized controlled trial with 12-month follow-up. Participants were recruited after discharge from rehabilitation and followed up in the community. 156 were people with stroke at risk of recurrent falls who were discharged home from rehabilitation. Tailored multifactorial falls prevention program and usual care were given to (n = 71) or control and usual care, (n = 85). There was no significant difference in fall rate
(intervention: 1.89 falls/person-year, control: 1.76 falls/person-year, incidence rate ratio = 1.10, p = 0.74) or the proportion of fallers between the groups (risk ratio = 0.83, 95 % confidence interval = 0.60–1.14). There was no significant difference in injurious fall rate (intervention: 0.74 injurious falls/person-year, control: 0.49 injurious falls / person-year, incidence rate ratio = 1.57, p = 0.25), and there were no significant differences between groups on any other secondary outcome. This multifactorial falls prevention program was not effective in reducing falls in people with stroke who were at risk of falls nor was it more effective than usual care in improving gait, balance, and strength in people with stroke. Further research is required to identify effective interventions for this high-risk group.

Jones, F., Livingstone, E. & Hawkes, L (2012) aimed to explore contextual, personal and professional factors in applying training in the use of a new stroke self-management programme at Korean community areas. Practitioners completed in-depth case reflections as part of their two-day training in the Bridges stroke self-management programme (SSMP). The study utilized a qualitative approach to explore the understanding and meaning the participants gave to their experiences using the SSMP. Data from case reflections were analyzed using a thematic content analysis. Data from 60 case reflections were included in the analysis. Several themes were prominent including: timing, belief in the concept of self-management, congruence with goal setting, balance of power and subtleties and sensitivities of using the SSMP. The use of in-depth case reflections enabled a personal awareness of the complexities of supporting self-management after stroke. Participants reflected on their communication styles and interactions and how they influenced the development of self-management skills in individuals, post-stroke.
Case reflections offered an opportunity for participants who had received education in the use of an SSMP to explore their experiences of using the programme with individuals, post-stroke. This enabled personal reflection on learning and facilitated a wider discussion on the professional and organizational context concerning integration of a self-management programme into stroke rehabilitation. The paradox between professionals having a role as ‘experts’ and the subtle changes in practice towards a more collaborative therapeutic relationship to support self-management needs further exploration.

Sun, Chiang, Yu & Lin (2012) designed an educational programme for nurses to educate family caregivers and to evaluate the longitudinal (12 months after the educational programme) effects of a stroke care education programme on the ability of families to care for suicidal relatives using a randomized controlled trial at Manchester hospital. n = 61 composed of the family caregivers of stroke individuals. Several caregivers (n = 26) were randomly allocated to an experimental group who attended a two-hour stroke care education programme, and the other caregivers (n = 35) represented a control group who did not attend the education programme. All of the participants were given a questionnaire at baseline, 3 months, and 12 months during the period from 2009 to 2011. The results of the longitudinal effects of the stroke care education programme demonstrated that there were statistically significant differences after the educational programme as compared to before the programme with regard to “seeking assistance from resources” and the ability to care for those who were once suicidal. The longitudinal results of both groups showed that there was a significant difference in terms of “caring ability” at 12 months. The results of a multiple linear regression analysis indicated that
evaluations performed at the three-month time point were able to effectively predict success in “seeking assistance from resources”, “caring ability”; caring ability also significantly improved among those who were engaged in the educational programme at the 12-month time point. The stroke care education programme had long-term effects for family caregivers caring for their stroke relatives. Nurses could employ the suicide care education programme to improve the ability of family caregivers to care for their stroke relatives.

Jo Byrne, Kamlesh Khunti, Margaret Stone, Azhar Farooqi & Sue Carr1, et al. (2011) aimed to test open randomized pilot trial, a structured group educational intervention to improve self-management of blood pressure in people with ischemic stroke. This paper explored patient acceptability of the intervention. Control group (n = 41) received standard clinical management of hypertension and intervention group (n = 40) received standard clinical care plus the educational intervention in renal outpatient clinics at a Single Study Centre at USA. A total of 267 patients were approached, and 30% were randomly assigned. Lack of time (48%) and lack of interest (44%) were the main reasons cited for non-participation in the study. Men were significantly more likely to be recruited (p = 0.048). The intervention was rated enjoyable and useful by 100% of participants. However, 37.5% of the intervention group failed to attend the educational session after recruitment. Participants failing to attend were significantly more likely to be older (p = 0.039) and have lower self-efficacy (p = 0.034). An evidence-based structured group educational intervention (CHEERS) was used to improve knowledge and self-management skills. Recruitment, uptake of the intervention and patient satisfaction were evaluated to explore patient acceptability of the intervention and to determine any differences
between patients regarding recruitment and retention. The findings suggested that delivering and evaluating an effective structured group educational intervention to promote better blood pressure control in patients with stroke would be challenging in the current context of stroke care.

Markle-Reid, M., Orridge, C., Weir, R., Browne, G., Gafni, A., Lewis, M, et al. (2011) compared a specialized inter professional team approach to community-based stroke rehabilitation with usual home care for stroke survivors using home care services at School of Nursing, McMaster University, Ontario, Canada. Randomized control trial of 101 community-living stroke survivors (< 18 months post-stroke) using home care services were chosen as samples. Subjects were randomized to intervention (n = 52) or control (n = 49) groups. The intervention was a 12-month specialized, evidence-based rehabilitation strategy involving an inter professional team. The primary outcome was change in health-related quality of life and functioning (SF-36) from baseline to 12 months. Secondary outcomes were number of strokes during the 12-month follow-up, and changes in community reintegration (RNLI), perceived social support (PRQ85-Part 2), anxiety and depressive symptoms (Kessler-10), cognitive function (SPMSQ), and costs of use of health services from baseline to 12 months. Results projected that a total of 82 subjects completed the 12-month follow-up. Compared with the usual care group, stroke survivors in the intervention group showed clinically proven greater improvements from baseline in mean SF-36 physical functioning score (p = 0.24) and social functioning score (p = 0.28). A 12-month specialized, inter professional team was a feasible and acceptable approach to community-based stroke
rehabilitation that produced greater improvements in quality of life compared to usual home care.

Tim Johanson & Claudia Wild (2011) conducted a systemic review of tele rehabilitation interventions in stroke care at Ludwig Boltzmann Institute for Health Technology Vienna, Austria. Nine studies, all published after 2005, were included in the review. A wide variety of telemedicine interventions in post-stroke rehabilitation care was identified. Four studies had been carried out in the USA, two in the Netherlands, two in Italy and one in China. There were four randomized controlled trials and one qualitative analysis. Four studies used an observational study design/case series. Review suggested that home-based tele rehabilitation interventions showed promising results in improving the health of stroke patients and in supporting caregivers.

Hild Fhaertoft, Gitta Rohweder & Bent Indredavik (2010) conducted a study on stroke unit care combined with early supported discharge. 320 patients with stroke, 160 allotted in each group, control group exposed to ordinary stroke unit care whereas study group given stroke unit care and early supported discharge care (ESD). Same patients were followed for one month after discharge till five years and assessed the functional outcome including mRS. There was no difference between the groups with modified Ramkin Score of <2. More patients were dead and institutionalized in the ordinary stroke unit care group and of the 158 alive, 84 were in ESD group and 74 were in ordinary stroke unit care; a greater proportion lived at home in ESD of p=0.019.
Sritipsukho, Riewpaiboon, Chaiyawat & Kulkantrakorn (2010) compared
the costs and effects of a home rehabilitation program versus conventional hospital
care for ischemic stroke patients in Thammasat University, Thailand. An open-label
randomized control trial was conducted to explore the efficacy of a home
rehabilitation program for acute stroke care for three months after hospital
discharge. 58 patients were included in which 28 were assigned for study and 30 for
control group respectively. The Barthel Index and Modified Rankin Scale were used
to evaluate the outcome measures. Success was defined as improvement by at least
one level of the outcome scales. An incremental cost-effectiveness ratio, including
sensitivity analysis, was presented. Results focused that the cost and number of
successful cases in the study group were higher than those of the control group. The
incremental cost-effectiveness ratio (ICER) was the lowest 13,644 Thai Baht (THB)-
regarding the Modified Rankin Scale measurement. For patients achieving mild
disability and no disability based on the Barthel Index, the ICERs were 14,212 THB
and 24,364 THB respectively. Sensitivity analyses regarding variations in number of
patients and cost of home visits demonstrated more cost-effectiveness than the base
case. Study concluded by saying that providing a home rehabilitation program with
higher cost resulted in a greater number of patients avoiding disability than via
conventional hospital care.

Oupra, Griffiths, Pryor & Mott (2010) carried out a non-randomized
comparative study with concurrent controls, using a two-group pre-test and post-test
design to find out the nurse-led Supportive Educative Learning programme for
family caregivers (SELF) of stroke survivors in Thailand and to evaluate the effect
of the SELF programme on family caregiver's strain and quality of life at University
of Western Sydney, Australia. A total of 140 stroke survivors and 140 family caregivers were recruited; 70 patients/caregiver pair in each group. Caregivers of patients admitted to the intervention hospital following an acute stroke received the intervention, while caregivers of patients admitted to the comparison hospital received the usual care provided at the hospital. The data were collected prior to discharge of the patients and after 3 months. The family caregivers in the intervention group had a significantly better quality of life than the comparison group (GHQ-28 at discharge p = 0.006; and at 3 months p < 0.001) and they also reported less strain (Caregiver Strain Index at discharge p < 0.001; and at 3 months p < 0.001). This research demonstrated that providing education and support to the family caregiver of stroke survivors could reduce caregiver strain and enhance their quality of life.

Chumbler, N.R., Rose, D.K., Griffiths, P., Quigley, P., McGee-Hernandez, N., Carlson, K.A, et al. (2010) conducted a randomized control trial on multifaceted tele rehabilitation (TR) intervention that uses tele health technology to simultaneously evaluate the home environment, assess the patient's mobility skills, initiate rehabilitative treatment, prescribe exercises tailored for stroke patients and provide periodic goal oriented reassessment, feedback and encouragement at South Carolina, Ireland. Fifty participants with a diagnosis of ischemic or hemorrhagic stroke were randomly assigned to one of the two groups: (a) TR; or (b) Usual Care. Dependent variables were measured at baseline 3 and 6 months and analyzed with a linear mixed-effects model across all time points. For patients recovering from stroke, the use of TR to provide home assessments and follow-up training in prescribed equipment has the potential to supplement effectively with existing home
health services, assist transition to home and increase efficiency. Suggestions put forth that if this technology is used in remote locations it would provide a massive outcome among stroke survivors.

Annie Rochette, Nicol Korner-Bitensky, Duane Bishop, Robert Teasell, Carole White, Gina Bravo, et al. (2010) examined the individuals who experience a first "mild" stroke, of a sustainable, low cost, multimodal support intervention (comprising information, education and telephone support) - "WE CALL" compared to a passive intervention (providing the name and phone number of a resource person available if they feel the need to) - "YOU CALL", on two primary outcomes: unplanned - use of health services for negative events and quality of life at Massachusetts Canada. 384 adults who met the inclusion criteria for a first mild stroke across six Canadian sites. Baseline measures were taken within the first month after stroke onset. Participants were stratified according to comorbidity level and randomized to one of two groups: YOU CALL or WE CALL. Both interventions were offered over a six months period. Primary outcomes included unplanned use of health services for negative event (frequency calendar) and quality of life (EQ-5D and Quality of Life Index). Secondary outcomes included participation level (LIFE-H), depression (Beck Depression Inventory II) and use of health services for health promotion or prevention (frequency calendar). Blind assessors gathered data at mid-intervention, end of intervention and one year follow up. Results were effective and the multimodal intervention could be delivered in both urban and rural environments making a sustainable and deliverable change in the existing infrastructure such as regional stroke centers and existing secondary
stroke prevention clinics to make this intervention, if effective, deliverable and sustainable.

Sharon, K. Ostwald, Sally Davis, Gayle Hersch, Carolyn Kelley & Kyler, M. Godwin (2008) investigated the effect of randomized clinical intervention in the form of stroke educational program that was offered to 72 stroke survivors and their families as part of an interdisciplinary research study called CAReS (Committed to Assisting with Recovery after Stroke) at Kentucky, Australia. As they were discharged home from inpatient rehabilitation, 159 stroke survivors and their spouses were randomized into usual care or home visit groups. Physical and psychosocial data were collected on stroke survivors and spousal caregivers in both groups at discharge and 3, 6, 9, and 12 months after discharge to test for differences between the two groups. All couples received information by mail for 12 months. The group randomized into the home visit group also received home visits for 6 months from nurses and therapists, who used 39 flexible, evidence-based guidelines developed by this article's authors for use with stroke survivors following discharge from inpatient rehabilitation. The guidelines were tested for ease of use and acceptance by stroke survivors and their families during more than 1,150 visits from an interdisciplinary team comprising advanced practice nurses, occupational and physical therapists. Results reported that 63% of stroke survivors and 85% of caregivers indicated they understood the content well, while only 6% of stroke survivors and less than 1% of caregivers had significant difficulty in understanding the content. Study recommended that these guidelines represented an evidence-based interdisciplinary approach to comprehensive education for stroke survivors.
and their families which in turn curbed their lack of knowledge in post caring of stroke patients at home.

Hilary, K. Wall, Brianne, M. Beagan, June, O'Neill, Kathleen, M. Foell, & Cynthia, L. Boddie-Willis (2008) conducted secondary research to identify messages with evidence-based effectiveness for communicating stroke signs and symptoms at Georgia, United States of America. Non-Hispanic white and non-Hispanic black women aged 40 to 64 years received education on stroke signs and symptoms. Knowledge change about stroke signs and symptoms was calculated immediately following education session and 3 months after the education session. From the results, a Stroke Heroes Act FAST animation was created and concept-tested. Using Stroke Heroes Act FAST educational materials that were developed, 72 women (mean age, 54 years; 15.5% were non-Hispanic blacks) received education about signs and symptoms of stroke and took the pre-tests and post-tests to assess knowledge change. Immediately after the education session, significant increases were seen in the percentage of participants who recognized that facial droop (92% Vs 99%, p = 0.02) and arm weakness or numbness (86% Vs 97%, p = 0.004) as the symptoms of stroke. Of the 65 participants who were given the 3-month follow-up survey, 100% remembered slurred speech and facial drooping as symptoms; 98.5% recalled arm weakness or numbness; and 97% would call 9-1-1 if they thought someone was having a stroke. None of these is a significant change from the posttest. The Stroke Heroes Act FAST kit may be a useful tool for improving knowledge of stroke signs and symptoms among adults.
Desrosiers, J., Noreau, L., Rochette, A., Carbonneau, H., Fontaine, L., Viscogliosi, C, et al. (2007) experimented a randomized controlled trail on the effect of a home leisure education program after stroke at University Institute of Geriatrics of Sherbrook, Canada among geriatrics. The main objective was to evaluate the effect of a leisure education program on participation and satisfaction with leisure activities (leisure-related outcomes) well-being, depressive symptoms, and quality of life (primary outcomes) after stroke among 62 stroke survivors. Experimental participants (n = 33) received the leisure education program at home once a week for 8 to 12 weeks. Control participants (n = 29) were visited at home at a similar frequency. Participants were evaluated before and after the program by a blinded assessor. There was a statistically significant difference in change scores between the groups for satisfaction with leisure with a mean difference of 11.9 points (95% confidence interval, 4.2-19.5) and participation in active leisure with a mean difference of 14.0. The study indicated that the effectiveness of the leisure education program was effective in improving participation in leisure activities, improving satisfaction with leisure and reducing depression in people with stroke.

Visser - Meily, A., van Heugten, C., Post, M., Schepers, V. & Lindeman (2005) evaluated a critical review on the effectiveness of different types of intervention programs for caregivers of stroke patients in Centre De Hoogstraat, Rembrandtkaad Nederland. A systematic search using Medline, Psych INFO, AMED and CINAHL till March 2010 was carried out and 22 studies were identified. Four types of support programs could be studied like providing specialist services, (psycho) education, counseling and social support by peers. Many different outcome domains and a variety of measures were used. Ten studies reported positive results.
on one or more outcome domains: reduction of depression (two studies) and burden (one), improvement of knowledge on stroke (five), satisfaction with care (one), family functioning (one), quality of life (three), problem solving skills (two), social activities (two), and social support (one). Three studies reported a negative result on caregiver outcome. Suggestions portray that the counseling programs appear to have the most positive outcome.

Larson, J., Franzen-Dahlin, A., Billing, E., Arbin, M., Murray, V. & Wredling, R (2005) evoked a randomized controlled trial on the impact of a nurse-led support and education programme for spouses of stroke patients at Karolinska Institute, Stockholm, Sweden. The aim of the present study was to determine the impact of a nurse-led support and education programme on general quality of life, life situation, general well-being and health state. 100 spouses were randomly assigned to intervention and control groups, 50 in each group. The intervention group participated in a support and education programme, six times during six months, led by stroke specialist nurses. Both groups were followed for 12 months. Results suggested that no significant differences were found between intervention and control groups, over time. In the sub analyses, it was found that the group attending 5-6 times had a significant decrease in negative well-being and increased quality of life over time, while the group attending fewer times had a significant decrease in positive well-being and health state, similar to the control group, which also had a significant decrease in negative and general well-being. Suggestions put forth stated that a support and education programme might have a positive effect on spouses' well-being, on condition that they attend at least five times.
Han Boter (2004) determined the effectiveness of multicenter randomized controlled trial of an outreach nursing support program for recently discharged stroke patients. 536 stroke patients randomized and 273 allotted for standard care and 263 for outreach care with their care giver. Intervention included three telephone contacts in 1 to 4 weeks, 4 - 8 weeks and 18 - 24 weeks after discharge and one home visit in 10 - 14 weeks after discharge and issuing of brochure and meeting individual caregiver need and reassurance. Primary outcome measures were quality of life and dissatisfaction with care. Secondary outcome measures were disability, depression, anxiety, use of health care services caregiver strain and social support. Outreach program patients had better scores on the SF -36 domains Role emotional than control group. No statistically significant differences were found on the other primary outcome measure. For secondary outcome in the intervention group patients used fewer rehabilitation services and lower anxiety score and no other statistical significance was found.

Werner, Robert, Kessler & Susan (1996) did the study to assess the Effectiveness of An Intensive Outpatient Rehabilitation Program for post-acute Stroke. A randomized controlled trial, single-blinded study to demonstrate the effectiveness of intensive outpatient therapy. The treatment intervention consisted of 1 hour each of physical and occupational therapy, four times per week, for 12 weeks; therapy focused on neuromuscular facilitation and functional tasks. All subjects were screened before the therapies and after 3 months and 9 months. Forty-nine stroke survivors, who were at least 1 year (mean, 2.9 yr) post stroke, were randomized with two treated patients to each control (no treatment supplied). All patients had received inpatient rehabilitation at the time of their acute stroke, but no
patient had any ongoing therapy within the last 6 months. The outcome measures included the Functional Independence Measure (FIM), Brunnstrom stages of motor recovery, timed mobility tasks, and the Jebson hand evaluation. We also evaluated the level of depression, self-esteem, and socialization. The treated patients demonstrated an improvement of 6.6 points over the 3 months of therapy compared with only 1.5 points in the control group in the FIM motor score transformed using Rasch analysis. The change from time 0 to 3 months was significant in the treated group but not in the controls. Treated patients maintained their gains at the 9-month follow-up, and controls lost ground. The treated group improved in terms of socialization and self-esteem as evidenced by a lower Sickness Impact Profile, whereas the controls tended to get worse. There was a trend toward less depression, but this did not reach $P = 0.05$ level of significance. The study demonstrated that significant functional gains could still be attained in the post-acute stroke survivor, despite prior inpatient rehabilitation services.

2.2 CONCEPTUAL FRAMEWORK

Nursing theory provides autonomy by guiding practice, education and research to function as a profession. Theory helps to develop analytical skills, critical thinking ability, clarify values and assumptions and determine the purpose of nursing practice and research (Peggy L. Chinn & Maeona K. Kramer, 1991).

It is widely believed that use of theory offers structure and organization to nursing knowledge and provides a systematic means of collecting data to describe, explain and predict nursing practice. Use of theory also promotes rational and
systematic practice by challenging and validating intuition (Melanic McEwen & Evelyn M. Wills, 2007).

Conceptual framework for this study was based on the Individual and Family Self – Management Theory (IFSMT) which was developed by Polly Ryan and Kathleen J. Sawin (2008). The model focused on the individual and family self-management to improve the health outcome. The need to manage chronic conditions and to actively engage in a lifestyle that fosters health is increasingly recognized as the responsibility of the individual and their family.

Health problems have shifted from acute to chronic and personal behaviors are linked to over half of chronic health problems. Stroke is one of the chronic conditions where the individual and the family need to manage their health problems following stroke. Health care delivery has shifted to non-hospital venues with hospitalizations often eliminated or shortened. Criteria for hospital discharge are related to outcomes of conditions or procedures rather than the ability of patients or families to manage care. While the values of health promotion are increasingly realized for individuals and families, few health-promoting strategies are routinely incorporated into the delivery of health care in many settings. Individuals and families are expected to sort through the myriad of contradictory health information of varying quality and engage in behaviors promoting their health.

The goal of this theory is to increase responsibility of dyads thereby to develop skills needed for independent living. Individual and family self-management (SM) includes the purposeful incorporation of health related behaviors
into an individual or family's daily functioning. Individual and family SM prevents or attenuates illness or facilitates the management of complex health regimens in ways that reflect individual and family values and beliefs in personally meaningful ways. The individual or caregiver assumes responsibility for individual and family SM and may occur in collaboration with health care professionals.

SM is a multidimensional process that can be conceptualized as affecting individuals, dyads, or families across all developmental stages. SM includes condition specific risk and protective factors, components of the physical and social environment and unique characteristics of individuals and family members. It includes the processes of SM; specifically, facilitation of knowledge and beliefs, enhancement of self-regulation skills and abilities, and social facilitation. SM affects a number of outcomes, both short and long term. SM behaviors are used to manage chronic conditions as well as to engage in health promotion behaviors.

The components of the model for the present study are discussed below. SM is a complex dynamic phenomenon consisting of three dimensions: context, process, and outcomes.

a. **Context dimension: risk and protective factors**

i. **Condition specific:**

These are stroke risk factors, localization of lesion in the brain, neurological dysfunction (weakness of the body, difficulty in swallowing, problem in reading, problem in memory etc), dyads (patient & caregiver) knowledge on stroke (risk factors, warning signs and symptoms and management of stroke).
ii. Physical and social environment

This includes type of family, family monthly income, place of residence, occupation, culture and access to health care facilities.

iii. Individual and family

These are personal characteristics of the dyads that included the background variables that consisted of age, gender, education status, marital status, kinship with the patient and prior experiences as caregiver.

b. Process dimension

i. Knowledge and belief factors

Functional status of the patient and the caregiver, information received from health care personnel, friends and family members, outcome expectancy by the dyads.

ii. Self-regulation skills and abilities

Self-regulation is the process used to change health behavior and includes activities such as routine care by the health care personnel, Comprehensive stroke Education programme, booklet on “Life after stroke”, adherence to medication, regular follow up, able to manage physical and emotional and cognitive responses associated with health behavior change and self-monitoring of risk factors of stroke.
iii. Social facilitation

This consists of caregiver and family support following stroke, engage in specific health behavior and collaboration between individuals and families and health care professionals.

c. Outcome dimensions

Outcome is expected following an intervention. Outcome of this has two aspects that are proximal and distal. The proximal outcome measures the individual and caregiver self-management behavior that are; adherence to medications, regular follow up, control of risk factors, prevention of other stroke and post stroke complications, life style modifications and utilization of health services. Distal outcomes are related, in part, to successful achievement of proximal outcomes. Distal outcome refers to the validation of the self-management behaviors in terms of improvement or no improvement in dyads (patient & caregiver) knowledge on risk factors, signs and symptoms and management of stroke, functional ability of the patient, generic and disease specific quality of life among patients with stroke and caregivers burden.

This theory combines and expands on individual and family SM, focusing on the individual, dyads within the family. This theory also explains how the SM process can enhance knowledge and beliefs, increase an individual’s use of self-regulation behaviors and foster social facilitation (Polly Ryan and Kathleen J. Sawin, 2008).
Figure 2.1 Conceptual framework based on Polly Ryan & Sawin’s The Individual and Family Self-Management Theory