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Original Article

Knowledge and Attitude Regarding Telemedicine among Undergraduate Nursing Students of Pokhara

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ABSTRACT

Introduction: Telemedicine is the use of information and communication technology to deliver healthcare services from distance. It aids in removing the physical obstacle of distance and broadening access to medical treatments. This study aimed to assess the knowledge and attitude regarding telemedicine and to identify the association of the level of knowledge with selected demographic variables.

Methods: A cross-sectional descriptive research design was used for the study. Proportionate stratified random sampling technique was used to select 116 undergraduate nursing students. The data was collected using structured self-administered questionnaire. Chi-square test was used to measure the association between knowledge and selected variables.

Results: In this study, mean age of the respondents was 21.17±1.04. Majority (61.2%) of the respondents had poor knowledge whereas (38.8%) had good knowledge regarding telemedicine. Most (87.1%) of the respondents had heard about telemedicine. Regarding attitude on telemedicine, more than half of the respondents (56.9%) had showed positive attitude. More than three quarters (76.7%) of the respondents knew the meaning of telemedicine. There was significant association of the level of knowledge with age (χ^2=7.127, p=0.025) and academic year (χ^2=5.023, p=0.028) of the respondents.

Conclusion: Despite of having poor knowledge, more than half of the respondents showed positive attitude regarding telemedicine. Thus, formal and structured education may enable to integrate telemedicine knowledge with medical care delivery with ease.

Keywords: *Attitude, Knowledge, Telemedicine, Undergraduate nursing students*

INTRODUCTION

Nepal is a country with a wide range of geographical regions, from low plains to high Himalayan peaks. Geographical difficulties and human resource limitations significantly limit access to health care. Telemedicine is a solution to such problems. It brings patients and doctors closer together without having to travel for extended periods of time while yet receiving all of the benefits of healthcare. It allows users to communicate with one another, resolve queries, and obtain responses to urgent health care problems.[1] It signifies the use of information communication technology (ICT) to improve patient outcomes by increasing access to care and medical information.[2] The use of the telemedicine has been constantly growing with 44% increase in the year 2015 to 2019 worldwidely.[3] During the first quarter of 2020, its use peaked by 50% in the United State compared with the same period in 2019.[4]

During global pandemic, telemedicine helped to preserve personal protective equipment. Protect healthcare workers from being infected and allowed the monitoring of patients with chronic conditions without putting them at risk by attending medical setting. The COVID-19 outbreak has highlighted the advantages of telemedicine. It has served as the mechanism where health system needed to

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implement telemedicine services more widely across the institutions.[5]

A cross sectional study conducted in North Ethiopia among healthcare professionals showed that only 37.6% had good knowledge about telemedicine and 64% had good attitude towards telemedicine.[6] Similarly, a cross-sectional study performed in medical students and allied healthcare students studying in private institutions of India demonstrated 43% respondents had inadequate knowledge regarding telemedicine.[7] An observational survey conducted in medical students of different Universities of Nepal showed that 77.4% had heard the term telemedicine among them only 26.5% had practiced with telemedicine in their medical college.[8]

In the context of Nepal, only few studies have been conducted on knowledge and attitude regarding telemedicine among medical students which showed that more of them had poor knowledge about telemedicine Nurses can play an important role in educating public about telemedicine. So, the researcher had chosen this topic to assess the Knowledge and Attitude regarding Telemedicine among the Undergraduate Nursing Students.

METHODS

A descriptive cross-sectional study design was used among undergraduate nursing students of a public college (School of Nursing, Pokhara University) and a private college (Gandaki Medical College) of Pokhara where BSc. Nursing 1st, 2nd and 3rd year students were included. The sample size was calculated with applying of Sloven's formula for the finite population ($n = N/1+ Ne^2$) where total sample size was 116. Proportionate stratified random sampling technique with lottery method was used to select sample. Data collection was done among students of 1st, 2nd and 3rd year of selected nursing colleges with their written consent.

Calculating sample size,

Firstly, Sample Fraction= Sample size/ Population size =116/141

=0.82

Then,

From:

1st Year	2nd Year	3rd Year
College 1=15x0.82=12	39x0.82=32	40x0.82=33
College 2=6x0.82=5	11x0.82=9	30x0.82=25
Total=17	=41	=58

TOTAL= 17+41+58=116

Self-administered questionnaire consisting of three parts. Part I: Sociodemographic and background information (age, sex, academic year, residence, religion, ethnicity, marital status and type of family, family monthly income, source of information, inclusion of Telemedicine (TM) in curriculum and practice of TM in hospital). Part II: Knowledge regarding telemedicine (consisted of 18 questions related to knowledge regarding telemedicine. Each correct response was scored as "1" for correct response and "0" for incorrect response). Level of knowledge was calculated using mean score.[6] Part III: Attitude regarding telemedicine consisted of 16 positively worded and negatively worded statements in a five-point Likert scale. Each positive statement was scored "5" for strongly agree to "1' for strongly disagree response Negative statements were reverse scored. After summing up the attitude scores, the mean score was used to form the level of attitude as positive attitude and negative attitude.

Validity of the instrument was established by seeking the opinion of subject experts. The appropriateness of instrument was established by pretesting among 12 undergraduate nursing students. As the instrument was found to be appropriate it was finalized for the data collection. Reliability of the attitude items was calculated by using Cronbach's alpha with "r" value as 0.795.

Study was conducted after getting ethical approval from institutional review committee (IRC) of Pokhara University and permission from other concerned authorities (Director and Coordinator of two selected nursing schools). Written consent was taken from each respondent. Respondent's anonymity was assured by not including the items

in the questionnaire that reveal personal identity. Collected data were coded and entered in Epi Data version 3.1 and was later transferred to Statistical package for social sciences (SPSS version 16 for analysis). Descriptive data was analyzed by using frequency, percentage mean, and standard deviation and displayed in tables. Inferential statistics i.e. chi square test was used to find out the association of the level of knowledge with selected socio-demographic variables.

RESULTS

Table 1 shows that among 116 respondents more than half (62.9%) of the respondents were in the age group of 18-21 years with mean ± SD as 21.27±1.04. All respondents were female. Half of the respondents (50%) were from third year. Only 7.8% were from rural area. Most of the respondents (85.3%) belong to Hinduism. Regarding ethnicity, more than half (60.3%) of the respondents were Brahmin/Chhetri. Most (94%) of the respondents were unmarried. Regarding the type of family, majority (80.2%) of the respondents were from nuclear family. Most of the respondents' (90.5%) family income was more than thirty thousand.

Table 1: Socio-Demographic Characteristics of the Respondents n= 116

Variables	Number	Percent
Respondents' age (years)		
(Mean ±S.D. = 21.17±1.04)		
18-21	73	62.9
22-24	43	37.1
Academic year		
First year	17	14.7
Second year	41	35.3
Third year	58	50
Residential area		
Rural	9	7.8
Urban	107	92.2
Religion		
Hinduism	99	85.3
Buddhism	17	14.7
Ethnicity		
Dalit	9	7.8
Janajati	37	31.9
Brahmin/Chhetri	70	60.3
Marital status		
Unmarried	109	94.0
Married	7	6.0
Types of family		
Nuclear	93	80.2
Extended	23	19.8
Family income (monthly Rs.)		
<30000	11	9.5
≥30000	105	90.5

Table 2: Hearing about and Sources of Information about Telemedicine among the Respondents

Variables	Number	Percent
Heard about telemedicine	101	87.1
(n=116)	15	12.9
Yes		
No		
Sources of information*		
(n=101)		
College	46	45.6
Hospital	9	8.9
Friends	21	20.8
Social media	57	56.4
Inclusion of telemedicine in nursing curriculum		
(n=116)		
Yes	45	38.8
No	49	42.2
Don't know	22	19.0

*Multiple responses

Table 2 shows that majority (87.1%) of the respondent had heard about telemedicine where the major sources of information as social media (56.4%) and college (45.6%). and Out of 116 respondents, only 38.8% responded that telemedicine was included in nursing curriculum.

Table 3: Knowledge on Different Aspects of Telemedicine n = 116

Knowledge related to Telemedicine	Correct Responses	
	Number	%
Meaning of Telemedicine	89	76.7

Discovery of Telemedicine	50	43.1
Types of Telemedicine	88	75.9
Communication tools of Telemedicine	101	87.1
The specialists most useful with Telemedicine*	22	19.0
Dermatology	56	48.3
Psychiatry	48	41.4
Infectious disease	7	6.0
Neurology	37	31.9
Pain management		
Technologies included by Telemedicine	81	69.8
Services that can provide with TM	47	40.5
Toll Free no. provided by Nepal Government for TM service	43	37.1
TM is most effective to access healthcare services where	87	75.0
Conditions that can be treated in virtual visits*		
Allergies	30	25.9
Cold and flu	80	69.0.
Diarrhea	63	54.3
Asthma	5	4.3
Skin related disease	30	25.9
Urinary tract infection	4	3.4
Advantages of Telemedicine		
No transportation time and cost	79	68.1
	30	25.9
No need to time off the work	64	55.2
Less chance getting hospital acquire infection	23	19.8
Better health		
Example of Telemedicine*		
Digital transmission of medical imaging	36	31.0
	29	25.0
Remote medical diagnosis	24	20.7
Home monitoring	79	68.1
Video consultation with specialists		
Basic requirement for Telemedicine	110	94.8

Table 3 shows that more than three quarter (76.6%) of the respondents knew the meaning of telemedicine. Just over three quarter (75.9%) of the respondents responded correct answer about types of telemedicine. Most (87.1%) of respondents knew the communication tools of telemedicine. Nearly half (48.3%) of the respondents responded psychiatry was the most useful specialist with telemedicine. More than one third (37.1%) of the respondents knew toll free no. provided by Nepal Government for telemedicine services. More than two third (68.1%) of the respondents responded that saving of transportation time and cost was the major advantage of use of telemedicine and 68.1% of the respondents answered video consultation was the common example of telemedicine.

There were 18 questions including multiple responses, with total score 43. The obtained scores were categorized as poor and good knowledge according to the mean score obtained by the respondents and presented in the following table.

Table 4: Level of Knowledge of Respondents regarding Telemedicine n = 116

Level of Knowledge	Number	Percent
Poor	71	61.2
Good	45	38.8

Table 4 illustrates that majority (61.2%) of the respondents had poor knowledge regarding telemedicine whereas only 38.8% of the respondents had good knowledge regarding telemedicine.

Table 5: Item wise Attitude of Respondents regarding Telemedicine in a Likert Scale n = 116

Items	Strongly disagree No. (%)	Disagree No. (%)	Neutral No. (%)	Agree No. (%)	Strongly agree No. (%)
Knowing more about computers and application of information, communication and technology (ICT) in medical field is a must for health professionals.	2(1.7)	6(3.4)	10(8.6)	63(54.3)	37(31.9)
Telemedicine encourages team work among health professionals which leads to quality health care.	1(0.9)	6(5.2)	20(17.2)	72(62.1)	17(14.7)
Application of ICT in healthcare services reduces the financial burden to Government.	2(1.7)	9(7.8)	38(32.8)	56(48.3)	11(9.5)
Health for all can be easily achieved through ICT enable health services.	1(0.9)	18(15.5)	33(28.4)	56(48.3)	8(6.9)
Health professionals only can personally benefit from being more aware of what telemedicine can offer.#	3(2.6)	0(0)	31(27.0)	74(63.8)	8(6.9)
Online health information improves patient's knowledge.	7(6.0)	12)10.3)	20(17.2)	62(53.4)	15(12.9)
Patient should be encouraged to have access to medical information through emails and website so they become better informed of their medical condition.	0(0)	4(3.4)	17(14.7)	69(59.5)	26(22.4)
Telemedicine combined with easy public access health information and advice will make for a healthier population in future.	5(4.3)	8(6.9)	20(17.2)	67(57.8)	16(13.8)
Use of telemedicine could make the distribution of healthcare more even with more emphasis on prevention.	2(1.7)	11(9.5)	28(24.1)	62(53.4)	13(11.2)
Quality of care is equal in telemedicine and face to face hospitals visits.#	14(12.1)	44(37.9)	32(27.6)	23(19.8)	3(2.6)
Telemedicine improves interactions between physician and patients and enhances doctor-patient relationship.	5(4.3)	11(9.5)	36(31.0)	54(44.0)	13(11.2)
Telemedicine is feasible only in big cities because of internet facilities.#	2(1.7)	12(10.3)	26(22.4)	60(51.7)	16(13.8)
Teleconferencing is very helpful among physician, patients and with other colleagues.	3(2.6)	6(5.2)	33(28.4)	67(57.8)	7(6.0)
It is very useful to monitor serious patients by telemedicine.#	34(29.3)	42(36.2)	19(16.4)	15(12.9)	6(5.2)
Diagnosis and treatment are more accurate by telemedicine.#	28(24.1)	70(60.3)	12(10.3)	3(2.6)	3(2.6)
I would attend training courses in telemedicine if they were offered at my hospital/college.	2(1.7)	2(1.7)	23(19.8)	64(55.2)	25(21.6)

Negative Statements

Table 5 depicted that more than half (54.3%) of the respondents had agreed that knowing more about computers and application of ICT in medical field was must. Less than two third (62.1%) of the respondents had agreed that TM had encouraged team work and had led to quality health care. Only 1.7% of the respondents had strongly disagreed with application of ICT in health sector reduced financial burden to Government. Less than two third (63.8%) of respondents had agreed that

health professionals could personally benefit from TM. Over half of the respondents had agreed that TM emphasis on preventive aspect of health. Only 2.6% of the respondents had strongly agreed that quality of care was equal in TM and face to face visits. Just over half (51.7%) of the respondents had agreed that TM was feasible only in big cities with internet facilities. More than one third (36.2%) of the respondents had disagreed that TM was very useful to monitor serious patients. About 60.3% of the respondents had disagreed with the statement of diagnosis and treatment were more accurate by TM. More than half (55.2%) of the respondents would like to attend training course regarding TM if they were offered.

There were 16 statements to identify the attitude of respondents regarding telemedicine using five-point Likert Scale. The data obtained were categorized as negative and positive attitude according to the mean score obtained by the respondents and are presented in table 6.

Table 6: Level of Attitude of Respondents regarding Telemedicine n = 116

Level of Attitude of respondents	Number	Percent
Negative attitude	50	43.1
Positive attitude	66	56.9

Table 6 illustrates that less than half (43.1%) respondents had negative attitudes regarding telemedicine whereas more than half (56.9%) of the respondents had positive attitude regarding telemedicine.

Table 7: Association of the Level of Knowledge with Selected Socio-demographic Variables n=116

Variables	Poor knowledge		Good knowledge		Chi-square value	*p*- value
	No.	%	No.	%		
Respondent's age (in years)						
≤21	39	53.4	34	46.6	5.023	0.025*
>21	32	74.4	11	25.6		
Academic year						
First year	6	35.3	11	64.7	7.127	0.028*
Second year	24	58.5	17	41.5		
Third year	41	70.7	17	29.3		
Residential area						
Rural	6	66.66	3	33.33	0.122	0.726
Urban	65	60.74	42	39.25		
Religion						
Hinduism	63	63.63	36	36.36	1.679	0.195
Buddhism	8	47.05	9	52.94		
Ethnicity						
Brahmin/Chhetri	44	62.85	26	37.14	1.918	0.383
Others	27	58.69	19	41.30		
Marital status						
Unmarried	69	63.30	40	36.69	3.342	0.068
Married	2	28.57	5	71.42		
Type of family						
Nuclear	58	62.36	35	37.63	0.265	0.607
Extended	13	56.52	10	43.47		

Family income (monthly)						
<30000	6	54.54	5	45.45	0.227	0.634
≥30000	65	61.90	40	38.09		

***** *p<0.05 is considered statistically significant.*

Data presented on Table 7 reveals that in terms of age group, higher proportion of respondents aged up to 21 years had good knowledge than that above 21 years' age group (46.6% vs 25.6%) which is significant at 0.05 level (p=0.025). Table 7 also reveals that in terms of academic year, with increasing academic year significantly lesser proportion of respondents had good knowledge (p=0.028). The remaining socio-demographic variables i.e. residence, religion, ethnicity, marital status, family type and family income were not associated with respondents' level of knowledge

DISCUSSION

In this study, the mean age of the respondents was 21.17(±1.04) and majority of the respondents 87.1% had heard about telemedicine.

The findings of this study showed 38.8% of the respondents had good knowledge and 61.2% of the respondents had poor knowledge regarding telemedicine. A study conducted in North Ethiopia showed similar result i.e. 37.6% of the respondents had demonstrated good knowledge and 62.4% of respondents had poor knowledge regarding telemedicine.[6] Also the finding of this study was supported by the study conducted among doctors in Central India.[10] Similarly, a study conducted in teaching hospitals in India also supported this study where only 37.6% of the respondents had good knowledge regarding telemedicine. The finding of this study was contradicted to the finding of the study conducted in private institutions of India which showed that 57% of the respondents had good knowledge and 43% had poor knowledge.[7] The reason for the contradictory result may be due to the difference in assessment instrument and method.

This study revealed that 43.1% of the respondents had negative attitude whereas 56.9% of the respondents had positive attitude regarding telemedicine. The finding of this study was consistent with the study conducted in North Ethiopia where 36% of the respondents had negative attitude and 64% had positive attitude regarding telemedicine.[6] Similarly, the finding of this study was supported by a study conducted in Mashhad in Iran and a study conducted in medical schools in France showed that 60.4% of respondents had positive attitude.[9,12] The finding of this study was contradictory to the finding of the study conducted in King Saud bin-Abdul-Aziz University for Health Sciences in Riyadh, Saudi Arabia, where 83.4% of the respondents had positive attitude regarding telemedicine.[13] The finding of this study contrast with the study conducted in medical students of different Universities of Nepal,[8] and a study conducted in Central India.[10]

The finding of this study revealed that the age of the respondents is significantly associated (*p* value = 0.025) with the level of knowledge of the respondents due to more feasible to access internet and increasing rate of exposure towards technology. Similarly, in this study, academic year of the respondents is significantly associated (*p* value = 0.028) with the level of knowledge. The finding of this study consistent with the study conducted in North Ethiopia.[6] Since, the both of studies conducted in similar study setting and with same sample characters this might be resulted in similar findings. In this study, no significant association was found between the level of knowledge and variables such as residential area, religion, ethnicity, marital status, family type, and family income.

CONCLUSION

This study showed, despite of poor knowledge and respondents not being able to be exposed and practice formal telemedicine training, most of the respondents had positive attitude towards it. Thus, it is essential to build proper and effective communication channels and awareness among students, professionals, and users of telemedicine to succeed in Nepal.

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