

Tele-stroke Services in Areas of Rural Nepal: A Dire Need

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ABSTRACT

With the increasing burden of non-communicable diseases in South Asian countries, Nepal also holds a pertinent position with the rapidly increasing prevalence of non-communicable diseases. Among the South Asian countries with the least developed health infrastructure in Nepal, the hurdles of providing equal health services to all demographic and geographic groups of people had always been a matter of serious concern. Moreover, the citizens of rural Nepal had always been kept at a distance from even minor to several major healthcare services for decades and stroke-related illness falls under one of those major diseases with spiking rates of hypertension and diabetes mellitus. Traditional risk factors, lifestyle and feeding practices of those regions combined with arduous transportation facilities barring the rural citizens from getting health care services from tertiary care centers have increased morbidity rates as well. Along with it the numbers of neurologists and stroke centers providing specialist services are not in par with the burden of stroke-related illness. Adding to it such stroke care services are below scarce level and completely devoid in most of the areas of rural Nepal which is a matter of global health concern. Telestroke service if properly implemented can act a modern solution to provide access to such special health care services preventing rural citizens from lifelong disability and dependence.

Keywords: non-communicable disease in Nepal; stroke in Nepal; tele-stroke services

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INTRODUCTION

Nepal being one of the low-middle-income countries with health infrastructures and facilities in the developing phase. The landscapes of the country along with economic and political instability have resulted in backwardness of health services, majorly affecting the rural areas of Nepal. As the prevalence of the non-communicable diseases are increasing in much more faster rates compared to previous years and diabetes, hypertension being two of the major issues. Due to lack of proper health awareness along with lack of adequate health infrastructures in rural areas of Nepal timely diagnosis and intervention for diabetes and hypertension falls back, resulting in increasing rates of stroke related deaths in areas of rural Nepal.¹

Stroke And Nepal

The prevalence of non-communicable diseases is constantly increasing mostly due to massive burden of

urbanization, increasing pervasiveness of a sedentary lifestyle, and unhealthy diet choices. In low- and middle-income countries which include the South Asian countries like Nepal, the numbers also shows that more than 80% of deaths are due to the burden of cardiovascular diseases.¹ This can be easily explained by the dietary fact that shows high intake of fat, sugar, and salt, in addition to high tobacco consumption, either by chewing or smoking.² The increasing burden of traditional risk factors, including hypertension, diabetes, dyslipidemia and smoking, in Nepal is alarming, and numerous nontraditional risk factors, such as water-pipe use, desi ghee, chewable tobacco, and infectious causes of stroke, are still understudied. Traditional Nepali cuisines which is known for excessive use of oil based products, frying as a method of cooking along with reusing of cooking oil and high heat cooked food which are preferred is colder areas of

rural Nepal region further promotes neo-formed contaminants (NFCs) such as trans-fatty acids (TFAs) and advanced glycation-end products (AGEs).³ Stroke being the central nervous system disease with acute condition affecting the bodily function at multiple levels due to blockage of circulation of blood to the vital areas of the brain resulting in temporary to permanent disability. To manage the patient of stroke the role of multidisciplinary team consisting of neurologist to speech therapist, occupational therapist, physiotherapist, neuropsychologist, dietitian and nurses. Such level of care is only possible in tertiary care centers.^{4, 5} Access to tertiary stroke care is limited, and the use of tissue plasminogen activator is scarce. In addition, public and caregiver awareness of stroke risk factors and management is still not robust, and the interest of governments and policy makers in stroke is below suboptimal. Interventions to reduce stroke burden and stroke-related mortality in rural areas of Nepal is still undervalued and out of matter of health concern in Nepal resulting in pertinent impact at the global level. Another massive hurdle that stand against developing stroke care services in Nepal is arduous transportation facility in areas of rural Nepal, where reaching to tertiary neurocare center easily takes half a day resulting in on way deaths of maximum number of stroke patients. Along with it the citizens of rural areas of Nepal with the minimal wage economy cannot afford taking expensive helicopter rescue services.

Situation Based Analysis Of Stroke Centers Of Nepal

The countries of South Asia accounts for 40% of the stroke burden in the developing world and is the highest contributor of global stroke mortality, under which Nepal also plays a vital spot in the burden.⁴ In spite of increasing stroke burden, Nepal has fewer than fifty neurologists and has a very minimal number of dedicated stroke centers with just ten centers capable of intravenous thrombolysis (IVT) and only 3 centers capable of carrying out mechanical thrombectomy (MT).³ Along with it the need for stroke rehabilitation centers is most so as to improve the quality of life of stroke patients from either temporary or permanent disability. For the proper functioning of stroke rehabilitation centers multi departmental level of care is most such as neurology, neurosurgery, nurses, physiotherapy, neuropsychiatry, dietitian and maintaining such broad level of care in a single setting is very arduous in areas of rural Nepal where even basic level of health care delivery is difficult to assess. Hence

there are very limited numbers of such stroke care rehabilitation centers in tertiary care centers of Nepal and such health care institutions are all based in urban and capital areas of Nepal. Moreover maximum number of these stroke care services are centered in urban areas only, further depriving the neurological services to the larger demographic group. Acute Ischemic Stroke (AIS) makes up for majority of all stroke cases and is highly treatable if the patient presents within the window time for definitive therapeutic intervention such as intravenous thrombolysis or mechanical thrombectomy.⁵ In spite of readily available guidelines adequate access to thrombolysis remains relatively low especially so in the rural areas.⁶ This strongly suggests us that stroke patients of urban areas will have much higher chances of getting appropriate treatment within the correct time frame whereas the stroke patients of rural areas are always kept at bay from timely receiving the adequate interventions resulting patients left with lifelong disability and dependence.

Recommendation For Telestroke Service Model In Rural Nepal

Telestroke facilities through telemedicine seem to be the modern solution to the modern problem which holds the strong potential to optimize stroke care across all the demographic group of people, bridging the economic and geographic barriers in the rural areas of Nepal. Majority of the patients in rural locations could be easily managed locally with guidance from specialists/super specialists in the urban settings without having to travel to reach the specialists in person. Telestroke services uses audio video technology and utilizes a robust model known as “hub and spoke” model for providing stroke care service.³ Under this model tertiary hospitals or stroke centers in urban areas acts as the hub whereas the periphery based health centers without neurologist or stroke specialist acts as the spoke. By following this model any trained physician can carry out initial important clinical investigations and thereafter potentially initiate thrombolysis therapy or refer if needed. Another critical model “drip and ship” model where immediate intravenous alteplase is given within the window period and further care is referred to the specialist in the urban settings.³ This model provide a vital time frame for the people of rural areas to travel to the desired health centers in cities preventing the major complications and ailments. All stroke care centers based in cities with CT scans can be included in the telestroke services. Workshops should be conducted to train and enable

medical officers in identifying stroke through mere clinical examination and imaging as well. Intravenous alteplase should be made available at all peripheral centers involved and should be provided free of charge where the role of government comes in front. Such models are being effectively used in the rural areas of our neighboring country like India and other south Asian countries with fruitful results.^{7,8}

Anticipated Barriers for Establishment of Telestroke Services In Rural Nepal

The utmost need for proper training in stroke medicine to the periphery based health care provider and its dire absence resulting in inability to recognize the manifestations of stroke can be considered as one of the major hurdle keeping us backward from utilizing such advanced health care services. Along with it the need for cooperation among first-contact physicians is utmost; and, the “pushback” culture among health care providers who do not wish to “lose” patients to other systems has been common in developing countries like Nepal. Proper certification and empowerment for the identified 'hub and spoke' hospitals is lacking way behind and has not been planned in national health care delivery systems. Moreover proper budget allocation and funding opportunities for telemedicine research has always been scarce due to lack of empowered health care workers and absence of designated health care policies targeting such advanced research to mitigate modern health care issues. Lack of public-private partnerships indigenous to the country as public-private partnerships are still in their infancy and are unable to receive encouragement from the governmental policymakers and enforcers also acts as major factor

that from past decades has always kept rural Nepal for gaining access to advanced specialty care.

WAY FORWARD

The first starting point of action can be the “Spoke” hospitals and cooperational “Wheels” for the 'hub and spoke' model of telestroke can be established and Nepal Stroke Association can be the regulatory body to oversee the endorsement of such centers. Demonstration of pilot projects for proof of principle in the development of spoke sites can help to derive a scientific proof suggesting the advantages of implementation of such advanced health care delivery system. Adequate estimation of funds for stroke and cardiovascular disease research by governmental scientific agencies and public-private partnerships as well as philanthropic organizations should always be sought for in collaboration with the international bodies. National Health plans should be the starting point for the establishment of Funds for initiation, development, and maintenance of telestroke programs. Development of user-friendly national legislation for licenses, compliance, liability, and privacy issues for telestroke services should be implemented as soon as possible which will help to begin a care free legal based health care delivery by respected bodies who are willing to provide such level of health care in rural areas. Community education and awareness programs along with Physician education for acute stroke diagnosis, treatment, prevention, and rehabilitation always comes forth as the robust factor that will always help in the advancement of future health care delivery system in Nepal.

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