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Telestroke: beliefs, expectations and perceived barriers among community people residing in Siddharthanagar, Bhairahawa, Nepal

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ABSTRACT

Introduction: Telestroke is often used for medical consultations in rural areas. The acceptance and utilization of this service in the community can be a useful means to combat stroke associated morbidity and mortality. Therefore, we aimed to study the beliefs, expectations and perceived barriers regarding telestroke among people residing Siddharthanagar Municipality.

Materials and methods: A cross–sectional study was conducted among 100 participants from the community of Siddharthanagar Municipality, Bhairahawa in order to explore the beliefs, expectations and perceived barriers regarding telestroke. A semi–structured interview schedule was used to collect the information from each member of the family. Statistical analysis was performed using IBM–SPSS version 20.0.

Results: Of total 100 respondents, majority were male (57%) and were educated up to grade–X (61%). The age ranged from 16 to 76 years and majority were between 21 to 40 years (44%). Almost all of them had heard about stroke (98%) even though majority (93%) did not have a family history of stroke. Ninety percent were known to use internet for >1 hour daily while almost 80% had heard about telemedicine or telestroke. More than half (56%) of the respondents strongly agreed that telestroke improve the diagnosis and treatment of acute stroke. Almost half (48%) of them believed that telestroke would be useful in research of emerging stroke medication and also be useful in physician and community stroke education. The barriers to implementation of telestroke commonly perceived were level of technology (45%), increased personal work (52%), time and cost of installation (48%), management of tissue plasminogen activator side effects (35%), preference of patients to visit physically (48%), concerns to safety/confidentiality of online data (43%) and time taken away from care of patients in the emergency department (44%).

Conclusion: Our study reflects that the community of Siddharthanagar are concerned about telestroke and its implementation for the improvement of acute stroke care.

Keywords: Telestroke; Belief; Expectation; Barrier; Community

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INTRODUCTION

In the 1970s the World Health Organization defined stroke as a "neurological deficit of cerebrovascular cause that persists beyond 24 hours or is interrupted by death within 24 hours".[1] Although stroke incidence, prevalence, mortality, and disability–adjusted life–years rates tend to decline from 1990 to 2013, the overall stroke burden in terms of absolute number of people affected by, or who remained disabled from, stroke has increased across the globe in both men and women of all ages and the data of "GBD 2013 stroke burden" estimates confirmed about the significant increase in stroke burden in the world over the last two and half decades, especially in developing countries.[2] In developed countries, stroke is a third leading cause of death. Each year, stroke occurs in more than 700,000 patients, leaving many with disabilities and unable to resume their previous lifestyle or employment. This makes the social and economic impact of stroke among the most devastating ones in medicine.[3] A retrospective study conducted in Nepal between June 2012 to November 2015 shows that there was massive increase in incidence of stroke over the last two decades in Nepal with younger people and more women being affected. Despite public health awareness program, modifiable risk factors are still common in stroke, notable of which is three–fold increase in incidence of dyslipidemia in patients with stroke. Availability of neurosurgical interventions has helped to decreased mortality but morbidity can be decreased further by risk modifications and widespread availability of thrombolytic and endovascular interventions.[4] Telemedicine is defined as "The delivery of health care services, where distance is a critical factor, by all health care professionals using information and communication technologies for the exchange of valid information for diagnosis, treatment and prevention of disease and injuries, research and evaluation, and for the continuing education of health care providers, all in the interests of advancing the health of individuals and their communities".[5] For over 40 years, telemedicine has been used to bring healthcare services to patients in distant locations. Not only does telemedicine improve access to patients but it also allows physicians and health facilities to expand their reach, beyond their own offices. Given the provider shortages throughout the world, in both rural and urban areas, telemedicine has a unique capacity to increase service to millions of new patients.[6] Telestroke is the practice of clinical stroke care via telecommunication and came into its own with the era of stroke thrombolysis in the late 1990s. A key driver was to ensure better equity for patients in accessing this time–critical therapy in metropolitan and rural hospitals.[7] By establishing a telemedicine link using videoconferencing and image sharing technology, stroke specialists from stroke center can examine patients at remote hospitals miles away to help diagnose the patient's ailment and recommend a plan of care. About 80% of stroke cases are ischemic type – an affliction in which a blood clot, formed in another part of the body, travels to a smaller blood vessel in the brain and becomes lodged, blocking the blood flow to that area. One form of treatment is to administer tissue Plasminogen Activator (tPA), a clot busting drug that can greatly reduce the disability resulting from a stroke. It must be administered within 4.5 hours of symptom onset. Unfortunately, some hospitals lack the resources to make this determination and cannot physically transfer the patient quickly enough to enable them to receive this therapy if warranted. This is where telestroke can be truly useful. Subscribing hospitals can receive acute care for patients without physically transferring the patient for an examination.[3] The growing global burden of stroke requires innovative, effective and widely available strategies for stroke prevention.[8] Telestroke has been effective in the management of acute ischemic stroke (AIS).[9] Evidence suggest that older residents are most open to health technologies for telecare that improve communications with healthcare personnel, especially for medical emergencies and detecting falls. Arthritis, hypertension and diabetes were the top health problems; and getting enough exercise and following a healthy diet were the key barriers to managing them.[10] Stroke related morbidity and mortality can be reduced through

prompt initiation of treatment. Telestroke is the best tool to achieve immediate treatment of stroke in a country like Nepal. Acceptance and utilization of telemedicine especially telestroke can be highly influenced by people's beliefs, expectations and perceived barriers towards it. Furthermore, the findings of the study will be helpful to obtain baseline information to plan and conduct awareness programme regarding telestroke. Therefore, we aimed to study the beliefs, expectations and perceived barriers regarding telestroke among people residing Siddharthanagar Municipality

MATERIALS AND METHODS

Study Design and Subjects: A cross– sectional research design was used to find out the beliefs, expectations and perceived barriers regarding telestroke among the community people residing in Siddharthanagar Municipality, Bhairahawa. Siddharthanagar municipality is the administrative headquarter of Rupandehi District on the outer Terai plains of Nepal, 265 km west of Kathmandu (capital of Nepal).

Study Population: The population of the study were the community people residing in Siddharthanagar Municipality. One member of one household who had heard about stroke was selected and was interviewed.

Data Collection: Semi–structured interview schedule was used to collect the information which was developed after reviewing of related literature. Interview questionnaire consisted of two parts. Part I consisted questions related to socio demographic characteristics of the respondents and Part II consisted questions related to beliefs, expectations and perceived barriers regarding telestroke. For beliefs and expectations a four point likert scale was used and for perceived barriers regarding telestroke a five point likert scale was used. Data was collected from 10/03/2018 to 25/08/2018.

Data Analysis Procedure: Collected data was checked, reviewed, edited, coded and then analyzed by using descriptive and inferential statistics. In descriptive statistics frequency and percentage were calculated for categorical variables and mean±standard deviation was calculated for numerical variable. The four point likert scale which was used for beliefs and expectations regarding telestroke was modified to dichotomous scale that is agree and disagree for further analysis. Strongly agree and agree were merged to 'agree and strongly disagree and disagree were merged to disagree. The five point likert scale which was used to explore perceived barriers regarding telestroke was also modified to dichotomous scale that is significant barrier and no barrier. Very significant barrier, significant barrier and moderate barrier were merged to significant barrier and mild and no barrier were merged to no barrier.

RESULTS

A total of 48 patients participated in this study. The sociodemographic characteristics of these participants is presented in table. Majority of the respondents (44%) were between the age group of 21 to 40 years with the mean±standard deviation of 41.58±16.05 years.

More than half of the respondents (53%) were female. Almost all the respondents (98%) had heard about stroke while 2% of the respondents have/had a family member suffering from stroke.

Table 1. Sociodemographic characteristics (n=100)

Variables	Frequency	Percentage
[a]Age (in years)		
≤20	7	7
21 – 40	44	44
41 – 60	35	35
> 60	14	14
Sex		
Male	47	47
Female	53	53
Educational level		
≤ Grade 5	31	31
Grade 5–10	30	30
Certificate/PCL	18	18
Bachelor	8	8
Master	5	5
PhD	8	8
Occupation		
Health	2	2
Non–Health	41	41
Medical student	1	1
Non–medical	10	10
No service	46	46

[a]Mean± SD = 41.58 ± 16.05

Table 2. Respondents beliefs and expectations related to telestroke (n=100)

Beliefs and expectations related to telestroke	SA %	A %	D %	SD %
1. Improve the diagnosis and treatment of acute stroke	25	73	2	–
2. More effective than telephone consultation	21	71	7	1
3. Reduce geographical differences in regional stroke care	20	75	3	2
4. Number of hospitals using telestroke will increase	13	82	4	1
5. Telestroke will be useful in research of emerging stroke medications	22	72	6	–
6. Telestroke will be useful to physician and community stroke education	19	76	4	1

SA: Strongly Agree, A: Agree, D: Disagree, SD: Strongly Disagree

Table 3: Respondents perceived barriers to telestroke implementation (n=100)

Perceived barriers to telestroke Implementation	VS %	S %	MO %	MI %	N %
1. Level of technology	16	31	45	8	–
2. Time and cost of installation	14	39	43	4	–
3. Perception that rt–PA not considered "standard of care"	10	42	45	3	–
4. Increased personal work	4	1	56	33	6
5. Management of rt–PA side effects	10	45	40	5	–
6. Medical liability	77	10	13	–	–
7. Patients prefer physical visits	1	13	39	44	3
8. Safety/Confidentiality of online data	8	49	33	10	–
9. Time taken away from care of patients in the ED	19	19	28	34	–

VS: Very Significant Barrier, SB: Significant Barrier, MO: Moderate Barrier, MI: Mild Barrier, N: No Barrier

More than two third of the respondents (73%) agreed that telestroke improve the diagnosis and treatment of acute stroke care and almost same percentage (76%) of the respondents agreed that telestroke will be useful in physician and community stroke education as shown in table 2. As shown in table 3 majority (77%) of the participants perceived that medical liability would act as a very significant barrier to telestroke implementation. Management of thrombolytic side–effects and confidentiality of online data were considered as significant barrier. Level of technology, time and cost of installation, rt–PA not considered as "standard of care", and increased personal work were considered to be moderate barrier and preference of patients to physical visit and time used in tele–consultation were considered as mild barriers by majority of the respondents.

Table 4: Association between respondents' socio–demographic variables and beliefs and expectations related to telestroke (n=100)

Variables	Agree n(%)	Disagree n(%)	χ^2	*p–value*
Age (in years)				
≤40	8(15.7)	43(84.3)	0.66	0.41
More than 40	5(10.2)	44(89.8)		
Sex				
Male	9(19.1)	38(80.9)	2.96	0.08
Female	4(7.5)	49(92.5)		
Educational Level				
≤10 years	7(11.5)	54(88.5)	0.32	0.5
>10 years	6(15.4)	33(84.6)		

Significance level at 0.05

Table 5: Association between respondents' socio–demographic variables and perceived barriers to telestroke implementation (n=100)

Variables	Significant Barrier n(%)	No barrier n(%)	χ^2	*p–value*
Age				
≤40 years	23(45.1)	28(54.9)	0.63	0.42
>40 years	26(53.1)	23(46.9)		
Sex				
Male	26(55.3)	21(44.7)	1.41	0.23
Female	23(43.4)	30(56.6)		
Educational				
≤10 years	33(54.1)	28(45.9)	1.62	0.20
>10 years	16(41.0)	23(59.0)		

Significance level at p<0.05

Table 4 and 5 shows that the association of socio–demographic variables with beliefs, expectations

and perceived barriers related to telestroke were statistically non–significant.

DISCUSSION

The concept of telemedicine started from early 1960s internationally. The modern patient expects 24/7 access to their doctor, and physicians today are able to use telemedicine to monetize remote assistance. Technologies like Facetime and Skype seem brand new, but actually, telemedicine has been around much longer than most people think–from the first half of the 20th century.[11] In Nepal, Bir Hospital which is one of the oldest hospitals located in Kathmandu, is set to launch telemedicine services to provide healthcare services to people living in remote areas. The service will be helpful to people living in remote areas as they will not have to travel a long distance for treatment.[12] The telemedicine system has three components: a brain imaging review, remote examination via video conferencing, and a web portal for synchronized "stroke and forward" requirements. Interpretation of the brain images (CT scan) is vital part of the acute stroke evaluation. The brain imaging review allows a partner stroke physician to download and view brain scans from the remote hospital. Since the scans are available, the partner stroke physician will be able to see subtle findings on the CT scan, thus helping to determine which patients qualify for thrombolytic therapy. The video conferencing component allows the physicians to collaboratively perform the National Institute of Health–Massachusetts General Hospital stroke scale, which represents the severity of the stroke and supports a diagnosis of stroke that may lead to further treatment. This informed consult allows physicians to recommend treatment quickly and in stroke care, as "Time is brain".[3] In our study, 73% of the respondents agreed that telestroke improve the diagnosis and treatment of acute stroke and this finding is supported by the study of Moskowitz et al.[9] There are many issues of concern regarding the legal and ethical aspects of telemedicine. These include the responsibilities and potential liabilities of the health professional, the duty to maintain the confidentiality and privacy of patient records, and the jurisdictional problems associated with cross–border consultations. There is also the issue of reimbursement for care provided using a telemedicine service. Telemedicine allows the transmission of health information across the borders of nation states. While this may be true that there are many of the legal and ethical aspects of telemedicine, but it is also the case that health–care professionals who undertake telemedicine in a prudent manner would minimize the possibility of medicolegal complications.[13] The physical geography of Nepal and lack of good roads prevent the availability of accessible services, especially for those living in villages in the mountains, and hilly regions. Because of this reason telestroke can benefit the stroke patients. But again lack of funds to service and maintain health care facilities, shortages of medicines and instrumentation along with uneven distribution of medicines and facilities creates difficulty in adopting and conducting telestroke facility. According to the 2011 census, only 65.9% of the total population is literate. In a country like this having 76% of the respondents believing that telestroke will be useful to physician and community stroke education is itself a good signal.

There are certain limitations of this study. It was conducted in a single community of Rupandehi district of Bhairahawa using purposive sampling technique. So, while interpreting the results of our study the possibility of the risk of sampling bias should be considered. The respondents of the study were general population (mixture of medical and non–medical) of the community. Hence, this study could be further explored among medical professionals.

CONCLUSION

The application of telemedicine for care of acute strokes, often called telestroke, is a natural progression from general telemedicine because of a shortage of stroke neurologists and recent advances in technology. Beliefs, expectations and perceived barriers of stroke among the community people helps to determine the acceptance and utilization of telestroke by the community and ultimately contribute to decrease the stroke related disability, mortality and morbidity.

COMPETING INTEREST

The authors declare that there are no competing interests regarding the publication of this paper.

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