Organization of Post-Stroke Rehabilitation Services: Changes between 2013 and 2018 in Services Provided by Health System in Mongolia

Batchimeg Shirmen[1], Batgerel Oidov[3], Narantsetseg Tsegmid[1], Batzorig Bayartsogt[4], Ryenchindorj Erkhembayar[5], Tsagaankhuu Guntev[2], Baljinnyam Avirmed[1]

[1]Department of Rehabilitation Medicine, School of Medicine, Mongolian National University of Medical Sciences, Ulaanbaatar, Mongolia; [2]Department of Neurology, School of Medicine, Mongolian National University of Medical Sciences, Ulaanbaatar, Mongolia; [3]Department of Administration, Third State Central Hospital, Ulaanbaatar, Mongolia; [4]Department of Epidemiology and Biostatistics, School of Public Health, Mongolian National University of Medical Sciences, Ulaanbaatar, Mongolia; [5]Department of International Cyber Education, Graduate School, Mongolian National University of Medical Sciences, Ulaanbaatar, Mongolia

Objectives: Stroke related disabilities significantly decrease patients' quality of life and post-stroke rehabilitation service is essential. Therefore, we studied post-stroke rehabilitation services and facilities provided in Mongolia between 2013 and 2018. **Methods:** A longitudinal study was performed in a total of 47 Mongolian hospitals that provide stroke rehabilitation services. A questionnaire regarding the organizational structure of rehabilitation units, equipment used, human resources, and adherence to recommended guidelines was developed and administered to specialists in these hospitals. **Results:** We recruited 47 (89%) out of 50 and 47 (94%) out of 53 hospitals delivering stroke rehabilitation service in 2013 and 2018 respectively. 25-34% of these hospitals provided post-stroke rehabilitation, with the majority being incapable of providing multidisciplinary team rehabilitation. The number of physiatrists and physical therapists increased significantly from 2013 to 2018 (p<.001) although the number of physical (p<.002) and occupational therapists (p<.001) was significantly lower in the rural areas. Utilization of Functional independence measures, namely, the Barthel index and modified Rankin scales were increased in 2018 compared to 2013. **Conclusion:** The majority of post-stroke rehabilitation services are not improved since 2013. Consistent national programs and policies are required to provide adherence to post-stroke rehabilitation guideline recommendations and implementation in clinical practice.

Keywords: Stroke Care, Rehabilitation, World Health Organization, Stroke Guideline, Disability,

Introduction

Stroke is the leading cause of long-term disability globally. Stroke consequences may be prolonged, with physical, social, psychological and financial problems affecting not only patients but also their families[1]. Annually, 17 million people worldwide

suffer stroke. Of these, 5 million die and another 5 million are left permanently disabled, placing a burden on family and community[2].

Stroke is the second leading cause of death and the main cause of disability resulting from cardiovascular disease in the world. According to research conducted within the Ulaanbaatar community, during the last 20 years, stroke incidence and resulting deaths are constantly increasing. Reported stroke cases were 0.72 per 1,000 people in 1978, however, the number had grown to 2.96 cases per 1,000 people by 1998 [D.Baasanjav et al. 2011]. In 2008, the World Health Organization (WHO) registered Mongolia as a country with a high prevalence of stroke. According to the latest WHO data published in 2017, stroke deaths in Mongolia reached 3,385 or 18.9% of total population deaths. The age adjusted death rate of 183.93 per 100,000 ranks Mongolia at #3 in the world[3]. There is little data on short-term mortality and survival rate. This lack of data hampers effective coordination of stroke prevention, treatment, and rehabilitation. There is an urgent need to strengthen the national program for the prevention, early identification, treatment and rehabilitation of stroke[4,5].

A Situational Analysis was carried out in January 2011 by the WHO representative, Sheila Purves, regarding rehabilitation service provisions, legislation and policies that are in place to address disability[6]. From the stakeholder meetings held during that consultancy, it was emphasized that a rehabilitation programming policy (or strategy) must urgently be developed in order to (1) meet the increasing demands for rehabilitation from acute to chronic stages, (2) prevent secondary disabilities, (3) work on an equal basis with other specialty areas, and (4) ensure that referrals and cooperation between levels and sectors occur for better outcomes[6].

Following this mission "Strategy on Developing Rehabilitation Care and Service" was developed by the "spell out name" (MOH) and WHO later in 2011[7].Unfortunately, this strategy implementation was insufficient. Under the Ministry of Health, the Millennium Challenge Corporation of Mongolia and WHO, created a project to ensure a sustainable improvement of the available rehabilitation services in Mongolia and improve access to these following Stroke and Heart Attack. Within the project, a 20-bed fully equipped Acute Stroke Unit, Cardiac Intensive Care Unit and Rehabilitation Unit was set up at central 3rd hospital for the first time at the national level. This project introduced advanced technologies of angiography and computed tomography, provided over 120 types of equipment for rehabilitation treatment and involved physicians and specialists in international training.1600 persons lost their lives due to the stroke and heart attack in 2017 down from 1970 persons dying in 2013.These 370 reductions of deaths is considered to have occurred as a result of the project.

In 2013, we surveyed stroke rehabilitation services in Mongolia and identified major deficiencies in the implementation of clinical guidelines for stroke care. We repeated the survey in 2018 to determine if the provision of stroke rehabilitation services in Mongolia has improved in the last 5 years and whether these services comply with guideline recommendations.

Our study goal is to determine advancements made between 2013 and 2018 in post-stroke rehabilitation services provided by the health system in Mongolia.

Materials and Methods

Study design and sampling

A longitudinal study design based on a questionnaire was carried out in total of 47 hospitals that provide stroke rehabilitation services in Mongolia. This survey was conducted two times, first in 2013, then in 2018. Results were then statistically analyzed. The survey questionnaire was divided into three sections including; the hospital unit's formal organizational structure, services offered and human resources employed by the rehabilitation departments. The survey was sent to a physician known to have an interest in stroke working in the unit or the head of the department at each of the 47 hospitals. The first survey was sent in September 2013 and the 2nd survey was sent in September 2018 followed by telephone contact to ensure a 100% response rate. Comparative results between the 2013 and 2018 surveys were calculated with a p value of <.05 considered significant.

Statistical analysis

Descriptive results were calculated using number and percentage. McNemar's test was used to compare two categorical dichotomous variables. Our samples from 2013 and 2018 were analyzed using repeated measurement and Wilcoxon's signed test to compare ordinal variables relating to overall evaluation of stroke rehabilitation.

Results

We recruited 47 (94%) of all 50 active stroke rehabilitation service providing hospitals in 2013, and 47 (89%) of all 53 active stroke rehabilitation service providing hospitals in 2018. Among the hospitals only 2% had been operating with a specialized healthcare "Stroke center" facility label. This finding suggests that the current capacity of the healthcare system is unable to deliver qualified and accessible service for the increasing number of stroke patients in Mongolia.

In the first part of the questionnaire, we identified the status of stroke care, structural aspects, human resources and services provided as shown in Table 1.

Although 25-34% of healthcare organizations provided acute phase stroke rehabilitation, only the Third General Hospital of Mongolia provided thrombolytic therapy and revascularization services. Multiple system pathologies including hemiplegia, speech and cognitive dysfunctions are the core clinical findings in stroke that require long-term rehabilitation care and nursing. Meanwhile the majority (94%/2013-96%/2018) of stroke rehabilitation service providing organizations were incapable of facilitating multidisciplinary stroke rehabilitation care that are strongly associated with therapeutic outcomes.

The average number of physiatrists and physical therapists among these organizations rose significantly from 2013 to 2018 (p<.001). In rural Mongolia, there were 18 physiatrists, 10 physical therapists, and no occupational therapists registered. However, in the capital city Ulaanbaatar 56 physiatrists, 49 physical therapists and 3 occupational therapists were registered. In the provinces of Khentii, Arkhangai, Uvurkhangai, Zavkhan, Selenge, Umnugovi there were no registered physiatrists or specialists, rather, oriental medicine doctors, nurses, and physical educators covered stroke rehabilitation services. There were significantly fewer healthcare human resources including physical therapists

(p<.002) and occupational therapists (p<.001) in the rural areas.

We clarified the functional status of stroke rehabilitation services and implementation of stroke rehabilitation guidelines in the second and third parts of the questionnaire.

In 2018, 18 (36%) hospitals from the 47 had specifically designed stroke rehabilitation rooms with an average of 21.93 square meters of space for 6 to 8 patients. This space allocation does not meet international standards of 8 to 10 square meters per patient.

Rehabilitation equipment supply and types did not increase from 2013 to 2018 except for parallel bars. Therefore, current government policy and hospitals administration's actions are not matching the increasing need of rehabilitation services. Unfortunately, none of the hospitals had widely recognized modern rehabilitation equipment, including tDCS, TMS, robotic services, and virtual reality etc.

We analyzed the period to initiate stroke rehabilitation therapy following hospitalization in 2018, and found 1 (2%) for first day, 12 (26%) within 3 days, 3 (6.4%) within 14 days and one (2%) within 28 days (figure 1).

However, there were no significant differences in rehabilitation initiation time between 2013 and 2018 among our participant organizations.

In addition, frequency of rehabiliation services and overall duration of services were determined (figure 2). Frequency analysis revealed 3-4 (6.4-8.5%) had 3 sessions per week, 31 (66%) had 5 sessions per week, and 7 (14.9%) had daily sessions. According to American Heart Association recommendations (2016), stroke patients require at least 5 sessions weekly with a minimum of 3 hours of physical and occupational therapy on each of those days.

Consecutive long-term rehabilitation after discharge and continuous in-home rehabilitation are essential components to recovery. Unfortunately, in our practice, stroke patients are

Table 1. Structural aspects

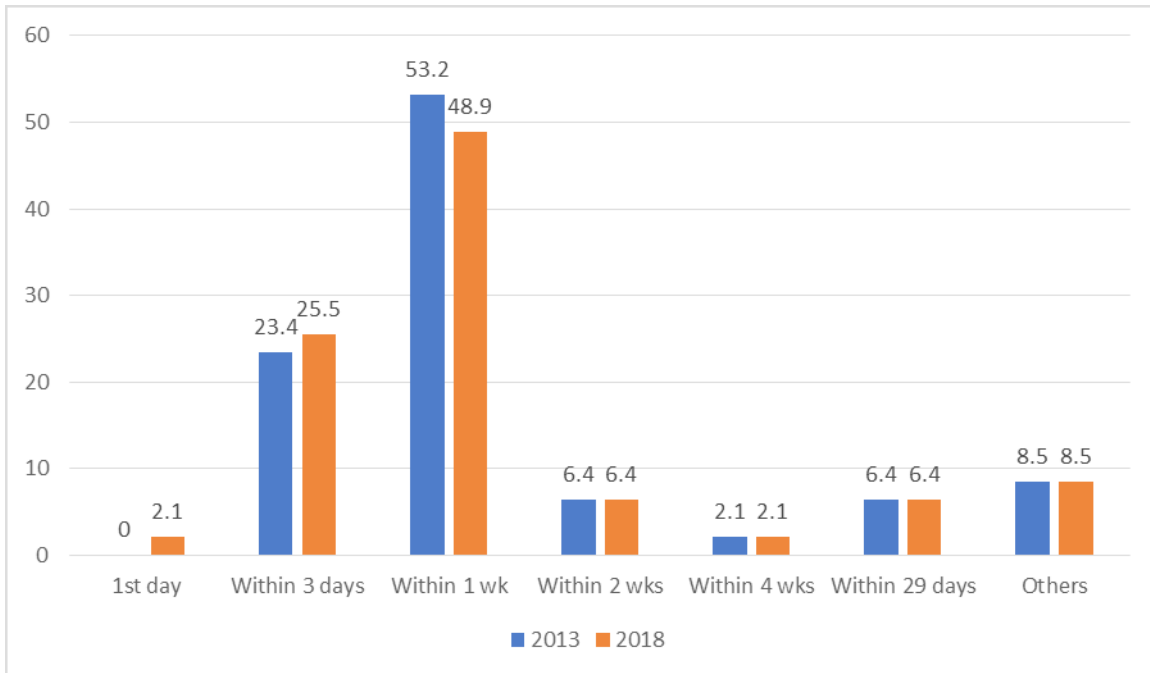| Structural aspects	2013		2018	
	N	%	N	%
Provides acute care in stroke (yes)	12	25.5	16	34.0
Provides subacute phase stroke care (yes)	33	70.2	34	72.3
Provides long term stroke care (yes)	47	100.0	47	100
Unable to provide multidisciplinary team care for stroke (yes)	45	96	44	94
In cooperation with emergency department (yes)	5	11	7	13

Figure 1. Time to initiate rehabilitation after stroke
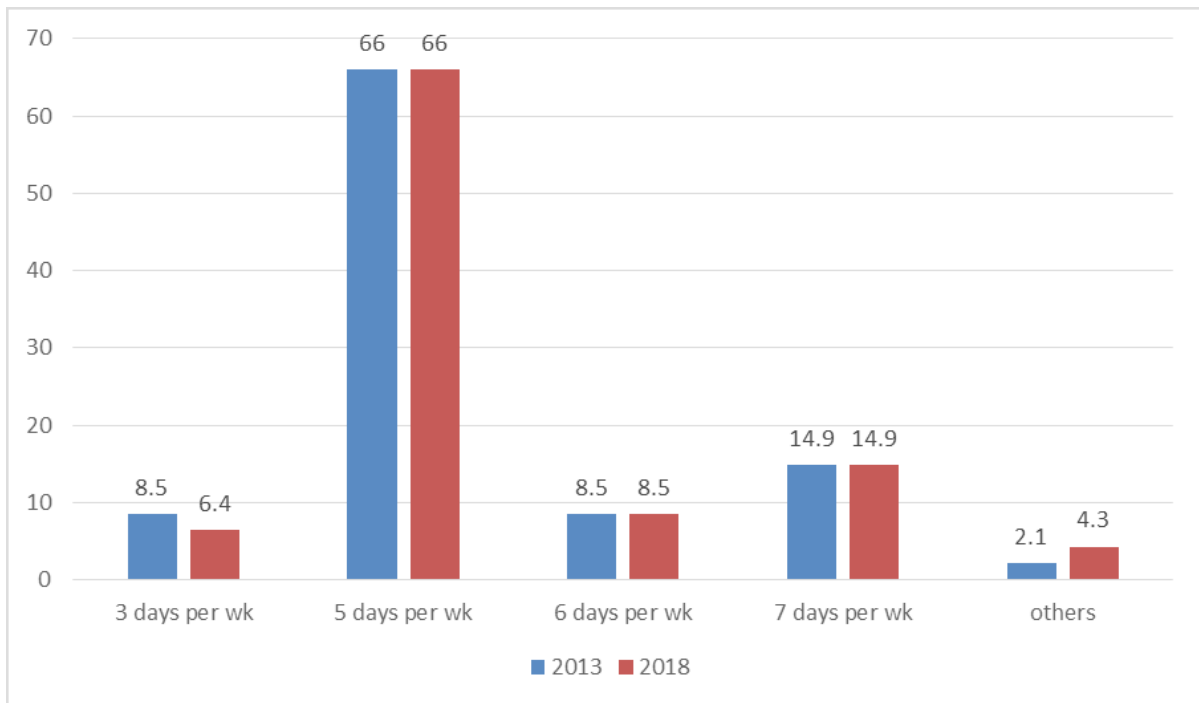

Figure 2. Post-stroke rehabilitation services frequency (per week)

allocated 30 to 40 minute daily sessions of rehabilitation during hospitalization of 5 to 7 days. In addition, patients reported that an absence of specialized rehabilitation at a hospital or rehabilitation center was the strongest barrier to rehabilitation after discharge.

We analyzed the usage of the Functional Independence Measure (FIM), a well-established stroke functional evaluation method in use among participant organizations. In 2013, 41 (87.2%) organizations did not implement FIM while 37 (78.7%) were not users in 2018. This finding suggests FIM implementation increased over the time.

Also Barthel index (BI) and Modified Rankin Scale (mRS) utilization increased. The percentage of institutions in which BI and mRS were not used was reduced from 2013 to 2018, with 39 (83%) to 34 (72.3%), and 47 (100%) to 41 (87.2%), respectively. Although global evaluation methods are becoming familiar among participant organizations, we recommend that all hospitals implement these evaluation methods (Table 2). Rehabilitation service is a patient centered multidisciplinary teamwork. Therapeutic outcome and recovery results are dependent oneffective teamwork. In addition, multidisciplinary team meetings, regular consultations with patients, and overall team goal and action plans are important determinants of successful rehabilitation care (Table 2).

Organizations were asked to evaluate their healthcare service satisfaction with only 6.4% rating themselves as sufficient. Therefore, the remaining 93.6% self-evaluated their rehabilitation services as poor quality and insufficient.

The Ministry of Health, MCA-Mongolia and WHO implemented this project in 2013 to ensure a sustainable improvement of the available rehabilitation services in Mongolia. Consequently, this project developed and implemented a national clinical guideline for rehabilitation, post-stroke, to improve the rehabilitation services available at the tertiary-level health care level and to improve the transition to Aimag- and Soum-level hospitals, primary care and community.

We assessed the following indicators to determine implementation status at 47 hospitals. It shows that 32-36 hospitals out of 47 have no specifically designed rehabilitation therapy room for stroke patients. Most have inadequate equipment and supplies, an absence of clinical team meetings comprised of specialized stroke rehabilitation experts, no individual therapy planning or registration of every stroke patient and do not assess Activities of Daily Living (ADL).

Furthermore, patient care management planning for possible complications and discharge planning is not conducted and driving ability, sexual function and occupational performance are never assessed as specified in the guidelines. These findings reveal that implementation of the "Guideline for Stroke rehabilitation" has been applied inadequately in Mongolia since 2013.

Table 2. Status of rehabilitation care

	2013		2018		p-value
	N	%	N	%	
Usage of Functional Independence Measure (FIM)					.285†
Yes	6	12.8%	10	21.3%	
No	41	87.2%	37	78.7%	
Usage of Barthel Index (BI)					.225†
Yes	8	17.0%	13	27.7%	
No	39	83.0%	34	72.3%	
Usage of modifies Rankin Scale (mRS)					.014†
Yes	0	0.0%	6	12.8%	
No	47	100.0%	41	87.2%	
Overall evaluation of stroke rehabilitation					.147§
Agree	3	6.4%	4	8.5%	
Neutral	2	4.3%	9	19.1%	
Disagree	42	89.4%	34	72.4%	

†-McNemar's test, §-Wilcoxon Signed Rank test

Discussion

Stroke is an apt description of the disease as it occurs "at a stroke." The insult is immediate and the effects may be prolonged, with physical, emotional, social and financial consequences not only for those affected but also for family and friends[1].

Rehabilitation plays a pivotal role for integrating persons with disabilities into social relations and making them active members of society. In accordance with the definition provided by the World Health Organization, rehabilitation is "a set of measures that assist individuals who experience, or are likely to experience disability to achieve and maintain optimal functioning in interaction with their environments." Although this definition is directly related to medical rehabilitation, it also aims at creating a favorable social environment for disabled persons and alleviates social barriers and negative attitude towards disability[8].

Overall, the Mongolian healthcare system is not meeting modern international rehabilitation service standards and no specialized centers are available among all registered 3500 healthcare organizations. Increased life expectancy and the burden of chronic illness is growing throughout the world, becoming a serious challenge to global health. Therefore, to meet these increasing demands, the need for rehabilitative care is growing tremendously. WHO notes that there are 17 million cases of stroke in the world annually leading to 5 million deaths and 5 million permanent disability cases per year[2].

Data on the epidemiology of stroke in South, East, and South-East Asia were derived from the Global Burden of Disease study (mortality, disability-adjusted life-years [DALYs] lost because of stroke), the World Health Organization (vascular risk factors in the community), and publications in PubMed (incidence, prevalence, subtypes, vascular risk factors among hospitalized stroke patients). Age- and sex-standardized mortality and DALY's are the lowest in Japan, and highest in Mongolia[9].

Rehabilitation care is a lawfully protected right for citizens with disabilities according to the United Nations. Based on a worldwide level needs assessment, WHO initiated the "Global Disability Action Plan 2014-2021". This program is intended to strengthen, broaden, equip and enrich current rehabilitation services on the community-based rehabilitation level. However, each country is required to adapt and modify this plan according to their specific needs. Healthcare service standards and measures in rehabilitation service are not clearly defined in Mongolia and that lack remains the strongest limitation to identifying specific objectives and conducting action planning[10].

The program's initial assessment in Mongolia concluded that knowledge concerning disability is poor, interdisciplinary cooperation is restricted, citizens are dispersed geographically, professional human resources are limited, state registry statistical data is lacking, and clinical guidelines and the legal environment remain unsatisfactory. The Melbourne Australian University hospital and the Department of Physical medicine and rehabilitation of the Mongolian National University of Medical Sciences joint team conducted a study covering 77 physiatrists and other professionals with Delphi methodology. They concluded that physical medicine and rehabilitation is a critical branch of medicine to be improved in Mongolia and that policy makers must promote development of the field and increase awareness of disabled person's human rights[10].

Newly approved healthcare law legislated the functions and services of rehabilitation according to rehabilitation center regulations in the thirteenth chapter of Health Care Service law. Additionally, rehabilitation service regulations, and clinical guidelines were approved under the 487th order of the Ministry of Health on December 12, 2015. Currently this order promotes a multidisciplinary rehabilitation approach consisting of physiatrists, physical therapists, occupational therapists, speech therapists, and other rehabilitation professionals[11]. Unfortunately, these standards are not currently met in Mongolian healthcare practice. Our study shows that ninety-four to ninety-six percent of all 47 organizations reported that organizations were not trained and prepared to provide the services of a multidisciplinary team.

Worldwide, stroke rehabilitation therapy consists of 40% physical therapy and 20-30% occupational therapy for a minimum of 1-3 hours daily per session. The average length of hospital stay for post-stroke patients was 44.5 days in the United Kingdom and 60 days in Belgium[12].

Stroke patients received 30 to 40 minute daily sessions of rehabilitation during 5 to 7 days hospitalization in our 47 participant organizations. Unfortunately, patients did not receive rehabilitation therapy from a specialized team on a continuous basis after discharge. This discontinuation leads to physical and occupational disabilities.

The Functional Independence Measure (FIM) was developed in 1983 by Carl Granger and Byron Hamilton of the

American Congress of Rehabilitation Medicine and Academy of Rehabilitation Medicine[13]. This measurement is widely used to assess a patient's physical and cognitive ability. In our study, FIM and Barthel Index practical usage were lower than international standards, being 21% and 27%, respectively.

Liesbet De Wit, Koen Putman, and Birgit Schuback reported in 2007 that the intensity of rehabilitation is strongly associated with recovery time. Their findings suggested functional recovery occurred faster due to longer exposure to rehabilitation compared to England. Rehabilitation success was related with appropriate organizational structure rather than having a higher number of employees[11]. Among 47 hospitals, 12 (26%) initiated rehabilitation within the first 3 days.

Post-stroke rehabilitation requires a long-term recovery process and, in many countries, patients receive rehabilitation services after hospitalization with at least three months subsequent rehabilitation treatment in centers or hospitals[14]. However, lack of rehabilitation following hospital discharge in Mongolia and lack of specialized professional multidisciplinary rehabilitation services are leading to poorer quality of life for Mongolian patients.

Effective teamwork determines rehabilitation efficacy and poor team composition is associated with inadequate quality of service. Ideally, 1-2 physical therapists, 1-2 occupational therapists, 0.2-0.6 speech therapists and 0.5 social workers are required per 10 hospital beds by international standards[15]. However, we also see significant increases in physiatrist and physical therapist numbers among participant organizations from 2013 to 2018 (p<.001).

The use of guidelines and protocols for the management of common problems in patients with stroke are important markers of effective, organized, stroke services[16-18].

Our study shows the implementation of stroke rehabilitation is not being adequately conducted in Mongolia. Furthermore, patient care management planning for possible complications and discharge planning are not being conducted. Driving ability, sexual function and occupational performance are never assessed even though these are specified in the guidelines.

The major finding of this study is that there have been no significant improvements in the provision of stroke rehabilitation services between 2013 and 2018.

Although the stroke morbidity rate has been increasing since 2013, the quality and accessibility of rehabilitation services

and the implementation of clinical guidelines are not improving or increasing accordingly. Stroke rehabilitation healthcare in Mongolia remains inadequate in accordance with modern needs and standards.

The Mongolian government has prioritized disability and rehabilitation as one of its key agendas. The level of funding, human resources and health infrastructure are well developed in urban areas but are not optimal in rural areas[19]. Since 1990, healthcare facilities and programs have grown exponentially in most areas of Mongolia[20]. However, the system still emphasizes provision of healthcare through hospitals, resulting in fragmented and inefficient implementation across hospitals, financing systems, human resources, planning, and regulatory processes[19].

Collaboration between health professionals is required across the entire stroke pathway. Collaboratively, teamwork, particularly which adopts an interdisciplinary approach, is a key contributor to care quality in stroke services[1].

Our study also shows that human resources and equipment supplies should be enhanced to meet the growing need. Furthermore, government policy should establish a national program strategy, management information system, and monitoring.

Our survey has a number of weakness. Questionnaires offer a simple means of rapidly surveying clinical practice but the most appropriate clinician may not be targeted and responses may not reflect actual practice. We did not attempt to verify the validity of responses but all participants were reassured that the survey was confidential. Attempts were made to contact specialists known to have an interest in stroke rehabilitation at each hospital, but this was not always possible and many questionnaires were simply addressed to the "medical director." However the 100% response rate provides some confidence that the survey process reflects the current state of stroke rehabilitation services in Mongolia. Stroke remains a complex and challenging condition. In the future we urgently need improvement in early recognition and diagnosis of stroke matched with an increasing focus on longer term support for stroke survivors.

A national guideline on rehabilitation, post-stroke, was developed but reorganization and staff capacity-building and increases in rehabilitation equipment has been inadequately addressed and is not meeting current needs. Furthermore, improved links between institutional and community-based

rehabilitation is required to ensure a common understanding of referral to provide access to services and standardization of information to clients and carers.

The burden of non-communicable diseases such as Stroke in Mongolia is high and with this, a high burden of disability adjusted life following Stroke. As such, the implementation of national clinical guidelines on rehabilitation post-Stroke under the national policy will ensure an increased awareness of the importance of rehabilitation and act as a guide for expanding the availability of additional rehabilitation services.

Conclusion

Stroke rehabilitation services are not much improved since 2013 and the implementation of national guideline for stroke rehabilitation in Mongolia has not been effective.

Rehabilitation is an emergency priority in Mongolia to address the rights and needs of persons with disabilities. Mongolia needs a consistent, national approach to the mandatory implementation of guidelines and a continuing and comprehensive audit of stroke services is required.

Conflict of Interest

The authors state no conflict of interest.

Acknowledgement

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