

# Assessment of Health Service Delivery to Address Cardiovascular Diseases in Nepal

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## ABSTRACT

### Background

A health care delivery system is the organization of people, institutions, and resources designed to deliver health services. A comprehensive study to explore cardiovascular health service delivery in Nepal is lacking.

### Objective

This study attempted to assess Nepal's health system gap on organization and delivery of cardiovascular disease prevention and management services.

### Method

This mixed-method study used the six building blocks of the World Health Organization health system framework: organization; access; coverage, utilization and demand; equity; quality of services; and outcomes. We conducted the desk reviews of national and international documents, performed several key informant interviews, calculated the relevant indicators, and assessed the Strengths, Weaknesses, Opportunities, and Threats of the cardiovascular health service delivery.

### Result

We found that most of the cardiovascular services are concentrated in urban areas, and suffer from poor access, quality, utilization, and coverage in most of the areas resulting in poor health outcomes. Though the services have recently improved due to increased primary care interventions, there is scope for the development of competent human resources, advancement of technologies, development of national protocols, and improved monitoring and supervision. Improved disease system including the medical recording and reporting mechanism to incorporate and reflect the true burden of CVD in Nepal is lacking.

### Conclusion

Despite having health facilities from grassroots to the central level, availability, access, and quality of cardiovascular health services are poor. Further improvement and equitable expansion of promotive, preventive, diagnostic, referral, and rehabilitative cardiovascular services are needed to ensure universal health coverage.

## KEY WORDS

*CVDs, Health-service delivery, Infrastructure, Needs-assessment, Nepal*

## INTRODUCTION

Non-communicable diseases (NCDs) account for 66% of total deaths in Nepal, Ischemic heart disease and stroke being the main causes.<sup>1</sup> While the burden of NCDs are increasing as compared to other diseases, Nepal is still at the very early stage in responding to the rising burden and has recently rolled out interventions to deal with the burden of NCDs including cardiovascular diseases (CVDs).<sup>2</sup> Despite health is assured as a fundamental human right by Nepal's Constitution 2015 and health service delivery is being continuously expanded and updated over the years, only a small portion (6.4%) of the total health budget is allocated for NCDs.<sup>3,4</sup>

Nepal lacks studies that comprehensively explore cardiovascular disease (CVD) related health service delivery in Nepal. Critical appraisal of strengths and weaknesses and exploration of challenges and opportunities that exist in the current CVD service delivery system provides future direction to the health professionals and policy-making bodies to enhance the quality system. Hence through this study, we aimed to assess Nepal's health system gap on organization and delivery of cardiovascular disease prevention and management services.

## METHODS

The assessment of CVD health service delivery is a part of a larger rapid assessment of Nepal's health system based on the United States Agency for International Development (USAID) manual "The Health System Assessment Approach: A How-To Manual", Version 2.0.<sup>5</sup> The need assessment protocol was developed in the respective to the six building blocks of the world health organization (WHO) health system framework (2012); leadership and governance, health financing, health service delivery, human resources for health (HRH), health information management systems (HMIS), and medical products and technologies.

### Task force and sub-committees

The work was steered by a national level task force, which was co-chaired by the Chairman of Nepal Health Research Council (NHRC) and Dean of Kathmandu University School of Medical Sciences (Principal Investigator of the Study).<sup>6</sup> The members of the team included representatives from: Policy, Planning and Monitoring Division, Ministry of Health and Population (MoHP); Health Coordination Division, MoHP; Non-communicable Disease and Mental Health Section, Epidemiology and Disease control section, Department of Health Services (DoHS); Nepal Heart foundation, a CVD care provider's group; Patient and other researchers. Each health system building block was then executed by a sub-committee based on their expertise.

We followed the indicators for health service delivery which was grouped into six topical areas and were further divided into 26 indicators as outlined in Table 1:

**Table 1. Topical areas, description and indicators for assessing health service delivery**

Topical Area	Indicators
A. Organization of health services	1. Number of hospital beds 2. Ratio of health care professionals to population 3. Number of health facilities by type and ownership 4. Number of primary health care facilities 5. Commercial entities offering health services for their employees and/or communities where they operate 6. Referral system
B. Access to health care services	7. Hours of operation for public and private health service providers 8. Percentage of people living within X kms of a health facility 9. Financial access 10. User fee exemption and waivers
C. Coverage, utilization and demand for health services	11. Primary care or OPD visits 12. Percent of population screened for risk factors of cardiovascular diseases and behavioral interventions 13. Knowledge attitudes and practices (KAP) regarding cardiovascular diseases and services i) in general population, ii) among CVD patients and their family members 14. Consumer profiles
D. Equity in the delivery of health services	15. Percent of women vs percent of men who access health care for cardiovascular diseases treatment If financial barrier exists for female to seek care 16. Percent of women who seek care for specific intervention or care for disease of cardiovascular origin by source and income group
E. Quality of Health Services	17. Existence of national policies for promoting quality of care 18. Clinical standards adapted into a practical form that can be used at local level 19. Percent of primary care facilities that are adequately equipped 20. Existence of clinical supervision by supervisor 21. Existence of other processes assuring quality of care besides supervision
F. Health services outcomes	22. Life expectancy at birth 23. Mortality rate attributable to cardiovascular disease 24. Disability adjusted life years lost (DALY) due to CVDs 25. Prevalence of CVDs 26. Treatment of CVD

### Data collection

This study was conducted with a mixed-method approach; both quantitative and qualitative data.

#### a. Desk review

For the quantitative part, we conducted desk reviews to collect mostly quantitative data from various online documents at global and both online and hard copies of documents at country levels. The following documents were thoroughly reviewed in the desk review.

- Department of Health Services, Annual Report 2014/15, 2015/16, 2016/17, 2017/18 AD,<sup>7-10</sup>
- Nepal Health Facility Survey 2015,<sup>11</sup>

- Non-Communicable Disease Risk Factors: STEPS survey 2013, 2019,<sup>12,13</sup>
- Package of Essential Non-Communicable Diseases (PEN) of Nepal.<sup>14</sup>
- Multisectoral Action Plan on the Prevention and Control of NCD in Nepal (2014-2020 AD),<sup>15</sup>
- National Health Policy, Nepal, 2014,<sup>16</sup>
- Shahid Gangalal National Heart Centre, Annual Report 2018.<sup>17</sup>
- Annual Report of Manmohan Cardiothoracic Vascular and Transplant Center, 2018.<sup>18</sup>
- Bir Hospital Souvenir, 2018.<sup>19</sup>
- Nepal Health Sector Support Programme.<sup>20</sup>
- Nepal National Health Accounts, 2012/13 – 2015/16.<sup>21</sup>
- Cardiovascular health knowledge, attitude and practice/behavior in an urbanizing community of Nepal: a population-based cross-sectional study from Jhaukhel, Duwakot Health Demographic Surveillance Site.<sup>22</sup>

#### b. Key Informant Interview (KII)

We identified 13 key informants from different divisions and sections of the MoHP, cardiologists, and nurses from the different tertiary and super-specialty hospitals, patients, representatives from civil societies (Cardiac Society of Nepal, Nepal Heart Foundation, and Jayanti Memorial Trust), and representatives from Nepal Nursing Council and Nepal Health Professional Council. The in-depth interviews were audio-recorded after informed consent from the informants.

#### Data management and analysis

For the quantitative part, following the manual, we aligned all the information from secondary sources and documents and estimated the indicators. The data were reviewed, compiled, and organized into respective topical areas and indicators. For the qualitative part, we transcribed all key informant interviews' audio recordings in the Nepali language. The interviews were moderated by PS, SB, and SS. We divided datasets into smaller, and analyzable units into categories and concepts in the form of codes. Two independent coders coded the transcripts and the intercoder agreement was 82.4%. We triangulated and categorized all the codes thematically into five major themes: indicators, strength, weakness, opportunity, and threat as per the manual.

#### Ethical considerations

We started the study after receiving ethical approval from NHRC on 24<sup>th</sup> April 2018 (Reg. no. 176/2018). We informed the identified key informants and took appointments for their participation. Interviews were conducted at the convenience of the informants. We explained the objectives of the study and assured their confidentiality.

We took written informed consent from each respondent in addition to the consent for audio recording and note-taking prior to the interview. All the recordings were coded and stored ensuring confidentiality, anonymity, and privacy.

## RESULTS

The results of desk review and key informant interviews are presented according to the six topical areas of health service delivery:

#### Topical Area A: Organization of Health Services

Nepal's health system moved into an independent three-level (federal, provincial, and municipal) system as per Nepal's constitution 2015. Health institutions are classified into five levels based on a minimum set of health services: community level (Health Posts or Community Health Units); Primary Hospitals; Secondary Hospitals; Tertiary Hospitals; Academic or Super-specialty hospitals. Cardiovascular health services are delivered by the government, non-government and private institutions. According to the Nepal health facility survey (2015), nearly 75% of health facilities offer services for CVD including diagnosis, prescription of treatment, and management of patients with CVD. Private facilities are more likely to have all CVD medicines and commodities than public facilities.<sup>11</sup> The services are offered by the type of health facilities are detailed in supplement.<sup>15</sup>

As shown in table 2, Nepal has 8002 health facilities including both public (hospitals and health posts) and private health facilities. The ratio of primary health care facilities was 1.78 per 10,000 population in 2019. The number of hospital beds per 1000 facilities was 0.71. Apart from the shortage of health workers and hospital beds, there is inadequate and inefficient management of quality human resources.

"Frequent transfer of health workers in public health facilities and frequent turnover of health workers in private facilities are putting a double burden on health service delivery. Unequal and inadequate pay to health professionals, inadequate safety provisions to the health professionals by the government, lowered motivation of health workers in rural settings are the causes of human resource unavailability." -Representative from a service provider in a tertiary center.

#### Topical Area B: Access to Health Services

In Nepal, basic health services are provided free of cost at public health facilities. However, utilization of public health services is low due to various factors like difficulty in travel, distance to point of service, unavailability of medicines, economic barriers for the indirect cost to receive services, and cultural inappropriateness. The community-level health centers provide only OPD services from 10 am to 5 pm. Health centers having birthing centers only provide maternity services round the clock. Twenty four

**Table 2. Key indicators of organization**

Indicators	Findings
1. Number of hospital beds for cardiac facility per 10,000 population	Public Hospital: 0.49 <sup>17-19,23</sup> Private Hospital: 0.22 <sup>23-27</sup> Total: 0.71
2. Ratio of health professionals per 10,000 population;	Doctors: 7.5 <sup>23,28</sup> Registered specialized doctors: 2.1 <sup>23,29</sup> Nurse and ANMs: 29.8 <sup>30,31</sup> Health Professionals: 24.7 <sup>23,32</sup> Cardiologist/cardiac surgeons: 0.057 <sup>30,33</sup> Number of cardiologist by Province <sup>33</sup> : Province 1: 11; Province 2: 4; Province 3: 138; Province 4: 7; Province 5: 5; Province 6: 0; Province 7: 0
3. Total number of health facilities by type and ownership	Total health facility <sup>34</sup> : 8002 By authority: Government: 5704; Non-government: 2298 By type: Hospitals: 836 (including 309 ayurvedic ashadhalaya); Clinics: 367; Health post: 3840; Primary Health Centres: 278; Urban Health Centres: 496; Community Health Units: 489; Rehabilitation Centres: 5; Diagnostic Centres: 137; Ayurvedic District Health Center: 53; Nursing Homes: 24; Uncategorized health institutions: 1438
4. Number of primary care facilities per 10,000 population	Number of primary care facilities was 1.78 <sup>30,34</sup> Province wise <sup>30,34</sup> : Province 1: 1.91 Province 2: 1.51 Bagmati Province: 1.84 Gandaki Province: 2.84 Province 5: 1.68 Karnali Province: 2.82 Sudur Pashim Province: 2.04
5. Commercial entities offering health services for their employees and/or communities where they operate;	No data of commercial entities offering health services for their employees and/or communities are available.
6. Referral System	No documented referral system was presented. However, there exist informal means of referral. People in the city directly visit specialized health centers, whereas, in rural areas, patients are referred by health facilities in charge with/without reports. The need for a systematic referral system is addressed and emphasized in the Public Health Service Act, 2018. In addition, the PEN package has emphasized and mentioned when, how to refer, and counter-refer the patient with detailed guidelines. <sup>14</sup> 'Health workers, doctors from referring facilities or hospitals usually inform while referring a patient and sometimes patients come through personnel contacts. We get direct calls, but mostly...some says... that they came from far and says that they were referred but no paper/document verify it' [Health care provider at a Tertiary Care Center]

hours emergency services are available only at hospitals. Therefore, people seek health services more from local pharmacies. There are some forms of user fee exemptions and waivers for CVD services but CVD treatment services are expensive to the general population. The details are shown in Table 3.

**Table 3. Indicators of access to health services**

Indicators	Findings
7. Hours of operation for public and private health service providers	Emergency services and inpatient care services operate 24 hours in both private and public facilities. <sup>35</sup> Outpatient Department (OPD) services, routine surgery, and other consultative services are provided 8 hours per day. <sup>17-19,36</sup>
8. Percentage of people living close to any health facility	Reach within 30 minutes: Mountain - 34.5%, Hill - 39%, Terai - 60% Reach within 60 minutes: Mountain - 39%, Hill - 42%, Terai - 35% Need more than 60 minutes: Mountain - 25%, Hill - 17%, Terai - 3% <sup>11</sup> During a heart attack, time is very important. But many times, patients from far away arrive late in the hospital. Few patients come from helicopters; 3-4 land here daily. Patients referred from far away in ambulance usually arrived late that's what I feel- (Health care provider, Tertiary Care Center)
9. Financial access	Out-of-pocket (OOP) spending as a percentage of total health expenditure in 2015/16 was 51.8%. <sup>21</sup> "Before the diagnosis of the CVD disease, there is no user fee exemption. They have to pay for the diagnosis. Most people come from outside Kathmandu, they have to travel a lot and arrange for food and lodging. This arrangement is even difficult for some." -Representative from Service Provider, Tertiary Health care center
10. User fee exemptions and waivers	<ul style="list-style-type: none"> <li>Government-initiated<sup>4</sup>: <ul style="list-style-type: none"> <li>-Medical Treatment of Deprived Citizens (Bipanna Nagarik Kosh) provides up to NPR 100,000 (approximately USD1000) per patient who can-not afford via notified hospitals for medication and treatment of severe diseases including cancer, heart disease, head injuries, spinal cord injuries, Alzheimer's disease, Parkinson's disease and sickle cell anemia.</li> <li>-Free Rheumatic Heart Disease (RHD) surgery for all;</li> <li>-Free medical services under Child Assistance Program (CAP) for below 15 years old, and Senior Citizen Scheme (SCS) for above 75 years old.</li> </ul> </li> <li>Non-governmental and private organizations such as Jayanti Memorial Trust (NGO), Mrigendra Samjhana Medical Trust (MSMT), and Nepal Heart Foundation provide monetary support to needy patients.</li> <li>Financial assistance is provided by different hospitals for poor patients.</li> </ul>

### Topical Area C: Coverage, utilization, and demand for health services

Health services utilization varies among different ethnic groups, gender, age groups, distance to the point of the service center, and also among the people with lowered socio-economic status.<sup>37</sup> Despite the provision of free basic health services and health insurance coverage for medical services, people from rural communities do not have easy access due to the high indirect costs for travel, caretaker cost, and opportunity costs. The details are given in Table 4 below:

**Table 4. Indicators for coverage, utilization and demand for health services**

Indicators	Findings
11. Primary care or OPD visits	<ul style="list-style-type: none"> <li>The total outpatient CVD morbidity was 399,304 for the year 2016/17 with 1.39% of the total population attending the OPD service in the year.<sup>9,23</sup></li> <li>Total patients with heart disease who received financial support from Bipanna Nagarik Kosh was 4280.<sup>21</sup></li> <li>There are 232,998 OPD cases in hospitals (Manmohan Cardiothoracic Vascular and Transplant Center (MCVTC), Sahid Gangalal National Heart Center (SGNHC), and Bir Hospital in 2018). Among them, 266,967 received non-invasive services, around 10,000 received interventional cardiovascular services, and around 4,000 received surgeries.<sup>17-19</sup></li> </ul>
12. Percent of population screened for risk factors of cardiovascular diseases and behavioral interventions	There are no routine screening services for CVD in Nepal. However, every 5 years, STEPS survey takes place for NCD risk factors to monitor NCD trends and its risk factors and health system response including service coverage and utilization. Recently, Nepal Completed 3rd round of STEPS survey 2019. <sup>13</sup>
13. Knowledge attitudes and practices (KAP) regarding cardiovascular diseases and services i) in general population ii) among CVD patients and their family members	A study conducted on cardiovascular health knowledge, attitude, and behavior/practice in an urbanizing community of Nepal reported that nearly 44% had insufficient knowledge and less than 20% had highly satisfactory knowledge. Among those with highly satisfactory knowledge, only 14.7% had highly satisfactory attitudes and 19.5% and 13.9% had satisfactory and highly satisfactory practices respectively. <sup>22</sup>
14. Consumer profiles	In the FY 2016/17, the number of inpatients for CVD was 13,922, out of which females were 6,429. <sup>9</sup> The patients in an emergency are 20,514 in SGNHC and 6110 in MCVTC. The 8843 inpatients in SGNHC and 3653 in MCVTC. However, these data were not disaggregated by age, sex, education, income, residence, and provider. <sup>17-19</sup> "Women from rural areas, mostly smoke tobacco, they have a high risk of hypertension and coronary disease, in addition, there is a shift from elderly to middle-aged young aged for CVD high-risk population" -Representative from Civil society and Service Provider.

**Table 5. Findings of Topical Area D**

Indicators	Findings
15. Percent of women vs percent of men who access health care for cardiovascular diseases treatment	Percentage of women who access health care for CVD: 0.022%. Percentage of men who access health care for CVD: 0.026% <sup>9</sup>
16. Percent of women who seek care for specific intervention or care for disease of cardiovascular origin by source and income group	In 2016/17, 72,584 female patients attended Shahid Gangalal National Heart Centre OPD, which is 47.2% of the total OPD patients while 7313 female patients attended the Emergency Department which is 42.9% of the total ER patients. <sup>17</sup> Among patients admitted with the diagnosis of acute coronary syndrome, 333 (27.8%) were females among patients admitted in medical ICU, 271 female (45%) were females and 117 (38.7%) female patients underwent pacemaker implantation.

**Table 6. Indicators for quality of health services**

Indicators	Findings
17. Existence of national policies for promoting quality of care	There is a National Health Policy, 2017 which ensures access to quality health services (Universal Health Coverage) to every citizen. However, the national structures, budget, and action plan for promoting quality of care is not clearly defined. <sup>9,16</sup> "These days, we face practical challenges of implementing the policies due to the changes in the government system. Previously, we had a central system, but now in the federal governance system, there is widespread confusion about the role of the authorities." -Representative of Policy Maker, Department of Health Services "Another one challenge to the quality of care is the high volume of patients and shortage of service providers. Patients come from all 77 districts to central super specialty centers leading to a high burden of patients over single specialists and need for care is almost at urgent and when few service providers have to take care of many patients at once quality may be compromised." -Representative from health care provider, Tertiary Care Center.
18. Clinical standards adapted into a practical form that can be used at local level	There is national clinical guideline or standards focusing on CVD treatment, however, PEN protocol is used for prevention and management of NCD including CVD in primary health centers in Nepal. <sup>14</sup> "The specialty hospitals have developed treatment protocols to specific diseases and procedures but there is poor compliance to the protocols as service providers hesitate to follow" - Representative from health care provider, Tertiary Care Center.
19. Percent of primary care facilities that are adequately equipped	Nepal health facility survey (2015) shows more than 80% of health facilities have an adult weighing scale, and more than 90% have stethoscope and blood pressure measuring apparatus. <sup>11</sup>
20. Existence of clinical supervision by supervisor	There is a system of yearly monitoring and supervision by MoHP and Nepal Medical Council within their jurisdiction with standard monitoring checklist but the system does not regularly function even in public hospitals and there are almost no monitoring and supervision visits in private hospitals, a senior cardiologist reported. <sup>38,39</sup> "Yes, Junior doctors and nurses are supervised by senior doctors and nurses during the treatment process", "As you know, people are reluctant to change, they just want to practice what they are doing conventionally but they have to be encouraged to practice the quality measures and uh! once they do it, they like it, because that brings about positive changes and improvement in the patients". A representative from health care provider, Tertiary Health Care Center.
21. Existence of other process assuring quality of care besides supervision	Presence of a complaint box kept within health facilities premises <sup>40</sup> for consumer feedback where patients and their families can drop their feedback and concerns for improvement. Patient surveys are rarely done. Hospitals submit quarterly reporting by health facilities to government. <sup>38</sup>

**Topical Area D: Equity in the delivery of health services**

In rural and hard-to-reach areas, there is more prevalence of CVD than in city areas. "Outside the valleys have a higher

**Table 7. Findings of Topical Area F**

Indicators	Findings
22. Life expectancy at birth	The life expectancy at birth in 2017 was 70 years. <sup>42</sup>
23. Mortality rate attributable to cardiovascular disease	The age-standardized mortality rate attributable to CVDs among both sex in Nepal was 2.60 per 1,000 population. The all-ages mortality rate was 6.11 deaths per 1,000 population in 2017. <sup>43</sup> The total inpatient CVD mortality was recorded 491(2016/17). CVD mortality per 1,000 population: 0.017. <sup>9</sup> "Mainly from big hospitals, medical colleges, private colleges, and even big government hospitals do not report data to the government system i.e. HMIS. We have only one system. We don't get reports so we cannot give proper information on it. Based on partial information, we cannot show the real burden of cardiovascular disease"-Representative from central government
24. Disability adjusted life years lost (DALY) due to CVDs	The age-standardized Disability Adjusted Life Years (DALYs) due to CVDs among both sex in Nepal was 52.4 per 1000 population. <sup>43</sup>
25. Prevalence of CVDs	The age-standardized prevalence rate of CVDs among both sex in Nepal was 56.79 per 1,000 population. <sup>43</sup> The overall prevalence of coronary heart disease is found as 2.9 in Nepal in 2019. High prevalence was in Gandaki and Sudur Paschim province as 3.6%. <sup>44</sup> The prevalence of borderline or definite rheumatic heart disease was 10.2 (95% CI, 7.5-13.0) per 1000 children and increased with advancing age from 5.5 (95% CI, 3.5-7.5) per 1000 children 5 years of age to 16.0 (95% CI, 14.9-17.0) in children 15 years of age, whereas the mean incidence remained stable at 1.1 per 1000 children per year. <sup>45</sup> The incidence of congenital heart disease was 5.8 per thousand hospitalized children. <sup>46</sup> The prevalence of hypertension in Nepal in 2019 was 24.5% compared to 25.7% in 2013 and 21.5% in 2008. <sup>9</sup>
26. Treatment of CVD	Overall 0.0143% population have received some treatment or intervention for CVD. <sup>21,23,44</sup> Total 164,528 patients received OPD services, 223,998 patients received non-invasive services, 8,384 patients received interventional cardiology services and 1,837 patients underwent cardiovascular surgeries at Shahid Gangalal National Heart Center, in the year 2018. <sup>17</sup> Similarly, at Manmohan Cardiothoracic Vascular Transplant Center, 57,809 patients received OPD services, 18,995 received non-invasive services, 1,408 patients received interventional cardiology services and 1,837 patients had cardiovascular surgeries in the year 2018. <sup>18</sup>

prevalence of RHD in school children than in Kathmandu. Similarly, is found in Karnali, Humla, Jumla. This means more problems among the unreached and poor population have high-risk factors for CVD"- Representative from Cardiac Health Service Provider and Civil Societies.

#### Topical Area E: Quality of Health Services

Adequate information regarding the "quality of CVD services" is not available due to the unavailability of data recording system. There is an inequitable distribution of

resources including human resources at community health centers and even in tertiary hospitals. There exists frequent turnover and frustration among human resources due to unequal and inadequate pay in government hospitals. The details are shown in Table 6 below:

#### Topical Area F: Health Services Outcomes

With the improvement in health services and different schemes and facilities like basic health care packages and various standards for health centers such as Minimum Service Standard, the health outcome of the population is expected to improve.<sup>20</sup> As shown in table 7 below, the life expectancy increased from 62.541 years in 2000 to 70 years in 2017 and the use of health services under Bipanna Kosh to 4280.

#### SWOT Analysis

The qualitative findings of this study are summarized and organized in the Strength, Weakness, Opportunity and Threats (SWOT) framework by topical areas.

## DISCUSSION

We found that the basic CVD services are available in primary health care centers, but a limited number of hospital beds for cardiac services and the inadequate number of cardiac health professionals are available to cater to the entire population. Though 24 hours cardiac emergency services are available, they are centered in urban areas, with major discrepancies noted among provinces. The service providers shared a lack of proper screening, national protocols, and guidelines, even though monitoring and supervision of the services are present within the health center. More clinical care-focused services are available than health promotion and prevention-focused for population screening and behavioral intervention. With the modern western lifestyle, Disability adjusted life years (DALY) for CVD is also increasing. Due to difficult geographical terrain, limited data are available from rural areas, these health care services are secondary, as the population is still struggling for basic food and education. With the National insurance scheme and PEN protocol development, NCD care can be improved. Though user exemptions and waivers are provided by government organizations, non-governmental and civil societies also support financial and human resources.

#### Organization of cardiovascular health services: reliance on private sector and lack of referral system are major issues

In Nepal, health services are provided by both public and private sectors similar to other low-resource settings such as in Guatemala and Kenya.<sup>47,48</sup> The private sectors grew 23% from 1995 to 78% in 2008 and nearly doubled the hospital beds than that of public hospitals.<sup>49</sup> This has resulted in increased access to health care with advanced technology, early diagnosis, and basic life support for CVD patients in an emergency before reaching tertiary centers.

Topical Areas	Strength	Weakness	Opportunities	Threats
A. Organization of Health Services	<ul style="list-style-type: none"> <li>Public and private health centers offer basic CVD services like blood pressure measurement, ECG monitoring, and blood test from primary to tertiary level.</li> <li>Local governance has the authority and responsibility for health care development</li> </ul>	<ul style="list-style-type: none"> <li>Technical and logistic deficiencies in public health facilities</li> <li>Inadequate communication and coordination between private and public institutions</li> <li>Inadequate trained human resources for quality CVD services in all parts of Nepal.</li> </ul>	<ul style="list-style-type: none"> <li>The enthusiasm of local governments to deliver can be tapped and their capacity can be strategically enhanced to improve CVD services.</li> </ul>	<ul style="list-style-type: none"> <li>Frequent turnover and transfer of quality human resources.</li> </ul>
B. Access to health services	<ul style="list-style-type: none"> <li>Basic services are available at primary health centers through the PEN package.</li> <li>Subsidized services and fee waiver schemes are available in government health outlets, particularly in specialty hospitals.</li> </ul>	<ul style="list-style-type: none"> <li>Tertiary care centers located only in the major cities</li> <li>Long waiting time in public hospitals for patient care</li> <li>Treatment cost is expensive</li> <li>Definite information is not available to assess access.</li> </ul>	<ul style="list-style-type: none"> <li>Provincial governments have the authority to establish at least one tertiary care center in every province</li> </ul>	<ul style="list-style-type: none"> <li>Difficult terrains, poor road conditions, and transport infrastructure</li> <li>Long-distance to health facilities</li> <li>The government's free and subsidized schemes are not endorsed by private health centers.</li> </ul>
C. Coverage, utilization, and demand for health services	<ul style="list-style-type: none"> <li>Hospital data on the number of OPD visits and inpatients are available.</li> <li>Service utilization has increased after the endorsement of the health insurance system</li> </ul>	<ul style="list-style-type: none"> <li>Lack of data of population screened and behavioural intervention</li> <li>Lack of data from peripheral health centers who received/seek CVD services</li> <li>Delayed health-seeking behaviour of the patients</li> </ul>	<ul style="list-style-type: none"> <li>A data management system can be revised to include more CVD related indicators</li> <li>Awareness about health service availability including free, subsidized, and patient support programs can be increased</li> </ul>	<ul style="list-style-type: none"> <li>Socio-cultural barriers about health-seeking hinder people from service utilization.</li> <li>CVD is of lower priority for a large sub-group of the population which is still struggling for adequate food, basic education, and other health problems.</li> </ul>
D. Equity in the delivery of health services Age, gender, class, ethnicity, location,	<ul style="list-style-type: none"> <li>No service discrimination based on gender, class, and ethnicity.</li> <li>Free treatment of RHD, and all in-hospital treatment for children and aged above 75</li> </ul>	<ul style="list-style-type: none"> <li>No adequate data available according to class and ethnicity</li> <li>Geographical inequity exists in accessing the health services especially in hill and mountain region</li> </ul>	<ul style="list-style-type: none"> <li>Lessons learned from other health programs can be applied to CVD services in future</li> <li>Constitution proclaiming health as a basic right resulting in increased awareness of equity</li> </ul>	<ul style="list-style-type: none"> <li>Possible increased burden of CVD morbidity and mortality among the hard-to-reach population and people of poor socioeconomic background.</li> </ul>
E. Quality of Health Services	<ul style="list-style-type: none"> <li>Policy on quality assurance exists.</li> <li>Few local governments are active in health promotion and prevention for NCDs.</li> <li>Provision of monitoring, supervision, and reviews at all levels</li> </ul>	<ul style="list-style-type: none"> <li>Limited data on service quality</li> <li>Consumer's satisfaction surveys are not common</li> <li>No national clinical protocols and supervision</li> <li>The government reporting format contains mostly numerical indicators and less describing the quality of services.</li> </ul>	<ul style="list-style-type: none"> <li>Existing policies</li> <li>Dialogue and process to develop a national protocol for CVD management</li> <li>Task Shifting and sharing can be adopted, especially to benefit the rural population with limited human resources for health</li> </ul>	<ul style="list-style-type: none"> <li>Lack of institutionalized quality assurance mechanism</li> <li>Lack of monitoring and quality assurance checks in the private sector by government</li> <li>Dubious trust in medical professional competencies due to commercialization of health services.</li> </ul>
F. Health service outcomes	<ul style="list-style-type: none"> <li>Improving life expectancy of Nepalese people</li> </ul>	<ul style="list-style-type: none"> <li>Services are mostly focused on output indicators and not outcomes</li> <li>CVD-related DALYs is very high</li> <li>The health system prioritizes clinical services more than health promotion and prevention.</li> </ul>	<ul style="list-style-type: none"> <li>Health insurance to reach the large population</li> </ul>	<ul style="list-style-type: none"> <li>The lifestyle of Nepalese becoming more sedentary, leading to increased hypertension and obesity.</li> </ul>

However, with these, private health care is expensive making the poor poorer and financial gain by business houses than government.<sup>48,49</sup>

Comprehensive referral and counter-referral systems are key for integrated health delivery systems and to ensure continuity of care for patients. Despite having a robust health care delivery system and structures, there are no specific referral systems or protocols in Nepal for chronic diseases like cardiovascular diseases.

In Nepal, there are 8.9 physicians and 20.8 nurses per 10000 population. This is low compared to the WHO recommendation of 10 physicians and 40 nurses per 10000 population.<sup>50-53</sup> The acute shortage of healthcare providers limits the capacity of Low- and Middle-Income Countries (LMICs) to manage CVD at the primary care level.<sup>50-53</sup>

**Access to Health Services: remote and rural population lack access**

There is a huge geographical disparity in health service access. Specialized secondary and tertiary hospitals are located in cities, which are not accessible to a majority of remote and rural populations. The diagnosis and treatment for CVD care are available in tertiary centers that are concentrated in urban areas.<sup>8</sup> For the needy, access is often via costly public transportation along with weak road infrastructures. The situation is similar in Kenya where the increasing distance from a health facility significantly reduced outpatient care seeking, and Guatemala, where the greater distance to health facilities and lack of qualified service providers are major barriers to accessing health services.<sup>47,54</sup>

**Coverage, utilization, and demand for health services: appropriate data is lacking**

General health care is provided through 5704 Government and 2298 Non-government health facilities throughout the country.<sup>34</sup> Primary CVD care through PEN package that includes CVD risk assessment and management, hypertension, and diabetes screening and treatment are available in health facilities in 39% of the districts.<sup>10</sup> Even though the government and civil societies provide subsidies and support, only 10% population is covered.<sup>55</sup> These programs are not well communicated to the public. Only hospital-based data regarding utilization of services are available but no community-based data on demand. Based on the STEPS survey 2019, around 3.3% of adults (40-69 years) have more than a 30% chance of predicted 10-year CVD risk with the prevalence of raised blood pressure 24.5% among adults and raised cholesterol 11%. Proper data regarding utilization is important as it will result from inadequate policies and awareness regarding CVD services which will result in an increase in demand. The balance between supply and demand is necessary, however, due to the lack of data, the CVD services in different regions of the country cannot be estimated.

**Equity in the delivery of health services: financing mechanism must support the vulnerable population**

In order to reduce inequity, the government and civil societies have made efforts to reduce the financial burden through various free and subsidized services. However, the out-of-pocket spending in the year 2015/16 was still very high at 51.88% of total health expenditure.<sup>21</sup> Poor people, particularly from remote settings, are therefore disproportionately vulnerable. Hence, a more equitable distribution of fee waiver schemes in terms of socio-economic status and geographical settings is needed.

The male and female ratio of seeking CVD services in the central level is almost equal but the data from the rural area is not available. Making provisions for the availability

of basic cardiovascular services and implementation of PEN packages nearby home/community and raising awareness about cardiovascular risk factors and diseases can improve the situation.

**Quality of health services: monitoring of quality of care is low**

According to the Nepal health facility survey (2015), basic services are available in most primary health centers. Government plans to improve the health services in the country and the inclusion of the local communities will further increase the success of such plans. A mandatory quarterly monitoring and a supervisory visit by the Nepal government is mentioned in policies in all health facilities but less practiced in real situations. Therefore, robust monitoring and evaluation of the services being provided is needed for feasibility and sustainability. Lack of reported studies on the quality of CVD services being provided and patient satisfaction should also be addressed.

**Health service outcomes: lack of appropriate data is a challenge**

All health facilities report to the National Database, in addition to quarterly, biannual, and annual review meetings at health centers.<sup>9</sup> However, no data regarding incidence, prevalence, DALY, service utilization data of CVD are available. Nonetheless, from the estimated data, the age-standardized DALYs due to CVD among both sexes is 5242.17 in Nepal, which is higher than global at 4597.92, but lower than South Asian at 6006.72 per 100,000 population.<sup>43</sup> Therefore, steps to lower the rising trend of hypertension, obesity, mental stress, sedentary lifestyle, and physical inactivity should be implemented to lower the DALY, CVD incidence, and mortality related to CVDs.

**Strengths and Limitations of the study**

This health delivery system assessment focusing on cardiovascular diseases is one of the comprehensive studies in Nepal. This is a foremost study to assess the health system needs for cardiovascular health service delivery in Nepal. It has covered all stakeholders of the system from policy level to grassroots-level health care workers. However, respondents of this study are confined to the centrally located stakeholders; tertiary level service provider hospitals, cardiologists and nurses working in Kathmandu, policy makers, focal persons in the health ministry, and different divisions of the Department of Health Services, patients and representatives from patients support organizations. This study did not include the third tier of the study - the patient party perspectives. Results are primarily focused on the qualitative inquiry and desk review so, some quantitative assessment would have given more insights into data and information needed.



## CONCLUSION

Health service delivery for CVD in Nepal has improved by strengthening community-based health interventions through local government to ensure health as a basic fundamental right for all. Further empowerment of local government has led to improved health communication and coordination among service providers. Still, there is immense scope for the development of competent human resources, advancing technologies, and developing national protocols. Through free and subsidized services to the patient, the government has made efforts to reduce the financial burden. However, promotive, preventive, diagnostic, referral, and rehabilitative services are still inadequate, while curative services including the PEN package further need to expand at all levels. Further, there is limited data available on disease incidence, prevalence, severity, utilization and satisfaction of health services, and challenges encountered by the population. Therefore, the disease surveillance system including the medical recording and reporting mechanism needs to be upgraded to incorporate and reflect the true burden of CVD in Nepal.

### Recommendations

1. Endorse more programs on i) health promotion, ii) prevention and control of risk factors of NCDs, and iii) encourage for early diagnosis and compliance towards treatment along with PEN services across the country.
2. Enhance the local government and the peripheral health centers/hospitals with life-saving services to deliver to CVD patients. The peripheral health centers and the hospitals with improved communication and coordination with

tertiary care centers can save the life of CVD patients in emergency and also provide continuity services to the chronic patients.

3. Peripheral health centers and hospitals should be capacitated with skilled human resources, laboratories, ECG and Echo services, ultrasound, and secondary level treatment protocols to serve CVD patients at the local level. Task shifting models can be adopted for a certain time to prepare skilled human resources.
4. Develop a specific referral network to ease the communication and transfer of the CVD patient in appropriate centers with the necessary support to the patient family for the referral. Every state/province should establish a tertiary-level care center.
5. Promote research activities related to CVD prevention, treatment, and management thereby incorporating research results in policy implementation.
6. Develop a national data system specific to CVDs to record the patient data which can be used for research purpose and review the cardiovascular health service delivery system.

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