



RESEARCH ARTICLE

COMPARISON OF THE EFFECTS OF REHABILITATION ON THE PROGNOSIS OF ISCHEMIC STROKE IN CHINESE HOSPITAL

¹Anni Diankreo Taboko, E., ^{2,*}Li Xiao, H., ³Selotlegeng, L. and ⁴Ainemukama, J. L.

¹School of Medicine, Shandong University, 44 Wenhua Xi Road, Jinan - 250012, China

²Department of Neurology, Jinan Central Hospital, Shandong University, 105 Jie Fang Road Jinan City, Shandong Province - 250013, China

³Institute of Social Medicine and Health Services Management, School of Public Health, Shandong University, 44 Wenhua Xi Road, Jinan - 250012, China

⁴School of Medicine, Shandong University, 44 Wenhua Xi Road, Jinan - 250012, China

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ABSTRACT

Stroke occurrence, mortality, and prevalence fluctuate generally among distinctive districts in China, and the quantity of patients who died from stroke is three times more than those who died from coronary heart disease. This study was carried out retrospectively with patients' data, collected from the hospital database for a period of one year and structured questionnaire, using purposive sampling. Of all the risk factors associated with stroke, hypertension was the most prevalent accounting for 66.14%, of which 54.8% were male and 45.3% female. The other risk factors weren't as prevalent with alcohol consumption accounting for 42.5%, smoking 43.3%, diabetes mellitus 29.1%, heart disease (coronary heart disease, ischemic heart disease) 38.58%, atrial fibrillation 5.5%, and 8.6% had had an episode of Transient Ischemic Attack. In China, the increase rate of hypertension and stroke related deaths shows a need for improvement in health care from the hospitals, as well as individuals. Stroke can serve as an alarm to underlying factors, and physiotherapy can help implement better behavioral interventions.

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INTRODUCTION

Stroke was the second most regular cause of death worldwide in 2012, representing 6.7 million deaths (11.9% of the world total) (Organization, 2012; Tsai, Thomas, & Sudlow, 2013). Approximately 17 million individuals had a stroke in 2010 and 33 million have beforehand had a stroke were still alive (Feigin et al., 2010). Between 1990 and 2010, the quantity of strokes abatement by more or less 10% in the developed nations and expanded by 10% in the developing world (Feigin et al., 2010). Overall, 66% of strokes happened in those more than 65 years old (Feigin et al., 2010). The significant reasons for death in China are vascular infection, tumor, and chronic respiratory disease (Wang, Kong, Wu, Bai, & Burton). Unlike countries in the west, cerebrovascular infection prevails; the quantity of patients who died from stroke is three times more than those who died from coronary heart disease (Wu et al., 2001). Stroke is among the most common causes of death, ranking second

among urban residents and third among rural residents of China (He, Klag, Wu, & Whelton, 1995). It is also the main reason for grown-up disability (Bonita et al.,). Motor impairment after a stroke is one of its most adverse consequences (Chung, 2014). Hemiplegia, spasticity and aphasia are the main neurological disorders caused by stroke (Gordon et al., 2004). The World Health Organization (WHO) defines stroke as rapidly developing clinical signs of focal (or global) disturbance of cerebral function, with symptoms lasting 24 hours or more and/or leading to death, with no apparent cause other than of vascular origin ("The World Health Organization MONICA Project (monitoring trends and determinants in cardiovascular disease): a major international collaboration. WHO MONICA Project Principal Investigators," 1988). Pathologically stroke can be divided into ischemic or hemorrhagic disturbances of cerebral blood circulation. Research has demonstrated the ischemic type to be the dominant subtype in China (Zhang et al., 2003), and is equally the focus of this study. High blood pressure, smoking and atrial fibrillation are regarded as stroke's most important risk factors

*Corresponding author: Li Xiao, H.

Department of Neurology, Jinan Central Hospital, 105 Jie Fang Road Jinan City, Shandong Province - 250013, China.

(Mant, 2011), with high blood pressure being the most imperative danger variable. Incidence and mortality rates related to stroke are both higher in the densely populated north eastern areas of China compared to the south (He *et al.*, 1995). Distribution of high blood pressure, smoking and alcohol consumption also show a higher prevalence in the north than in the south (He *et al.*, 1995). Stroke occurrence, mortality, and prevalence fluctuates generally among distinctive districts inside China, with detectable north-south slope. The extent of intracerebral discharge was high and came to 55% in one city (Wu *et al.*, 2001).

A few national rules on stroke aversion and treatment have been produced. As a result of methodological constraints in the study of disease transmission studies, official government information has been questionable regarding making any firm conclusions. There have been rings for desperately expected to-date, very much composed, and well done epidemiological studies and remedial trials in China (Feigin *et al.*). Physical treatment is progressively turning into an essential piece of post-stroke recovery and instructing both patient and/or parental figure. Different physiotherapy (PT) approaches have been developed to facilitate motor recovery and functional improvement in patients after a stroke (Chung, 2014). Approaches most commonly used by physiotherapists (PTs) include the Bobath concept, the motor learning approach, proprioceptive neuromuscular facilitation (PNF), the functional approach and the orthopedic approach (Chung, 2014). In China, Tui Na massage therapy, a part of Traditional Chinese Medicine (TCM), has been used in treating stroke since ancient times. Presently, it is used in rehabilitation after stroke (Yun, Wu, & Qin, 2011) and is part of the physiotherapy and rehabilitation ward of this Chinese hospital. The objective of this study is to demonstrate the benefits and effectiveness of physical therapy in stroke rehabilitation.

Methodology

This study was carried out retrospectively with patients' data, collected from structured questionnaire and the hospital database for a period of one year, as well as the professional opinion of some health care givers and specialists so as to be able to compare between patients undergoing and not undergoing physiotherapy, and compare before and after receiving therapy

Sampling

A purposive sampling was used (nonprobability sampling in which the researcher consciously selects participants for inclusion in a study in order to ensure that the elements meet certain attributes relevant to the study). This sampling is ensured in that specific inclusion and exclusion criteria is applied for participation in the study. Furthermore, stroke survivors and/or their caregivers with a variety of demographic characteristics were sampled.

Participants

Participants were randomly selected using data and medical history files collected from various patients admitted into the

Jinan Central Hospital neurological department, between the periods of March 2015 to March 2016 inclusive. Diagnosis, was determined by a qualified neurologists based both on clinical characteristics, using assessment tools such as the NIH Stroke Scale to determine the severity of the stroke, and neuroimaging findings (CT or MRI). Rehabilitation assessment was carried out depending on the severity of the stroke, using the following criteria; Tinetti gait analysis and Berg balance scale index (to assess balance and gait), The Barthel stroke index, and the Brunnstrom scale

Included in this study were:

- 1- Ischemic stroke patients
- 2- Patients that suffered from an attack lasting ≤ 3 weeks

Excluded from this study were:

- 1- Patients with significant neurological or musculoskeletal problems from other than stroke.

Statistical Analysis

Descriptive analysis was analyzed as mean \pm SD. SPSS 22.0 software was used for data analysis.

Ethical Considerations

This study was approved by the ethics board of Jinan Central Hospital – an affiliated hospital of Shandong University, for collection of patient information. Privacy was kept up all through the study not importing patient information or data once the study was completed. The ethical committee of Shandong University endorsed the study as well.

RESULTS

The number of patients' data reviewed for this study were 150, of which 127 (59.1% males and 40.9% female) inclusive and 23 exclusive. Ages ranged from 30 to 86+ years, with the highest percentage of patients in the 60-65 years' age bracket (Fig. 1).

Of all the risk factors associated with stroke, hypertension was the most prevalent accounting for 66.14%, of which 54.8% were male and 45.3% female. The other risk factors weren't as prevalent with alcohol consumption accounting for 42.5%, smoking 43.3%, diabetes mellitus 29.1%, heart disease (coronary heart disease, ischemic heart disease) 38.58%, atrial fibrillation 5.5%, and 8.6% had had an episode of Transient Ischemic Attack (TIA). A great majority of the patients were married (95.28%). Two records of the NIH Stroke Scale were taken, on admission into and before discharge from hospital. 50.4% were admitted with moderate stroke, 39.4% with a minor stroke, 3.15% had no stroke, moderate stroke, moderate to severe stroke and severe stroke respectively meanwhile 0.79% didn't have a scale taken. However, the results on discharge from hospital showed a slight improvement with 44.9% having a minor stroke, 40.16% having a moderate stroke. Hospital stay ranged between 2 and 52 days (recorded on discharge), with 33.05% staying between 11 and 15 days.

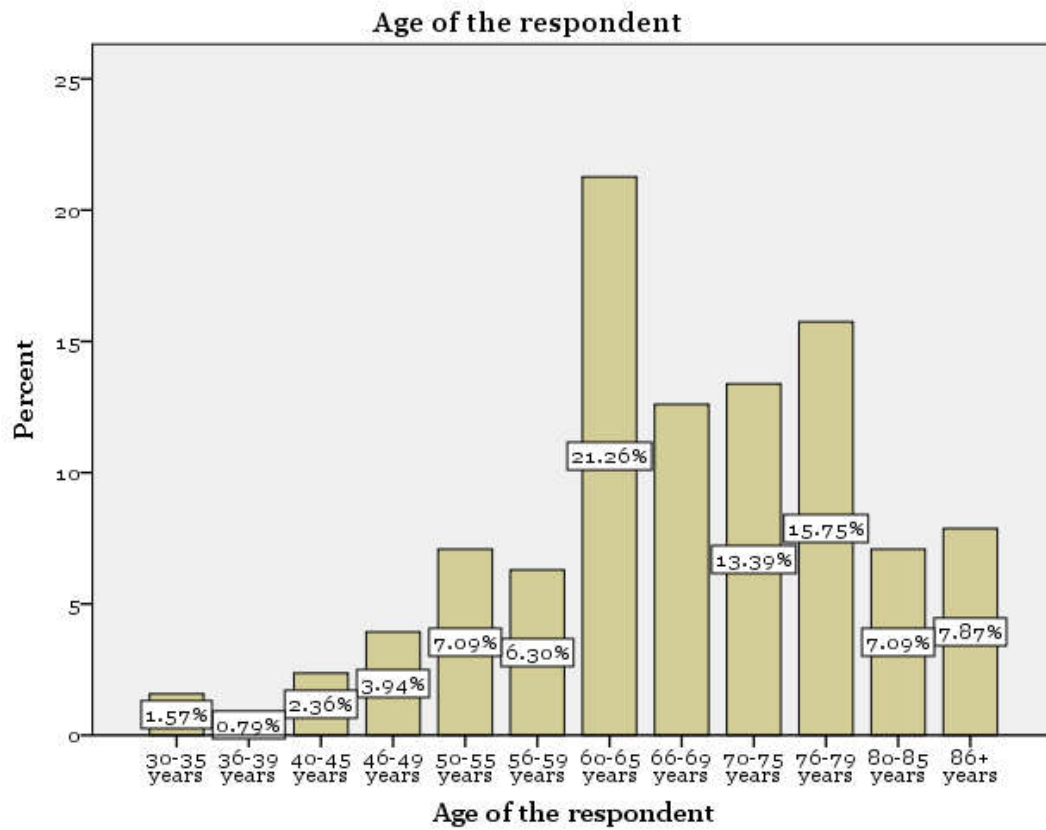


Figure 1. Age of respondent

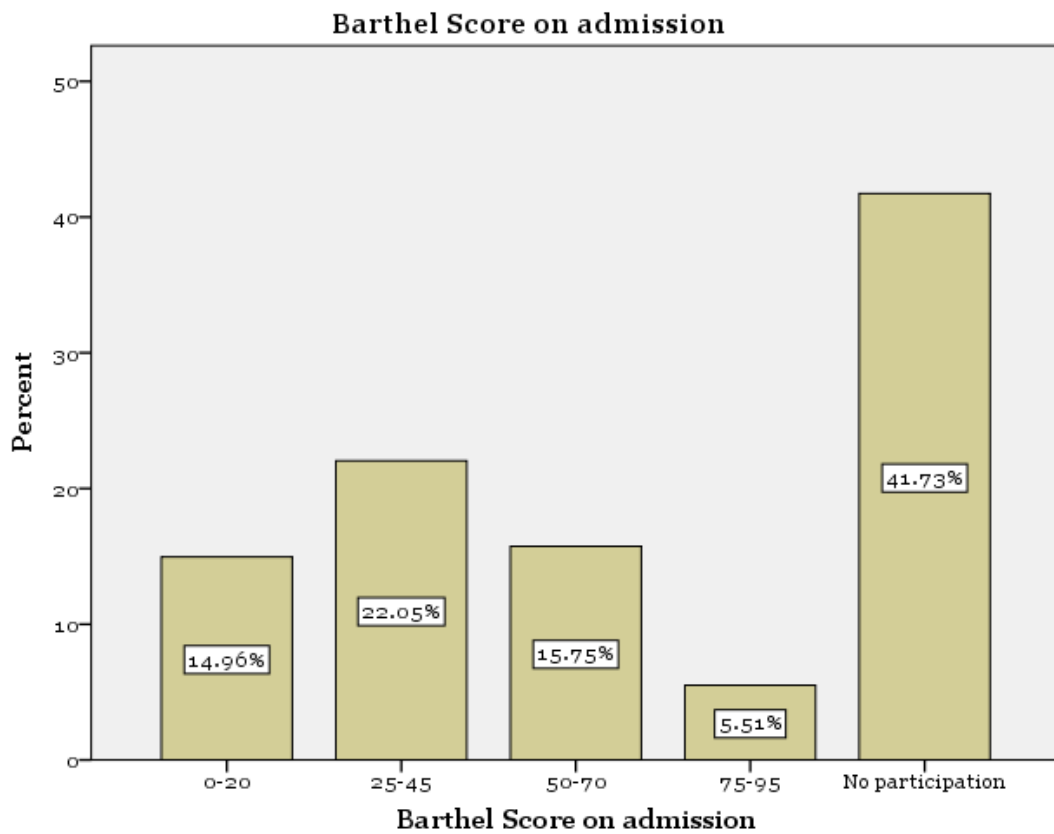


Figure 2. Barthel index score on admission

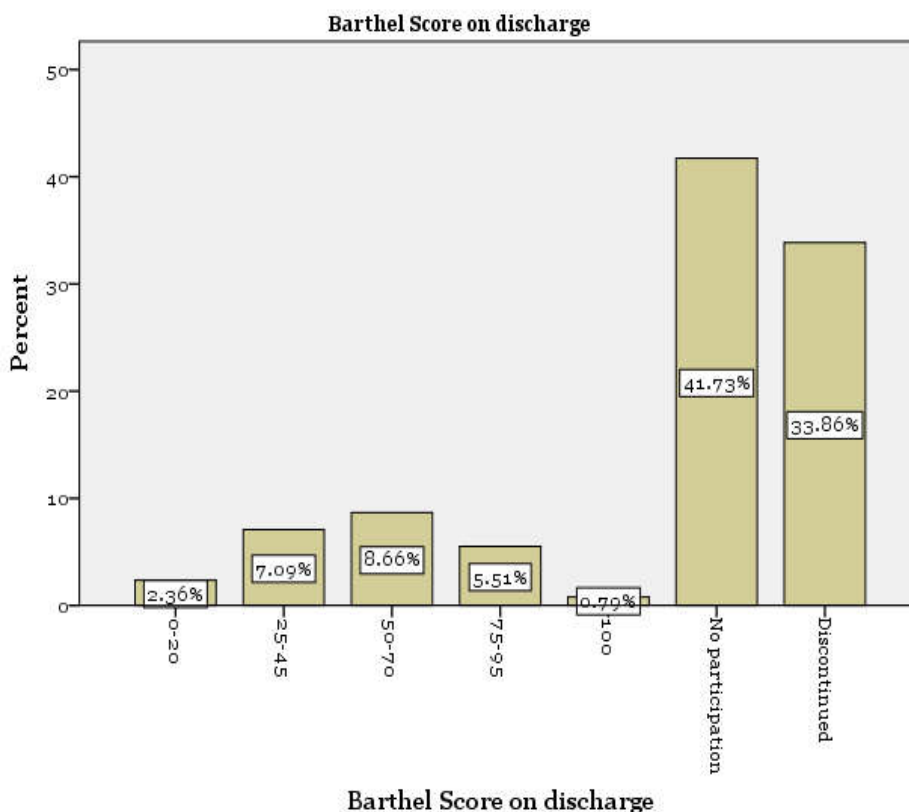


Figure 3. Barthel index score on discharge

Table 1. Program Limitations

Limitations	Model 1:Male (n=35)		Model 2:Female (n=21)	
	Yes n (%)	No n (%)	Yes n (%)	No n (%)
Sensitization	21 (60)	14 (40)	8 (38.1)	13 (69.1)
Treatment Cost	12 (34.3)	23 (65.7)	7 (33.3)	14 (66.7)
Discontinued therapy	11 (31.4)	24 (68.6)	7 (33.3)	14 (66.7)
Level of education	10 (28.6)	25 (71.4)	6 (28.6)	15 (71.4)

Depending on the severity of the stroke, number of days at hospital, and the various treatment methods given by the various physiotherapists, Barthel index scores were recorded at various times during the treatment. For the sake of this study, we only recorded the first and last Barthel scores. We found out 22% scored between 25-45, 15.75% scored between 50-70, 14.96% scored between 0-20, 5.51% scored between 75-95, and 41.73% did not participate in it. The trend was even more alarming on discharge as apart from the 41.73% non-participants, 33.86% of patients did not take a second test. Of those remaining, there was a slight increase in patients scoring 50-70 accounting for 8.66% as seen in Figures 2 and 3. Table 1 indicated, sensitization (60% male and 38.1%) as the major barrier that affects this program.

DISCUSSION

As reported by previous researches (Go *et al.*, 2014), this study also revealed the incidence of stroke was higher in men (59.1%) than in women (40.1%). From the study it was observed that although stroke affects mainly the 60-65 years’

age bracket (21.3%), it also demonstrated how much it is affecting much younger and younger people (the youngest patient was 30 years old), though being a minor stroke. Stay at hospital ranged between 2 to 52 days, the highest frequency of patients recorded, stayed at the hospital between 11 to 15 days (30.7%). It is advised to start therapy as quickly as possible (less than 7 days) ("The World Health Organization MONICA Project (monitoring trends and determinants in cardiovascular disease): a major international collaboration. WHO MONICA Project Principal Investigators," 1988), and most patients enrolled into the physiotherapy program on the third day of their admission into hospital. Most of the patients were married and had at least one caretaker to assist them, anytime of the day. Research has demonstrated that stroke could be inherited (Albers, Alberts, Broderick, Lyden, & Sacco, 2000; Mant, 2011). Though there were cases whereby there was a family incidence of stroke, 91.3% of cases had no family incidence of stroke or any other cardiovascular diseases. This study equally revealed hypertension as being the most common risk factor, and although most patients weren’t involved in the other risk factors, still it cannot be neglected, as the difference between

patients who did and does who did not was very little (42.5% consumed alcohol, 43.3% smoked, 29.1% had diabetes mellitus, 38.6% had a form of heart disease). On admission, NIHSS data revealed that most patients had either minor or moderate stroke (39.4% and 50.4% respectively). The tendency was different on discharge though as most of the patients left the hospital with a minor stroke (44.9%). Though the NIHSS scale is a clinical assessment, meaning the improvement of the patients cannot be solely relied on physiotherapy, but these results were from patients who enrolled for and received physiotherapy treatment for some period of time during their stay at hospital. Various assessment tools were also used before enrolling for the rehabilitation program. The magnitude of activity limitation can generally be related to, but not entirely dependent on stroke severity (Gordon *et al.*, 2004). The Barthel Index is used to evaluate the patient's daily living and mobility, assessing various tasks including feeding, bathing, bowel and bladder continence, walking up and down stairs, grooming, transferring to and from a toilet, bathing, and movement. It is one of the major assessment tools used by the physiotherapist prior to treatment. Scores are given according to the patients' inaptitude to perform task (0), performs task with some help (5), and is independent (10 or 15). Each activity is summed up to create a total of 100. Overall results show what the patient can do on his/her own, with/without help (with the use of aids if necessary). The higher the patient scores, the more "independent" they are. In this study, most patients on admission scored between 25 to 45, which according to the hospital scale revealed serious functional defects. As observed earlier, there was an overwhelming number of patients (33.86%) who did not do a second assessment, and patients who did not even participate in the assessment (41.73%). These can be explained by the fact the patients do not see any major improvement with the treatment, or they don't see any changes quickly enough, so they choose to discontinue the rehabilitation program. Another reason was most patients did not know or had never heard about PT before, and found it to be an additional cost to an already expensive treatment. So to cut on costs, they rather not enroll in the program. For those who continued the program, results showed a slight improvement in patients with serious functional defects, to moderate functional defects.

Limitations

This study was carried out at department of neurology of the Jinan Central Hospital. The physiotherapy department of this unit had 7 therapists. 2 of them had a TCM background, and 5 had a physical therapy background. They not only look after cases in the neurology department, but they also handle cases in other departments in internal medicine. They could be a case of the physiotherapy department being understaffed with one therapists handling over 10 patients daily. The hospital uses various therapeutic methods in treating stroke. The most common ones used are;

- 1- Comprehensive training of hemiplegic limbs
- 2- Comprehensive training of paraplegia body
- 3- Air pressure massage
- 4- Speech training
- 5- Acupuncture
- 6- Tui Na massage

Patients here tend to use mostly the acupuncture and tui na massage therapies compared to the other aforementioned methods. This could be because physiotherapy has been growing rather slowly in China (Veach, 2011) (in this hospital, the physiotherapy department was opened in 2004-5), and prior to its introduction, TCM has been the preferred rehabilitation therapy used by Chinese people. Philosophically, most Chinese think that sick people need plenty of rest and very little or reduced activity (Veach, 2011). Other factors that influence patients' activity limitation are; adaptability and coping skill, mood and intrinsic motivation, cognition and learning ability, medical stability, type and severity of acquired or preexisting medical comorbidity, physical endurance levels, effects of acute treatments, amount and type of rehabilitation training (Gordon *et al.*, 2004). Through a questionnaire, filled by some of the patients in this study, they revealed that some of the exercise routines were too difficult for some, or too intense for others. Others revealed meanwhile the speech training skill was too easy (opinion of a caregiver).

Conclusion and Recommendation

The purpose of this study is to demonstrate the importance and highlight the significance of physical rehabilitation post stroke. In China, the increase rate of hypertension and stroke related deaths shows a need for improvement in health care from the hospitals, as well as individuals. Stroke can serve as an alarm to underlying factors, and physiotherapy can help implement better behavioral interventions. Promoting physical exercise, educating in its importance and encouraging participation and adoption, can be very valuable. Hospitals need to develop rehabilitation programs not only for when the patient is in the hospital, but equally for when they return to their homes or communities. Sensitization on various stroke symptoms as well as rehabilitation programs should be emphasized, as rehabilitation is best when started early. More patients reported having no knowledge of this therapy method prior to their having the disease. This goes to show the importance of sensitization of this treatment method.

Competing interest

The authors declare that there is no conflict of interests.

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Authors' contribution

The concept, data analysis and drafting of the manuscript were done by Eric Anni Diankreo Taboko. All authors contributed to reading and correcting the manuscript prior to submission.

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