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A STUDY ON THE INTERVENTION AND PREVENTION OF STROKE RECURRENCE AMONG SENIOR CHINESE CLIENTS IN MALAYSIA

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ABSTRACT

Stroke is the most important cause of death and foremost cause for dysfunction around the globe. As a result increase in the number of elderly population the incidence of stroke has emerged as an important public health problem. Major developments have taken place in the field of medication for the prevention and treatment of stroke during the past decade. Inspite of major interventions proposed by several organizations and the government, the present scenario of the stroke management facilities is still not promising. This article intends to investigate the health care facilities present for the elderly individuals with high risk of stroke reoccurrence through proper analysis of the health system in Malaysia. The objectives are to find out evidence-based, reasonably priced and endurable measures to control the recurrences of stroke and to evaluate the outcomes of these interventions. It was noticed that in Malaysia though there many amenities for stroke patients are available but reorganizing and strengthening of few aspects such as human resource by multidisciplinary input is necessary for proper management of senior stroke patients. Moreover monitoring is essential to support patients after discharge from the hospital. The ethical variations among patient with stroke recurrence and the risk factor associated with stroke is not fully understood by healthcare workers. So, this study attempts to guide the stroke patient, their families and the health care workers to prevent stroke recurrence.

Keywords: *Stroke, Stroke Interventions, Stroke in Malaysia*

INTRODUCTION

The World Health Organization has conducted many health promotions for the world population in order to improve and increase the awareness regarding health related matters. However, all these knowledge and information will be in vain if the individuals do not follow the rules and regulations appropriately. In Malaysia the Chinese community believe in the philosophy of "Eat first, die later". Due to such a cultural practice, the citizen of Malaysia suffers from many chronic diseases. Among the major diseases, the high incidence of stroke needs urgent attention. This article aims to find out the health care facilities for the elderly individuals with high risk of stroke reoccurrence through proper analysis of the health system in Malaysia, with emphasis on primary care and community-based action. The objectives are to find out evidence-based, reasonably priced and endurable measures for the hindrance for the recurrences of stroke and to evaluate the consequence of these interventions. The health measures of stroke must include interventions before (primary) and after (secondary) stroke, in addition with acute phase management methods along with constant supervision.

Stroke the leading cause of death and major reason for disability worldwide (Rosamond *et al.*, 2008). It is the most common source of neurological dysfunctions among adults especially in the industrialized countries (Donnan *et al.*, 2008). With the increase in the number of ageing population, stroke is fast emerging as the most important public health problem (Poungvarin, 1998). Major developments have taken place in the field of medication for the prevention and treatment of stroke during the past decade. There are a strong geographical disparity in the occurrence of risk factors for the incidence of stroke due to the variation in the genetic characteristics and differences in the intervention pattern (Strong, Mathers and Bonita, 2007). Though there has been a steady decline in the incidence of mortality due to stroke in developed countries, but the developing countries are still unable to combat the high frequency of stroke (Bonita,

1992). The most probable justification for the failure of the developing countries is that they are unable to improved the control measures necessary for the reduction of stroke risk factors (especially high blood pressure and cigarette smoking) along with corresponding improvement of the living standards (Thrift *et al.*, 2006).

The fast increase in the incidence of cardiovascular and other non-communicable ailments signify the need of major health care interventions for global development (WHO, 2012). The government of Malaysia has prioritized healthcare services under 10th Malaysia Plan (2011-2015), with an aim to reduce the incidence of stroke, which includes strategies to promote healthy lifestyle, increase public awareness and campaigns for health-care screening. Therefore, the objective of this academic study is to explore the main cause and the incidence of stroke among Chinese in Malaysia and the prevention of the disease among this particular ethnic group.

PREVALENCE OF STROKE IN MALAYSIA

Stroke has become third leading cause of death in Malaysia's after heart disease and cancer, and as a result average of 110 people die every day due to stroke (National Stroke Association of Malaysia, NASAM, 2011). According to the statistics on stroke, 59% of the patients are male and the patients' average age is 62 and mostly from the State of Selangor, Malaysia (Mn, 2009). Furthermore, 85% of the stroke patients were Chinese. Hence, stroke among senior Chinese patients contributes to approximately 70% of the total patients (Table-1). Based on this study result, it showed that the senior Chinese in Selangor will have a much higher chance to contract with stroke. It has been reported that stroke patients often experience recurrence as result of poor health care services (Azarpazhooh *et al.*, 2008; Lewsey *et al.*, 2010). So the healthcare institutions have to amend the prevalent strategies for better intervention to prevent recurrence of stroke (Lawrence *et al.*, 2010).

Table 1: Demographic Characteristic of the Subjects

Demographic Characteristics		N (Total - 61)	%
Age (yr)	<60	11	18
	≥60	50	82
Gender	Male	34	56
	Female	27	44
Ethnicity	Malay	9	15
	Chinese	52	85
	Indian / Others	0	0
Marital status	Married	55	90
	Not married	6	10
Post-stroke duration (yr)	<1	22	36
	≥1	39	64

Source: (Mn *et al.* 2009) Demographic Characteristics of the Subjects by Faculty of Allied Health Science, University Kebangsaan Malaysia in 2007 in Selangor.

Stroke is the leading cause for disability in adult and an estimated 40,000 people in Malaysia suffer from stroke (Rabia and Fammed, 2007). Recurrence of stroke in elderly patient in Malaysia will increase significant in such a manner that about 25% of survivors of first stroke will experience recurrent attacks over the next 5 years and 28% will die within 28 days (Hairi *et al.*, 2010). As the rate of occurrence of stroke is much higher in the developing countries, so the stroke patient of Malaysia should be monitored in such a manner so as to provide them with sufficient support from the current health care system which should include precautionary intervention to prevent secondary stroke (Rochette *et al.*, 2010). Thus this paper will try identify the factors contributing to the occurrence of stroke and look for the health care interventions necessary for the prevention of stroke recurrence among the senior Chinese citizen of Selangor.

CONTRIBUTING FACTOR OF STROKE

The risk factors that contribute to the occurrence of stroke are ethnicity, geographical location, age and gender (Wu *et al.*, 2010). Shen *et al.*, (2007) considered stroke as polygenic or multi-factorial diseases and each factor will contribute at different level of effects toward stroke.

AGE

According to the National Census Malaysia (2000), about 4.5% of the population (28 million) are over 65 years of age. Aging and degeneration of the body are the most significant factors responsible for any major chronic disease, For example, mortality due to stroke as a result of acute basilar artery (a vital artery in the posterior cerebral circulation) occlusion is significantly higher compared to all the stroke cases. The wall of these arteries stiffens with ageing and this may be related to the loss of the elastic component in the arterial wall (Gudiene *et al.*, 2011). The stroke risk

management and treatment along with modification of therapies should be adjusted according to the age of the individuals (Wu *et al.*, 2010). Saric *et al.*, (2011) also concluded that the risk of stroke will be significantly higher if the age of the patient is increased as these patients suffer from other diseases such as high blood pressure. Thus interventions should be formulated to suit the old age to prevent recurrence of stroke.

FOOD

Among the Chinese population of Malaysia food is a major part of their life. Moreover, lavish spreads of food are found during festivities and it is sign of their ethnicity, culture and prosperity. The elderly Chinese population consume legumes and animal oil like lard, beef and mutton improperly causing deterioration of their health (Wang *et al.*, 2010). This kind of food has high saturated fat, which will cause hyperlipidaemia, hypertension and will contribute to the incidence of stroke. The study of Medin *et al.*, (2010) showed that stroke patients encounter difficulty and dilemmas when it comes to changing their eating habits. Thus the stroke patients need assistance to control their diets in order to adapt to a healthy eating habit.

ALCOHOL

There are significant higher consumption of alcohol and smoking among Chinese male, as this could be due to the cultural difference (Maniam, 1994). As drinking and smoking is prevalent among the males it was seen that the number male stroke patients are higher than the female patients. Table 2 illustrates that older patients with drinking and smoking habits have higher risk of stroke than younger patients (Wu *et al.*, 2010).

Table 2: Risk factors compared with very old patients and younger patients

Age groups	<85years (n=1,089)	85years (n=72)	*P*
Hypertension	729 (66.9)	41 (56.9)	0.09
Diabetes	350 (32.1)	16 (22.2)	0.09
Heart disease	214 (19.7)	27 (37.5)	0.001
Previous stroke	311 (28.6)	22 (30.6)	0.69
Smoking	440 (40.4)	14 (19.4)	<0.001
Alchol	235 (21.6)	2 (2.8)	<0.001
Obesity	219 (20.1)	8 (11.1)	0.06

Figures in paratheses are in percentage

Patra *et al.*, (2010) stated that heavy consumption of alcohol increases the relative risk for stroke recurrence, whereas, light or moderate consumption acts as a protective agent for stroke patients. The polyphenols content of red wine much higher which is indicative of its activity in prevention of cancer, cardiovascular disease and other degenerative diseases (Proestos, *et al.*, 2006).

CHINESE HERBAL

Malaysian Chinese consume many traditional herbal medicines which they believed to have some effect on the improvement of blood circulation and augment good health (Huang *et al.*, 2010). However, most of these Chinese herbals were used without the approval of the doctors or the Ministry of Health in Malaysia, resulting in improper dosage and higher risk of stroke recurrences (Chen, 2009).

GENETIC

Genetic factor have direct impact on the occurrence of stroke. Individuals with history of incidence of stroke in the family members might have higher risk of stroke recurrence (Munshi and Kaul, 2010). A number of works have indicated that C-reactive protein (CRP), an inflammatory marker, is related with stroke severity and its adverse effects (Dewan and Rana, 2011). High CRP levels are regarded as a predictor of ischemic stroke (IS) in elderly individuals by damaging the cerebral vascular tissues. CRP genes appear to be prognostic markers of ischemic stroke and this polymorphism could be a useful genetic marker (Morita *et al.*, 2006).

OBESITY

A study done by Ismail *et al.*, (2002), exhibited that 29% of Malaysian Chinese male were overweight whereas 22% of Chinese Women are overweight respectively. Obesity among different ethnic groups of the Chinese population of Malaysia is related to modern lifestyle which include fast foods and sedentary lifestyle (Zhang *et al.*, 2011). Song *et al.*, (2004) confirmed that obesity acts as a risk factor for both ischemic and haemorrhagic stroke. Raised body mass index (BMI>25kg m^{-2}) causes overweight and obesity which leads to poor prognosis and high morbidity regarding stroke (Sun *et al.*, 2012).

Table 3: The age-adjusted prevalences of underweight, overweight and obesity in Malaysian men and women of different ethnis groups

	Underweight <16.5*	Overweight 25.0-29.9*	Obesity 2 30.0-39.9*	Obesity 3 >40.0*
Men				
All groups	11.5	20.1	3.8	0.2
Malay	12.3	19.9	4.2	0.2
Chnese	9.2	23.9	4.7	0.1
Indian	10.7	23.7	3.7	0.1
Other indigenous	11.6	17.1	2.8	0.0
Women				
All groups	14.1	21.4	7.2	0.4
Malay	14.7	23.9	9.0	0.6
Chnese	14.1	17.7	4.6	0.4
Indian	12.9	25.1	9.2	0.3
Other indigenous	16.5	19.6	6.3	0.1

*Body mass index (BMI) value, expressed in kg m2.

MALAYSIAN CONTEXT

Stroke is the fourth most common cause of death after septicemia, cancer and ischemic heart disease in the Malaysian Ministry of Health hospitals, and accounts for severe disability in adults (Miniño *et al.*, 2011). Mohamed (2010) have investigated the reasons of stroke recurrence among elderly Chinese patients and have emphasized on the lack of awareness about the disease and the ways of prevention. Other than this, language acts as a barrier for the transfer of the knowledge to the patient especially for the low income ethic group (Karliner *et al.*, 2012). Moreover Chinese perceptive toward health and illness is influenced by cultural beliefs and traditional philosophies. The health care profession are often unaware of the complex Chinese culture that influences their patients' responses to care (Hui, 2008; Chew *et al.*, 2011). All these factors mentioned above contribute to the stroke recurrence in elderly Chinese population, hence, proper intervention must be implemented in order to reduce the chance of recurrence of stroke.

INTERVENTION METHODS AND ITS LIMITATION

1. Nutrition

Research findings showed that a huge consumption of fruits, vegetables and cereals reduces the risk of stroke significantly (Larsson *et al.* 2009). National Stroke Association of Malaysia arranges special nutrition diet class to teach and educate the family members and patient regarding the quality food and modify encourage them to modify their daily diet (National Stroke Association of Malaysia, 2011).

2. Traditional Chinese Medication

Traditional Chinese medication (TCM) has great influence among the Chinese community. In Malaysia, most of the Chinese patient would prefer TCM instead of the western treatment (Fu, *et al.*, 2011). It was also proven by recent studies that well monitored TCM can reduce mortality due to stroke, and daily intake in proper dosage can decrease the incidence of stroke and hypertension (Iwaoka *et al.*, 2007). So the Ministry of Health in Malaysia should keep a watchful eye over TCM for proper regulation and administration.

3. Rehabilitation

Community based rehabilitation classes are conducted in Malaysia to take care of the elderly stroke patients (Wu, *et al.*, 2010). Community-based exercise like Tai Chi is a safe rehabilitation programme for stroke survivors in Malaysia. Studies suggest that recruitment and retention of an adequate number of older generations in these types of exercise can help to reduce stroke recurrence (Taylor-Piliae and Coull, 2012). But in the present scenario, nurses are insufficient for the rehabilitation curriculum. There is a need to train the community nurses to perform rehabilitation work and to increase awareness among them (Barnett, Namasivayam and Narudin, 2010).

4. Intervention and Motivational Programmes:

As the people experiencing transient ischaemic attack (TIA) or first strokes are at significant risk of subsequent stroke, so the risk factors should be identified in these cases (Davis and Donnan, 2012). These include factors associated with lifestyle such as tobacco use, diet, obesity, alcohol consumption, physical activity and stress. Thus an overview of the evidence relating to lifestyle risk factors for stroke is needed for proper targeted therapeutic interventions. Health promotion theories and intervention techniques for nurses to modify lifestyle behaviour following stroke, has been formulated (Lawrence *et al.*, 2011). Young graduate nurses who conduct the interviews are unable to explain the depth of the disease, its preventions and thus cannot stimulate awareness. Other factors such as patient's reliance

to traditional treatments (Rosnah, 2005) and unconducive noisy hospital environment forces healthcare provider to get unenthusiastic towards these secondary interventions (Hamidon, Nabil and Raymond, 2006).

5. Formal Stroke Risk Assessment

To reduce the recurrence of stroke, patients should be a provided with a formal stroke risk assessment curriculum by the healthcare workers and the information should be documented based on the country's guideline. Moreover, properly designed recommendations should be readily available to the medical team regarding appropriate therapy (Jackson and Peterson 2011). But specific stroke unit or rehabilitation unit are not available in Malaysia. The staffs and nurses are inexperienced and not specialized forn stroke management (Samsiah *et al.*, 2011).

6. Multimodal Support as Intervention

Instant information in the internet and helpline should be readily available to the patients along with documentation (Rochette *et al.*, 2010). The patients will be referred to the local community or directly to family doctor when there is a health problem. As the stroke patients suffers from various physical disabilities like dysphagia, balance disability, impairing arm function, phasia etc, such multimodal support interventions will be modestly effective and will not be able to bring about significant behaviorial changes for patients (Holmes-Rovner *et al.*, 2008).

7. Home Base Rehabilitation

Mohamed, (2010) has proposed the supportive environment to regain and develop some stability for stroke patients and this responsibility will be shifted to home care by the family members. So the family members must be trained to care for these stroke patients, so as to provide them proper rehabilitations and prevent further complications. So it is the duty of the health visitors to assist in building up the home environment to suit the needs of stroke survivals. Malaysian Ministry of health can also train more health visitors who can do frequent home visits to help patients and family members.

8. Cultural Training

All healthcare workers must go through cultural competency training (Robinson *et al.*, 2011). This training has to follow a standard education plan. They have to learn about the Chinese philosophy, cultural believes and taboo. It will enhance the rapport among the healthcare workers and the patient which will enable to earn the cooperation for the patient.

9. Stroke unit care

A stroke unit care should be constructed separately by each hospital. This is unit should be organized with hospital facility so as to take care of stroke patient (Cadilhac *et al.*, 2004). It must consist of healthcare workers with multidisciplinary background with special knowledge about stroke. Every intervention will be centralized from this unit. It is going to monitor, manage and evaluation each intervention for the patients who have discharged from this hospital.

10. Formal Risk Assessment

A formal risk assessment should be made for the stroke patients with first attack. Multimodal support system which includes internet, telephone and paper ought be provided for the first six months after discharge (Robinson *et al.* 2011). Recommendation must be given to a special task group who will look after the patient case regarding the proper follow up and therapy. Healthcare worker would help the patient to become self sufficient so that they can managed their health condition.

ETHICAL ISSUES

Nurses will encounter different types of ethical issues daily, as these issues is very significant where there are more senior patients with the chronic illness (Ulrich *et al.*, 2010). There are some ethical issues will be faced by healthcare workers;

1. Autonomy

The elderly Chinese patients might not be educated, as result may pose language barrier. So the health care institution has to make sure that proper communication is conducted towards the patient. Consequently, the procedure of treatment received must be informed with consent to the patients from admission, rehabilitation to discharge (Wallace, 2010; Wang, *et al.*, 2010). The details of rehabilitation phase are as per Table 4.

Table 4: Facilitating patient autonomy: the health professionals' approache as experienced and the approach desired in the different phase of rehabilitation, as revealed from interviews with stroke patients (differences between experienced and desired approach in italics)

	Rahabilitation Phase		
	Admission	**Rahabilitation**	**Discharge**
Patient:			
Autonomy	Decreased	Gradual increase	Increased
Role in rehabilitation	Passive	Moderately active	Active
Health professionas:			
Approach experienced	Full support	Support / supervision	Reduced supervision
	Assessment	Training / instructions	Final instructions
	Lack of information	Lack of information	Lack of information
	Paternalism	Excess paternlism	Excess paternalism
Desired approach	Full support	Support / supervision	Reduced supervision
	Assessmment	Training / instructions	Final instructions
	Information	Information	Information
	Paternalism	Partial paternalism*	Sharing decisions*

**Regarding treatment only.*

Source: (Ehabilitation et al., 2007). The opened interview of 22 stroke patients was gathered in the rehabilitation wards of three nursing homes in the province of Limburg, Netherlands.

2. Right

First of all, treatment must be equal and equitable whether the patient is receiving treatment from public or privation health care. So the data input in the system should consist of details on patients' health conditions only. Hence, patients should have the right to refuse to participate in the intervention or assume to be as anonymous in the database (Leino-kilpi *et al.*, 2003).

3. Beneficent

Healthcare worker should consider the benefits and burdens of stroke treatment (Pavlish *et al.* 2011). However, healthcare workers must pay attention to the religious dimension of patient's identity that will influence the bioethical dilemma (Baeke *et al.*, 2011). The further aim is to ensure patient to minimize risk of post stroke and to ensure quality life.

4. Justice

Healthcare team must monitor the standard of treatment overcoming the interference of the family members who block the treatment and must prevent biasness due to differences of race, age or income level (Pavlish *et al.*, 2011). The Malaysia Ministry of Health has to ensure that the health care system is up to the desired standard by recruiting qualified health care workers, essential tools and equipments. A standard referreral system, operation protocol and assessment system for the patients must be developed.

5. Cultural Training

Cultural practices in Malaysia involves truth telling, family involvement in the treatment of the patients, considering the doctor's know the best (Fuscaldo *et al.*, 2010). Besides, it will also help to review the patients' situation to get proper intervention (Lapadat and Lindsay 1999). Therefore the healthcare workers have to go through cultural competency training.

IMPACT ON HEALTH CARE ENVIRONMENT

There are few consequences of this intervention on health care industry

1. Quality of Health Care Industry will be Upgraded

In healthcare organization patients' satisfaction comes from the healthcare worker which will build the healthcare institution's reputation (Janicic *et al.*, 2011). The patient centred approach to healthcare delivery will certainly enhance the patients' satisfaction (Wong *et al.*, 2008). According to Robinson *et al.*, (2011), cultural health intervention has to be implemented for patient care to ensure high quality of care. As a result, continuous quality improvement includes , effectiveness and efficiency to maintain equity, accountability and confidence which is promoted by health care provider (Baylina and Moreira, 2011). Competency training will improve the skills, knowledge and attitude of the healthcare workers.

2. Adequate Supply of Nurses

According to Waters (2011), the poor quality care among nurses is due to excess workload. The shortage and uneven distribution of health care workforce is a global crisis in health workforce. Job satisfaction and staff turnover is related to this crisis (De Milt *et al.*, 2011).

3. Independence on Healthcare Education and Health Management

Coaching of the health workers will help them to self managed, increase the knowledge ensuring improvement

in the health condition and quality of life for patients (Lanese *et al.*, 2011). A higher self care confidence on the part of the patient (McCarley, 2009) will definitely increase the perceive health.

4. Increase the Healthcare Cost Expenditure

Improvement in the standard of healthcare will incur additional cost, with the increase of life longevity of senior patient (Pritchard, 2011). Furthermore such reformations in the healthcare sector will increase cost in order to receive positive outcome (Reform *et al.*, 2010). The reformation of healthcare cost ought to involve the opinion from civil servants, political parties and consumer groups which will ensure just, equitable and cost effective healthcare (Quek 2011). Therefore, expenditure will occur on training, purchasing equipment and tools and salary for healthcare worker to ensure good quality of intervention.

5. Lessen Social and Economic Issues

Government might relocating resource to support the senior citizen healthcare (Pritchard 2011). The burden of families of stroke patients will be decreasing as stroke issues are resolved (Bakas *et al.*, 2004). The recovered stroke patients may be able to go back to work and this would solve some of the financial difficulties (Daniel *et al.*, 2009). The financial difficulties were related to age, severity of stroke and phycho-social consequences (Thorsen *et al.*, 2005).

6. Technology Impact on Healthcare

New tools and information system will enhance the interaction of the patients with the healthcare workers (Friedman *et al.*, 2009). Healthcare environment are becoming more complicated, hence, technology and information system are needed to cope the patients' condition under various circumstances (Kovalchuk and Mcdonald-maier 2011). Healthcare providers will encounter various type of challenges which includes poor user awareness regarding technologies, education., etc (Chikotie *et al.*, 2008). The leverage of information system is to utilize decision. This can be done by ensuring patients database and record are stored in the healthcare database.

CONCLUSION

Evidently, there are ethnic and racial differences in stroke incidence and risk factors in Malaysia (Ulrich *et al.*, 2010). Younger nurses with fewer working experience face more ethical challenges compare to the senior nurses. All healthcare workers are encouraged to attend cultural competency training as it will improve knowledge, skills and attitude of health professional (Robinson *et al.*, 2011).

Numerous interventions have been made to prevent stroke recurrence. However, some of the recommended intervention may be applied in general while others need highly experience healthcare workers for proper implementation. As a result, more studies and research is necessary to identify the cause of stroke and the best suited methods of intervention. Nevertheless, the general care of stroke patients in the hospital still play a major role to achieve better outcomes as many complications in stroke can be avoided in this manner.

In Malaysia, many infrastructures for stroke patients are available but reorganizing and strengthening of few aspects such as human resource and training are important to enable multidisciplinary input of the senior Chinese stroke patients. However, much monitoring work is needed to support patients after discharge from the hospital. The ethical variations among patient with stroke recurrence and the risk factor associated with stroke is not fully understood by healthcare workers.

The health care institution should consider the range of critical issues, such as controlling health expenditure, public insurance system, care of the poor and unhealthy. Finally, healthcare institution must seek view from government, civil servants, political parties and healthcare workers before implementing any intervention.

REFERENCES

Abdullah, NKW (2005). Regulating the private health sector in Malaysia. Kuala Lumpur: University of Malaya Press.

Azarpazhooh, MR, Nicol, MB, Dannan, GA, Dewey, HM, Sturm, JW, Macdonel, RAL, et. al. (2008). Patterns of stroke recurrence according to subtype of first stroke event/ : the North East Melbourne Stroke Incidence Study (NEMESIS). International Journal of Stroke. 3(August), pp 158-164.

Baeke, G, Wils, J-P & Broeckaert, B (2011). Orthodox Jewish perspectives on withholding and withdrawing life-sustaining treatment. Nursing ethics. 18(6), pp 835-46.

Bakas, T, Austin, JK, Jessup, SL, Williams, LS & Oberst, MT (2004). Time and difficulty of tasks provided by family caregivers of stroke survivors. Journal of Neuroscience Nursing. 36(2), pp 95-106.

Barnett, T, Namasivayam, P & Narudin, DA (2010). A critical review of the nursing shortage in Malaysia. Int Nurs Rev. 57(1), pp 32-9

Baylina, P & Moreira, P (2011). Challenging healthcare- associated infections/ : a review of healthcare quality management issues. Journal of Management. 4(4), pp 254-264.

Bonita, R (1992). Epidemiology of stroke. The Lancet. 339, pp 342-344.

Cadilhac, DA, Ibrahim, J, Pearce, DC, Ogden, KJ, McNeill, J, Davis, SM & Donnan, GA (2004). Multicentre comparison of processes of care between Stroke Units and conventional care wards in Australia. Stroke. 35, pp 1035–1040.

Chen, C, Venketasubramanian, N, Gan, RN, Lambert, C, Picard, D, Chan, BP, Chan, E, Bousser, MG & Xuemin, S (2009). Danqi Piantang Jiaonang (DJ), a traditional Chinese medicine, in poststroke recovery. Stroke. 40(3), pp 859-63.

Chew, KS, Tan, TW & Ooi, YT (2011). Influence of Chinese cultural health beliefs among Malaysian Chinese in a suburban population: a survey. Singapore Medical Journal. 52(4), pp 252-6.

Chikotie, T, Oni, J & Owei, V (2008). Factors Determining the Adoption of ICTs in Healthcare Service Delivery/ : A Developing Country Context. Library. Pp 127-134.

Daniel, K, Wolfe, CD, Busch, MA & McKevitt, C (2009). What are the social consequences of stroke for working-aged adults? A systematic review. Stroke. 40, e431-e440.

Davis, SM & Donnan, GA (2012). Clinical practice. Secondary prevention after ischemic stroke or transient ischemic attack. N Engl J Med. 366(20), pp1914-22.

De Milt, DG, Fitzpatrick, JJ & McNulty, R (2011). Nurse practitioners' job satisfaction and intent to leave current positions, the nursing profession, and the nurse practitioner role as a direct care provider. Journal of the American Academy of Nurse Practitioners, 23(1), pp 42-50.

Dewan, KR & Rana, PVS (2011). C–reactive Protein and Early Mortality in Acute Ischemic Stroke. Kathmandu Univ. Med J. 36(4), pp 252-5.

Donnan, GA, Fisher, M, Macleod, M & Davis, SM (2008). Stroke. Lancet ;.371, pp 1612-1623.

Friedman, L, Gyr, H & Gyr, A (2009). The Changing Patient in the Digital Era/ : A Typology for Guiding Innovation in Healthcare. Water. 1(4), pp.39-47.

Fu, S, Zhang, J, Menniti-Ippolito, F, Gao, X, Galeotti, F, Massari, M, Hu, L, Zhang, B, Ferrelli, R, Fauci, A, Firenzuoli, F, Shang, H, Guerra, R & Raschetti, R (2011). Huangqi injection (a traditional Chinese patent medicine) for chronic heart failure: a systematic review. PLoS One. 6(5), e19604.

Fuscaldo, G, Russell, S & Delany, C (2010). Enhancing Cross-Cultural Understandings of Ethical Issues in Medical Education. AJOB Primary Research. 1(1), pp 28-33.

Gudiene, D, Balnyte, I, Palubinskiene, J & Valanciute, A (2011). Age Related Structural Changes In Human Basilar Artery. Papers on Anthropology. 20(93), pp 93-103.

Hairi, NN, Bulgiba, A, Cumming, RG, Naganathan, V & Mudla, I (2010). Prevalence and correlates of physical disability and functional limitation among community dwelling older people in rural Malaysia, a middle income country. BMC Public Health. 492(10), pp 1-13.

Hamidon, BB, Nabil, I & Raymond, AA (2006). Risk factors and outcome of dysphagia after an acute ischaemic stroke. Medical Journal of Malaysia. 61(5), pp 553-7.

Holmes-Rovner, M, Stommel, M, Corser, WD, Olomu, A, Holtrop, JS, Siddiqi, A, et al., (2008). Does outpatient telephone coaching add to hospital quality improvement following hospitalization for acute coronary syndrome? Journal of General Internal Medicine. 23(9), pp 1464-1470.

Huang, Y, Wang, J, Wei, JW, Headley, AP, Wong, LKS, Heeley, EL, et al., (2010). Age and gender variations in the management of ischaemic stroke in China. Internatit onal Journal of Stroke/ : Journal of the International Stroke Society. 5(5), pp 351-9.

Hui, E (2008). Parental refusal of life-saving treatments for adolescents: Chinese familism in medical decision-making re-visited. Bioethics. 22(5), pp 286-95.

Ismail, MN, Chee, SS, Nawawi, H, Yusoff, K, Lim, TO & James, WPT (2002). Obesity in Malaysia. East, pp 203-208.

Iwaoka, E, Noguchi, T, Han, J-Y, Lin, X-P and Gao, M (2007). Preventive Effect Of The Chinese Herbal Medicine 'Myakuryu' On Hypertension And Stroke in Stroke-Prone Spontaneously Hypertensive Rats. Clinical And Experimental Pharmacology and Physiology. 34, S51–S52.

Iwaoka, E, Noguchi, T, Han, JY, Lin, XP & Gao, M. (2007). Preventive Effect of the Chinese Herbal Medicine "Myakuryu" on Hypertension and Stroke in Stroke-Prone Spontaneously Hypertensive Rats. Clinical and Experimental Pharmacology and Physiology. 34(s1), p.S51-S52.

Jackson, SL & Peterson, GM (2011). Stroke risk assessment for atrial fibrillation: hospital-based stroke risk assessment and intervention program. Journal of Clinical Pharmacy and Therapeutics. 36(1), pp 71-9.

Janicic, R, Lecic-cvetkovic, D, Filipovic, V, Vukasinovic, Z & Jovanovic, V (2011). Patients' satisfaction as key point in healthcare services. Surgery. 5(6).

Karliner, LS, Auerbach, A, Nápoles, A, Schillinger, D, Nickleach, D & Pérez-Stable, EJ (2012). Language barriers and understanding of hospital discharge instructions. Med Care. 50(4), pp 283-9.

Kovalchuk, Y & Mcdonald-maier, K (2011). Overview of ICmetrics Technology – Security Infrastructure for Autonomous and Intelligent Healthcare System. Science And Technology. 4(3), pp 49-61.

Lanese, BS, Dey, A, Srivastava, P & Figler, R (2011). Introducing the health coach at a primary care practice: impact on quality and cost (Part 1). Hospital topics. 89(1), pp 16-22.

Lapadat, J, & Lindsay, AC (1999). Transcription in research and practice: From standardization of technique to interpretive positionings. Qualitative Inquiry. 5(1), pp 64–86.

Larsson, SC, MÓnnistç, S, Virtanen, MJ, Kontto, J, Albanes, D & Virtamo, J (2009). Dietary fiber and fiber-rich food intake in relation to risk of stroke in male smokers. European Journal of Clinical Nutrition. 63(8), pp 1016-24.

Lawrence, M, Fraser, H, Woods, C & McCall, J (2011). Secondary prevention of stroke and transient ischaemic attack. Nursing standard (Royal College of Nursing (Great Britain): 1987, 26(9), pp 41-6.

Leino-kilpi, H, VÓlimÓki, M, Dassen, T, Gasull, M, Lemonidou, C, Schopp, A, et al., (2003). Privacy and informed consent in the consent in the care of elderly people in five European countries : General Overview. Nursing Ethics. 10(1), pp 18-27.

Lewsey, J, Jhund, PS, Gillies, M, Chalmers, JWT, Redpath, A, Briggs, A, et al., (2010). Temporal trends in hospitalisation for stroke recurrence following incident hospitalisation for stroke in Scotland. BioMed Central. 23(8), pp 2-7.

Maniam, T (1994). Drinking habits of Malaysians in general practice. Medical Journal of Malaysia. 49, 369-374.

McCarley, P (2009). Patient empowerment and motivational interviewing: engaging patients to self-manage their own care. Nephrology nursing journal/ : journal of the American Nephrology Nurses' Association. 36(4), pp 409-13.

Medin, J, Larson, J, Von Arbin, M, Wredling, R & Tham, K (2010). Striving for control in eating situations after stroke. Scandinavian Journal of Caring Sciences. 24(4), pp 772-80.

Miniño, AM, Xu, JQ & Kochanek, KD. Deaths: Preliminary data for 2008 (2010). National vital statistics reports; 59 (2). Hyattsville, MD: National Center for Health Statistics.

Nor Azlin MN, Rizal AM, Wei Bi L (2009). Health related quality of life(HRQOL) among stroke survivors attending rehabilitation centres in Selangor. Journal of Community Health. 15(2), pp 83-90.

Mohamed, CR (2010). The educational needs of home-based stroke patients and family caregivers in Malaysia. Unpublished doctoral dissertation. Victoria university of Wellington. Wellington.

Morita, K, Celso, CL, Spencer-Dene, B, Zouboulis, CC & Watt, FW (2006). HAN11 binds mDia1 and controls GLI1 transcriptional activity. Journal of Dermatological Science. 44(1), pp 11–20.

Munshi, A & Kaul, S (2010). Genetic basis of stroke: an overview. Neurology India. 58(2), pp 185-90.

National Census 2000,Department of Statistics Malaysia. National Census (2000). Department of Statistics, 2001, Malaysia.

National Stroke Association of Malaysia (NASAM) (2011). Its Brain Attack. Malaysia.

Patra, J, Taylor, B, Irving, H, Roerecke, M, Baliunas, D, Mohapatra, S & Rehm, J (2010). Alcohol consumption and the risk of morbidity and mortality for different stroke types - a systematic review and meta-analysis. BMC Public Health. 10, pp 258.

Pavlish, C, Brown-Saltzman, K, Hersh, M, Shirk, M & Rounkle, A (2011). Nursing priorities, actions, and regrets for ethical situations in clinical practice. Journal of nursing scholarship/ : an official publication of Sigma Theta Tau International Honor Society of Nursing / Sigma Theta Tau. 43(4), pp 385-95.

Poungvarin, N (1998) Stroke in the developing world. Lancet. 352 (Suppl. III), pp 19–22.

Pritchard, RE (2011). Senior Citizens, Social Security , And Healthcare Costs. Journal of Business. 9(1), pp 23-29.

Proestos, C, Boziaris IS, Nychas GJE & Komaitis, M (2006). Analysis of flavonoids and phenolic acids in Greek aromatic plants: Investigation of their antioxidant capacity and antimicrobial activity. Food Chem. 95(4), pp 664-671.

Quek, DKL (2011). Healthcare costs & challenges for Malaysia's health system. (March), pp 30-32.

Rabia, K & Fammed, M (2007). Recurrent stroke : What have we learnt? Case Report. Online, 2(2), pp 70-73.

Reform, H, Kaufman, NS & Advisors, KS (2010). Changing Economics in an Era of. , (Foster).

Robinson, A, Gozu, A, Palacio, A & Smarth, C (2011). NIH Public Access. Health Policy. 43(4), pp 356-373.

Rochette, A, Korner-Bitensky, N, Bishop, D, Teasell, R, White, C, Bravo, G, et al., (2010). Study protocol of the YOU CALL—WE CALL TRIAL: impact of a multimodal support intervention after a "mild" stroke. BMC Neurology. 10, p 3.

Rosamond W, Flegal K, Furie K, et al (2008). Heart Disease and Stroke Statistics—2008 Update: A Report From the American Heart Association Statistics Committee and Stroke Statistics Subcommittee. Circulation. 117(4), e25-146.

Samsiah, M, Das, S, Chee, SY, Rashidah, R, Siti, H, Ruth, P, Hamidah, H, Ho, SE & Santhna, L (2011). The ideal measurement of the quality of life in post stroke patients: an urban study. Clin Ter.162(3), pp 209-15.

Saric, B, Buric, S, Vasilj, I, Saric, B & Simovic, M (2011). Analysis of risk factors in patients treated by stroke in Clinical Hospital Mostar. Blood Pressure. 5(4) pp 936.

Shen, LH, Li, Y, Chen, J, Cui, Y, Zhang, C, Kapke, A, Lu, M, Savant-Bhonsale, S & Chopp, M (2007). One-year follow-up after bone marrow stromal cell treatment in middle-aged female rats with stroke. Stroke. 38(7), pp 2150-6

Song, WZ, Chen AF & Wang, DH (2004). Increased salt sensitivity induced by sensory denervation: role of superoxide. Acta Pharmacol Sin. 25(12), pp1626-32.

Strong, K, Mathers, C & Bonita, R (2007). Preventing stroke: saving lives around the world. Lancet Neurol. 6(2), pp 182-7.

Sun, Y, Jiang, D, Zhang, B, Yu, H, Gao, Y, Li, Y & Qi, G (2012). Impact of obesity on the outcome of Chinese patients with ST-segment myocardial infarction undergoing urgent percutaneous coronary intervention. Acta Cardiol. 67(5), pp 541-8.

Taylor-Piliae, RE & Coull, BM (2012). Community-based Yang-style Tai Chi is safe and feasible in chronic stroke: a pilot study. Clinical Rehabilitation, 26(2), pp 121-31.

Thorsen, AM, Holmqvist, LW, de Pedro-Cuesta, J & von Koch, L (2005). A randomized controlled trial of early supported discharge and continued rehabilitation at home after stroke: five-year follow-up of patient outcome. Stroke. 36(2), pp 297-303

Thrift, AG, Dewey, HM, Sturm, JW, Paul, SL, Gilligan, AK, Srikanth, VK, Macdonell, RAL, McNeil, JJ, Macleod, MR & Donnan, GA (2006). Greater incidence of both fatal and nonfatal strokes in disadvantaged areas: the Northeast Melbourne Stroke Incidence Study. Stroke. 37, pp 877-882.

Ulrich, CM, Taylor, C, Soeken, K, O'Donnell, P, Farrar, A, Danis, M & Grady, C (2010). Everyday ethics: ethical issues and stress in nursing practice. Journal of advanced nursing. 66(11), pp 2510-9.

Wallace, GL (2010). Profile of life participation after stroke and aphasia. Topics in stroke rehabilitation, 17(6), pp.432-50.

Wang, Z, Dong, B, Zeng G, Li, J, Wang, W, Wang, B & Yuan, Q (2010). Is there an association between mild cognitive impairment and dietary pattern in Chinese elderly? Results from a cross-sectional population study. BMC public health. 10, p 595.

Waters, D (2011). Excellence at EfCCNa. Nursing in Critical Care, 16, pp 210

Wong, WS, Fielding, R, Wong, CM & Hedley, AJ (2008). Psychometric properties of the Nine-Item Chinese Patient Satisfaction Questionnaire (ChPSQ-9) in Chinese patients with hepatocellular carcinoma. Psycho-Oncology. 299(July 2007), pp.292-299.

World Health Ranking. (2012). Stroke ranking. WHO, Geneva.

Wu, C-Y, Wu, H-M, Lee, J-D & Weng, H-H (2010). Stroke risk factors and subtypes in different age groups: a hospital-based study. Neurology India. 58(6), pp 863-8.

Zhang, C, Zhu, KJ, Zheng, HF, Cui, Y, Zhou, FS, Chen, YL, et al. (2011). The effect of overweight and obesity on psoriasis patients in Chinese Han population: a hospital-based study. Journal of the European Academy of Dermatology and Venereology/ : JEADV. 25(1), pp 87-91.