

**Spectrum of Medical Emergencies at Tertiary Care Hospital of North India****Ishaan Hriday Darbari<sup>1</sup>, Savita Kumari<sup>1</sup>, Kashish Narula<sup>1</sup>, Rohit Mattoo<sup>1</sup>, Amay Makhija<sup>1</sup>, Chirag Sethi<sup>1</sup>, Ashutosh Bhushan<sup>1</sup>, Shefali Sharma<sup>2</sup>**<sup>1</sup>Department of General Medicine, Maharishi Markandeshwar Institute of Medical Sciences and Research (MMIMSR), Ambala, India<sup>2</sup>Department of Otorhinolaryngology, Maharishi Markandeshwar Institute of Medical Sciences and Research (MMIMSR), Ambala, India

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**Abstract:****Background:** Medical emergencies are the critical conditions that demand prompt healthcare action to avoid immediate or long-term morbidity and mortality to the patients. Therefore, it is essential to analyze the pattern of medical emergencies with respect to local demographics so that the healthcare system could be well-equipped to deal with such critical conditions.**Objective:** Present study was aimed to analyze the symptomatic and etiological pattern of medical emergencies of tertiary care hospital of north India and to study the final outcomes of these medical emergencies.**Methodology:** All patients that presented with a medical emergency were admitted in medicine unit from emergency department. Total 287 patients were enrolled in the study over the duration of 1 year. Data regarding the socio-demographic determinants, symptoms, system involvement/etiology and comorbidities was noted. Patients were then followed up to analyze the final outcomes of these medical emergencies.**Results:** The mean age of the patients was 52.79±15.33 years with a M: F ratio of 1.14:1. Prehospital delay in most of the patients (47.39%) was up to 24 hours. Most common symptom was shortness of breath (26.83%). Infectious etiology (20.91%) was found to be most common among patients. The most common comorbidity found in the current study was hypertension (51.57%), followed by type II diabetes mellitus (29.27%). Out of the total 287 patients, 71.78% recovered and got discharged from the hospital successfully whereas mortality occurred in 11.15% cases and 17.07% cases did not continue with medical therapy despite adequate counselling.**Conclusion:** Present study provides insights about the pattern of medical emergencies in north India. The results of this study will not only create awareness among healthcare workers of emergency departments regarding the pattern of medical emergency, but will also help them to handle these emergencies more efficiently. Improving the quality of emergency medical care will help in reduction in morbidity and mortality due to these emergency medical conditions.**Keywords:** Emergency, Prehospital Delay, Infection, Death, Comorbidities.

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**Introduction**

Medical emergencies involve acute diseases that impose an immediate or long-term risk to the health of a patient. Medical emergencies have become a major public health challenge in the developing as well as developed countries. The aim of emergency department (ED) at a hospital is to provide the initial resuscitation to the patient, diagnosis, appropriate treatment and/or referral of the patient to higher centre depending up on the situation [1]. The overall outcome of the ED depends largely on its infrastructural, instrumental, and human resource facilities available in the department [2,3]. Hence, the outcome of the medical emergencies mirrors the strength of healthcare system [4]. In India, Ayushman Bharat Pradhan Mantri Jan Aarogya Yojana (PMJAY) has been initiated that

aligns with the Sustainable Development Goals (SDGs) that aim to achieve universal health coverage (UHC) globally by 2030. Recently, NITI Aayog reports revealed that emergency and injury care in India are facing the shortcomings in health framework, workforce, and medical supplies [5]. Most patients die within approximately 2 h after arrival at the ED (6). Road traffic accidents (RTAs), acute myocardial infarctions (AMIs) and cerebrovascular accidents (CVAs) are the most commonly cited causes of death and disability in India. Acute medical care that is delivered within the first few hours of the onset of treatable acute conditions, can help better manage the most commonly presenting Indian injuries and diseases to ensure better clinical outcomes [7]. In

developing nations, it is gauged that by improving prehospital and emergency care, deaths may be reduced by half. This is especially true in cases of injuries, infections, exacerbations of non-communicable diseases, and complications of pregnancy. Therefore, it is essential to investigate the profile of the patients attending ED in the local region to strengthen the healthcare accordingly [5].

Furthermore, such information is essential in planning of essential health services including equipment, hospital space, and other logistics [8,9]. Study of hospital admissions pattern in terms of different specialty and patient outcome are very useful in performance evaluation of a hospital, health care planning and in a bid to improve service delivery to the society.

Understanding the epidemiological trends in hospital admissions, including outcome patterns helps in appropriate allocation of scarce resources in developing countries [10,11]. Till date, limited knowledge is available about the spectrum, pattern, characteristics, and clinical outcomes of medical emergencies in north India especially parts of Western UP, Haryana, UT of Chandigarh. The objective of this study was therefore to assess the spectrum, pattern, characteristics, and clinical outcomes of emergency department admissions among adult population who visited emergency department of a tertiary care hospital. Present study will help in reducing the ever-growing mortality and complications in medical emergencies.

### Methodology

**Study design:** Present study is a prospective, observational and hospital-based study in which 287 patients admitted in medicine unit from

emergency department over the duration of one year were enrolled. Only adult patients of either gender were enrolled in the study whereas patients with surgical emergencies, trauma, gynaecological and obstetric emergencies were excluded from the study. Permission from the institute ethical committee was obtained before conducting the study.

**Physical and Clinical Examination:** Detailed clinical examination included general physical examination and systemic examination in these patients including respiratory system, cardiovascular system, abdomen and central nervous system examination. The routine investigations in these patients included hematological investigations, biochemical investigations, liver and kidney function tests. Data regarding the sociodemographic determinants, symptoms, system involvement/etiology, comorbidities, and clinical outcome of the patients was noted down.

**Statistical Analysis:** Data was analyzed using the SPSS 27.0 software. Mean and SD was calculated for quantitative data whereas number and percentage was calculated for qualitative data. Appropriate tables were used to depict the data.

### Results

The mean age of the patients was 52.79±15.33 years. Most of patients (47.74%) belong to the age group of 41-60 years. There were 53.31% male and 46.68% females in the study with a M: F ratio of 1.14:1. Prehospital delay, the time of symptom onset until the time of hospital arrival was up to 24 hours in 47.39% (Table 1).

**Table 1: Socio-demographic determinants of the patients**

Variable	Domain	Number	Percent
Mean age		52.79±15.33 Yrs	
Age group	19-40 Yrs	60	20.91
	41-60 Yrs	137	47.74
	61-80 Yrs	86	29.97
	>80 Yrs	4	1.39
Gender	Male	153	53.31
	Female	134	46.68
Prehospital delay	Up to 24 Hour	136	47.39
	>1-5 Days	121	42.16
	6-10 Days	29	10.10
	>10 Days	1	0.35

Most common symptom was shortness of breath (26.83%) followed by fever (18.12%), giddiness (13.59%), nausea/vomiting (12.89%), cognitive or functional decline (10.45%) and generalised malaise (10.45%). The least common symptom was alleged history of poisoning (3.14%) followed by limb weakness (5.23%), abdominal pain (5.57%), GI bleed (5.92%), seizures (6.27%) and chest pain (7.67%) (Figure 1).

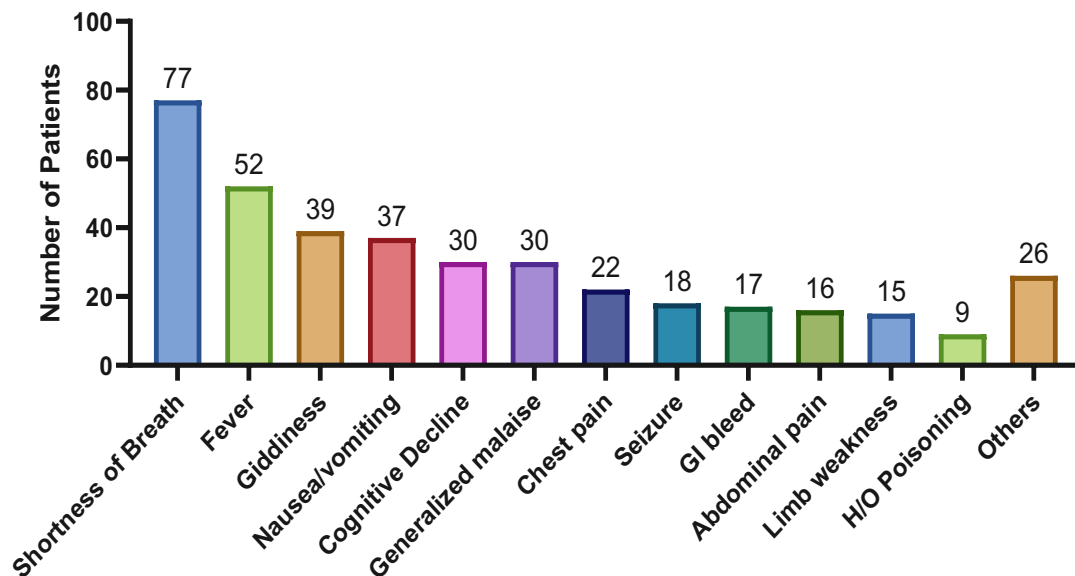


Figure 1: Symptoms among patients

Infectious etiology (20.91%) was found to be the most common among patients. Most common system involvement was respiratory system (20.21%) followed by cardiovascular system (14.63%), endocrine system (13.59%), nervous system (12.89%), gastrointestinal system/liver (12.54%), and renal disorders (9.76%). Least common cause was by connective tissue disorder (1.39%), followed by poisoning (2.44%), immune system (2.44%) and hematological disorders (6.27%) (Figure 2).

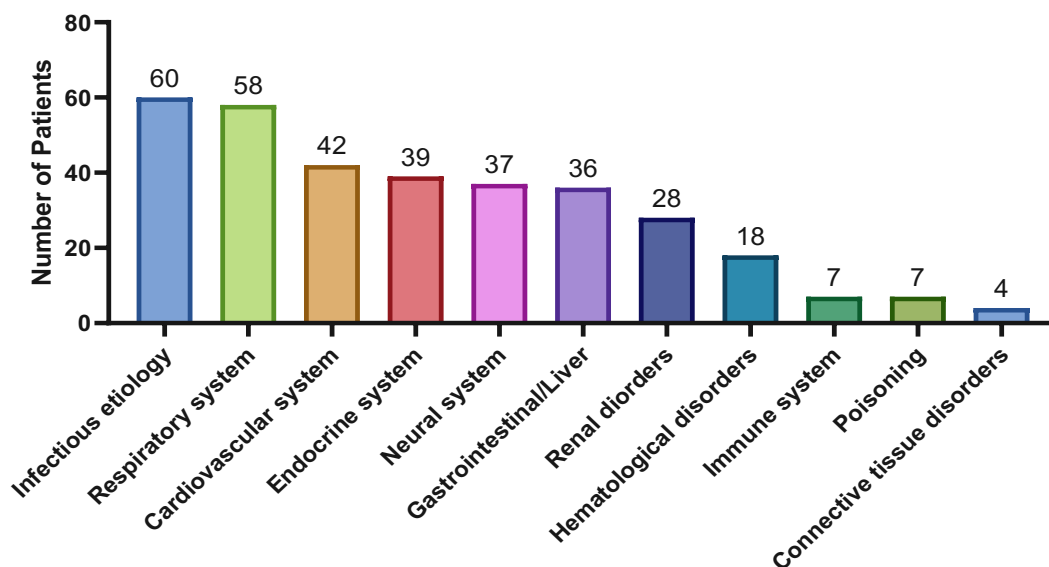


Figure 2: Symptoms among patients

The most common comorbidity found was hypertension (51.57%), followed by type II diabetes mellitus (29.27%).

Hypothyroidism was found in 6.27% of subjects. Amongst the respiratory comorbid conditions, chronic obstructive pulmonary disease and bronchial asthma was reported among 4.53% and 6.27% of the subjects respectively. Amongst the cardiovascular conditions, coronary artery disease

was present in 16.72% of subjects, whereas rheumatic heart disease and dilated cardiomyopathy were present in 2.79% and 2.44% each respectively.

Chronic kidney disease was found in 6.62% of the subjects, while 2.79% subjects had history of old CVA. Psychiatric disorder was present amongst 2.09% of study subjects, malignancy constituted

1.74% and chronic liver disease constituted 2.09% of the study subjects (Table 2).

**Table 2: Comorbidities among the study subjects**

System	Comorbidities	Number	Percent
Endocrinological	Type II Diabetes Mellitus	84	29.27
	Hypothyroidism	18	6.27
	Hyperthyroidism	5	1.74
Respiratory	Chronic Obstructive Pulmonary Disease	13	4.53
	Bronchial Asthma	18	6.27
Cardiovascular	Coronary Artery Disease	48	16.72
	Rheumatic Heart Disease	8	2.79
	Dilated Cardiomyopathy	7	2.44
	Hypertension	148	51.57
Chronic Kidney Disease		19	6.62
Cerebrovascular Disease (Old CVA)		8	2.79
Psychiatric Disorder		6	2.09
Malignancy		5	1.74
Chronic Liver Disease		6	2.09

Out of the total patients admitted from ED (N=287), 71.78% patients recovered and get successfully discharged from the hospital. Mortality was observed in 11.15% patients. Total 17.07% patients did not continue with medical therapy despite adequate counseling (Table 3).

**Table 3: Symptoms among patients**

Symptom	Number	Percent
Patients admitted in Hospital through emergency	287	100
Total Patients who recovered and got discharged	206	71.78
Patients who suffered Death	32	11.15
Patients who did not continue with medical therapy despite adequate counselling	49	17.07

## Discussion

In the present study, the mean age of the patients were  $52.79 \pm 15.33$  years with most of the patients belonging to the age group of 41-60 years (47.74%). In a previous study by Sharma et al., most of patients (68%) belong to the age group of 20-59 years which is in line with the findings of present study [12]. Ogah et al. and Akpa et al. also reported that majority of medical admissions in the emergency room of a tertiary centre in Nigeria were from the age group of 20 to 59 years (66.3% and 74% respectively) [13,14]. This suggests that the adult patients during their years of productivity are more vulnerable to medical emergencies, and it has a huge socioeconomic burden in the healthcare expenditure and reduction in GDP from low productivity.

In present study, a higher male predominance (53.31%) was observed. Similar results have been reported by the Ogah et al. in which 52.6% patients were males [13]. Kumar et al. also observed a male predominance (65.4%) in their study which is in line present study [15]. A similar male predominance (58%) was observed in another study conducted by Siddiqui et al. [16]. Sharma et al. in their study showed nearly equal burden of emergencies in both the genders [12]. There were 94 males and 122 females patients in the Iloh et al. study with a male to female ratio of 1:1.3 [17]. This difference in male and female distribution among

different studies might be due to cultural differences and differences in educational status. In our study, the most common symptom was shortness of breath (26.83%) followed by fever (18.12%), giddiness (13.59%), nausea/vomiting (12.89%), cognitive or functional decline (10.45%) and generalised malaise (10.45%). The least common symptom was alleged history of poisoning (3.14%) followed by abdominal pain (5.57%). Chest pain was present in 7.67% of the study subjects. In a study by Kumar et al., most common presenting complaints were breathing difficulty (28%), fever (21.6%), vomiting (14%), chest pain (11.5%), abdominal pain (11.5%), trauma including falls (11%), giddiness (10.4%), and altered sensorium (10%) [15]. These findings are similar to our study indicating that medical emergencies follow a common trend in context of symptomology. ED physicians must be trained well to recognize and manage acute breathlessness of any cause associated with comorbidities or decreased functional status. Infrastructure for invasive and non-invasive ventilation is limited to tertiary care hospitals and private corporate hospitals and is usually out of reach of the majority of the rural population. These two forms of ventilator support, though unavailable in most parts of the country, play a crucial role in early resuscitation for patients with acute breathlessness in the ED. Since ours is a tertiary care hospital, therefore the majority of patients received in ED

presented with shortness of breath, mostly referred from nearby hospitals. Infectious etiology (20.91%) was found to be the most common among patient in present study. Most common system involvement was respiratory system (20.21%) followed by cardiovascular system (14.63%), endocrine system (13.59%) and neural system (12.89%). The least common etiology was connective tissue disorder (1.39%), followed by immune system disorders (2.44%) and poisoning (2.44%). Bhutta et al. and Shumbusho et al. in their studies showed that incidence of morbidity due to infection and inflammatory diseases in developing countries is about 45% which is higher as compared to the present study, where infections and inflammatory conditions (including connective tissue disorders) contributed to 22.3% [18,19]. This difference is attributed to the fact that these studies included populations from Sub-Saharan Africa and Latin America, where communicable diseases are still more prevalent, whereas the current study is limited to the population of North India, with considerable difference in the implementation of various health programmes and availability of health resources.

According to Kumar et al., the most common organ systems involved are as follows: cardiovascular system (18.7%), respiratory system (15.8%), trauma (13.9%), genitourinary system (13.8%), neurological system (12.3%), skin and soft tissue infections (6%), and others (25.1%), whereas in the present study most common organ system involvement was respiratory (20.21%), followed by cardiovascular (14.63%) [15]. In a study by Iloh et al., the three most common causes of emergencies were malaria (33.8%), hypertensive crisis syndrome (19.0%), and acute hypertensive heart failure (18.1%), whereas in the present study most common cause was dengue (8.7%), acute exacerbation of bronchial asthma (7.3%), followed by septic shock (6.6%) [17]. The higher incidence of infectious causes in the present study is attributed to the prevalence of various tropical illnesses in the region, mainly dengue, due to poor hygienic practices, low socio-economic status and lack of awareness, along with difference in the year of study. Also, patients presenting with sepsis including those with septic shock form a significant part of the study, as ours are a tertiary care hospital where mostly patients get referred from other local hospitals in the vicinity.

In a study by Sharma et al., gastrointestinal diseases (28.3%), trauma (28.2%), and respiratory diseases (13.9%) were the top three leading cause of morbidity [12]. In the present study infectious causes (20.91%) and respiratory diseases (20.21%) were the most common, followed by cardiovascular diseases (14.63%). However, gastrointestinal causes were found in only 12.54% of the cases. In the present study, the higher incidence of

respiratory involvement is attributed to various cultural practices like, burning firewood for cooking purposes (chullah), burning of stubble, smoking and occupational like working in brick kilns, which is comparable to the study done by Aryal et al. and Etyang et al. [20,21]. The most common comorbidity found in the current study was hypertension (51.57%), followed by type II diabetes mellitus (29.27%). Hypothyroidism was found in 6.27% of subjects, whereas hyperthyroidism was found in 1.74% of subjects. Amongst the respiratory comorbid conditions, chronic obstructive pulmonary disease and bronchial asthma were reported among 4.53% and 6.27% of the subjects respectively. Amongst the cardiovascular conditions, coronary artery disease was found amongst 16.72% of subjects, whereas rheumatic heart disease and dilated cardiomyopathy were present in 2.79% and 2.44%, respectively. Chronic kidney disease was found in 6.62% of the subjects, while 2.79% subjects had history of old CVA. Psychiatric disorder was present amongst 2.09% of study subjects, malignancy constituted 1.74% and chronic liver disease constituted 2.09% of the study subjects.

In a study by Kumar et al., among the respiratory conditions, acute exacerbation of asthma/chronic obstructive pulmonary disease (COPD) was the most common, in contrast to the present study where cardiovascular comorbidities were predominant, mainly hypertension (51.57%) and among respiratory comorbidities, bronchial asthma (6.2%) was the most common [15]. This higher prevalence of hypertension in the current study can be attributed to various environmental factors, diet, sedentary lifestyle, lack of awareness and poor compliance to pharmacotherapy. Mishra et al. showed that approximately 4% of the patients were seeking medical services from emergency department due to psychiatric problems, whereas in the present study it was found to be 2.09% [22]. This could be due to socio-cultural stigma of visiting a psychiatric facility, under-reporting and improper referral practices. This suggests that we are still starving to combat for the better control of these medical problems. This may be due to lack of knowledge regarding diet, nutrition and medical awareness.

In spite of all these observations the present study has certain limitations. The study being hospital based, it may not reflect the real scenario of emergency conditions in this area. Due to the remoteness of the region, it is very difficult for people to get the emergency health facilities of the hospital in time. In addition, people practice complimentary and traditional healing systems before seeking hospital services. These factors may be the cause of statistical differences observed in calculating morbidity and mortality in our study as

compared to other studies. Secondly, the study includes only those patients who got admitted from ED on selected days of the week (Medicine Unit IV admission days). It may require a study including a larger number of patients being admitted through ED. Due to logistic reasons, all surgical emergencies, trauma cases, gynecological and obstetric emergencies were not included in the study; therefore the statistics of this study may not represent the exact pattern of all emergencies.

### Conclusion

The admission profile among the population showed that infectious etiology was the most common cause among the study subjects. Most common system involved was respiratory system followed by cardiovascular system, endocrine and nervous system. ED of India should be aware of this demographic profile and be prepared to handle these emergencies efficiently. Improving the quality of emergency medical care will help in reduction of these emergency medical conditions. Similarly, health education of the population to embrace early health related help seeking behavior, health maintenance, and promotional practices that are needed to promote longevity is invariably advocated.

### References

1. Akpa MR, Alasia DD, Altraide DD, Emem-Chioma PC, Wokoma IS. Profile and Outcome of Medical Emergencies in a Tertiary Health Institution in Port Harcourt, Nigeria. *The Nigerian Health Journal*. 2013;13(1):48-53.
2. Kilbreth PhD E, Shaw B, Westcott D, Gray MPH CE. Analysis of Emergency Department Use In Maine: A Study Conducted on Behalf of the Emergency Department Use Work Group of the Maine Advisory Council on Health System Development. Cutler Institute, Muskie School of Public Service. 2010:1-98.
3. Ross J. The patient journey through emergency care in Nova Scotia. John Ross Provincial Advisor on Emergency Care. 2010.
4. Ekere A, Yellowe B, Umune S. Mortality patterns in the accident and emergency department of an urban hospital in Nigeria. *Niger J Clin Pract*. 2005;8(1):14-8.
5. Misra A, Yadav DC, Kole T. Emergency care in India beyond 75 years of independence—problems and solutions. *Journal of Global Health*. 2023; 13: 03015.
6. Stefanovski PH, Vladimir Radkov R, Lyubomir Ilkov T, Pencho Tonchev T, Yoana Mladenova T, Vihar Manchev K, et al. Analysis of mortality in the emergency department at a university hospital in Pleven. *J Int Med Res*. 2017;45(5):1553-61.
7. Clark EG, Watson J, Leemann A, Breud AH, Feeley FG, Wolff J, et al. Acute care needs in an Indian emergency department: A retrospective analysis. *World journal of emergency medicine*. 2016;7(3):191.
8. Ingle GK, Nath A. Geriatric health in India: Concerns and solutions. *Indian J Community Med*. 2008;33(4):214-8.
9. Aminzadeh F, Dalziel WB. Older adults in the emergency department: a systematic review of patterns of use, adverse outcomes, and effectiveness of interventions. *Ann Emerg Med*. 2002;39(3):238-47.
10. Osarenkhoe J, Omoruyi L, Imarhiagbe L, Adebayo O, Freeman O. Pattern and outcome of medical admissions in a Nigerian rural teaching hospital (2009-2012). *Annals of Tropical Medicine & Public Health*. 2014;7(3):171-76.
11. Abhulimhen-Iyoha BI, Pooboni SK, Vuppali NKK. Morbidity pattern and outcome of patients admitted into a pediatric intensive care unit in India. *Indian journal of clinical medicine*. 2014;5:IJCM. S13902.
12. Sharma D, Amgain K, Panta PP. Profile and Outcome of Medical Emergencies in a Tertiary Care Hospital of Remote and Rural Region of Western Nepal. *IOSR Journal of Dental and Medical Sciences*.18(4):11-7.
13. Ogah O, Akinyemi R, Adesemowo A, Ogbodo E. A two-year review of medical admissions at the emergency unit of a Nigerian tertiary health facility. *African Journal of Biomedical Research*. 2012;15(1):59-63.
14. Goh W-P, Han HF, Segara UC, Baird G, Lateef A. Acute medical unit: experience from a tertiary healthcare institution in Singapore. *Singapore Med J*. 2018;59(10):510-13.
15. Kumar JG, Abhilash K, Saya RP, Tadipaneni N, Bose JM. A retrospective study on epidemiology of hypoglycemia in emergency department. *Indian J Endocrinol Metab*. 2017;21(1):119-24.
16. Siddiqui S, Robin C. Clinical profile and outcomes of elderly patients in an Asian intensive care unit: a retrospective observational study. *Int J Crit Care Emerg Med*. 2018;4(2):1-2.
17. Iloh G, Amadi A, Awa-Madu J. Common geriatric emergencies in a rural hospital in South-Eastern Nigeria. *Niger J Clin Pract*. 2012;15(3):333-7.
18. Bhutta ZA, Sommerfeld J, Lassi ZS, Salam RA, Das JK. Global burden, distribution, and interventions for infectious diseases of poverty. *Infectious diseases of poverty*. 2014;3:1-7.
19. Shumbusho E. The Trend of Communicable and Non-Communicable Diseases in East African Community (EAC) Countries: Case Study of Burundi, Rwanda, and Uganda-1990

- to 2013. Wright State University. Dayton, Ohio. 2016.
20. Aryal KK, Mehata S, Neupane S, Vaidya A, Dhimal M, Dhakal P, et al. The burden and determinants of non communicable diseases risk factors in Nepal: findings from a nationwide STEPS survey. PLoS One. 2015;10(8):e0134834.
  21. Etyang AO, Munge K, Bunyasi EW, Matata L, Ndila C, Kapesa S, et al. Burden of disease in adults admitted to hospital in a rural region of coastal Kenya: an analysis of data from linked clinical and demographic surveillance systems. The lancet global health. 2014; 2(4):e216-e24.
  22. Mishra SR, Neupane D, Bhandari PM, Khanal V, Kallestrup P. Burgeoning burden of non-communicable diseases in Nepal: a scoping review. Globalization and health. 2015;11:1-10.