# FACTORS INFLUENCING THE COMPETENCIES IN PREVENTION AND CONTROL OF CHRONIC DISEASES AMONG PRIMARY HEALTHCARE WORKERS IN BHUTAN

TSHEWANG LHADON

A Thesis Submitted to the Graduate School of Naresuan University
in Partial Fulfillment of the Requirements
for the Master of Public Health in Public Health Program
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By Tshewang Lhadon

has been approved by the Graduate School as partial fulfillment of the requirements

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**Title** FACTORS INFLUENCING THE COMPETENCIES IN PREVENTION AND CONTROL OF CHRONIC DISEASES AMONG PRIMARY HEALTHCARE WORKERS IN BHUTAN

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**Keywords** Chronic diseases; Competency; Primary health care; Primary healthcare worker; organizational support; work environment

## ABSTRACT

Chronic diseases are the leading caue of mortality of worldwide. The burden of chronic diseases are highest among low and middle income countries. Literatures confirms that prevention and control of chronic disease necessitates robust primary health care system with competent healthcare workforce. Emphirical information on competency in prevention and control of chronic disease and its determinant among primary healthcare workers in Bhutan is limited. This study aims to examine level of competencies and factors influencing the competencies in prevention and control of chronic diseases among primary healthcare workers. A descriptive cross sectional study design was employed. Data for this study was collected from the health facilities across all the 20 districts of Bhutan. Simple random sampling was used to recruit the study sample. 330 pimary healthcare workers responded to the questionnaire. The validated and reliablity tested structured self-administered questionnaire was used to collect data. The ICV-I was 0.90 and Cronbach's Alpha coefficient was 0.97. A stepwise multiple regression analysis was employed to determine the predictive factors of the competency. The overall mean score of the competency was 191 (SD= 25.7). 96% of participants rated competent in prevention and control of chronic diseases. The multiple regression indicated that work environment ($\beta = 0.473$), gender ($\beta = 0.126$), location of health facility ($\beta$ = -

0.114), and organizational support (β = 0.117) significantly influenced the competencies in prevention and control of chronic diseases by 31.4% with a statistical significance (R2 = 0.314), (p < 0.05). Findings from study suggests that although the competency among primary healthcare workers appeared high, ensuring adequate learning resources, intensifying supportive supervision in rural health centers and strenghtening the reward and recognition measures could further enhance the competency.

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Tshewang Lhadon

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**Abbreviation**

| | |
|---|---|
| BHTF | Bhutan Health Trust Fund |
| CVD | Cardiovascular diseases |
| DHO | District Health Officer |
| DHIS | District health information system |
| EDL | Essential drug list |
| GNH | Gross National Happiness |
| HA | Health Assistant |
| HEARTS | Healthy lifestyle counseling, Evidence based treatment, Access to essential medicine and technology, Risk based management, Team based care, System of monitoring |
| ICT | Information and communication technology |
| KGUMSB | Khesar Gyalpo University of Medical sciences of Bhutan |
| LMIC | Low middle income countries |
| MoH | Ministry of health |
| NACDD | National Association of Chronic Disease Directors |
| NCD | Non communicable Disease |
| NCDD | Non communicable disease Division |
| NSB | National statistical bureau |
| PEN | Package of Essential Non communicable disease |
| PHC | Primary Healthcare Center |
| PHW | Primary Healthcare workers |
| SCCI | Service with care and compassion initiative |
| THC | Thromde Health Center |
| WHO | World Health Organization |
| WHO SEARO | World health organization, Southeast Asian Region |

# CHAPTER I

# INTRODUCTION

## 1.1 Background

Non-communicable diseases (NCDs) also known as chronic diseases are health conditions that are generally slow in progression, lasting for an extended period (often lifelong), and those that are non-contagious (Lankester & Grills, 2019; WHO, 2013; World health organization, 2021b). The steady increase in the NCDs in every region of the world poses a substantial burden to health care system (WHO, 2018). In 2021, the chronic diseases such as cardiovascular diseases, cancers, diabetes, and chronic respiratory diseases accounts for more than 41 million deaths, equivalent to 71% (WHO, 2021b) of all deaths worldwide and if no actions are taken, it is predicted to rise to 75.26% by 2030 (Wang & Wang, 2020). Although it affects people of all ages irrespective of sex and region, the evidence shows that approximately around 15 million deaths caused by chronic diseases are among the productive age group of 30-69 years and 85% of these premature deaths occur in low and middle-income countries (WHO, 2021b). The alarming rate of NCD mortality is driven by aging, rapid urbanization, globalization, and inequitable access to health care (WHO, Haque et al., 2020; 2014a). Owing to the chronic nature of the disease, these diseases require a prolonged course of treatment and care, incurring huge socio-economic burden to the government and individuals (Wang & Wang, 2020). Like any other low and middle-income countries (LMIC), NCDs are the commonest chronic diseases that exceed all cause of mortality in Bhutan (Ministry of Health, 2020a).

Bhutan is a small landlocked country nestled in the eastern Himalayas with the population of 735,553 people (National Statistics Bureau, 2017). It is popularly known for the Gross National Happiness philosophy (GNH) for development. All the developmental plans are guided by the GNH philosophy. Health and wellbeing are closely linked with the concept of GNH. A nationally representative GNH survey reported that the health domain contributed 14% to people's happiness (Sithey et al., 2018; Ura et al., 2008).This incorporation of health in the country’s development plan

had resulted in rapid improvement in health services leading to improved life expectancy and longevity of the population.

The gradual demographic transition has been observed since late 1980s. The demographic structure has shifted due to decrease in fertility rate and an increased longevity, resulting in greater life expectancy. The total fertility rate fell from 5.6 in 1994 to 1.7 in 2017, while life expectancy rose from 64.2 in 2000 to 70.6 in 2017 (MoH, 2020a). Over a decade, the proportion of senior adults (> 60 years) has rose from 6.98 percent in 2005 to 7.80 percent in 2017 (NSB, 2017). Asian Developement Bank (2019) estimates that older population in Bhutan will further increase to 15% in 2050. In addition, the growth in longevity within 20 years is expected to increase from 65 years lifespan in 2005 to 75 years in 2030 (an increase of 10 years) in Bhutan, which is predicted as the highest growth in Southeast Asian region (Długosz & Raźniak, 2014).

Population ageing, globalization and poorly planned urbanization are predominately the main drivers of the increasing global burden of the chronic non communicable diseases (Benziger et al., 2016). NCDs are the chronic health conditions that tend to be of longer duration and progress over the period. Because of the chronic nature and complexity of related complications, NCDs bear detrimental social, economic, and public health impacts. The most common chronic diseases are NCDs includes cardiovascular diseases, diabetes, cancer, and chronic respiratory diseases responsible for the substantial part of the global burden of the disease (WHO, 2013). It leads to deterioration of the quality of life and causes premature morbidity and disability (WHO, 2018). In the last few decades, Bhutan has observed an increasing trend of NCDs. Ministry of health reported increase in NCD cases attended by the health facilities from 43% in 2010 to 51% in 2019 (MoH, 2020a). On the mortality side, as the death from acute diseases are waning, the deaths attributed to chronic illness are increasing in the relative frequency. NCDs cause the highest proportion of death accounting for 69% of all deaths. Among deaths caused by NCDs, cardiovascular diseases are responsible for most cases (28%), followed by cancer (10%), chronic respiratory diseases (9%), diabetes (4%) and others related to injuries (11%) (RGoB, 2015a). Evidence shows increasing trend of death caused by NCDs from 2014, 2016, and 2019 as follow: 56%, 69% and 71% respectively (MoH, 2020a;

WHO, 2013; WHO, 2018). NCDs are not only debilitating itself, but it also exacerbates the severity of the communicable disease. Evidence-based and timely actions for management of risk factors will help in prevention of chronic diseases.

The main risk factors of NCDs are classified into biological and behavioral risk factors. Biological risk factors such as raised blood sugar, overweight and obesity, and raised blood pressure if left unattended would lead to chronic diseases and life-threatening complications and disabilities such as stroke, ischemic heart disease (heart attack), kidney failures, and blindness (WHO, 2020b). The nationwide risk factor survey by the Ministry of health (2020c) showed that 28% of adult are reported to have raised blood pressure, while 33.5% and 11.4% are reported to be overweight and obese respectively, and 11% had raise cholesterol level. However, more than half of adult during survey were unaware of their raised blooded pressure and 1 in 5 hypertensive people are not on any antihypertensive treatment. Furthermore more than 90% were unaware of their raised cholesterol level (MoH, 2020c). This indicates the existence of a diagnosis and treatment gap. The survey in 2019 also indicated that the behavioral risk factor for NCDs such as consumption of unhealthy diet, physical inactivity, consumption of tobacco and alcohol are alarmingly high in Bhutan. The population level mean salt intake is 8.3g/ day against the WHO's daily recommendation of 5g. The prevalence of physical inactivity, tobacco use and alcohol use are 7.3%, 23.9% (current user) and 42.9%(current drinker) respectively (MoH, 2020c). In the view of above, it is critical to prevent the risk factors to control NCDs and prevent death and disabilities.

The prevention and management of NCDs should focus on prevention of risk factors to prevent the diseases onset. To effectively control and prevent NCDs, the strategies must be strengthened to improve outcome across the disease continuum from prevention through long-term care. Among the people with chronic disease the effort should be on controlling the symptom and enhance quality of life by preventing the complications, improving the functionality, and prolonging life rather than absolute cure of the disease. Combination of both individual level interventions (lifestyle management and treatment) and population level strategies such as multi-sectoral collaboration, knowledge and information management, and innovations (Budreviciute et al., 2020) are imperative for management of NCDs. Prevention of

NCDs aimed toward reducing behavioral risk factors such as harmful use of alcohol, tobacco use, unhealthy diet, and physical inactivity supported by robust public policies and cost-effective interventions are necessary (Budreviciute et al., 2020; Widyahening, 2019).

In 2016 the World Health Organization (WHO) supported the member countries to develop and implement national non communicable diseases action plans aligning with the Global action plan for the prevention and control of non-communicable diseases (2013–2020) (WHO, 2013). Bhutan is one of the seven countries in South-East Asian region that implemented this plan promptly. The assessment was performed in 2018 to assess the implementation process and outcome. The assessment reported that the country has good performance in ensuring smoke-free public spaces (compliance score 10/10) and total bans on tobacco advertising, promotion, and sponsorship. Bhutan developed Multisectoral actional plan for prevention and control of non-communicable, 2015 (MoH, 2015) and strategies for reduction of daily salt consumption and promotion of physical activity (Tuangratananon et al., 2019) for the prevention and control of chronic diseases through whole of the government approach. In addition, since 2013, the WHO Package of essential non-communicable diseases (PEN) intervention has been implemented in Bhutan across all PHC to transform the delivery of services for chronic diseases, especially the four major NCDs (Wangchuk et al., 2014).

WHO developed PEN intervention for primary health care to systematically respond to the rising trend of NCDs. PEN is a cost-effective primary care approach to improve access to essential NCD care (WHO, 2010). It comprises of a set of validated evidence-based simple clinical algorithms and protocols for clinical diagnosis and treatment of common NCDs, prioritizing on 1) prevention of disease and promotion of healthy lifestyles, 2) early detection and management, and 3) community outreach. PEN focuses on major chronic diseases such as CVDs, diabetes, chronic respiratory diseases, and breast, cervical, and oral cancers (WHO, 2010). WHO PEN The guideline was first developed and published in 2010. It was improved with addition of evidence-based interventions in 2013 and later from 2017–2020. Bhutan was one of the first countries to implement PEN in 2010 and subsequently adapted all the revise versions. The latest PEN interventions was revised incorporating modules from the

WHO HEARTS technical package in 2018 (MoH, 2020a). The new version, known as PEN HEARTS, was introduced using a people-centered care approach. It is a comprehensive strategy for enhancing the quality of life for people living with NCDs and other chronic conditions. The PEN HEARTS initiative was renamed as the Service with Care and Compassion initiative (SCCI) in 2021, conforming with the Bhutanese context of healthcare delivery (Younten, 2021).

The early evaluation report for the PEN HEARTS ( unpublished) carried out by the Khesar Gyalpo University of Medical Sciences of Bhutan and Boston University School of Public Health (2020) observed that the better quality of services delivery, patient satisfaction and health worker's knowledge score in the district where the program has been implemented comparing to non-implementing districts. In general, the WHO PEN is aimed to improve leadership/governance, long-term health financing, essential medicine and technology access, the health information system, service delivery, and the health workforce capacity. In context to the health workforce capacity building, initially the focus was on providing training to improve knowledge and skills in the prevention and control of NCDs, and auditing performance, rather than core competency (WHO, 2010b). However, the newer version of PEN with HEARTS components includes some of the competency area proposed by WHO, including people-centered care, team-based care, quality improvement, healthy lifestyle counselling including brief interventions.

NCDs, often known as chronic diseases, are distinguished by a complex aetiology, a multitude of risk factors, a protracted latency period, a prolonged course of treatment, and functional impairment or disability (Budreviciute et al., 2020; WHO, 2020b; WHO, 2021b). Maintaining a healthy lifestyle and continuum of care across the disease trajectory is critical to improve the quality of life for people with living with chronic diseases and possible prevention of onset of disease (Clarke et al., 2017). The chronic disease practice concept is in consistent with the distinctive characteristics of primary care including continuity, coordination, and comprehensiveness (Reynolds et al., 2018; Starfield, 1998). Strong primary care health systems produce improved population health, greater health equity across populations, and higher resource efficiency (Starfield, 1998). People with NCDs or at risk of developing NCDs require proactive, patient-centered, community-based, and

long-term treatment, such services can only be provided equitably and sustainably through primary health care-based health systems (WHO, 2021b) which are supported by secondary and tertiary care for higher level management (Varghese et al., 2019).

Primary health care in Bhutan is delivered at all levels of practice, from the National Referral Hospital to regional referral hospitals, district hospitals, and community-based Primary Health Centers (PHCs) (MoH, 2020c; 2017). Health services in Bhutan are delivered through a tiered network of 3 tertiary level referral hospitals, 48 secondary level hospitals (district hospital and 10 bedded hospital), 186 PHCs, 53 sub-posts and 542 outreach clinics. This health service delivery system caters to all the citizens living in 205 sub districts (locally known as gewog in Bhutan) throughout the country (MoH, 2020a). District hospitals and PHCs functions under the framework of the district health system. While PHCs are the first contact point health facility in the rural areas, district hospitals are the secondary level health facility which serves as a first point of contact for urban population providing primary care services simultaneously with the curative services. Districts hospitals also serve as a referral center for the PHCs in the same district (Thinley et al., 2017). Health services are provided by wide range of healthcare workforces trained in various discipline. Doctors, nurses, and various allied healthcare providers work in secondary and tertiary level health facilities. Primary healthcare workers (PHWs) work in all levels of healthcare facilities, albeit they are mandate to work in PHCs in rural communities.

Primary healthcare workers (PHWs) in Bhutan are the non-physician, frontline health care provider trained in the field of community health known as Health Assistant (HA) (MoH, 2017; WHO, 2020a). Their training covers a wide range of subjects including basic medical care, maternal and child health services and along with preventive, promotive and treatment aspects (MoH, 2020b). Before joining their work, they must undergo three year of diploma/certificate level course in community health from single country-based the medical university. Besides the pre-service training, the healthcare workers are provided with continued medical education (CME) and in-service training programs to keep them abreast with the evolving medical and public health knowledge and practices. In-service training and CME on chronic diseases intervention are provided to all discipline of healthcare workers at

the districts level (WHO, 2020a) for prevention and control of chronic diseases. Trainings are being conducted through different modes, either training of the trainer program, district level training, or peer coaching and mentoring programs, and it is also done virtually. All these trainings are being conducted with the aim to enhance the health workforce competency in prevention and control of chronic diseases. Wangchuk et al. (2014) suggested the first step for implementation of NCD intervention is the capacity building of healthcare provider through training and workshops. Competency of PHWs is deemed essential because primary healthcare is the cost effective and equitable model of care for chronic disease practice where the health promotion and disease prevention interventions and strategies can be implemented. Incompetent healthcare worker in primary healthcare facilities led to increased pressure on the curative healthcare (secondary and tertiary level care) which are more expensive and fatal to the patient, thus incurring huge socioeconomic burden to the government and individuals.

Experts suggest competent health workforce, essential medicines and technologies, and information system are key element of primary health care systems to respond effectively to NCDs (Mahipala et al.,2018). Moreover, the systematic review of factors that influenced the implementation of chronic care models (CCM) within primary healthcare settings by Davy et al. (2015) found that preparing healthcare workforce is critical for CCM implementation. This is because the skills and experience of staff have a great significance on taking new roles and responsibilities in implementing the intervention according to the concept of CCM. Global NCDs, Injury, and Environmental Health initiative of the US Center for Disease Control and Prevention (CDC) proposes a three-pronged strategy to NCD prevention and control including 1) strengthening surveillance, 2) expanding the evidence base, and 3) increasing workforce capacity (Kostova et al., 2017). Furthermore, according to Yang et al. (2018), NCDs management approaches such as biological and behavior model with socio-psychological theories requires healthcare practitioners to be appropriately competent. Therefore, healthcare workers competency is critical for prevention and management of NCDs in the population.

Competency is defined as an abilities, knowledge, attitudes, skills, and behaviours that can be observed, measured and related attributes essential for

achieving desired outcome, enhance job performance and supporting organizational success (Kak et al., 2001; Royal Civil Service Commission, 2019). Different group of professions requires the set of different competencies to achieve optimal performance outcomes. Competencies in the health sector are directly associated with the quality of care and health outcomes (Langins & Borgermans, 2015). Healthcare workers require different set of competencies to prevention and control chronic diseases and manage their complex risk factors and severe complications.

Competency in chronic diseases practice is defined as a combination of measurable knowledge, skills, abilities, and individual traits that contribute to prevent, control and care of long term chronic conditions (Kane et al., 2019, WHO, 2005). For the care of chronic diseases, various organizations have developed a diverse but related set of competencies. The National Association of Chronic Disease Directors (NACDD) developed core competencies for chronic disease prevention, a standard set of competencies for professionals in chronic disease prevention and control in 2007, and it was reviewed in 2015 and 2018. The chronic care competencies by NACDD consist of 1) build support, 2) design and evaluate, 3) programs to influence policies and systems change, 4) lead strategically, 5) manage people, 6) manage programs and resources, and 7) use public health science (Kane et al., 2019). The chronic care competency for Primary healthcare workers (PHWs in Thailand was described by four domains of behavioural risk management, symptom management, basic medical care, and health coaching (Ruksaphram et al., 2014). Furthermore, Ishikawa et al. (2019) identified the competency of healthcare staff in the prevention and control of NCDs as follows: 1) work management, 2) monitoring and evaluation, 3) community partnership, and 4) community diagnosis. The World Health Organization (2005) identified five core competencies for healthcare workforce to provide care for the chronic diseases. It includes patient-centered care, partnering, quality improvement, information and communication technology and public health perspective. WHO affirms that all healthcare workers irrespective of the discipline, must obtain these five competencies to provide continuum of care for chronic diseases (WHO, 2005). This set of competencies by WHO was employed for this study because these are the fundamental competencies to supplement the respective technical competencies required by every healthcare worker for prevention and control of chronic diseases.

Moreover, these competency shares the similarities with the chronic disease management approach practiced in Bhutan (WHO, 2022).

Healthcare workforce competency is the basic requisites and indispensable cornerstone for providing care for chronic diseases (Kane et al., 2019). Studies suggest that the competent healthcare worker not only provide quality services to the population, but also gain considerable amount of job satisfaction within the services provider themselves (Davy et al., 2015; H.-Y. Liu et al., 2019; Primary Health Care Performance initiative, 2018). Measuring the level of competency among the healthcare worker is consider critical to determine the ability and readiness of the healthcare workers to provide quality services (Kak et al., 2001). The core of high quality and efficient health system is built with the availability, adequate, and quantity of competent and motivated healthcare workforce (WHO Regional Office for South-East Asia, 2012). However, various factors influence competency of healthcare workers in providing care and management of chronic diseases.

A study by Cheng et al. (2020) revealed that age, religion, job category, disability care experience, the receiving of performance bonuses and year-end bonuses are influencing the competency of nurse assistant (NA) working in long-term facilities with chronic diseases ($p < 0.05$). In addition, a systematic review found that factors that affected nursing competence were work experience, environment, educational level, adherence to professionalism, critical thinking, and personal factors (Rizany et al., 2018). Moreover, the study by Nuntaboot and Ha (2020) reported that working environments and nurse training system affect the competency. Furthermore, it was found that personality, intrinsic and extrinsic motivation significantly influence primary care managers' managerial competency (Mohd-Shamsudin & Chuttipattana, 2012). Other studies indicated that demographic attributes such as age, sex, religion, level of qualification, work experience influence the competency of the health work force (Ishikawa et al., 2019; Istomina et al., 2011). There are also evidence showing other factors such as knowledge, attitude, work environment, incentives, and the job title (Cheng et al., 2020; Ishikawa et al., 2019; S. Liu et al., 2019). The study in the Fiji among healthcare staff engaged in prevention and control of NCD (Ishikawa et al., 2019) and the study among family doctors in Shanghai (Cheng et al., 2020) reported that the training availed on the related topic affects the competency of the

healthcare workers. However, most of the studies on competency and its influencing factors were conducted among the nursing profession, healthcare managers, and doctors/physicians (Cheng et al., 2020; Ishikawa et al., 2019; S. Liu et al., 2019; Mohd-Shamsudin & Chuttipattana, 2012; Rizany et al., 2018; Istomina et al., 2011; Nuntaboot et.al 2020) and few research among PHWs.

Traditionally healthcare workforces are mostly trained to respond to the acute health problem and provide episodic care. It remained the same throughout despite the surging prevalence of chronic diseases (Institute of Medicine, 2003; Pruitt & Epping-Jordan, 2005; WHO, 2005). The health system designed to provide acute care is increasingly known to be inadequate to address this issue of chronic diseases (Budreviciute et al., 2020; Kostova et al., 2017; Pruitt, 2002). This calls for healthcare organizations a paradigm shift in disease management from acute episodic care to the proactive, patient-centered and continuum of care from management of risk factors to palliative care to prevent disease and improve the of quality of life for people with chronic conditions (WHO, 2005). Competency building of the health care provider is important to change the service delivery model. The healthcare workers must learn and apply the latest and accurate competencies to prevent, control and care of chronic conditions (Langins & Borgermans, 2015).

The increasing chronic diseases are the national concern in Bhutan, and it engenders huge burden on the health system and socio economic of the country (Sithey et.al., 2021; Pelzom et.al., 2017; MoH., 2020a). Experts suggest that the chronic disease services provided through primary health care approach are cost effective, equitable and sustainable model of care that can reduce morbidity and mortality. Competent health workforce at the primary health care is one of the vital component for effective chronic disease practices (Mahipala et al.,2018; Kostova et al., 2017). Thus, assessing the competency of helps to determine the ability and readiness of the healthcare workers to provide quality services (Kak et al., 2001). However, most of the previous studies to examine level of competency and factors influencing the competency were conducted among the nurses, primary health care managers and family doctors in other regions of the world. There is a paucity of empirical data concerning the factor influencing competencies in prevention and control of chronic diseases among PHWs. Moreover, the competencies in prevention

and control of chronic disease and its determinants among the PHWs in Bhutan has never been studied before. HA is one of the important primary healthcare workforces for prevention and control of chronic diseases in Bhutan. It is against this scenario that this study was conducted to examine the factors influencing competencies in prevention and control of chronic diseases among the PHWs (HA) in Bhutan. Therefore, findings from this study has a potential to provide insights in competency development strategies to improve competencies for prevention, control, and care of chronic diseases among the primary healthcare worker, to produce competent primary healthcare workforce for prevention, control, and long-term care of chronic diseases in primary health care.

### 1.2 Research questions

1. What is the level of competencies in prevention and control of chronic diseases among PHWs in Bhutan?
2. What are the crucial factors influencing the competencies in prevention and control of chronic diseases among of PHWs in Bhutan?

### 1.3 Research Objectives

1. To determine the level of competencies in prevention and control of chronic diseases among PHWs in Bhutan.
2. To investigate the predictive factors affecting the competencies in prevention and control of chronic diseases among PHWs in Bhutan.

### 1.4 Hypotheses

**Hypothesis 1:** Socio demographic factors influence the competency in prevention and control of chronic diseases among PHWs in Bhutan.

**Hypothesis 2:** The working environment influences the competency in prevention and control of chronic diseases among PHWs in Bhutan

**Hypothesis 3:** Organizational support influences the competency in prevention and control of chronic diseases among PHWs in Bhutan.

### 1.5 Scope of the study

The study is aimed to assess the level of competencies in prevention and control of chronic diseases among the PHWs in Bhutan. The study aims to examine the factor predicting the competency of the PHWs in Bhutan. The population of this study covers 616 PHWs from the health facilities with the representative sample from all the 20 districts of Bhutan. The study is expected to conduct between June to August 2022. The independent variables for the study include, socio demographic factors, work environment and organizational support and the dependent variable is 5-domain competency by WHO including patient-centered care, partnering, quality improvement, information and communication technology, and public health perspective.

### 1.6 Operational definition

**1. Non-communicable diseases (NCDs)/ chronic disease** are the health conditions which are generally slower in progression and lasting for the extended period (lifelong), such as cardiovascular disease (CVD) (Coronary health diseases, stroke & hypertension), diabetes, cancer and chronic respiratory diseases which are non-infectious in nature.

**2. Primary healthcare worker (PHCW)** in this study, it is defined as frontline, non-physician healthcare workers, locally known as Health Assistant (HA) working in PHCs and hospital throughout the country and are responsible for prevention, control, and care of chronic diseases.

**3. Competency** refers to combination of measurable knowledge, skills, abilities, and individual traits that are essential for prevention, control, and care of chronic diseases such as CVDs, cancer, diabetes, and chronic respiratory diseases. It includes patient-centered care, partnering, quality improvement, information and communication technology and public health perspective.

**4. Primary health center (PHC)** refer to the health care facility providing basic level of health care that includes promotion of health, prevention of disease, early diagnosis disease and basic curative, follow up and rehabilitation. It includes Primary health centers (PHC) and sub post in the rural and Thromde health center (THC) in urban.

**5. Patient-centered care** refers to health care provider's ability to provide coordinated, continuous, and timely care centering around the need of the patient while respecting their value, preferences, and perspective to relieve the suffering, prevent disease and disabilities, and promote wellness and healthy lifestyle through effective communication shared decision making.

**6. Partnering** is an ability to coordinate and collaborate with patients, families, community, and health care team for the care of chronic health condition.

**7. Quality improvement** refer to the ability of a health care worker to comprehend and recognize the aim and outcome of their work, as well as how to evaluate their performance. The health personnel must be able to recognize changes that will increase quality while also ensuring patient safety and service delivery efficiency.

**8. Information and communication technology** refers to the health care workers ability and skill to use the appropriate and available technology to record and maintain patient's information for monitoring the patients for treatment response and outcome and exchange patient information within the care team for effectively chronic disease care.

**9. Public health perspective** refers to the health care worker's ability to view health care as population-based health system, multiple level of care system and care continuum perspective rather than a single individual episodic clinical care perspective.

**10. Work environment** refers to the environment that place the health care workers work and dwell. Work environment factors include adequate resources, working relationship and control over practices/ autonomy will be assessed using the structured questionnaire.

**11. Organizational support** refers to the physical and non-physical support rendered to the healthcare workers vertically from ministry of health and district health administration. The factors include training opportunities, mentoring, and coaching, recognition and reward, supportive supervision, and career development opportunities.

# CHAPTER II

# LITERATURE REVIEW

This chapter elaborates on the literatures for the study and substantiates the development of the conceptual framework. The sources of the literatures include books, reports, Naresuan University library databases including Scopus, ProQuest, CINAHL, MEDLINE and Science direct and other internet search such as Google Scholar. The literature about Bhutan were largely the official publications from the Ministry of Health and the annual reports of primary care organization were also used. The chapter is presented in the following outline:

2.1. Geography and socio-demography of Bhutan

2.2 Health status

2.3 Overview of health system in Bhutan

- 2.3.1 Health services
- 2.3.2 Health workforce
- 2.3.3 Medicine, equipment, and technology
- 2.3.4 Health information
- 2.3.5 Health financing
- 2.3.6 Leadership and governance in health care

2.4 Primary health care

- 2.4.1 Development of primary health care system in Bhutan
- 2.4.2 Health services in primary health care
- 2.4.3 Health workforce in primary health care
- 2.4.4 Medicine, equipment, and technology in primary health care
- 2.4.5 Health information in primary health care
- 2.4.6 Health care financing in primary healthcare
- 2.4.7 Intersectoral collaboration in primary health care

2.5 Non communicable diseases/chronic diseases

- 2.5.1 Prevention and control of chronic diseases/NCDs in Bhutan
- 2.5.2 Policy and strategic framework for prevention and control of NCDs in Bhutan

**2.1 Geography and socio-demography of Bhutan**

Bhutan is a small landlocked country nestled in the eastern Himalayas with an area of 36 394 square.kilometer ranging from the sub-tropical foothills in the south to alpine/arctic in the north with rugged Himalayan mountains (NSB, 2017). It regionally grouped in WHO's South-east Asia region. Bhutan shares border with China in north and north-west and with Indian state of Sikkim, West Bengal, Assam, and Arunachal Pradesh in west east and southern border with an elevation ranging from about 160 m above sea level in the south to more than 7500 m above sea level in the north (NSB, 2020). Conforming with the constitution for the kingdom to maintain at least 60% of forest cover for all time (RGoB, 2008), currently Bhutan has 70% of forest cover absorbing more carbon than it emits, thus making it one of the carbon negative countries in the world (Wangchuk, 2019). The country is divided into twenty districts in three different regions, eastern, western, and central. It is further divided into 205 gewogs (sub-districts) (Figure 1) (NSB, 2017).


**Figure 1 Map of Bhutan**

**Source:** WorldAtlas.com, 2021 (https://www.worldatlas.com/maps/bhutan)

The primarily agricultural society, Bhutan is undergoing rapid economic growth and transformation in the recent decades. The socioeconomic development in Bhutan is guided by the overarching philosophy of Gross National Happiness (GNH). All the socioeconomic developmental plans in the country are mandated to be aligned with the four pillars of GNH including good governance, sustainable development, environmental conservation, and preservation and promotion of culture guides. The GNH index under nine domains such as psychological well-being, health, time use and balance, education, cultural diversity and resilience, good governance, community vitality, ecological diversity, and resilience, and living standards, and 33 indicators measures the developmental progress (Ura et al., 2008). Health is the fundamental part of the happiness, two domains of GNH are directly related to health and wellbeing. It is measured by three indictors, mental health, self-reported health status, healthy days, and disability (Yangchen et al., 2016). Further, Bhutan has been ranked 84th happiest country out of 157 countries and owing to the smallest gap

between rich and poor, it is ranked number one for equality of wellbeing in world happiness report in 2016 (Thinley et al., 2017).

The Population and housing census of Bhutan (PHCB), 2017 enumerated the total resident population of 735,553 increasing the population by about 16% from PHCB 2015. The population comprise of 52.3% of male and 47.7% female, while the rural and urban composition was 452,829 (62.2%) and 274,316 (37.8%) persons respectively. Although the population in the rural is much higher (62.2%), the steady growth in urban population was observed with the stride of 30.1% from 2005 to 37.8% 2017. The median age of the population had increased from 22.3 years in 2005 to 26.9 years, indicating increase in life expectancy the decline of fertility rates and in a country (NSB, 2017). It shows that albeit the population is youthful at the moment, it is gradually aging (NSB, 2020).

The total fertility rate (TFR) has dropped to below replaceable level. It has decreased from 2.5 in 2005 to 1.7 in 2017. Aging population and increasing dependency ratio are the long-term impact of the sustained below replaceable TFR. Moreover, increase in ageing population would increase the burden of chronic diseases placing a greater demand for health care and social services. While the total dependency ratio decreased from 60.6% in 2005 to 40.7% in 2017, the old age dependency ration has increased from 7.5% in 2005 to 8.7% in 2017 (NSB, 2017).

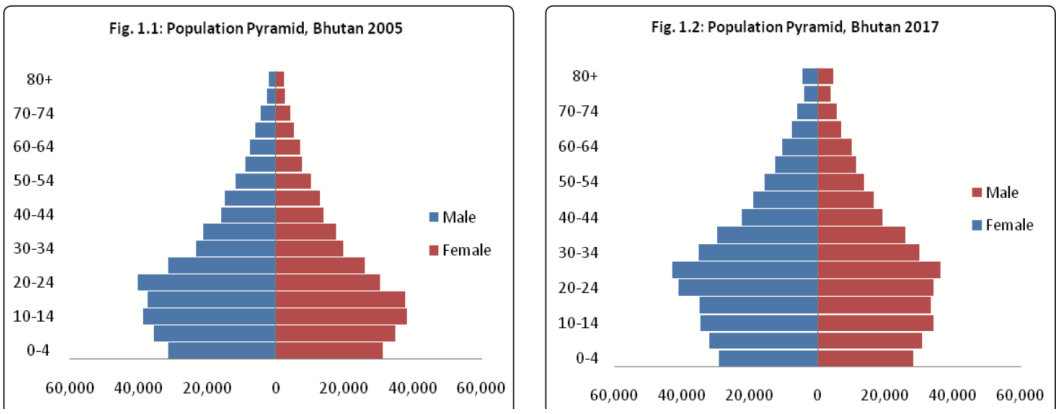


**Figure 2 Comparative population Pyramid**

**Source:** National Statistics Bureau (2020)

The population pyramid Bhutan indicates that the size of the young generations in the age groups 0-4 to 15-19 years has started to decline approximately 20 years ago because of reduced fertility rates, while the population in the elderly and working group are increasing suggesting demographic transition (NSB, 2020). (Figure 2). The demographic transition is attributable to the increased accessibility of family planning services, enhancement of preventive, promotive and curative health services and improvement education and literacy, particularly the female education (ADB, 2019). In Bhutan, over the span of a decade the literacy rate has increased from 59.5% to 71.4% from 2005 to 2017. In general male are more literate than female, however the female education has increased significantly from 46.8% to 69.9% from 2005 to 2017 (NSB, 2017).

Overall, the socio-economic development of the country is moving forward in the right direction, this socio-economic demographic factor such as population aging, urbanization and globalization underlies general health status of the country.

**2.2 Health status**

Modern healthcare in Bhutan was initiated from 1961 with the launch five-year developmental plan (Yangchen et al., 2016). Subsequently considerable stride in the health status of the country has been made, increase in life expectancy, bringing substantial improvement in preventing and controlling communicable diseases, enhancing maternal and child health services and development of infrastructure and human resources (Thinley et al., 2017). The total fertility rate has reduced from 5.6 in 1994 to 1.7 in 2017 and the life expectancy has increased from 36 years in 1950 to 70.2 years in 2017 (MoH, 2020a). Almost all the childhood vaccine preventable diseases are either eliminated or reduced to no more a public health concern. The national health survey by Ministry of Health (2012) estimated the maternal mortality ratio at 86 per 100, 000 live birth in 2012 comparing to 777 in 1984 and infant mortality rate were reduced from 102 in 1984 to 30 in 2012. While leprosy and iodine deficiency disorder had been eliminated, other communicable disease such as tuberculosis, Human Immunodeficiency Virus (HIV) infection and malaria are largely under control (Thinley et al., 2017).

Despite significant progress in prevention and control of communicable diseases and maternal and child health improvements, Bhutan's health system, like any other countries around the world, confronts numerous problems. While communicable diseases still have a long way to go, chronic NCDs are on steady rise and emerging diseases such as Multi drug resistant tuberculosis (MDR-TB) and covid-19 pandemic are resulting in a triple burden of disease exerting huge pressure on the already a resource constraint healthcare system. NDCs are rapidly increasing, this surge is attributed to population, rapid demographic transition, economic development, and globalization (Sharma et al., 2014). The proportion of senior adults (> 60 years) has increased from 6.98 percent in 2005 to 7.80 percent in 2017 (NSB, 2017) and it is expected to further increase to 15 % by 2050 (ADB, 2019), indicating burden of NCDs will keep on mounting as the frequency of NCDs increases with age. In the span of less than a decade the percentage of annual NCD morbidity attendance in outpatient department in the health centers has increased by 8% (MoH, 2021) indicating that the burden of Chronic NCDs is ever increasing. (Fig 3)

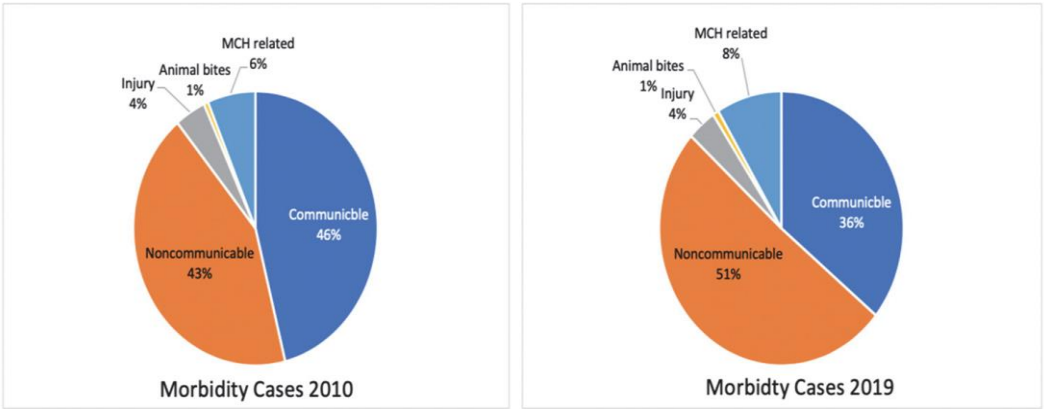


**Figure 3 Trend in morbidity of NCD in Bhutan**

**Source:** Annual Health bulletin, 2019

According to World Health Organization (2018) country profile report for non-communicable diseases such as cancer, diabetes, chronic respiratory diseases, and cardiovascular disease accounts for 69% of mortality in 2016. Cardiovascular diseases

accounts for 28% of total death followed by cancer (10%), chronic respiratory diseases (9%), diabetes (4%) and other NCDs (17%). The main risk factors contributing to NCDs are the modifiable behavioral factors leading to NCDs worldwide including lifestyle related factors such as unhealthy dietary habits and physical inactivity, as well as the hazardous use of alcohol and tobacco. This increase in behavioral risk factors results in biological risk factors such as hypertension, hyperlipidaemia, impaired blood glucose and obesity subsequently leading to NCDs (Budreviciute et al., 2020; WHO, 2021b).

National NCD risk factor survey, 2019 by Ministry of health (2020c) among the adult population aged 15-69 indicated that 42.9% of adults were found to be current alcohol drinker (past 12 month prior to survey) and 23.9% used tobacco product. People indulge into the high calorie and energy dense diets, excessive salt and fat, sugar sweetened beverages and alcohol, this culture now has penetrated the most remote corner of the country, while fruits and vegetables are sparsely consumed. The mean population sodium consumption in Bhutanese population is per day is 8.3gm against WHO's recommendation level of <5gm and 86.4% were not consuming the recommended five servings of fruits and vegetables indicating consumption of unhealthy food in 2019. Around 7.3% of adult were not performing WHO recommended level of physical activity of at least 30 min per day. These factors predispose biological risk factors such as overweight (33.5%), raised blood pressure (28 %) and raised blood sugar (2%). 11% of adult were reported to have raised cholesterol level among 90% are not aware of the cholesterol status. The prevalence of these risk factors is higher among the older age group of 40 to 69 years (MoH, 2020c).

NCDs poses the devastating health consequences for individuals and families and increasing burden on overall health system and the socioeconomic due to the chronic in nature of the diseases and which requires medical treatments which are expensive and often lengthy (Benziger et al., 2016; Budreviciute et al., 2020; WHO, 2014a). One of the implications of rising NCD epidemic in Bhutan is the increasing cost of referrals out of the country for complications such as renal failure and complicated cardiovascular diseases which is currently estimated around 5% of the total health expenditure (Thinley et al., 2017). The rapid increase in NCDs impedes

the achievement of GHN concept of socio-economic development because good health is essential to achieve the optimum happiness (Sithey et al., 2018). To respond to the growing NCD burden in the country the government established Lifestyle related disease program in 2009 to oversee all the activities and interventions for prevention and control the four major NCDs. THE WHO PEN initiative was adapted and implemented across the country for early detection, screening, and management in 2013 (Wangchuk et al., 2014). The government launched the Multi sectoral Action Plan in 2015 highlighting aspects of prevention, control, and management of NCD beyond health sector the whole of the government approach (RGoB, 2015a). Although, considerable progress in maternal and child health issues, prevention and control communicable disease, Bhutan is confronted with rising burden of chronic non-communicable. Experts recommends the health system wide approach for prevention and control non-communicable.

### 2.3 Overview of the health system in Bhutan

An organizations, institutions, resources, and people whose primary purpose is to improve health combine make the heath system (WHO, 2010a). It was in the early 1960s with the launch of the first five-year development plan (1961-1966), Bhutan embraced modern development in all sectors such as health, economy, education, and other social sectors. The formal modern health system was introduced in Bhutan in 1961 by establishing two hospitals by the Bhutanese doctor trained in India (Yangchen et al., 2016). Bhutan became a signatory to the Declaration of Alma-Ata on primary health care in 1978 Since then, the health system in Bhutan has evolved and progressed significantly improving the quality and longevity of life and achieved almost all the MDGs within the time frame (Thinley et al., 2017).

The health system in Bhutan is predominantly public financed and managed. Health care services are availed free of charge for all the citizens since the inception. The law of the country does not allow private health practice in Bhutan, except for private diagnostic centers and retail pharmacies (Sharma et al., 2014; Thinley et al., 2017; WHO, 2020a). This is further reinforced with the adoption of the Constitution of the Kingdom in 2008 which states that “The State shall provide free access to basic public health services in both modern and traditional medicine” (RGoB, 2008). The

national health policy by Ministry of Health (2011) provides fundamental and essential guidance for the health system entailing intersectoral collaboration, preventive, promotive and curative services for realizing the overall vision of health ministry and country, “The Nation with best health”.

Consequently, all the activities for prevention and control of diseases are executed through the health sector strategic and operational plans guided by the Gross National Commission aligning with the National five-year plan focusing on the all the six building blocks of the health system. Health services, health workforce, health information system, access to essential medicines health financing and leadership/ governance are the six core component of health system building blocks by World Health Organization (2010a).

### 2.3.1 Health services

Ensuring quality health service delivery is fundamental component of any health system (WHO, 2010a). The health services in Bhutan are delivered with the major thrust on primary health care and preventive aspects since the beginning of the modern health system in the 1960s. Comprehensive health care services are being delivered in an integrated three-tiered system with National Referral Hospital and regional referral hospitals at the top, district hospitals, and Primary Health Centers (PHCs) at mostly rural community Level (Thinley et al., 2017). In 2020 there were 1 national referral hospital, 2 referral hospital, 48 hospitals, 148 Primary Health Centre (PHCs), 54 Sub-posts, 552 Out-reach clinics, and 3 Thromde health centers (in the major cities but equivalent to PHCs) that cover 95% of population with 3 hours of travel (MoH, 2020a)**.**

The systematic referral of the patient from primary care to secondary and tertiary care services by healthcare center or self-referral to the higher level are carried out following the clearly defined patient pathways. However, referral systems are frequently bypassed leading to the congestion in the higher centers (Wangmo et al., 2018). For the lifesaving treatments beyond the clinical capacity and facilities in Bhutan, patients are being referred to aboard (mostly India) fully supported by the government (Thinley et al., 2017). Allopathic and traditional medicines are integrated into the national health system and the services are delivered from one facility under

the same roof. There are one traditional medicine hospital and 2 traditional medicine units across the country in 2020 (MoH, 2021).

**Table 1 Level of care, location, facility, healthcare workforce**

| Location | Level | Facility | Health workforce |
|---|---|---|---|
| Capital city (Thimphu) National | Tertiary care | 1 National referral hospital (NRH | Sub-specialist, specialist, medical officers, nurse, medical technologist/ technician, dentist, HA, and other allied health workers |
| Regional (Eastern and Central region) | Tertiary care | 2 Regional referral hospitals (RRH) | Specialist doctors, medical officer, nurse, medical technologist/technician, dentist, HA, and other allied health workers |
| District (all 20 districts) | Secondary care | District hospital (DH) 10 bedded- hospital* | Medical officers, nurse, medical technologist/technician, dentist, and HA |
| Sub district (206 gewogs) | Primary care | Primary health Center (PHC)** in Rural, Thromde Health center (THC), Sub post- far flung rural area | 2 to three HAs (preferably one female) |
| Village/Community | Out-reach clinic where primary healthcare workers visit on monthly basis. Village health worker support in maintaining the facility. | | |

*Previously known as BHU I. **Previously known as Basic health Unit (BHU II)

**Source:** Wangmo et al. (2018)

Healthcare services for chronic diseases are delivered from all levels of health facilities by the diverse range of healthcare workforce. Doctors, nurses, nutritionist, and other allied health workforce are responsible for healthcare services on hospitals, HA are the main healthcare worker in PHC for prevention, control, and care of NCDs.

### 2.3.2 Health workforce

The adequate and equally distributed human resource with necessary knowledge, skills, and motivation for delivering health services is imperative in meeting the overall health goal (WHO, 2010a). In Bhutan the human resource division in the Ministry of Health is responsible for national-level planning, recruitment, management, development, and deployment of HRH conforming to The HRH Master Plan (2013-2023). The deployment within each district has been decentralized to the district health administration within the jurisdiction (Thinley et al., 2017). The health workforce has taken a great stride with 4 (two doctors and two nurses) in 1961 to 5901 in 2019, healthcare workforce of all levels including administrative and support personnel (MoH, 2019; Thinley et al., 2017), however the shortage of health workforce continues to exist, especially the professional healthcare workforce such as specialist, medical doctors, and dentist. The shortage is further escalated with the emerging challenges associated with the increase in chronic disease such as NCDs, expansion of new services, technologies, and increasing urbanization resulting in evolving health needs and demand for better healthcare services (Tangcharoensathien et al., 2018; Yangchen et al., 2016).

Human resources in the health system are structured with HA at PHCs and sub-posts, general medical doctors, nurses, medical technicians/technologist, HA and other allied healthcare worker at the secondary level, specialists and superspecialists, doctors Nurses, medical technicians/technologist, HA, and other allied healthcare worker at the tertiary level (Table.1). The secondary and tertiary health centers are supported by broad array of allied healthcare workers and nurses. Today there are 376 medical doctors, 1187 medical technologists, and technicians, 620 Health Assistants, 1364 Nurses providing various health services. Approximately 25% of healthcare workers hold bachelor’s degrees and above and the rest have the qualification of

diploma or certificate (MoH, 2020a). The ratio of doctors, nurses and midwives combined is 1.24 per 1000 population which is below the global recommended level of 2.28 per 1000 population. In 2017, the number of doctors and nurses per 10,000 population was 3.3 and 14.1, respectively (Tuangratananon et al., 2019). The Bhutan medical and health council (BHMC) regulate the human resource for health to improve and sustain quality services by ensuring that health professional meets the minimum competency level and ethical standards (Thinley et al., 2017).

### 2.3.3 Medicine, equipment, and technology

In Bhutan all the medicines and medical supplies are centrally managed and procured to by the Ministry of health for all the health centers in the country. The annual procurement is carried out by the department of medical supplies and health infrastructure (DoMSHI) under ministry of health according to the estimates of respective health centers (Thinley et al., 2017). The regular update of national medicine list and availability and use of Standard Treatment Guidelines (STGs), having formularies and the absence of a private sector facilitate rational use of medicines. The availability of over 90% of essential drugs is maintained throughout the year (Sharma et al., 2014).

All the essential medicine and diagnostic equipment for the NCDs are supplies to the health centers according to Essential drug list (EDL) of Ministry of health for different level of health facility through annual requisition and supply system. The drugs and medicine which are not available in the lower health centers can be mobilize through special mechanism for requisition name patient base requisition to the higher health centers (Thinley et al., 2017). The PEN clinical audit conduct in 2016 revealed that essential NCD equipment such as glucometer, sphygmomanometer, weighing scale and stadiometer are available in more than 90% of PHCs (WHO SEARO, 2017). Consequently, the adequate supply of medicine and equipment enhance the quality of care and prevent complications due to chronic diseases.

### 2.3.4 Health information

Reliable and current health information is essential for the overall health system development and functioning (WHO, 2010a). All the health information system is being managed by the health information unit in ministry of health. The health information in Bhutan is mostly maintained manually by the health workers. The morbidity and activity data in the health centers were collected, complied, and reported manually and paper based until the introduction of District Health Information Software 2 (DHIS2), the web-based information system in 2014. DHIS2 is used for entering aggregate data on activities, including morbidity data by health centers by all level of health facilities with internet connectivity. Health facility without internet connectivity is mandated submit the using standard reporting forms to District Health Office (DHO) to input the data into DHIS2 (WHO, 2018b; Thinley et al., 2017). It has been implemented in all the 20 district health offices, all hospitals which have internet connectivity. All the health information generated from the DHIS2 are being published in the annual health bulletin by ministry of health to be used for planning of health interventions at the both the national and district levels, and to review the health indicators The patient information is being maintained paper based in health centers and the health record of individual patients were maintained in patient prescription booklet/sheet carried by patient themselves. The web based electronic patient information system (ePIS) is in the process of development (MoH, 2020a; Mongal Singh et al., 2019). The morbidity and mortality information for NCDs are collected through DHIS2 system, while the NCDs risk factors information is being collected through nationwide NCD risk factors STEPs survey that is being carried out every five years. This heath information is important to develop appropriate planning and allocation of budget.

### 2.3.5 Health financing

The healthcare in Bhutan is predominantly public financed conforming with the constitutional mandate of providing free access to basic public health services. However, the citizens enjoy the free access to comprehensive health services including referral outside the country when treatments are beyond the clinical capacity and facilities available in the country (Sharma et al., 2014; Thinley et al.,

2017). The government is the primary source of health financing in Bhutan (80.1%), followed by out of pocket (OOP) expenditure (15.4%), and external aids (3%) in 2019 (MoH, 2021). The Bhutan Health Trust Fund (BHTF) initiative to was launched in 1998 to ensure sustainable free healthcare to the population. The BHTF have been financing the vaccine and it had started cost sharing to finance essential medicine since 2014 contributing 5.4% of the health expenditure (Thinley et al., 2017).

The GDP allocation for the health sector continues to be around 4% over the years (MoH, 2021). while on the other hand the spending on the per capita spending on the health increase steadily over the years. According to the WHO health expenditure profile the per capita spending in Bhutan has increased from 30.9 USD in 2010 to 102.7 USD in 2018 (World Health Organization, 2021a). The expenditure on the curative services exceeds the preventive services. In the fiscal year 2012-2013 the spending on the curative services was 70% against the 2 % for preventive services. This is mainly due to increasing referral cost outside the country for treatment. The referral cost amounts for almost 5% of the total health expenditure (Thinley et al., 2017) and the top three referral outside the country were the chronic diseases such as cancer, heart diseases and kidney diseases.

### 2.3.6 Leadership and governance in health care

Leadership and governance are an integral part of the health system for improving the better health outcomes (WHO, 2010a). In Bhutan health ministry is led by the democratically elected Health Minister. The head of the bureaucracy is the secretary of health supported by the directors for the respective departments. There are five departments in the ministry of health including Department of Public Health (DoPH), Department of Medical Services (DoMS), Department of Medical Supplies and Health Infrastructure (DoMSHI), Department of Traditional Medicine Services (DoTMS) and the Directorate Services. Under each department, there are different divisions working on different activities to achieve the common goal.

The Ministry of Health (MoH) has the sole responsibility for policy formulation, health planning, policy implementation, monitoring, and supervision of services both in traditional and modern medicines. Moreover, it provides technical guidance to the district health management and ensures continued availability of

medical and non-medical supplies and human resources. The district level health planning and management were decentralized to the district health management team headed by the district health Officer (DHO) within the framework of local government. While the district hospitals and PHCs within the districts are administered under the district health system, the referral hospitals are managed vertically by ministry of health. Medical superintendent is the team leader in the regional referral hospitals and the National referral hospital in the capital city is being led by the President of the hospital (Dorji et al., 2019; Thinley et al., 2017). Non communicable disease division (NCDD) under DoPH is designated to look after the activities related to chronic non communicable diseases (Thinley et al., 2017). Strengthening the health system including health service delivery, health workforce, health information system, access to essential medicines, health financing and leadership/governance is crucial to provide integrated non-communicable disease services to optimize the quality of care across all trier of health care delivery (WHO, 2010a). Competent health workforce enhances the integrated health services delivery for the population they served. Strengthening a competency of health workforce warrants provision of coordinated/integrated health services (Langins & Borgermans, 2015).

**2.4 Primary health care**

In 1978 the Alma Alta conference defines primary health care as a whole-of-society approach for providing essential health care that are practical and scientifically sound for health promotion, disease prevention, treatment, rehabilitation, and palliation which are accessible, acceptable, and affordable for the individuals and families in the community (WHO, 1978). Primary healthcare entails both individual patient care and public health functions. Primary care is the first level of contact with the health system for promotive, protective, preventive, curative, rehabilitative, and palliative services for the individual health care (Muldoon et al., 2006). Primary healthcare and primary care are often interchangeably used, however Muldoon et al. (2006) states that there exists the thin line between the two concepts. He describes that primary health care broadly revolves around health policy and service provision for approach for both the individual patient care and population health while primary

care is the “family doctor-type” where services are mostly provided to the individual level. Starfield (1998) summarized that the ideal characteristics of primary care as comprehensive, coordinated, continuous, integrated, and accessible care which is most appropriate for the care of chronic diseases. Healthcare services delivered through primary health care are cost effective, community based, and sustainable contributing in prevention and control of non-communicable disease. Therefore, Bhutan being the low resource country, the health services are provided with the major thrust on the primary health care approach since the inception of modern health care system (Thinley et al., 2017).

### 2.4.1 Development of primary health care system in Bhutan

Modern Health care in Bhutan was first established in 1961 with the initiation of first five-year plan. Bhutan became the member of WHO and signatory to the Alma Alta declaration on primary healthcare in 1978 (Thinley et al., 2017). Since then, the progressive health system built on the Primary health care approach reaching all corners of the country (Yangchen et al., 2016). The primary health care services are availed from all levels of health facilities starting from the referral hospitals and district hospital to PHCs. It is relatively well organized and evenly distributed to serve the geographically dispersed population. Primary care service is supported by secondary and tertiary care services through institutional referral or self-referral (Dorji et al., 2019; Thinley et al., 2017).

PHCs are the main health centers for providing primary health care services nearest to the population in the far-flung rural areas across every corner of the country (MoH, 2011; Sharma et al., 2014). PHCs are the health care facility serving a minimum catchment population of 1500 to 3000 and located not more than three hours walking distance from the catchment population (MoH,2017) and governed by the district health administration. In 2020 there are 238 PHCs including Outpost clinics, distributed in every rural sub-district locally known as gewog (sub-district) in Bhutan. The PHCs are extended to the far-flung communities by the outreach clinic (ORC) where health worker visits on monthly basis to provide services related to maternal and child health, chronic disease follow up and other preventive and health promotion activities. Thromde health Centre (THC) are the primary healthcare centre

in the major urban areas which has an equivalent function as the PHCs. The main functions at the PHCs are the promotion of health, prevention of disease, early diagnosis of disease, and rehabilitation (MoH, 2020a). Therefore, for prevention, control, and care of chronic diseases, it is imperative to understand the health system at primary health care level.

### 2.4.2 Services in primary health care

In the PHCs the health worker provides primarily maternal and child health services such as antenatal and postnatal screening, immunization, growth monitoring and nutrition support and contraception. They also provide screening for general health conditions such as blood pressure and physical examinations. They also collect pap test samples for cervical cancer screening and send the sample to hospital and perform rapid laboratory examination such as blood haemoglobin, random blood sugar and urine stripe test for albumin and sugar. PHCs have a suitable range of medicines including antibiotics, antihypertensives and some antidepressants. Minor surgical interventions such as wound care and acute injuries are being managed in PHCs. Other services including elderly care, basic mental health services, alcohol detoxification, basic rehabilitation services for persons with disabilities, health education and awareness program to the communities and monitoring of drinking water quality and sanitation are carried out routinely. The Primary care workers are trained on community- based rehabilitation for patients with disabilities, WHO package of essential non communicable diseases intervention (PEN) for management of chronic diseases, particularly NCDs (Thinley et al., 2017; WHO, 2020a).

### 2.4.3 Health workforce in primary health care

The main health workforce in primary health care facilities is HA. They are recognized as the core health workforce of primary health care providing services across the country. Bhutan is one of the few countries in the South- East Asia Region, where non-physician primary health care workers or HA are authorized to screen and prescribe medicine for minor health ailments including NCDs (MoH, 2020b). PHC are staffed with two to three HA preferably one female. The HA come from varying levels of qualification, while most of the HA are trained two years courses in

community health while some are trained for three years, and few have Bachelor's degree in Public Health (MoH, 2019; WHO, 2020a). HA are trained to provide preventive and promotive services in the community along with treatment of minor aliment and follow-up and care of the chronic disease. Generally, three years training program is expected to develop the competency on the clinical skill in identifying the health problem and provide prompt management, mother & child health care, be able to communicate effectively, be able to collaborate with other sectors and community, understand research process, and have leadership qualities for decision making (WHO, 2020a). At the grassroots level, PHC are supported by the village health workers who play a role in health promotion and act as a bridge between health services and the community (Thinley et al., 2017).

While HA are mandated to work in rural PHC, HA are also being placed in secondary and tertiary hospitals to provide the primary care services (mostly mother and child health services) in the urban areas. Currently 63.4% of HA are placed in PHC and 36.6% in the secondary and tertiary health facilities (MoH, 2019). HA are the main health workers to provide overall health services including care for chronic disease in the PHC.

### 2.4.4 Medicine, equipment, and technology in primary health care

All the medicines, medical equipment, and technologies in PHC are centrally procured and distributed. The procurement of medicine is being carried out according to the requisition placed by the health centers following essential drug/medicine list which has been maintained and updated on the periodic basis by ministry of health. The type of the medicine and diagnostics technology available in the health facilities depend on the service capacity of the health facility as mentioned in the EDL. However, some medicines meant to be use at a higher-level facility were found at lower-level facilities mainly for the purpose of prescription refills (Thinley et al., 2017).

The essential medicines for management of chronic diseases such as hypertension, chronic respiratory medicines, diabetes, and access for prophylaxis treatment of rheumatic heart disease are generally available in the PHC. While the insulin, oral morphine, and nicotine replacement therapy are available only in the

hospital level where medical doctors are available. In general, all the PHC are supplied with basic NCD screening and monitoring equipment such as blood-pressure measuring instrument, glucometer, weighing scale and stadiometer and essential medicines (as per the EDL) for chronic diseases. Thus, adequate supply of diagnostic and screening equipment and medicine enhances the effective prevention and control of chronic diseases.

### 2.4.5 Health information in Primary health care

Health data and information are imperative to understand the health status of the community and the country in general. Health information in the primary care in Bhutan include monthly morbidity and mortality data. Monthly activity report such as maternal and child health, family planning and disease screening data. Household information in the catchment area. All the health data and information in the PHC is maintained paper based and by the end of the month the data are being entered in the DHIS2 web base system. The individual information is maintained in the register book and patient themselves in the form of prescription paper. There is no electronic patient information system (Mongal Singh et al., 2019; Thinley et al., 2017). The morbidity and mortality related NCD information are collected through the DHIS2 system, while the disease control rate and patient information are maintained paper based or in the computers of respective health centre. Moreover, NCD risk factor survey is being conducted every five years to determine the prevalence of the risk factors in the population. Consequently, the information can be used to develop evidence-based decision or policies for prevention and control of chronic diseases.

### 2.4.6 Healthcare financing in primary health care

All the financial matters in the PHC are governed by the district health administration. PHC do not have any stake of planning and budgeting because procurement of all medicine and equipment and are being carried out centrally and the planning of program are conducted by the district health administration for PHC. There does not exist financial allocation processes and transfer of budget for PHC, district health administration office carrys out all the financial matter including staff

salary, renovation and maintenance of the facility, capacity building, and conducting health programs (Thinley et al., 2017). Therefore, PHC does not have any control in financial planning and allocation.

### 2.4.7 Intersectoral collaboration in primary health care

Chronic diseases are often associated with the complex factors such as poverty, urbanization, and globalization. Intersectoral collaboration between different stakeholder outside health and within has proven successful in significantly improving the impact of NCDs (Haque et al., 2020). The healthcare workers across the health system are expected to work in harmony within and beyond health sectors to achieve overall health outcome. In primary care facilities, HA need to collaborate with the other sectors to address the social determinates of health which are beyond the scope of health sector. At primary care level, the PHC collaborate with the local government, agricultural sector, monastic body, education sector and community member for health promotion, prevention and control of chronic diseases (RGoB, 2015a).

Thus, understanding the capacity of health system at primary health care level is crucial. This is because there are mounting evidence that the NCD services provided through primary health care approach are cost effective, more accessible, and sustainable for chronic diseases that stems from the complex web of causation and last for the longer duration.

## 2.5 Non communicable diseases (NCDs)/Chronic diseases

Non communicable diseases (NCDs), often known as chronic diseases are defined as the medical condition that are lasting over the period of years and decades requiring ongoing medical treatment and management (Pruitt, 2002; WHO, 2021b). NCDs are gradually developed because of genetic, physiological, environmental, and behavioral factors (Benziger et al., 2016; Budreviciute et al., 2020). Therefore, NCDs are also known as chronic diseases. There are numerous chronic diseases causing burden to the human health, however, the major chronic diseases include diabetes, heart diseases, asthma, chronic respiratory diseases, and mental disorders (WHO, Pruitt, 2002; 2021b). The population aging, globalization and urbanization are the

main driver of the NCDs epidemic, aggravating situation to worst. These NCDs are attributable to the behavioral risk factors such as tobacco use, alcohol consumption, unhealthy diet, and physical inactivity. The behaviors lead to four key metabolic alterations such as raised blood pressure, overweight/obesity, hyperglycemia (high blood glucose levels) and hyperlipidemia (high levels of fat in the blood) that increases the risk of NCDs (RGoB, 2015a; Widyahening, 2019; WHO, 2016; WHO, 2021b).

Globally NCDs are not only the leading global burden of disease but also causes a huge burden on global economic. According to the world Economic Forum (2019), the world will lose 48% of global GDP ($30 trillion) to the treatment of NCDs by 2030, if not addressed appropriately (Kamineni, 2020). In 2021 WHO estimates that 41 million deaths worldwide are attributed to NCDs and 36.6% of these deaths happen between the age of 30-69 years. 85 % of these premature death NCD deaths occur in low- and middle-income countries (LMIC) (WHO, 2021b). In the Southeast Asia NCDs accounts for 8.9 million deaths, equivalent to 64% of all deaths and half of these are premature death (Mahipala et al., 2018). Bhutan is one of the LMICs where rising NCD are the major public health burden. The NCDs account for 69% of the total death in 2018 in Bhutan (RGoB, 2015a; WHO, 2014b). Although the increasing burden of NCDs is putting a strain on health systems, many chronic diseases are preventable and controllable with the timely and appropriate efforts by the government, community, and individuals.

### 2.5.1 Prevention and control of chronic diseases/NCDs in Bhutan

Noncommunicable diseases (NCDs) including cardiovascular diseases, diabetes, cancer, and chronic respiratory disease cause the substantial burden to the health and economy of the country (Benziger et al., 2016; WHO, 2014a). NCDs are the leading cause death and disabilities in the world acounting for 77% of NCD deaths occur in low- and middle-income countries (LMIC) (WHO, 2021b). In 2018, NCDs were responsible for 69% of the total death in Bhutan (WHO, 2018). Appropriate policies and cost-effective interventions at the national and local level are essential to strength NCD services. Healthcare workforce, essential medicine and technologies,

and information system are the vital component of primary health care system to respond to the escalating burden of NCDs (Mahipala et al., 2018).

In Bhutan, ministry of health committed is to address the key challenges of NDCs by establishing Non communicable disease division under department of public health in pursuit of management of NCDs burden in the country. The national health policy provides and overarching guidance for development of all the health-related plans and strategies (MoH, 2011). Several population-based strategies were formulated including National policy for the prevention and control of NCDs in 2009 (RGoB, 2009). National multisectoral action plan for prevention and control of NCDs in 2015 (RGoB, 2015a). Furthermore, policies have been framed to control the NCD risk factor such as tobacco and alcohol use (RGoB, 2013, 2015b).

Furthermore, for individual level intervention and build healthcare workforce capacity to prevent, control and long-term care of NCDs, in 2012 the ministry of health has adapted and initiated the implementation of WHO's Package of Essential Noncommunicable (PEN) Disease Interventions. It comprises of risk factor management, early detection, treatment, and long-term care chronic diseases (NCDs) (WHO, 2020b). Since the introduction of PEN program in Bhutan, series of trainings were being conducted to build the capacity of the healthcare worker to manage NCDs effectively. Health facilities are supplied with essential medicines and diagnostics equipment for screening and NCD management. Subsequently the separate diabetes clinics were establish in all hospitals in 2013, which later was upgraded to NCD clinic to provide comprehensive NCD services (Thinley et al., 2017; Yangchen et al., 2016).

To control and manage the common risk factor, Bhutan works towards strengthening the best buy interventions for primary prevention of NCDs to reduce prevalence NCDs (RGoB, 2015a). It includes placing embargo on production and marketing of tobacco and smoking in public places, implementation of alcohol sale and restriction, promotion of a healthy diet and physical activity (RGoB, 2009). Physical activities are being promoted through creating awareness throughout different walks of life and establishment of the outdoor gyms, walking trails and other physical activity facilities in the strategic locations in all 20 districts particularly in the urban areas (Yangchen et al., 2016). Education and awareness on salt, sugar and fat reduction and adopting healthy food choices are being conducted through different

medium. Consequently, prevention of the chronic diseases includes management of risk factors at the education and counselling and providing comprehensive, coordinated, continuous care throughout disease trajectory.

### 2.5.2 Policy and Strategic Framework on Prevention and Control of NCDs in Bhutan

To tackle the growing epidemic of the chronic diseases it is critically important to develop polices and strategic action plan and framework for prevention and control of NCDs. In 2013, the 66$^{th}$ World Health Assembly endorsed the Global Action Plan for Prevention and Control of NCDs 2013–2020 comprising of 9 voluntary global NCD targets and 25 indicators to be attained in 2025, including a 25% relative reduction in premature mortality from NCDs by 2025 (WHO, 2013). NCDs are well embedded in the sustainable development goals (SDG) 2015. SDG target 3.4 entails to reduce the premature death form NCDs by one third by 2030 (Nugent et al., 2018). Bhutan's response to growing prevalence of chronic diseases in the country are guided by the overarching National health policy, 2011 (MoH, 2011) and National multisectoral action plan for prevention and control of NCDs 2015 (RGoB, 2015a). Other NCD related health policies including National policy and strategic framework to reduce harmful use of alcohol 2015-2020 (RGoB, 2009) and national tobacco control rules and regulations 2013 (RGoB, 2013). NCDs are deeply anchored in many of the important national policies and strategies to prevent and control NCDs and its complications.

### 2.5.3 National health policy

The National Health Policy was promulgated and pass by the cabinet in 2011, prioritizing on the realization of universal health coverage (UHC) on the principles of primary health care. The National health policy provides overarching fundamental guidance for the government on health system, disease control, medical care, and partnership in health to achieve international and national goals for health. NCDs holds an important place in the National health policy. It states that to address the NCDs the government should focus on prevention strategies by responding to the unhealthy lifestyle through advocacy, risk surveillance and analysis and holistic

interventions (MoH, 2011). Furthermore, it states that “health promotion, disease prevention and health care services will be incorporated as a vital component in the entire relevant programs, and appropriate measures will be instituted to intensify health promotion interventions that address social determinants causing life style related diseases” (Ministry of Health, 2011). However, although strong policies and strategies exist, prevention, and control of NCDs remains beyond the health sector alone because of the underlying socio economic and demographic risk factors. Coherence of policies and multisectoral action is imperative.

### 2.5.4 Multisectoral Action Plan for prevention and control of NCDs

The national multisectoral NCD action plan endorsed in July 2015. The action plan was developed to ensure a multisectoral approach to reduce NCD risk factors through a ‘whole of society/government’ approach by 2020. This Action Plan is designed for the integrated approach by relevant stakeholders and focusing on addressing the major modifiable risk factors and their determinants because most of NCD risk factors are beyond the control of health sector because response initiatives limited to health sector proves to be futile (RGoB, 2015a; Tuangratananon et al., 2019)

The Action plan entails four broad action areas including 1) advocacy, partnership, and leadership, 2) health promotion and risk reduction 3) health systems strengthening for early detection and management of NCDs and their risk factors Surveillance and 4) monitoring and evaluation, and research. The action area 3, health systems strengthening for early detection and management of NCDs, and their risk factors surveillance explicitly describes the actions on strengthening health system, particularly the primary health care, improved access to health-care services, increased competence of primary health care workers to address NCDs, and empowerment of communities and individuals for self-care (RGoB, 2015a).

### 2.5.5 The WHO PEN guideline

The Package of essential noncommunicable (PEN) disease interventions for primary health care in low-resource settings was first introduced in 2010 to respond to need of growing NCD epidemic. It is a prioritized set of cost-effective

action-oriented interventions for NCDs to strengthen health system capacity to integrate and intensify care of NCDs in primary health care in low resources settings. PEN consist of evidence-based interventions structured in a simple algorithm to prevent, detect, treat and care of cardiovascular diseases, diabetes, asthma, and obstructive pulmonary diseases, provide health education and brief interventions to manage risk factors with the clear referral criteria for NCD complications and women with suspected breast and cervical cancers (WHO, 2010). WHO PEN evolved through many phases since the inception in 2010. In 2013 a set of comprehensive tools were added, and it was revised in 2017 including best buys component and other recommended interventions for the prevention and control of NCDs. WHO HEARTS technical package modules were published in 2019–2020 (WHO,2020b).

Bhutan piloted WHO package of noncommunicable disease intervention (PEN) program in 2009-2010 in two districts. Following its successful implementation, in 2012, the Ministry of Health expanded the PEN as a national program in all the 20 districts (Wangchuk et al., 2014). In 2016, a PEN clinical audit conducted by ministry of health observed improvement in NCD service availability in district hospitals and PHCs. However, certain gaps were identified related to health workers' prescribing practices, poor follow up of patients and referral practices resulting in treatment interruption due to lack of guidance and limited competency of the healthcare workers. Supportive supervision and clinical mentoring of health facilities at all levels were not adequate (WHO SEARO, 2017). These are important health service delivery leverage points that provide opportunity for further improvement of PEN services.

To address the deficiencies and keep abreast with the evolving medical knowledge, Bhutan adapted the revised version of WHO PEN interventions incorporating the complementary modules from HEARTS technical package in 2018 (MoH, 2019). WHO HEARTS includes the protocols on; 1) healthy lifestyle counselling, 2) evidence-based treatment protocol 3) access essential technologies and medicines, 3) risk-based management 4) team-based care and 5) system of monitoring (WHO, 2016). The newer version PEN initiative is being implemented through people centered care approach which comprise of seven core components including recall/reminder, refill of medicine, responsive referral (bidirectional between PHCs

and Hospital), reach out to home/bed bound patients, real time mentoring and support, reliable laboratory diagnostic services and robust team based. The care delivery is well-coordinated, comprehensive, and continuous across different levels of health system within and outside the district. The implementation was started in Punakha and Tsirang districts and started to expand to other districts on the phase wise manner. PEN interventions has been fully implemented in another two districts of Wangdue Phodrang and Zhemgang making the total of four districts by the end of 2019 (MoH, 2019). The initial evaluation report for the PEN HEARTS (final report yet to be published) carried out by the KGUMBS observed the improvement in the quality of NCD services, patient satisfaction and health worker's knowledge score in the PEN implementing comparing to non-implementing districts (KGUMBS, 2020). Therefore, currently PEN intervention is by and large the only intervention for prevention, control, and care for NCDs in Bhutan.

### 2.5.6 Impact of prevention and control of NCDs in Primary health care

As envisaged in the Alma-Alta declaration for primary health care in 1978, primary health care is the whole of the society approach for achieving the best health care services accessible to all the people, as near as possible to the community to achieve universal health coverage (WHO,1978). Primary health care is recognized as the crucial foundation of the health care system (Ramli, 2008) for effective prevention and care for NCDs (van Weel et al., 2016; Widyahening, 2019).

In the wake of rising epidemic of the chronic diseases, the core primary health care principles including comprehensiveness, continuity and coordinated care (Starfield, 1998) are the crucial for high quality care and management of the chronic diseases. Literatures show that policies and interventions aimed towards management of chronic diseases through primary health care are cost effective, affordable, and enhance equitable distribution of the health services (Ramli, 2008; Varghese et al., 2019; Widyahening, 2019).

Varghese et al. (2019) illustrate that integrating NCDs in primary health care will help in improvement in quality of care through increased accessibility, enhanced health outcome and decreases the hospitalization. Furthermore, they urged that task shifting through use of non-physician healthcare workers in primary care play a

greater role in reducing the health care cost for NCDs. The lack of effective primary care and care coordination in the health care system will lead higher hospital admission, more drug interactions and disease complication among the people with chronic diseases leading to severe complications and expensive treatments at secondary and tertiary levels (Ramli, 2008). Thus, primary health care is seemingly the best approach for management and care for chronic diseases.

In summary, prevention, control, and care of chronic diseases necessitates comprehensive and integrated healthcare services supported by appropriate policies and cost-effective interventions at primary health care level. Moreover, Mahipala et al. (2018) ascertains that the fundamental component for responding to rising NCDs in primary health care are uninterrupted supply of medicine and technologies, health information and competent healthcare workforce.

## 2.6 Competency of healthcare workforce in prevention and control of NCDs/chronic diseases

Given the burden of chronic diseases in the world, the flexible, responsible, and effective means and innovative approaches to chronic disease prevention and management is imperative (Kane et al., 2019). For the chronic disease prevention and management, it is important that the health care provider require abilities, knowledge, and skill to meet the new complexities (Pruitt & Epping-Jordan, 2005; Quinlan et al., 2010). Health care workforce is the significant component of health system in stimulating, creating, and sustaining health care services. It is crucial that health care workers acquire appropriate competencies and expand new competencies to meet the complex health needs of chronic diseases care (WHO, 2005) .

### 2.6.1 Definition of competency and the impact of competency performance

Competency is the word originated from Latin word competentia, which means suitability or fitness. Competency is the ability and capability to perform (WHO, 2015). Spencer & Spencer defines competencies as “an underlying characteristic of an individual that is causally related to criterion-referenced effective and/or superior performance in a job or a situation”(Chouhan & Srivastava, 2014). In

this definition underlying characteristic indicates that the competence is rooted in the personality traits and can predict behavior in wide variety of situations and work. ‘Causally related’ indicates that competency predict the behavior or performance. Criterion-referenced indicate the competency are measured on a specific criterion or standard to predict performance level of an individual. Furthermore, Boyatzis (2009) ascertained that competencies are the different set of interrelated behaviors organized around an underlying construct called intent”. The behaviors are another form of intent that exhibits according to various situation or times.

Royal Civil Service Commission (2019) of Bhutan defines competency as a “cluster of observables, measurable, and highly interrelated attributes, including knowledge, skills, and abilities (KSAs) that give rise to the behaviors needed to perform a given job effectively to contribute to organizational success”. The competency share the iceberg analogy, knowledge and skill make only one-fifth of the visible component of competency above the surface of the water, while behavioral components such as attitude, qualities, self-image, motive, and organizational fit make up the majority of what lies beneath the water's surface. (Royal Civil Service Commission, 2019).

According to World Health Organization (2005), competency is defined as the abilities, knowledge, attitudes, skills, and behaviors that are essential for achieving desired outcome, enhance job performance and support organizational successes. Health care competencies are the standards that healthcare workers perform while providing health care services. Competency can be developed during the pre-service education as well as in service education and it does not limit to the technical knowledge (Kak et al., 2001). Langins and Borgermans (2015) ascertains the competencies are acquired over the period and it is measurable, must be flexible and it informs recruitment, evaluation, and training. Competency help to unite healthcare workforce together. Furthermore, it is important to understand that competency ais not limited to clinical- technical skills, but also includes soft skills. Those are the key facet of the healthcare workforce competency.

Overall, the competency has been defined by different authors according to intended context of the authors, however the main essence of competency underlies the behaviour to enhances performance and achieving the success and goal. The

healthcare workforce competency in prevention, control, and care for chronic diseases requires different set of competencies.

### 2.6.2 Competency in prevention and control of chronic diseases

Until 2015, countries around the world had been working to achieve MDGs targets, which were mostly for the communicable diseases and maternal and child health service and no mention about the NCDs (Buse & Hawkes, 2015). On the other hand, chronic diseases are constantly on rise causing substantial burden to the patient, families, and society. The health system built on the care of acute diseases in 20$^{th}$ century are less effective for the 21$^{st}$ century health concern, the chronic diseases. Chronic care competency of the health care provider is the cornerstone for effective management of chronic health problems (Kane et al., 2019) because health care services for chronic disease is intrinsically different from the acute and episodic health issues (Pruitt & Epping-Jordan, 2005; Ramli, 2008). Effective care of chronic health problems requires a comprehensive, well-coordinated, patient-centered and continuous management over the period of years or decades (WHO, 2005). Competent health workforce is directly associated with the quality of care and health outcomes (Langins & Borgermans, 2015). For the prevention, control and care of chronic diseases, healthcare workers require a different set of core competencies for better health outcome and improved quality of life (Pruitt & Epping-Jordan, 2005)

World Health Organization (2005) defines chronic care competency as skills, ability, knowledge, attitude, and behavior in the practice for prevention and care of chronic diseases. It is the indispensable, basic and core competency required for delivering care for the chronic conditions irrespective of the discipline. Chronic disease care competency has been formulated by various professional organization, however, the list of core competency proposed by WHO are the basic competencies healthcare workforce must possess in addition to the respective clinical competency for effective prevention, control, and care of chronic diseases.

### 2.6.3 Trainings and education on chronic disease prevention and control in Bhutan.

A well trained, skilled, and motivated health work is the backbone of the quality health care services. In Bhutan the health care workforce is the team of varied discipline of health profession trained from the different universities around the world and from the only medical university in the country, KGUMSB. HA are the main healthcare provider working in PHCs trained within Bhutan for 2 to 3 years (MoH, 2020b).

According to the competency-based framework for health Assistant by Ministry of Health (2020b), HA are trained on theorical knowledge and on-job clinical practice to develop necessary competencies to work independently at the PHC remote villages (WHO SEARO,2020a). The framework identified three key roles including services provider, health educator and primary healthcare manager and 8 competency area clustering under the different key roles for HA. As a services provider the trainees are being trained in clinical aspects of diagnosis and treatment of common health problem including maternal and child health services, application of safe practices and effective communication. As a health educator, HA are being trained on application of public health aspect for prevention of diseases and promotion of health in the communities and among their colleagues. HA are also being trained on leadership and management in health system for administration and planning of services in the communities (MoH, 2020b).

The clinical training for diagnosis and management of chronic disease among primary health care provider starts from the pre-service training. To supplement the pre-services training for the management of NCDs, Bhutan adapted WHO PEN intervention for prevention, early detection, and treatment of the NCDs since 2012 and trained all the PHWs in the country. As WHO revised and updated the PEN guidelines, Bhutan embraced and adapted new version of WHO PEN according to the Bhutanese context in 2018. The revised WHO PEN consist of the component with more focus comprehensive, coordinated, and continuous care of chronic disease. Since 2018 PHWs are being trained on WHO PEN putting more focus on team-based and people centered NCD services designed for improving patient care, the referral system, proactive patient follow-up and building the team through mentoring and

coaching. This has been successfully piloted in two districts, currently the healthcare worker trainings are underway for the expansion across the country. The PEN training of the health care workers was being cascaded from the master trainers in the medical university, KGUMSB to the district core group and then to the other healthcare worker. The package of online course for WHO PEN was developed for the healthcare worker to supplement the training (MoH, 2021; WHO SEARO, 2020a). The Ministry of health planned to the scale up the program across the nation by 2020, unfortunately the implementation process was impeded due the covid-19 pandemic. The administrative information reported that PEN trainings for the health workers is being started back since mid of 2021 as Bhutan successfully control the new community cases of covid -19.

Most of the pre-service and in-service trainings emphasis on enhancing knowledge and skill rather than personal traits. For this study the 5-dimension chronic care competency proposed by World Health Organization (2005) will be employed because these competencies are essential, basic, requites and indispensable cornerstone for delivering chronic disease care. Moreover, these competencies have been deliberated and supported by most of the influential health professional organization including World medical organization, international council of nurses, International pharmaceutical federation, European respiratory society as well as international alliance of patient organization. Moreover, this study plans to assesse the PHCW's competency in prevention and control of chronic diseases with the expectation that the finding from this study will help to develop and improve training programs for PHWs so that they can deliver NCD services competently.

## 2.7. Relevant literature

### 2.7.1 Competencies of health care provider (General)

Institute of Medicine (2003) (IoM) as mentioned in their book "Health Professions education: A bridge to quality (2003)" proposed a set of five core competencies the health workforce should possess to manage the health problems irrespective of the discipline. It includes 1) provide patient-centered care, 2) work in interdisciplinary team, 3) employ evidence-based practice, 4) apply quality improvement and 5) utilize informatics. IoM urges that these five competencies are

meant to be core competency and not an exhaustive list for managing the 21st century health care need.

The study by Kuo et al. (2021) conducted the community health nursing competency and psychological and organizational empowerment of public health nurses: a cross-sectional survey nationwide survey design. A self-developed structured questionnaire was administered to public health nurses. This research measured the competency including 1) community care nursing competence (community care, communication, and management) and 2) community empowerment (psychological community empowerment and organizational community empowerment).

Dois et al. (2018) conducted Training and competencies for primary care teams from the perspective of Chilean experts. This study reported the competencies of basic level in primary care teams including health care model, promotion of user-friendly treatment, family approach, motivational interview, adult education, problem solving capacity in PHC and teamwork.

Therefore, the healthcare workforce of different discipline needs to obtain various technical competencies according to the nature of their occupation. For example, the nurses require set of prescribed nursing competency by the organization and the medical doctors require a different set of competencies. However, the effective prevention and control of chronic diseases, the healthcare workforce require set of relevant competencies.

### 2.7.2 Competencies in chronic disease practice

Ruksaphram et al. (2014) in their study in A conceptual structure of chronic care competency for Thai Primary Care Provider (PCPs) specified four domains and twelve component of chronic care competency for Thai PCPs. With the 2 steps of concept analysis of chronic care competency based on Walker and Avant's method and interviews with Thai primary care providers to refine the pre-specified structure of chronic care competency to fit with the Thai primary care context. The competency domain includes 1) behavioral risk management, 2) symptom management, 3) symptom monitoring and 4) health coaching. Unlike in Bhutan, the

PCPs in Thailand and elsewhere comprise of team of health workers of different discipline.

Kane et al. (2019) developed core chronic disease prevention competencies, a standard set of competencies for professionals in chronic disease prevention and control in 2007, it was reviewed in 2015 through 2018. The study described the competencies here as the combination of observable and measurable knowledge, skills, abilities, and personal attributes that contribute to enhanced employee performance and support organizational success. Seven core competencies for chronic disease prevention practice were identified including 1) build support, 2) design and evaluate, 3) programs to influence policies and systems change, 4) lead strategically, 5) manage people, 6) manage programs and resources, and 7) use public health science. It important to note that the competency areas for chronic care by NACDD may have different levels of relevance to different chronic disease practitioners and not a one size fit for all.

The cross-sectional study by Cheng et al. (2020) conducted on "Factors Affecting the Competence of Nursing Assistants in Taiwan Long-Term Care Institutions" among 255 Nurse assistants working in long-term care facilities in Taiwan. This study identified 6 competency domain including assistance in daily living, medical professionalism, mental and spiritual care, professional ethics and acknowledgment, health education and literacy and recognition of patient right. These competencies are influenced by age, religion, job category, disability care experience, the receiving of performance bonuses, and the receiving of year-end bonuses significantly affected the level of care competence ($p < 0.05$). It showed that care provider aged 51-60 had significantly greater care competencies in assistance in daily living competency ($\beta= 0.22$, $p<0.01$), medical professionalism ($\beta= 0.18$, p 0.02) and mental and spiritual care ($\beta= 0.25$, $p <0.01$) than those in the younger age. Care provider with work experience of more than 10 years (($\beta= 0.35$, p 0.02) associated with greater mental and spiritual competency. The incentives such as performance bonus ($\beta= -0.13$, p 0.04*)* and year-end bonus ($\beta= -0.16$, p 0.03) as associated with the professional ethics and acknowledgement competencies.

According to the study on "Self-reported measurement scale on a potential component of competency in healthcare staff engaged in prevention and control of

non-communicable disease in Fiji" among 179 health care staff engaged in prevention and control of NCDs by Ishikawa et al. (2019) identifies four major work types based on 16 items including 1) work management, 2) monitoring and evaluation, 3) community partnership & 4) community diagnosis. Monitoring and evaluation roles were related to ethnic background (p- 0.005, community partnership was related to the religion and community diagnosis was related to academic qualification (p- 0.004). While community diagnosis was associated with the academic qualification (p- 0.007) and workplace (p- 0.02). Thus, this study ascertained that ethic background, religion, academic qualification and working place are significantly associated with the potential competency component of the health care worker in prevention and control of NCDs in Fiji.

World Health Organization (2005) in its publication of "Preparing a health workforce for the 21st century: the challenge of chronic condition" proposed five basic competencies for all the health care work force caring for chronic conditions to address the need of patients and families. The five core competencies include:

1. Patient-centered care,
2. Partnering,
3. Quality improvement,
4. Information and communication technology and
5. Public health perspective.

The competencies outlined above by the WHO were formulated after series expert consultation and literature reviews. This final list of core competencies garnered support from influential International professional councils, education leaders and patient advocacy groups and experts for chronic diseases.

**Table 2 Competencies in chronic disease practice**

| Author/Title/Year | Healthcare provider | Domain of competency |
|---|---|---|
| Author: Tsai-Jung Cheng et al. Year: (2020) Title: Factors Affecting the | Nursing Assistants in Taiwan Long- | 1. Assistance in daily living 2. Medical professionalism 3. Mental and spiritual care |

| | | |
|---|---|---|
| Competence of Nursing Assistants in Taiwan Long-Term Care Institutions | Term Care Institutions | 4. Professional ethics and acknowledgment<br>5. Health education and literacy<br>6. Recognition of patient right. |
| Author: Ishikawa et al.<br>Year: 2019<br>Title: Self-reported measurement scale on a potential component of competency in healthcare staff engaged in prevention and control of non-communicable disease in Fuji | Health care staff engaged in prevention and control of NCDs | 1. Work management<br>2. Monitoring and evaluation,<br>3. Community partnership<br>4. Community diagnosis |
| Author: Mary Kane, Jennifer Royer-Barnett, and Jeanne Alongi revised in<br>Year: 2019<br>Title: The core competencies for chronic disease prevention practice | All providers who responsible for chronic disease prevention practice | 1. Build support<br>2. Design and evaluate programs<br>3. Influence policies and systems change<br>4. Lead strategically<br>5. Manage people<br>6. Manage programsand resources<br>7. Use public health science |
| Author: Angelina Dois, Paulina Bravo, Aixa Contreras, María Gabriela Soto, and Isabel Mora<br>Year: 2018<br>Title: Training and competencies for primary care teams from the perspective of Chilean | Primary care team (multi-disciplinary team) | 1. Health care model<br>2. Promotion of user-friendly treatment<br>3. Family approach<br>4. Adult education<br>5. Teamwork |

experts

| | | |
|---|---|---|
| Author: Institute of medicine,Year: 2003 Title: Health professional Education: A Bridge to Quality. Chapter 3: The core competencies need for health care professional (Book) | All discipline of health workforce | 1. Patient-centered care,<br>2. Work in interdisciplinary team,<br>3. Evidence-based practice,<br>4. Quality improvement and<br>5.Utilize informatics |
| Author: World Health Organization Year: 2005, Title: The report on preparing a health care workforce for the 21st century: the challenge of chronic conditions. | All health care workforce for the 21st century: the challenge of chronic conditions | 1. Patient-centered care<br>2. Partnering<br>3. Quality improvement<br>4. Information and communication technology<br>5. Public health perspective |
| Author: Piyanart Ruksaphram, Sang-arun Isaramalai, and UmapornBunyasopun Year: 2014 Title: Development of a conceptual structure of chronic care competency for Thai primary care providers | Thai primary care providers | 1. Behavioral risk management<br>2. Symptom management<br>3. Symptom monitoring<br>4. Health coaching |

The competencies in chronic disease practices were summarized in Table 2 above. The relevant published chronic care competency literatures were reviewed and complied, it includes Competence of nursing assistants in Taiwan Long-Term Care Institution (Cheng et.al, 2020), competency in healthcare staff engaged in prevention

and control of non-communicable disease in Fiji (Ishikawa et.al, 2019), chronic care competency for Thai primary care providers (Ruksaphram et.al, 2014), core competencies for chronic disease prevention practice (Kane et.al, 2019), community health nursing competency (Dios et.al., 2018), competencies for primary care teams, the core competencies need for health care professional (IoM, 2003) the core competencies need for health care professional, and preparing a health care workforce for the 21st century: the challenge of chronic conditions (WHO, 2005).

After reviewing the literatures, it is concluded that albeit, the competencies for chronic diseases practice were developed and conceptualized by different organizations very little, if any, research has looked at factors influencing competency in prevention and control of chronic diseases among PHWs, particularly in the Southeast Asian region and Bhutan. Furthermore, most of the available published studies were conducted to explore factors influencing competency were conducted among nurses, doctors, and primary healthcare managers. In this study the core competencies identified by WHO in their publication "Preparing a health care workforce for the 21st century: the challenge of chronic conditions (2005)" was used as dependent variable because these competencies are the fundamental competencies required by healthcare worker for prevention and control of chronic diseases and moreover, these competency shares the similarities with the chronic disease management approach practiced in Bhutan. WHO recommended that every discipline of healthcare workforce must possess the core competencies to respond to the growing epidemic of chronic diseases. The findings from this study guarantee the potential to provide insights in development of training strategies to improve competencies for chronic diseases prevention, control, and care among the healthcare worker, especially the non-physician PHWs, thus improving the quality of care for the patients with chronic disease and their families and prevention of severe complication.

### 2.7.3 Relevant literature on factor influencing competency

The study conducted by Mohd-Shamsudin and Chuttipattana (2012) to identify the critical managerial competencies of primary care managers and to determine the relationship between personality and motivation, and managerial competency among 358 rural primary health care managers in southern Thailand. The

study identified the six managerial competency including visionary leadership, assessment, planning, and evaluation, promotion of health and prevention of disease, information management, partnership and collaboration, and communication. The study found out that found out that both personality and motivation significantly influence the managerial competency of primary care managers. The personality factors such as conscientiousness is associated with all the domain of managerial competency ($p < 0.05$) and neuroticism ($\beta = -0.12$, $p < 0.01$) is negatively associated with the visionary leadership competency. While openness is significantly associated with health promotion and disease prevention ($\beta = -0.12$, $p < 0.05$) and partnership and collaboration ($\beta = -0.16$, $p < 0.01$) competency. For attitude factors the extrinsic factor is related to the visionary leadership ($\beta$ -0.23, $p < 0.001$), assessment of planning and evaluation ($\beta = -0.23$, $p < 0.001$) and communication ($\beta = -0.16$, $p < 0.01$ competency, while intrinsic factor is related with the visionary leadership ($\beta = -0.16$, $p<0.01$), health promotion and disease prevention ($\beta = -0.20$, $p < 0.01$), partnership and collaboration ($\beta = -0.24$, $p < 0.001$) and communication ($\beta$-0.16, $p < 0.01$ competency.

A systematic review to explore “Factor that affect the development of nurse competencies by Rizany et al. (2018) reviewed 21 research article published between 2006 to 2016 to identify the factors influencing nurse competency. Six factors were identified to have statistically significantly associated with competency development of nurses. Factors includes 1) work experience (r= 0.272, p.001), 2) nursing environment (ys= 0.4, p.010), 3) education level (p= .001), the review also revealed that the average competency of nurses with master’s degrees are significantly higher than those with bachelor’s degree, 4) adherence to professionalism through mentorship from senior positively influence the development of nurse competency, 5) critical thinking; the nurse ability to think critically was found to be a factor that affect nurse competency ($r = 0.32$, $p < 0.001$) and 6) personal factors such as age, sex confidence, knowledge, attitude, and health influence the competence of the nurses.

The descriptive qualitative research was conducted by Nuntaboot and Ha (2020) to explore the “Factors influencing competency development of nurses as perceived by stakeholder” in Ho chi mi in Vietnam among health professionals using purposive sampling method. The study participants described the factors that nursing

education, training system in Vietnam, work environment of the nurses, public image and value of nursing profession, characteristic of nurses themselves, socio culture-economic and political aspects and global context influence the competency of Vietnamese nurses.

The study by Istomina et al. (2011) to explore the "competence of nurses and factor associated with it" from the nurse perspective was conducted among the 218 nurses of surgical ward in 7 Lithuanian hospital. The study observed that socio demographic factors such as nurse education, experience, license, professional development, independence, work satisfaction and evaluation of quality are significantly associated with the nurse competence ($p = <0.05$). Nurses with the higher education, higher level of independence and higher satisfaction at work are positively associated with the nurse competence. While the nurses having the operating theatre license is negatively associated with helping role and diagnostic function competency comparing to those having other licenses.

Liu s. et al. (2019) conducted a study on "Factor affecting the work competency and stability of family doctors in Shanghai". This study is a 2 year follow up study initially carried out in 2013 and 2016. The study found out that in 2013 the family doctor's qualification and job training, family doctor's team, training grasp of specific content of the family doctor system and family doctor's ability play and demonstrate as family doctor are significantly associated with the competency ($p = <0.05$). However, in 2016 family doctor's training and family doctor's ability play and demonstrate as family doctor were statistically significantly associated with the competency ($p = 0.05$). Here the competency (dependent variable) was based on "Whether it was possible to provide residents with all contents specified in the contract services package".

The review of the published literature above depicts varied, yet similar factors that influence the competency of different discipline of healthcare providers. Substantial evidence suggested that competency of healthcare provider is the cornerstone for quality health care services. The literatures review shows several variables, however for this study the independent variables are grouped in three variables including socio-demography factors, work environment and organizational support taking the most common factor competency influencing the competency from

previous literatures. The 5-domain competency by WHO is used as dependent variable as depicted in conceptual framework for the study (Figure 5).

**2.8 Conceptual framework**

The conceptual framework consisted of the independent and dependent variables as illustrated below. The independent variables including 1) Socio demographic factors, 2) Work environment, and 3) The organizational support. The dependent variable is the competencies in prevention and control of chronic diseases that was classified in 5 sub-dimensions including 1) Patient-centered care, 2) Partnering, 3) Quality improvement, 4) Information and communication technology, and 5) Public health perspective competency (Figure 5).

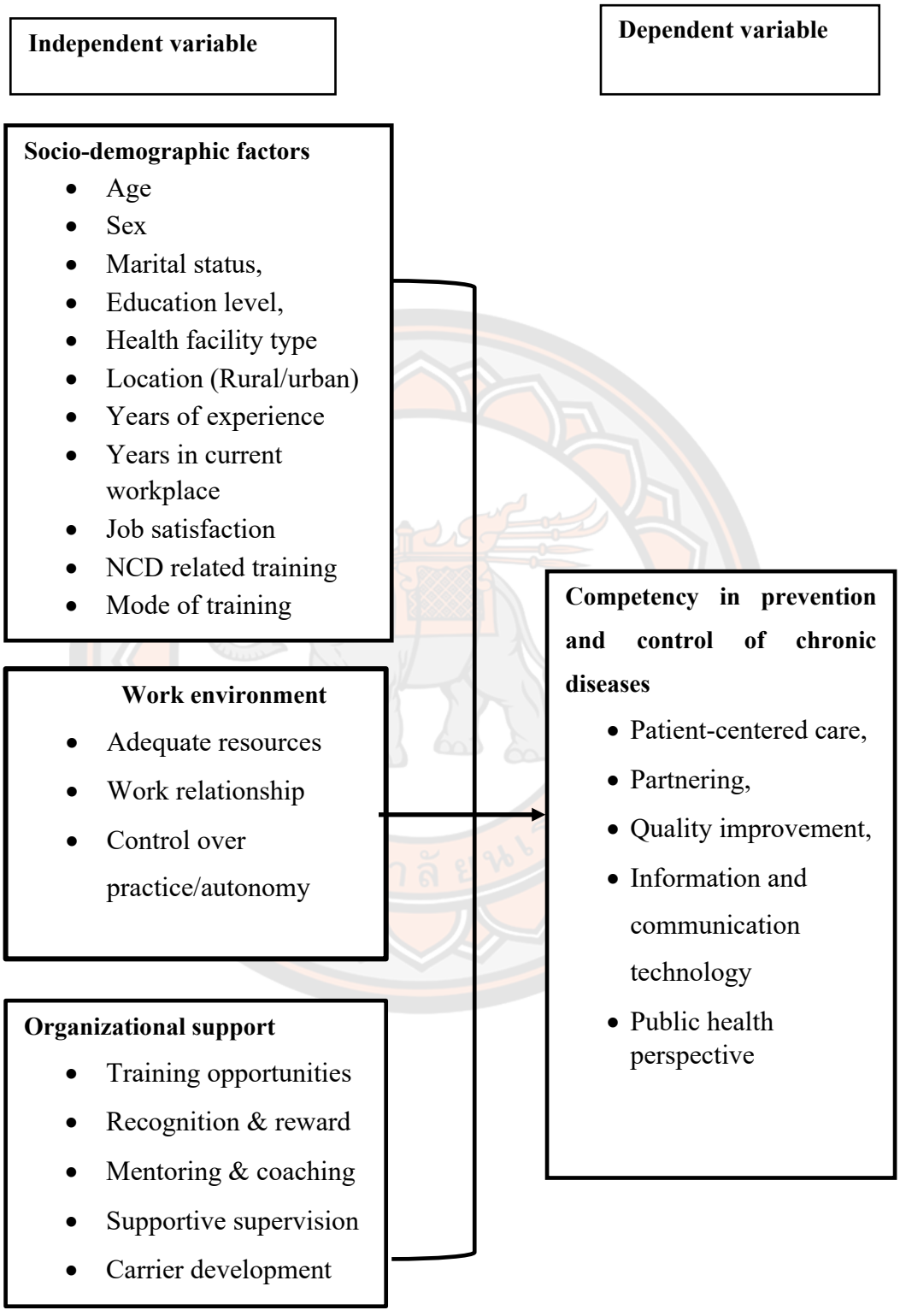


**Figure 4 Conceptual framework**

# CHAPTER III

# METHODOLOGY

The cross-sectional study titled “Factor influencing the competencies in prevention and control of chronic disease among healthcare workers working in healthcare facilities in Bhutan” is aimed to examine the level of competency for prevention and control of chronic diseases and investigate factors influencing the competency among PHWs in Bhutan. This chapter entails research design, setting, population and sampling technique, instrumentation, data collection, data analysis, and protection of human subject. The detailed of each step as follows:

## 3.1 Research Design

Research design is a blueprint for collection, measurement, and analysis of data. It is a logical framework within which the research is conducted. The good research design is characterized by flexible, appropriate, efficient, economical, and able to derive the answer for each research question while minimizing the bias and increasing the reliability of the data collected (Kothari, 2004). The quantitative descriptive cross-sectional study design was used for this study.

## 3.2 Setting

Bhutan is geographically divided into 3 regions and further in 20 districts, 205 sub districts and villages. This study was conducted in the health facilities across all the districts in Bhutan. This study focused on competency of PHCWs particularly HA who provide the first point of care for health issues of the population. Therefore, health facilities across Bhutan were selected as the unit of analysis.

## 3.3 Population and sampling technique

Adequate, well distributed and competent health workforce is the cornerstone of the health system to provide quality health services (WHO, 2020a). In Bhutan,

ministry of health is a main agency that looks after the health human resource including planning, recruitment, development, and deployment. The majority of professional level health workforce such as doctors, clinical nurses, medical technologist, and dental surgeon are trained abroad, particularly from India, Thailand, Sri Lanka, Cuba, and Bangladesh, while diploma level health workers including HA, medical technicians and nurses are trained from the single medical university in Bhutan. All PHWs are being trained from the Faculty of Nursing and Public health in Bhutan and are being deployed by the government to work primarily in the rural health facilities such as PHC and sub post (WHO 2020a, Thinley et al., 2017), however, there are PHWs working in all level healthcare facilities to provide primary health care services in the urban areas. The study population for this study was 616 HAs working across the country. The sampling for the study was carried out to determine the representative group for the study.

Determining the minimum required sample size that is representative of the population is critical in any scientific research. Inappropriate sample size may adversely affect while inferencing the study result to the target population. Small sample will fail to garner enough power to identify effect of association and estimate the significant associations precisely to target population and the exceedingly large sample will incur huge amount of time and expenditure (Singh & Masuku, 2014). The target population for this study was 616 PHWs working in the health facilities across 20 districts of Bhutan. The required sample size was calculated using the mean estimation formula (Singh & Masuku, 2014).

$$n = \frac{N Z_{\alpha/2}^2 \, \sigma^2}{e^2 (N-1) + Z_{\alpha/2}^2 \, \sigma^2}$$

Where $n$ is the necessary sample size, the standard deviation ($\sigma$) was 0.44 from (Dorji et al., 2019), the margin of error ($d$) was 10% (0.044) with 95% confidence interval ($Z$ = 1.96) giving the sample size of 236.84. Non-response rate of 40% (94.73) calculated, thus, the required sample size ($n$) is calculated to 331.57. The number is round up and total number came to 340.

The study participants were selected by employing computer based (SPSS) simple random sampling (SRS) with the proportional allocation for each district. SRS carried out because it helps in providing each member of the population an equal

opportunity of being selected to represent the population (Sharma, 2017). When the population is homogenous, this technique provides unbiased and better estimates of the parameters (Singh & Masuku, 2014). The researcher listed all the members of the primary health care providers of each facility to be included in random sampling. Three regions, 20 districts, 238 primary care facilities and 47 hospitals were the unit of analysis, and 616 primary health care providers who worker in these facilities were randomly selected. The list of representative samples was drawn by the proportion allocation to achieve the number of samples from each district (Table 3).

**Table 3 Study population and proportional allocation of the sample in the facility**

| Region and name of district | No. of PHW in PHC, THC and Sub-post | No. of PHW in hospitals | Proportional allocation of the sample |
|---|---|---|---|
| **Western** | **150** | **71** | **123** |
| Thimphu | 24 | 10 | 19 |
| Punakha | 22 | 5 | 15 |
| Paro | 11 | 11 | 12 |
| Haa | 9 | 3 | 7 |
| Chukha | 24 | 18 | 23 |
| Samtse | 27 | 14 | 23 |
| Gasa | 5 | 2 | 4 |
| W/phodrang | 28 | 8 | 20 |
| **Central** | **110** | **54** | **91** |
| Sarpang | 24 | 16 | 22 |
| Tsirang | 16 | 4 | 12 |
| Dagana | 13 | 9 | 12 |
| Zhemgang | 28 | 15 | 24 |
| Trongsa | 17 | 8 | 14 |
| Bumthang | 12 | 2 | 18 |

| | | | |
|---|---|---|---|
| **Eastern** | **173** | **58** | **128** |
| Mongar | 51 | 10 | 34 |
| Lhuentse | 27 | 2 | 16 |
| Trashigang | 31 | 21 | 29 |
| Trashi yangtse | 16 | 5 | 12 |
| Pemagatshel | 28 | 7 | 19 |
| Samdrupjongkhar | 20 | 13 | 18 |
| **Total** | **433** | **183** | **342** |

**Source:** Administrative data, ministry of health (2021) & Annual health bulletin

The statistical package SPSS version 22.0 was used to compute simple random sampling of the study participants. Simple random sampling was conducted in SPSS as follows:

1. The researcher coordinated with the primary care manager of all primary care facilities to get the name and email of PHWs.
2. Created the number, name of primary care facility, name and email of PHWs in SPSS for the study population.
3. For example, the number of PHWs in Thimphu is 24+10 = 34 and selected 19 samples. The selection process in the SPSS was employed as follows:
   3.1 Menu Data -- > Select case -- > Random sample of cases option, and click **Sample**
   3.2 Click **Exactly** (enter number of required sample) **cases from the first** (total population in the district) **cases** option such as Exactly 19 cases from the first 34 cases.
   3.3 Click **Continue** and it will take back to **Select Cases** dialog box, the **output.**
   3.4 From the **Output** category, there are three options. Select **Filter out unselected cases** and click **ok.** The new variable will be created namely **filter_$** where a value will be designated, value 1 for selected subjects/cases and 0 for unselected cases.

3.5 Then, click on the variable **filter_$**, and sort it in the descending order, all the value 1(selected subjects) will be grouped together in the top rows and value 0 in lower rows. Copy the all the selected cases and create a new dataset or copy to the excel sheet

3.6 The process of selecting will be replicated until the sampling was completed for all the districts

3.7 The number and name of PHWs that were selected will be compiled in the new sheet to coordinate with DHO/ADHO for their permission in participation in this research.

Those who fulfilled following inclusion and exclusion criteria were selected. The inclusion criteria were

1. PHWs who had worked for at least one year in health care facility and
2. Those who consent to participate in the study and
3. The participants those are aged 20 years and above.

The exclusion criteria were

1. PHWs who plans to retire in six months and
2. Those on leave such extra ordinary leave and long-term study leave.

**3.4 Instrumentation**

The data for this study were collected using structured questionnaire. The questionnaire for dependent variables were developed based on the concept of chronic care competency by (WHO, 2005). The questionnaire for the independent variable was developed by the researcher by gathering and reviewing the variable from the relevant literatures. The variables were divided into four parts including 1) socio demographic factors, 2) work environment factors, 3) organizational factors and 4) the competency for chronic disease practice with 5 dimensions. The questionnaire was illustrated as follows:

**Part 1:** The socio demographic variables include 11 items. This part consists of age, sex, marital status, level of education, health facility type (PHC, THC, Sub-post, District hospital/ 10 bedded hospital or referral hospital), location (urban/rural), years of work experience, years in current workplace, job satisfaction, training availed

on NCD/chronic disease and mode of training. The responses were collected by filling in the blanks and selecting the most relevant answers.

**Part 2:** The work environment factor was measured using questionnaire adapted from healthcare provider work index (HPWI) by McAuliffe et al. (2009) in their research on "Measuring and managing the work environment of the Mid-level provider- the neglected human resource". This instrument is appropriate tool to assess the work environment factor for the primary healthcare workers because, this instrument has been tested and used to measure the work environment of mid-level healthcare providers in low-income countries which shares the similar characteristics with HA in Bhutan. The Healthcare provider work index (HPWI) has four subscales including adequate resources, management support, work relationship and control over practice and these subscales are measure by 14 items (McAuliffe et al., 2009). However, this study had adapted 10 items from 3 subdomain: 1) adequate resources, 2) work relationship and 3) control over practice to assess the work environment of the health care provider. The 5-point Likert scale was used to measure each item, where 1 represents strongly disagree, 2 disagree, 3 neutral, 4 agree and 5 strongly agree. The sum of the score ranges from 10 to 50 and level of work environment is interpreted as the methods of Likert scale used in measuring the opinionnaire by (Best & Kahn, 2006). The interpretation used to obtain information from Likert scale as follows:

The scale of 5 with 10 items = 50

The scale of 3 with 10 items = 30

The scale of 1 with 10 items = 10

The interpretation cut off point was set at 30. Therefore, <30 indicates unfavorable work environment and > 30 is favorable work environment (Best & Kahn, 2006)

| **Mean score** | **Work environment** |
|---|---|
| 10-30 | Unfavourable work environment |
| 31- 50 | Favourable work environment |

**Part 3:** Organizational support includes 7 items. This section includes factors such recognition, and reward, training opportunities, mentoring, and coaching,

supportive supervision, and career development. Each item was rated on the 5-point Likert scale 1 represents strongly disagree, 2 disagree, 3 neutral, 4 agree and 5 strongly agree. The value of chronic care competency obtained from each item questionnaire was converted to the summated scale by adding the score of each item to obtain single score for work organization variable and it will be interpreted as the methods of Likert scale used in measuring the opinionnaire by (Best & Kahn, 2006):

The interpretation used to obtain information form the Likert scale as follows:

The scale of 5 with 7 items = 35

The scale of 3 with 7 items = 21

The scale of 1 with 7 items = 7

The interpretation cut off point was set at 21. Therefore, <21 indicates limited organizational support and > 21 is adequate of organizational support (Best & Kahn, 2006)

| **Mean score** | **Organizational support** |
|---|---|
| 7-21 | Limited organizational support |
| 22-35 | Adequate of organizational support |

**Part 4**. The competency for prevention and control of chronic diseases includes 48 items. This competency related data was collected using questionnaire developed by the researcher deriving from the concept of each competency domains from original document (WHO, 2005). Some of items for sub-domain quality improvement, information and communication technology and public health perspective were adapted from the Competency based framework for Health Assistant in Bhutan 2019 (Ministry of Health, 2020b). The competency level was measured by questionnaire developed against each domain including 1) patient-centered care, 2) partnering, 3) quality improvement, 4) information and communication technology and 5) Public health perspective. Each domain consists of several items in which healthcare worker self-rated themselves by providing the score. The Patient-centered care consist of 11 items, partnering consist of 11 items, quality improvement domain had 7 items, information and communication technology consist of 11 items and lastly the public health perspective domain consists of 8 items. All item scores were rated

using the ordinal scale, the 5-point Likert scale score where 1 represents lowest performing, 2 low performing, 3 for moderated, 4 for high performing and 5 for highest performing. However, to allow more power for statistical analysis, the ordinal-level data were summed to analyze as interval data (Gray et al., 2016). The sum of the score ranges from 50-240 scores. The value of competency obtained was interpreted in two level as the methods of Likert scale in measuring the opinionnaire by (Best & Kahn, 2006). The interpretation used to obtain information form the Likert scale as follows:

The scale of 5 with 48 items = 240

The scale of 3 with 48 items = 144

The scale of 1 with 48 items = 48

The interpretation cut off point was set at 144. Therefore, <144 indicates need improvement and > 145 is competent (Best & Kahn, 2006).

| **Mean score** | **Level of competency** |
|---|---|
| 48-144 | Need improvement |
| 145-240 | Competent |

### 3.5 Measuring of validity and reliability in Research

#### 3.5.1 Validity

The research instruments for this study were either adapted from the existing published studies or some items were developed by the researcher conforming with the concept of variables in the study. The questionnaire was developed in English and was tested before use. The original validity and reliability test result was not considered for the new scales (Creswell, 2009). The questionnaire was sent to five experts in Bhutan to assess the content validity of the instruments. The experts were one policy maker in chronic disease, one doctor who trains and mentors primary care workers, one Assistant professor and a lecture from medical university and a master trainer for Non communicable diseases from Bhutan.

The expert panel were requested to evaluate each question by rating the relevance to the instrument's aim and its understandability/clarity conforming to the operational definition. In addition, experts were requested to evaluate whether the items covered all important aspects or if there were missing components. The experts

could also comment on every item of the variables. Item with the score of at least 0.80 were retained (Polit & Beck, 2006; Polit et al., 2007). The four sections of the instrument were rated on a 4-point scale (1= not relevant, 2= somewhat relevant, 3= quite relevant, and 4= highly relevant). Then, for each item, the I-CVI was computed by the number of experts giving a rating of either 3 or 4 (thus dichotomizing the ordinal scale into relevant and not relevant), divided by the total number of experts. After the expert's assessment of the items, content validity index (I-CVI) of the scale was calculated and it was noted at 0.90.

### 3.5.2 Reliability

After validity test of instruments, the questionnaire was tested for reliability by employing pilot test before applying to the true sample. This will help in revealing any weakness of the questionnaire (Kothari, 2004). The value of the alpha is expressed as a number between 0 and 1. The acceptable value of the alpha is ranges from 0.7- 0.99 (Tavakol & Dennick, 2011). For this study, the pilot test was conducted among 30 HA who share similar characteristics as the sample using the self-administered questionnaire. Those individuals involved in a pilot test were excluded in true data collection process. The result of the pilot study was assessed for the internal consistency by Cronbach's Alpha coefficient calculation. Overall Cronbach's alpha coefficient was 0.97 all the scale. The coefficient for scales such as work environment, organizational support and competency were 0.90, 0.90 and 0.98 respectively indicating good reliability. Cronbach's Alpha Coefficient is mathematically calculated as: (Urbina, 2014).

$$\propto = \frac{k}{\mathrm{k}-1}\left[1 - \frac{\sum s_i^2}{s_t^2}\right]$$

Where:

$\propto$ : Cronbach's Alpha Coefficient

$k$: number of items in the questionnaire (number of questions)

$\sum s_i^2$: sum of variance of items scores

$s_t^2$: variance of total scores on the instrument

**3.6 Data collection**

The data for this study was collected from the sampled study participants from across the health facilities using self- administered questionnaire, web based google form. The questionnaires were distributed to selected participants through email. It was conducted in the month of July 2022.The duration of data collection was carried out for the period of three weeks. The reminder was sent to the participants to the questionnaire after two weeks. The follow up reminder was sent after one week for any late responder, however, not a single respond was received in the fourth week and called it an end of data collection. By the end of 3rdweek the total of 332 participants responded, however 2 persons chose not to consent to participate, thus making the total consented respondent to 330. The response rate was 97.05% (330 out of 340). The sample size calculation revealed that 237 participants would be required detect the effect with the margin of error (*d*) 10% (0.044) with 95% confidence interval ($Z$ = 1.96). Therefore, the number of respondents was enough for statistical analysis.

Anonymity of the respondents was ensured using self-administered questionnaire sent through the email. The covering letter including explanations about the purpose of this study, the voluntary nature of participation in the study and data confidentiality was attached with the questionnaire. The covering letter was sent as below:

"Dear Sir/Madam,

My name is Tshewang Lhadon. I am a master student in Public Health at Naresuan university, Thailand. I would like to request your participation in a research study that I am conducting titled: "Factors influencing the competency in prevention and control of chronic diseases among primary health care workers on Bhutan". As we all know that the PHCWs (HA) (HA) are the backbone of the primary healthcare system in Bhutan. This study intends to assess the competency and factor that influence the competency of prevention and control of chronic diseases among PHCWs (HA) in our country.

The study consists of basic demographic information, your opinion on work environment and organizational support. You are also

requested to self-rate your competency in the prevention and care of chronic diseases which should take approximately 15-20 minutes.

Participation is completely voluntary, and you may withdraw from the study at any time. Your responses will be anonymous and confidential. Therefore, it does not require you to provide your name or any other identifying information. If you agree to participate in the study, please read the information provide and provide electronic informed consent before filling in the questionnaire in Google form. To begin the study, click the link of google form tick the appropriate and answers. After responding to all the questions "submit". If you have any quires, please feel free to contact me at the given email (email: tshewangl63@nu.ac.th) or WhatsApp @ +97517515740.

Thank you for your time and participation"

**3.6.1 The google form questionnaire**

The initially planned paper-based questionnaire was improved and created the instrument in the google form. Information sheet was summarised to make the participants understand the research including title, objective, benefit, risk, inclusion, and exclusion criteria, contact address and number of the researcher. The front page also contains information on uncomfortable questions and how to manage and the contact address to the Naresuan Ethics committee or Research ethics broad for health in ministry of health, Bhutan. The researcher requested the study participant to complete the research questionnaire after reading the information related to the research, the participants were asked to confirm electronic informed consent before filling the questionnaire in Google form.

**3.6.2 The process of data collection will be as follows:**

1. The researcher sought administrative clearance from the Ministry of health to conduct the research.
2. Collect the list of PHWs from the Human Resource Division (HRD) from ministry of health and list them in the respective district wise.
3. Employed SRS in district wise to get the required number of participants.

4. Emailed to the District health offices for the appraisal and support to conduct research attaching the administrative clearance from Ministry of Health.
5. Collected information details of selected participants including, email id and name of health facility from each district from District health officer (DHO) / Assistant district health officer (ADHO)
6. Owing to the current COVID-19 pandemic situation the web google form was used to collect data due to restricted movement outside and within the country.
7. The link to access google form was sent through the email to the research participant to collect data.
8. After receiving the data was cleaned and managed in the existing excel sheet, then export to SPSS program

**3.7 Data Analysis**

The analysis of the data was conducted using SPSS program (statistic package for social science) version 20.0 by encoding categorical variables into the number. The data were checked for duplication and completeness of questionnaires by visual inspection and measuring the percentage of missing values in the variables. The data were cleaned to confirm for the required information in the excel sheet and exported to the SPSS program. The data were coded as per the requirement after exporting to SPSS.

1. Descriptive statistics, frequency, average, and standard deviation were employed for socio-demographic factors including as age, sex, marital status, education level, year of work experience, years in current workplace, work satisfaction, training availed on NCD/chronic disease care and mode of training. It was also applied for work environment, organizational support and PHCW competencies for prevention, control, and care of chronic diseases.
2. For the inferential statistics, multiple regression analysis (MRA) was applied to test the hypothesis and predict relationship between the independent and dependent variable.

The researcher estimates the extend of the relationship between several independent variables and dependent variable when exploring the MRA (Gray et al.,

2016). The assumptions of MRA were checked and met the required assumptions before running the multiple regression analysis to avoid bias and errors of significance and effect sizes. Some of the assumption of multiple regression analysis that the researcher needs to consider for drawing the conclusion are 1) normality 2) linearity 3) homoscedasticity and 4) no perfect multicollinearity (Gray et al., 2016; Osborne & Waters, 2002).

1. Dependent variable is the competencies in prevention and control of chronic diseases that was measured on a continuous scale.
2. Independent variables had 13 variables
3. Normality was tested by plotting Normal P-P Plot, the residuals (errors) are approximately normally distributed (Appendix D)
4. The linearity of the variables was tested by Pearson's correlation matrix. The correlation coefficient of the variables were 0.002 – 0.681 indicating that there is no multicollinearity between the variables (recommended value $r < 0.80$) (Hair et al., 1995) (Appendix F).
5. The multicollinearity was assessed by inspection of correlation coefficients and computing tolerance and Variance Inflation Factor (VIF). The values tolerance of more than 0.2 and VIF less than 10 is required to exclude multicollinearity. The tolerance and VIF for this data set were in the acceptable range with value ranging from 0.644 – 0.980 and 1.02 – 1.553 respectively (Appendix B)
6. The independence of the observations was assessed using the Durbin-Watson statistic. The existence of auto-correlation of residual is excluded when the value of the Durbin-Watson statistic is between 1.5 - 2.5. The Durbin-Watson statistic for this study was 1.87 indicating absence any extreme outlier and auto-correlation of residual in this study (Appendix C).
7. When the data are symmetrically dispersed both above and below regression line throughout the ranges of value indicating linearity on the scatterplot, it is considered the data is homoscedastic. In this study the scatterplot on appendix E shows symmetrical pattern and equally distributed indicating no homoscedasticity of residual.

### 3.8 Ethical consideration

Naresuan University Ethical Committee (NU-EC) in Thailand and Research Ethics Board for Health (REBH) of ministry of health in Bhutan reviewed the research proposal. Both the agencies reviewed the research proposal for violation of any ethical conduct in the process of conducting research. The proposal was subsequently approved (file attached in annexure) because the study did not involve any vulnerable group as the participant and were not subjected to any medical procedures. The administrative approval to conduct research in the health facilities Bhutan among healthcare worker was sought from ministry of health, Bhutan via order number MoH /PPD /ADM .CL/ 9/2022/014 dated 18/05/2022 (file attached in annexure).

The consent was sought from all the participant respecting the right of everyone to participate in the research. Since the data were collected using web-based questionnaire, the electronic consent was sought from all the participant before starting to the answer the questions. The participant information was provided for the participants to read through before consenting to be the study participant. In medical and social research, obtaining informed consent is arguably the most common method for respecting the participant right (Kumar, 2018). It is important that the consent should also be voluntary and without coercion of any kind by the researcher. Gray et al. (2016) states that the informed consent should comprise of few components as such the study participant should receive essential study information, must have comprehension of information disclosed about the study, must be competent to provide consent and must give consent voluntarily.

For this study the essential information related to research and researcher was disclosed to each participant in the first page of questionnaire. The introductory information about researcher, the purpose and objective of the research, explanation of self-reporting tool are written explicitly before proceeding to the questionnaire. All the responses were voluntary, and information of respondent were maintained with utmost confidentiality. The respondent anonymity and confidentiality were ensured to protect the respondent from any sort of repercussion form the answer provided and the personal information were to be deleted from the data file.

# CHAPTER IV

# RESULT

The main purpose of the study was to determine the factors influencing competency in prevention and control of chronic diseases and examine the level of competency among primary healthcare workers in Bhutan. This chapter entails the findings of the study after statistical analysis to answer two research questions. Firstly, an overall description of the sample was interpreted including background information, work environment, organizational support, and different dimensions of competency. Then, results of the regression analysis and assumptions of the multiple regression analysis were described.

## 4.1 Descriptive variables

### 4.1.1 Socio-demographic variables

Socio-demographic variables including background information, work related information, chronic disease related trainings and general work satisfaction of the study participant were described below.

**Table 4 Background characteristics of the samples (n = 330)**

| Characteristics | N | Percent (%) |
|---|---|---|
| **Age (Year)** | | |
| 20 – 30 | 80 | 24 |
| 31 – 40 | 109 | 33 |
| 41 – 50 | 103 | 31 |
| 51 – 60 | 38 | 12 |
| Mean = 38.51, SD = 9.01, Min = 24, Max = 57 | | |
| **Sex** | | |
| Male | 174 | 53 |
| Female | 156 | 47 |
| **Marital status** | | |

| | | |
|---|---|---|
| Married | 286 | 87 |
| Single (Divorced, separated & widowed) | 16 | 5 |
| Never married | 25 | 8 |
| **Education** | | |
| Certificate | 258 | 78 |
| Diploma | 52 | 16 |
| Bachelor's degree | 20 | 6 |

Overall, data from 330 study participants were analyzed in this study. Table 4 depicts the background characteristics of the study participants. The mean age of the study participants was 38.51± 9.01 (range 24-57) years. More than half of the participant were male (53%) and 47% were female. 87% are married and 5 % were single because they are either divorced, separated, or widowed and the remaining 8% were never married. Among the participants 87% (258) had a certificate level education in community health, followed by diploma (16%) had in community health and bachelor's degree (6%) level of education.

Work related information includes the work-related information such as workplace, type of heath facility, years of work experience, work satisfaction and work-related trainings availed. The result was presented in Table 5.

**Table 5 Work related information (n = 330)**

| **Type of workplace** | **N** | **Percent %** |
|---|---|---|
| Referral hospital | 11 | 3 |
| District hospital | 48 | 15 |
| 10 Bedded hospitals | 38 | 12 |
| Primary health Center (PHC) | 202 | 61 |
| Thromdey Health Center (THC) | 7 | 2 |
| Sub-post | 24 | 7 |
| **Location of health facility** | | |
| Rural | 256 | 78 |
| Urban | 74 | 22 |

| | | |
|---|---|---|
| **Years of work experience** | | |
| 1-5 years | 58 | 18 |
| 6-10 years | 59 | 18 |
| 11-20 years | 96 | 28 |
| >20 years | 117 | 36 |
| **Years in current job of this facility** | | |
| 1-5 years | 191 | 58 |
| 6-11 years | 93 | 28 |
| >11 years | 46 | 14 |
| **Work satisfaction** | | |
| Very unsatisfied and unsatisfied | 2 | 0.6 |
| Neutral | 43 | 13 |
| Very Satisfied and satisfied | 285 | 86.4 |
| **NCD related training (PEN/PEN HEARTS/SCCI) (n= 330)** | | |
| Ever | 132 | 70.3 |
| Never | 98 | 29.7 |
| **Mode of trainings (n= 232)** | | |
| District level training | 181 | 78.4 |
| Training of trainer | 24 | 10.4 |
| Online course | 13 | 5.6 |
| Multiple method | 13 | 5.6 |

Table 5 depicts the work related in formation of the study participants. Most of the participant were from the PHCs (61%) followed by District hospital (15%), 10 bedded hospital (12%), Sub-post (7%), referral hospitals (3%) and THC (2%). 78% of the participant were working in the rural are and 22% were from urban health centers. The highest proportion of participants had the work experience for more than 20 years (36%) followed by 11-20 years (28%). 18 % had the work experience of 1-5 years. This finding indicates the higher proportion of experienced PHWs working in the healthcare facilities. More than half the study participant had been working in the

current health facility for 1-5 years (58%) while 28% and 14% were working in the same current facility for 6-11 and more than 11 years respectively. In the context of general work satisfaction, 60.3% (199) and 26.1% (86) of participants reported to be satisfied and very satisfied respectively with their work and 13% (43) chose to remain neutral, while 0.6% (2) individual reported unsatisfied.

### 4.1.2 Work environment

The data for work environment among the study participants was assessed using 10 items. The table below presents the mean score and standard deviation of each item of the work environment.

**Table 6 Mean and standard deviation of working environment classified by the items**

| Working environment | Mean | Standard deviation |
|---|---|---|
| **Adequate resource** | | |
| 1. The number of staff at workplace is adequate | 3.26 | 1.28 |
| 2. Workload is manageable most of the days | 3.48 | 1.00 |
| 3. Learning material in the format of online and hard copies are easily available and accessible | 3.18 | 0.98 |
| 4. The stock of essential NCD medicine is adequate throughout the year | 3.59 | 1.00 |
| 5. The equipment such as BP instrument, weighing scale, stadiometer, glucometer with stripes and measuring tape for screening of NCD are always adequate | 3.48 | 1.069 |
| **Working relationship** | | |
| 6. Working relationship among the staff members is good in the facility I work | 4.14 | 0.904 |
| 7.Good collaboration between health workers from different level of healthcare facilities for | 3.84 | 0.890 |

| | | |
|---|---|---|
| patient referral and logistic mobilization | | |
| 8. Adequate support services (caretakers and helper) allow health workers to spend time with patients. | 3.74 | 0.923 |
| **Control over practice/autonomy** | | |
| 9. Have freedom to make important patient care and work decisions within my capacity | 3.89 | 0.805 |
| 10. Patient care assignments promote continuity of care, such as being able to see the same patient throughout the care process including accessibility to patient information across different care levels | 3.68 | 0.849 |

Table 6 shows the mean and standard deviation of work environment. Work environment is measured by 10 item scale on 5-point Likert scale. The highest mean score of 5 indicates strongly agree to the lowest of 1 indicates strongly disagree. Among all the items “Learning material in the format of online and hard copies are easily available and accessible” scored lowest with the mean score of 3.18 (SD= 0.98). This indicate that participants agree less on easy availability and accessible to the learning materials.

### 4.1.3 Organizational Support

Organizational support is measured by 7 items. The table below presents the mean score and standard deviation of each item of the organizational support.

**Table 7 Mean and standard deviation of organizational support classified by the items**

| Items | Mean | Std. Deviation |
|---|---|---|
| 1. I am being rewarded and recognized according to my achievement | 2.90 | 1.017 |
| 2. People who turn ideas into actions are rewarded. | 2.92 | 0.966 |
| 3. Receive fair opportunities to attend continuous professional developments programs (trainings and workshops) | 3.23 | 1.025 |
| 4. My opinion and ideas are valued at work by the colleagues and supervisors | 3.56 | 0.853 |
| 5. Supervisor and mentor are easily accessible for consultation and discussion | 3.68 | 0.860 |
| 6. Adequate supportive supervision and mentoring from the district health office and district hospital. | 3.45 | 0.909 |
| 7. Performance ratings are according to the work I perform. | 3.44 | 1.039 |

Table 7 shows the mean and standard deviation for organizational support. It was measured by 7 items on 5-point Likert scale with the scores ranging from 7 to 35. The highest mean score of 5 indicates strongly agree to the lowest of 1 indicates strongly. “I am being rewarded and recognized according to my achievement” was assessed lowest with the mean score of 2.90 (SD=1.01) and “supervisor and mentor are easily accessible for consultation and discussion” scored highest (3.68, SD= 0.860) among all the items.

**Table 8 Summary of level of work environment and organizational support**

| Domain | N | Percent |
|---|---|---|
| **Work environment** | | |
| Favorable work environment (31-50) | 261 | 79 |
| Unfavorable work environment (10-30) | 69 | 21 |
| Mean = 36.29, SD. = 6.43, Min = 12, Max = 50 | | |
| **Organizational support** | | |
| Adequate support (22-35) | 77 | 23 |
| Limited support (7-21) | 253 | 77 |
| Mean = 23.19, SD. = 5, Min = 7, Max = 35 | | |

Table 8 depicts the descriptive statistics of work environment and organizational support. Majority of the study participants agreed (79%) that their work environment is favorable. The summated mean scores for work environment were 36.28 (SD = 6.43), the highest score indicating favorable work environment. Conversely, a more than two third proportion of the participants disagreed (77%) on having adequate organizational support. This indicates that they have limited organizational support. The summed mean scores for organizational support were 23.19 (SD = 5.00). The summated mean scores of 22 or more indicates adequate organizational support.

### 4.1.4 Competency in prevention and control of chronic diseases

Table 9 displays the information on the dependent variable, the competencies in prevention and control of chronic diseases. The dependent variable comprises of five domains including patient-centered care, partnering, quality improvement, information, and communication technology, and public health perspective. All the domains were measured by 5-point Likert scale where 1 represents very low performing to 5 representing very high performing.

**Table 9 The level of the competencies across all five domains (n = 330)**

| Domain | Level of competency | | | | mean | SD | Min & Max |
|---|---|---|---|---|---|---|---|
| | Competent | | Need improvement | | | | |
| | n | % | n | % | | | |
| Patient-centered care | 305 | 92.4 | 25 | 7.6 | 46.25 | 5.05 | 21-55 |
| Partnering | 305 | 92.4 | 25 | 7.6 | 46.46 | 6.51 | 22-55 |
| Quality improvement | 308 | 93.3 | 22 | 6.7 | 28.9 | 4.22 | 12-35 |
| Information and communication technology | 282 | 85.5 | 48 | 14.5 | 41.42 | 5.21 | 12-40 |
| Public health perspectives | 283 | 85.8 | 47 | 14.2 | 30.32 | 5.21 | 12-40 |
| Overall competencies | 316 | 96 | 14 | 4 | 191 | 25.7 | 94-240 |

Overall, 96% of participant perceived competent in prevention and control of chronic diseases and only 4% felt need improvement. The summated mean score of overall competencies was 191 (SD=25.7) with score ranging from maximum of 240 to minimum 94 score. Among 5 domains of competency the highest proportion of participant perceived competent in quality improvement (93.3%) with the means score of 46.25 (SD = 6.51). The least proportion of competent participant was seen in the domain of information and communication technology (85.5%) with the mean

score of 41.42 (SD= 5.21). Other domains of competency, such as patient-centered and partnering competencies were measured by 11 items each with the total score ranging from 11-55. The analysis showed that 92.4% perceived competent in both patient-centered and partnering competencies while 7.6% felt need improvement with the summated mean scored of 46.25 (SD= 6.05) each. 85.8% perceived competent in the domain of public health perspective while 14.7% felt need improvement (30.32, SD = 5.21).

In summary, the quality improvement competency (93.3%) revealed highest proportion of competent PHWs followed by patient-centered care and partnering competency (92.4% each), public health perspective (85.8%) and the least proportion of competent participant was seen in the domain of information and communication technology (85.5%).

**4.2 Inferential analysis, factors predicting competency**

The assumptions of multiple regression analysis (MRA) were tested for necessary assumptions before running MRA (Williams et al., 2013) (attached in appendix). All the necessary assumptions for the analysis were met and described as followed:

1. Dependent variable is the competencies in prevention and control of chronic diseases that was measured on a continuous scale
2. Independent variables had 13 variables as follows including 11 socio demographic variables, work environment and organizational support.
    2.1 Continuous variables are age, year in current facility, work environment, organizational support
    2.2 Categorical variables were grouped and created into the dummy variable as followed:
        2.2.1 Sex (2 groups of male and female) defined into dummy variable with male coded as 1 and female as reference group was coded 0.
        2.2.2 Education level was created into 2 groups (Certificate leve and higher than certificate including diploma, bachelor's degree, and others) defined into dummy variable with certificate as code 1 and

higher than certificate including diploma, bachelor's degree and others as reference group was coded 0.

2.2.3 Location of health facility (2 groups of rural and urban) defined into dummy variable with rural was coded 1 and urban as reference group was coded 0.

2.2.4 Year of work experience (2 groups of < 5years means junior level and over 6 years means middle level to senior level) was defined into dummy variable with < 5years was as 1 and over 6 years as reference group was coded 0.

2.2.5 Work satisfaction (2 groups of very satisfied and satisfied and the group of neutral, unsatisfied, and very unsatisfied) defined into dummy variable with very satisfied and satisfied as code 1 and neutral, unsatisfied, and very unsatisfied was a reference group coded as 0.

3. Normality was tested by plotting Normal P-P Plot, the residuals (errors) are approximately normally distributed (Appendix D)
4. The linearity of the variables was tested by Pearson's correlation matrix. The correlation coefficient of the variables were 0.002 – 0.681 indicating that there is no multicollinearity between the variables (recommended value r < 0.80) (Hair et al., 1995) (Appendix F).
5. The multicollinearity was assessed by inspection of correlation coefficients and computing tolerance and Variance Inflation Factor (VIF). The values of tolerance more than 0.2 and VIF less than 10 is required to exclude multicollinearity. The tolerance and VIF for this data set were in the acceptable range with value ranging from 0.644 – 0.980 and 1.02 – 1.553 respectively (Appendix B)
6. The existence of autocorrelation of residual is excluded when the value of the Durbin-Watson statistic is between 1.5 - 2.5. For this data set the Durbin-Watson statistic was 1.87 indicating absence any extreme outlier and auto-correlation of residual in this study (Appendix C).
7. When the data are symmetrically dispersed both above and below regression line throughout the ranges of value indicating linearity on the scatterplot, it is

considered the data is homoscedastic. In this study the scatterplot on appendix E shows symmetrical pattern and equally distributed indicating no homoscedasticity of residual.

**Table 10 Multiple regression analysis of the factors predicting the competencies in prevention and control of chronic diseases among PHWs (n = 330)**

| Variable | B | SEb | β | t | p-value |
|---|---|---|---|---|---|
| Constant | 126.978 | 8.693 | | 14.607 | <0.001 |
| Work environment | 1.891 | 0.229 | 0.473 | 8.269 | <0.001 |
| Sex (male) | 6.456 | 2.425 | 0.126 | 2.662 | 0.008 |
| Location of health facility (rural) | -9.010 | 2.856 | -0.114 | -2.455 | 0.015 |
| Organization support | 0.600 | 0.292 | 0.117 | 2.054 | 0.041 |
| $R = 0.560$, $R^2 = 0.314$, Adjusted $R^2 = 0.306$, $F = 4.221$, $df = 1$, $p = 0.041$ | | | | | |

Table 10 presents the multiple regression results, which indicate the factors affecting the competencies in prevention and control of chronic diseases among PHWs. These explanatory variables were work environment (β = 0.473), sex (β = 0.126), location of health facility (β = -0.114), and organizational support (β = 0.117). These variables predict the competencies in prevention and control of chronic diseases by 31.4% with a statistical significance ($R^2 = 0.314$), ($p < 0.05$). According to the results, the predictive equation could be constructed in Unstandardized Score, and Standardized Score by Stepwise technique as follows:

The Predictive Equation in Unstandardized score:

Y (Competency) = 126.978 + 1.891 (work environment) + 6.456 (sex) – 9.010 (location of health facility) + 0.600 (Organization support)

The Predictive Equation in Standardized score are:

Z (Competency) = 0.473 (work environment) + 0.126 (sex) - 0.114 (location of health facility) + 0.117 (Organization support)

The regression correlation coefficient of work environment is 0.473 indicating positive relationship between work environment and competency. This finding

indicates that for every one score increase in the work environment variable, the competency score will increase by 0.473.

Variable regression coefficient on sex is of 0.126 indicating positive relationships between sex and competency. The result indicates that when all other variables remain constant, being male increases the competency score by 0.126 than their female counterpart (female= 0 as a reference group)

Variable regression coefficient on location of health facility is – 0.114 indicating negative relationships between location of health facility and competency. The result indicates that when all the variables remain constant, location of health facilities in rural area decreases the competency score by 0.114 than the urban (urban= 0 as a reference group).

The correlation coefficient of organization support is of 0.117 exhibiting positive relationship between organization support and competency. The result indicates that for every one score increase in the organization support increases the competency level by 0.117.

# CHAPTER V

# DISCUSSION

This study has sought to investigate the factors influencing competency in prevention and control of chronic diseases among PHWS in Bhutan. Chapter five elaborates on the discussion of the main finding of the study in relation to other published literatures, existing government document, strategies, and policies. It entails summary of conclusion, interpretation of result, discussion of main findings, and limitation and strength of the study. Finally, this chapter includes recommendations for the policy makers, healthcare manager and some recommendations on further future research according to the findings from this study.

## 5.1 Conclusion

The current study sought to investigate the factors influencing the competency in prevention and control of chronic diseases among PHWs in Bhutan. A quantitative cross sectional study design was employed among the PHWs in the health facilities across 20 districts of Bhutan. 340 PHWs working in different level of healthcare facilities in Bhutan were selected employing computer generated simple random sampling method. The response rate of 97.05% was achieved. The research instrument for this study was a structured self-administered questionnaire which was divided into 4 parts consisting of socio-demographic variable, work environment, organizational support and competency in prevention and control of chronic diseases. The questionnaire was assessed for validity (I-CVI 0.90) and reliability (Cronbach's alpha coefficient 0.97) test. Data collection was carried out by using web-based google form sent through email. Data were analyzed employing SPSS program version 20.00. The findings of this study to investigate competency and the factor influencing competency were summarize as follows:

**Socio demographic variables:** Age, sex, education level, marital status, health facility type, location of workplace, years of experience, years in current health facility, work satisfaction NCD related training and mode of training were the socio demographic component for independent variable.

Overall, data from 330 study participants were analyzed in this study. Most of the study participants were male (53%) and married (87%) with an average age of 38.51 year (SD = 9.01) ranging from 24-57 years. The education level was predominantly certificate level education in community health 78% (258), followed by diploma in community health 16% (52) and 6% (20) with bachelor's degree. Most of the respondents work PHC (61%) located in the rural area (78%). The highest proportion of respondents had a work experience of more than 20 years (36%) followed by 11-20 year (28%) and less than 10 years (18%). 70.3% of the respondents reported to have had received one or more sessions of NCD related trainings. Among those who received training (232), 62.4% received at least once and 38.6% received two or more. District level training (74.8%) was the most popular method of training, while 5.6% received through multiple trainings through different methods such as district level training, online course, and training of trainer course. Generally, 86.4% (285) of respondents were satisfied with their work rating either satisfied or very satisfied, while 13% (43) chose to remain neutral and a negligible proportion of 0.6% (2) individual reported unsatisfied.

**Work environment:** Majority of respondents 79% (261) perceived that they had a favorable work environment. The summed mean scores of 36.28 (SD = 6.43) where the higher score corresponds the favorable work environment.

**Organizational support:** 77% (23.19 (SD = 5.00) of respondents perceived there was no adequate organizational support in the workplace. It is measured by 7 items with 5-point Likert scale range from 7 to 35. The summed mean scores of 22 or more indicates having adequate organizational support.

**Competency in prevention and control of chronic diseases:** The competency in prevention and control of chronic diseases was measured by 5 domains and 48 items on 5-point Likert scale. Overall, 96% (191, SD = 25.7) of the study respondent rated themselves as competent in providing prevention and control services for chronic disease. Among different domains of the competencies, 93.3% (28.9, SD = 4.22) of the study respondent believed that they were competent in quality improvement competency ranking it the highest among all the domains of competency, followed by 92.4% each in patient-centered care (46.25, SD = 5.05) and partnering competency (46.26, SD = 6.51). The proportion of competent respondents

in public health perspective was 85.8% (30.32, SD = 5.21), and the least proportion of competent respondent was seen in the domain of information and communication technology (85.5%) with the mean score of 41.21(SD = 5.21).

The step wise multiple regression analysis was performed to identify factors predicting the competencies in prevention and control of chronic diseases. Work environment (β = 0.473), sex (β = 0.126), location of health facility (β = -0.114), and organizational support (β = 0.117) were the predictive factors with the $R^2$ being 0.314, (p 0.041). While work environment, organizational support and being male were positively associated to the competency, locating in rural area was negatively associated with the competency in prevention and control of chronic diseases among PHWs in Bhutan. These variables predict the competencies in prevention and control of chronic diseases by 31.4% with a statistical significance ($R^2$ = 0.314), (p 0.041).

## 5.2 Discussion

The number of people living with chronic diseases is ever increasing predisposed by population aging, economic development, and globalization. The need for comprehensive and integrated services for chronic disease is gradually increasing and indispensable. Primary health care is recognized as the crucial foundation of the health care system for effective prevention and control of chronic diseases (Ramli, 2008; van Weel et al., 2016; Widyahening, 2019). Skilled healthcare workforce is one of the key elements for primary healthcare system to respond effectively to growing chronic diseases (Mahipala et al., 2018). In Bhutan HA are the frontline primary healthcare workforce in promotion of health, prevention and control of diseases in the communities, particularly in the rural area, where more the half of the population (62.2%) resides (NSB, 2017), therefore, their knowledge and skill affect the quality and reach of healthcare services. The current study examined the level of competency in prevention and control of chronic diseases and determined the crucial factor influencing the competency among PHWs in Bhutan.

### 5. 2.1 Competencies

This paper illustrates the self-rated competency of PHWs in prevention and control of chronic diseases in Bhutan. The core competencies for the healthcare

worker for the care of chronic diseases by World Health Organization was used as the dependent variable (WHO, 2005). The domain of the competency in this study includes 1) patient-centered care, 2) partnering, 3) quality improvement, 4) information, and communication technology (ICT) and 5) public health perspective. In comparison to the 5 competency domains in this study, the competency-based framework (CBF) for HA in Bhutan by ministry of health comprise of eight competency area encompassing the whole spectrum of healthcare practices for HAs (MoH, 2020b). Some of the items in this study were adapted from the CBF for HA form the competency area of health promotion, leadership and management, management and care, and community health. Certain similarities were observed with the competencies identified by Ishikawa et al. (2019) for prevention and control of chronic disease in Fiji including 1) work management, 2) monitoring and evaluation 3) community partnership, and 4) community diagnosis. The competency domains patient-centered care, quality improvement and health informatics are consonants with core competencies identified by Institute of Medicine (2003) to address the 21$^{st}$ century health issues. In contrast, the competency domain for chronic disease practice for PHCWs in Thailand includes mostly the clinical competency including behavioral risk management, symptom management, basic medical care and health coaching (Ruksaphram et al., 2014). However, the five-domain competency by WHO was used in this study because albeit, these competencies do not represent the whole gamut of chronic disease practice, but, it is the fundamental competencies essential for healthcare workforce in the practice of chronic diseases (WHO, 2005). Moreover, these competencies correspond to the component of Service with care and compassion initiative, an adapted WHO PEN intervention for NCD management in Bhutan (WHO Bhutan, 2022).

The finding from this study exhibits that overall, 96% of the PHWs in Bhutan reported higher level of competency in prevention and control of chronic diseases. Among the domains of competency, the proportion was highest in the quality improvement competency (93.3%) and lowest in information and communication competency (85.5%). The high proportion of study participant reporting competent in prevention and control of chronic diseases in Bhutan could be attributed to early implementation of WHO PEN intervention, an integrated

management of chronic diseases including diabetes and hypertension in primary health care by ministry of health in Bhutan since 2009. The evaluation results of three-month performance assessment in 2012 showed reduction in cardiovascular risk due to improved risk factor control (Wangchuk et al., 2014). WHO PEN was later rolled out nationwide 2014 (Thinley et al., 2017; Wangchuk et al., 2014). This is supported by the evidence reported in this study that 70.3% of the study samples received at least one session of training on WHO PEN package. Moreover, longer years of work experience among study participant in this study may have attributed higher proportion reporting competent because 65% had a work experience of 11 or more. Similar was noted in previous study that longer years of work experience influences the competency of healthcare workers because it is a learning process that contributes in acquisition of competencies (Rizany, 2019). Furthermore, the consistency in the competency among the study participant may be because all the PHWs are trained from the single country-based university that helps in providing uniformity in level of competency in accordance with the diseases burden and health service requirement of the country. This finding suggests that the competency training and refresher training in prevention and control of NCDs in Bhutan are required.

**Quality improvement competency:** The highest proportion of the study participants perceived competent in quality improvement competency. This is consistent with the study by (Pelzang & Hutchinson, 2020), the study noted that the healthcare professional in Bhutan are familiar with improving patient safety and practices. Patient safety, reducing waste and enhancing efficiency are some of the important components of quality improvement competency (WHO, 2005). The mean score for the item “Ability to strive continuously to make thing better for patient” was ranked highest (4.20/5) followed by “Accept the changes in the process of care delivery with the objective of improving” (4.15/5). This findings corresponds to the “managing change” competency among primary healthcare managers in Bhutan that showed relatively higher level of competency (Dorji et al., 2019). The higher level of competency in quality improvement could be because in Bhutan, ministry of health of initiated the series of quality assurance processes since 2002. Initially the healthcare services in the country were mainly focused on quantity and coverage of services, today with achievement of high population health coverage and widespread service

availability the focus was shifted toward assuring the quality of health care services (Sharma et al., 2014; Thinley et al., 2017). The Quality Assurance and Standardization Division (QASD) in Ministry of Health developed Bhutan healthcare standard for quality assurance (BHSQA) outlining the minimum requirements for different levels of healthcare facilities to ensure quality and safety of patient (MoH, 2018a). Different categories of healthcare providers both for the in-service and pre-service PHWs are being trained on quality assurance and continuous quality improvement. The extensive awareness and training were conducted among healthcare worker and mandatory reporting of KPIs on regular intervals may have contributed to the increased competency. However, the healthcare workers need to try to fully embrace the changes and put into practice for better health outcome.

**Information and communication (ICT) competency:** The proportion of study participants perceived competent in communication and information technology was the lowest (85.5%) among all the domains of competency in this study. In this domain lowest score was observed in using computer technology for data analysis and identifying and utilization of reliable information from internet (3.5/5). Similarly, lack of digital skill to find information and use of government provided online services were reported among civil servant in Bhutan (Rinzin. 2022). However, ICT competency in the current study was relatively higher than the nurse informatic competency in Korea nurses (Hwang & Park, 2011) and digital competency of healthcare provider in Ethiopia (Shiferaw et al., 2020). The qualitative study among health care workers in European country perceived that they possess sufficient ICT competency (Jarva et al., 2022). Being competent in ICT is deemed important for every discipline of healthcare workforce because of its ability to collect, report, data analyze, understand, and utilize data reliable health information besides their clinical skill. Furthermore, the ICT competency proved to be indispensable with the onset of covid-19 pandemic where the physical movements were restricted and people were connected through digital platforms using information and communication technology for surveillance, services delivery, meeting, teaching-learning, and socializing (Dorji, 2021). Lower ICT competency among Bhutanese PHCW may be attribute to the limited ICT amenities and network connectivity issues due rugged geographical terrain. According to the PEN clinical audit reported 63% of health facilities without

functional computers and 73% without internet connectivity (WHO Regional Office for South-East Asia, 2017). However, the situation may have changed today with improved supply of physical amenities and intensification of internet connectivity in Bhutan. The ICT competency among healthcare workforce in Bhutan is expected to increase with implementation of eHealth strategy because one of the focus areas in the Bhutan eHealth strategy is building the digital skill and knowledge of health workers (Mongal Singh et al., 2019) and improved supply of digital infrastructure and internet connectivity.

### 5.2.2 Predictive factors

The result of the current study revealed that the being male, location of health facility (rural), work environment and organizational support were significant factors that influence the competency in prevention and control of chronic diseases among PHWs. Contrary to this study, previous studies showed that the competencies were influenced by the socio demographic factors such as financial status, work experience, education level, job title, bonus and pay among health nurses (Cheng et al., 2020; Istomina et al., 2011; Rizany et al., 2018) other healthcare worker (He et al., 2015; Ishikawa et al., 2019). Following discussion will entail association of work environment, organizational support, sex, and location of health facility with the competencies in prevention and control of chronic diseases among PHWs in Bhutan.

**Work Environment:** This study demonstrates that more than two third of study participants acknowledged that their work environment was favorable. Work environment is positively associated with the competency in prevention and control of chronic diseases. The result is congruent with findings from other previous similar studies (Nuntaboot, 2020; Rizany et al., 2018; Yamamoto et al., 2021). Furthermore Zafar et al. (2020) confirms that work environment has a strong influence on the competency of the employee in the sectors other than health. This study assessed the work environment by 1) adequate resource, 2) working relationship, and 3) control over practice/autonomy that cover both physical and non-physical environment. This concept is consonant with the study by (Maassen et al., 2021) in terms of 1) autonomy, 2) relational atmosphere, and 3) working conditions where employees can provide quality services with the available time and resources. Santrić Milicevic et al.

(2011) suggested that the enabling work environment for health workers is related to improved health outcomes. The favorable work environment in this study was mostly relates to HAs working in PHCs and sub-post scattered throughout the country to provide primary health care services in the rural communities which is manned by two to three HAs (Tobgay et al., 2011). Therefore, HAs require wide range of knowledge and skills to provide services from management of acute minor symptoms, health promotion, preventive care to social work, this makes them to build strong relationship and control over practice/autonomy of their works. Among the items for work environment "learning material in both online and hard copies are easily available and accessible" scored lowest (3.1/5). Although learning material such as guidelines, manuals and reports are distributed to the health facilities, the widespread locally tailored online learning resources for PHWs are limited. This seeks for creating learning environment and encourage healthcare workers to engage in continuous learning to acquire information, knowledge, and attitude that are relevant to their works. The item "adequate staff in the workplace" score second lowest (3.2/5). This could be because with the expansion of health services in PHCs every year with the development in field of medicals science, the existing number of staff in PHCs may be burdened with increased workload. Therefore, workload based human resource deployment may be ease the workload. The current study showed the moderate score for accessible to resources such as medicines and equipment for managing NCDs. This is in consistent with the PEN clinical audit that reported 30% of health facilities in Bhutan experience intermittent stockout of NCD medicines, inadequate laboratory reagent and test kits and limited treatment guidelines (WHO Regional Office for South-East Asia, 2017). Having a good work relationship was assessed highest (4.1/5) in this study which is consistent with the previous study among physicians in Bhutan (Wangmo et al., 2019). This study suggests that the work environment in the health facilities positively influence the competency, workload-based staff deployment and enhancing the availability of locally tailored learning material may increase the competency further.

**Sex:** Being a male was positively associated with competency in prevention and control of chronic disease in this study, albeit with the small value, it is statistically significant. This finding is consistent with the systematic review for nurse

competency and associated factor by Rizany et al. (2018) and midwifes (Goshu et al., 2018) reported male were more competent than their female counterparts. Similarly study in Ethiopia (Bitew et al., 2021) noted that being male is likely to have good knowledge than female. Moreover, a study showed that there exist the general stereotypical perception among general population that male are more competent than female (Ashton-James et al., 2019). ). In Bhutan, although there does not exist any gender bias in work or social life as well as professional development opportunities such as training, workshops, and meetings. Most of the PHC managers were male (Dorji et al., 2019) and being PHC manager, one is privileged with slightly more professional development opportunities than other PHCWs. Because training intervention helps in enhancing competencies (Duprez et al., 2017). Furthermore, this sex disparity can be understood as when asked to self-rate, male are more confident and tends to overestimate their competency while female are modest in self rating themselves (Kronmehl et.al., 2021). However, previous studies to assess factor influencing competency among Nursing Assistant in long-term care facilities in Taiwan (Cheng et al., 2020) and competency health staff engaged in prevention and control of chronic diseases in Fiji (Ishikawa et al., 2019) showed no signification association between sex and competency. This finding suggests the fair opportunities for professional development opportunities and sustained encouragement and support female healthcare worker. Furthermore, future studies are recommended to identify challenges faced by female health care providers in gaining and maintaining the required skills and competencies.

**Location of Health facility:** Location health facility was significantly associated with the competency of PHWs in Bhutan. Being in the rural health facility was negatively associated with the competency. Although all the PHWs were trained to perform same job, in practice their job responsibility in rural and urban healthcare facilities are slightly different. Healthcare worker in rural need to manage multifaceted responsibilities for various services such as preventive, promotive, treatment, rehabilitative and administration works in remote PHCs, those PHCW working in urban hospitals are engaged in lesser range of services and have easy access to the varied professional consultation. Inconsistent supportive supervision in rural healthcare facilities could be attributed to rural healthcare worker competency

(KGUMBS, 2020). This could be attributed to rural healthcare worker competency because studies show that supportive supervision is one key factor influencing the competency to improve practices (Madede et al., 2017; Rowe et al., 2022). Although healthcare provider in rural area is privileged with more opportunities for professional development programs such as trainings, workshop, and meeting, being in rural was shown to be negative influencer of competency in this study. Qualitative research to understand phenomena of rural primary healthcare workforce competency may be recommended**.** Furthermore**,** an enhanced supportive supervision for rural healthcare worker may help to enhance the competency of rural healthcare workers.

**Organizational support:** The current study demonstrated the organizational support positively influence the competency of PHWs in prevention and control of chronic diseases. The similar finding were noted in the study among the organizations other than health (Sitindaon et al., 2021) indicating higher level of support enhances the competency of employee. In this study it was observed that the majority (77%) of study participants perceived limited support with the lowest score in reward and recognitions (2.9/5) indicating that PHWs perceived that they are not adequately rewarded or recognized for their work. The limited organization support in general indicates that the organizations often focus on the services and seldom on intrinsic value of the employee that impact the competency of healthcare worker. A study among primary healthcare managerial competency (Mohd-Shamsudin & Chuttipattana, 2012) reported that that intrinsic motivator such as achievement, reward and recognition, responsibility, and advancement and personal are positively associated with competency. The components of intrinsic motivator were analogous to organizational support items in the current study. Similarly the study among the midwife in Ethiopia (Goshu et al., 2018) noted that recognition/reward for good performance was positively associated to the competency. In line with this, the academics indicated that the intrinsic and extrinsic rewards such as salary, bonuses, recognition, praise, flexible working hours, social rights, supervision, training, and carrier development will enhance retention and motivate employees to attain high performance and competency in their works (Manzoor et al., 2021; Rowe et al., 2022). In Bhutan generally all the healthcare providers are under public services domain and all the services, promotions, training, benefits, and support are bound by

one rule and regulation. However, the health manager can encourage and motivate healthcare worker through intrinsic rewards and recognition measures. Supportive supervision is one of the components of organizational support. It scored moderately in this study (3.45/5). The supportive supervision in organization support corresponds with the literatures that indicates the effective supervision is one important factor influencing the competency to improve practices (Madede et al., 2017; Rowe et al., 2022). Therefore, health manager and supervisor are recommended to develop and adopt other approach for rewarding and recognition such as social recognition measures to motivate and enhance their competency for optimal performance.

### 5.3 Strength and limitation

In this cross-sectional study the method biases from using self-administered questionnaire in this study was minimized by dividing the questionnaire into 4 sections, therefore, the respondents can pause, carefully read, and understand the instructions after each section. The wording of the scale items was improved to eliminate ambiguity. To reduce the tendency to respond in a socially desirable manner, the clear instruction on the cover page of the questionnaire was designed and requested each participant to read it before starting to respond to the questionnaire. In addition, the probability sampling methods are employed. The proportion of the sample represents the target population to achieve the goal of generalization to a larger population The finding from this study can be generalized to all PHWs in the country because this study sample covered health facilities across all the 20 districts in the country. One of the limitations is the self-rated questionnaires which limits the guarantee of accuracy of the responses provided and are at risk of being invalid. However, the researcher minimizes the error of method bias by maintaining anonymity of the study participant by not asking the personal identifier and sending the questionnaire link online. The findings from this study cannot be generalized to other categories of healthcare providers, nevertheless, this study can be generalized to the study population in Bhutan, because the sampling covered the whole population of PHW (HA) across the country.

## 5.4 Recommendation

The current study to investigate factors influencing competency in prevention and control of chronic diseases among PHWs in Bhutan confirmed that work environment, organizational support, being male and being in rural healthcare facility influences the competency of PHWs in Bhutan. The researchers would like to suggest few recommendations to different agencies according to the finding s from the study with the aim to improve the competency of PHW in prevention and control of chronic diseases in Bhutan.

**Health policy**

1. This study suggests the ministry of health the workload-based staff deployment in PHC rather than merely restricting on service standard.
2. Allocation of resources to build information and communication technology competency particularly for search, retrieve and utilization of reliable health information. Being competent in information and communication technology will help achieve other competencies

**Health services**

1. This study suggests the health manager and supervisor to strengthen the reward management system (financial and non-financial reward). To supplement the existing reward and recognition system social recognition measures may be adopted.
2. Assess availability of learning materials and need for additional learning resources in the healthcare facilities.
3. Development of easily accessible online learning materials tailored with PHCW's (HA) job.
4. Strengthen mentoring and supportive supervision of rural healthcare worker on the periodic basis.

**Academic**

1. There is a discrepancy in healthcare worker competency and performance because despite high level of competency shown in this study, NCD risk factor survey in 2019 showed huge treatment and diagnosis gap (MoH, 2020c).

Future research should seek to assess the relationship between the competency and performance in prevention and control of chronic diseases.

2. The similar future studies need to be carried out among other frontline health worker engaged in chronic disease practice such as dieticians, medical, doctors and nurses because they are the frontline healthcare professional in the urban area.
3. Qualitative research to understand phenomena of rural primary healthcare workforce competency in prevention and control of chronic diseases is recommended.

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# APPENDIX

# APPENDIX A MEAN AND STANDARD DEVIATION OF COMPETENCY DOMAINS CLASSIFIED BY THE ITEMS

| Items (Patient-centered care) | Mean | Std. Deviation |
|---|---|---|
| 1. Respect the individual patient's preferences, values, differences, and health needs | 4.24 | .693 |
| 2. Relieve pain and suffering of chronic diseases for patients | 4.20 | .676 |
| 3. Listen and communicate with empathy obtaining information from the patient's point of view | 4.36 | .667 |
| 4. Conduct effective interview of the patient/client to identify concerns, emotion, and behaviors without judgment | 4.24 | .689 |
| 5. Educate patients, family member and community on prevention and control of disease to delay disabilities and impairments | 4.38 | .692 |
| 6. Perform shared decision-making with patients and their family for disease management | 4.16 | .709 |
| 7. Promote wellness and healthy lifestyles for prevention and control of chronic disease | 4.27 | .696 |
| 8. Guide and support to patient/client to avoid unhealthy behaviors and adherence to the medication | 4.28 | .666 |
| 9. Apply effective counselling strategies to motivate the patients for promoting health and preventing disease | 4.22 | .739 |
| 10. Understand and respect the patient's self-management activities (for example: monitoring BP and blood sugar at home by themselves and practicing and maintaining healthy lifestyle) | 3.76 | .961 |
| 11. Plan and coordinate continuous and timely care and follow up of chronically ill patients | 4.15 | .771 |

| Items (Partnering) | Mean | Std. Deviation |
|---|---|---|
| 12. Set goal to improve clinical outcome with chronically ill patients | 3.86 | .750 |
| 13. Set goal to improve behavioral outcome with chronically ill patients and families | 3.85 | .734 |
| 14. Empower the patients to create an atmosphere in which patients can mutually participate in care process | 3.90 | .742 |
| 15. Demonstrate mutual respect, trust, support, and appreciation of each discipline of healthcare workforce | 4.01 | .688 |
| 16. Coordinate responsive referral of patient between the healthcare facilities, such as referral to the higher center and back referral to your facility | 4.12 | .766 |
| 17. Collaborate with other healthcare professionals to improve care for chronic diseases | 4.12 | .772 |
| 18. Negotiate and resolve conflict with other professions when the problem occurred during service delivery to chronically ill patients | 4.00 | .766 |
| 19. Partner with supervising physicians, health care managers, and other health care providers to improve healthcare delivery and patient outcomes | 4.03 | .720 |
| 20. Partner with your health facility with patients and their families for disease prevention and care | 4.06 | .719 |
| 21. Collaborate with sectors beyond health sector such as local government, community leaders and other stakeholders for prevention and control of chronic diseases | 3.99 | .787 |
| 22. Accept and embrace individuals, families, and communities as an equal partner in health care decision making | 4.02 | .719 |

| Items (Quality improvement) | Mean | Std. Deviation |
|---|---|---|
| 23. Determine the chronic disease control status (hypertension and diabetes control rate) in the catchment area | 4.07 | .773 |
| 24. Identify mistakes in care delivery and correct those at your capacity to reduce hazard and wastage | 4.11 | .770 |
| 25. Develop basic safety standard operating procedures (SOPs) line with national guidelines and protocols | 4.05 | .807 |
| 26. Accept the changes in the process of care delivery with the objective of improving quality | 4.15 | .695 |
| 27. Ability to strive continuously to make things better for patient | 4.20 | .705 |
| 28. Assess current practices and compare them with the relevant better practices elsewhere as a means of identifying opportunities for improvements | 4.02 | .729 |
| 29. Embrace new practices without resistance to change and put it into practice | 3.98 | .746 |

| Items (Information and communication technology) | Mean | Std. Deviation |
|---|---|---|
| 30. Maintain proper documentation, records and reports of both clinical & administration works electronically | 3.98 | .916 |
| 31.Understand the importance of health information systems (BHMIS/DHIS2) and generate necessary health information including the prevalence and incidence of chronic disease for your catchment area | 4.00 | .834 |
| 32. Carry out basic analysis and interpretation of data using information technology to determine the treatment out and control rates | 3.72 | .891 |

| | | |
|---|---|---|
| 33. Employ word processing, presentation, and data analysis to measure and present treatment/care plans and outcome | 3.58 | .898 |
| 34. Use email, instant messaging, social media applications and file transfers for care and monitoring of patients | 3.72 | .963 |
| 35. Participate in internet supported learning and education to enhance knowledge and skill | 3.80 | .849 |
| 36.Search, retrieve, manage, and make decisions using reliable electronic data from internal information databases (eg: DHIS2) and online databases from the internet for patient care | 3.56 | 0.936 |
| 37. Understand security protection such as access control and data security systems related to use of patient information to guarantee the privacy and confidentiality of patients | 3.70 | 0.922 |
| 38. Establish communication using email, instant messaging and other social media applications for discussion and consultation of patient care with other healthcare providers | 3.86 | 0.867 |
| 39. Communicate important message to clients/patients such as appointment reminders, medication refill, notify patients of test results and patient education | 4.06 | 0.866 |
| 40. Communicate with community and healthcare providers by using the appropriate methods for each group in facilitating self-management for better disease management | 3.95 | 0.782 |

| **Items (Public health perspective)** | **Mean** | **Std. Deviation** |
|---|---|---|
| 41. Carryout disease surveillance, operational research, and screening activities to understand health needs of the catchment population | 3.59 | 0.932 |

| | | |
|---|---|---|
| 42. Understand and apply three levels of disease prevention and behavioral change strategies according to need of specific population | 3.71 | 0.799 |
| 43. Identify various health promotion approaches and develop a framework for health promotion | 3.74 | 0.791 |
| 44. Analyze and understand the factors or situation affecting public health problem in the community | 3.77 | 0.769 |
| 45. Understand the link between maintaining a healthy lifestyle, prevention of chronic disease and the cost of healthcare for chronic management | 3.93 | 0.756 |
| 46. Apply population-based health promotion strategies to reduce risk factors and improve access to appropriate services and providers | 3.80 | 0.785 |
| 47. Provide care across the disease continuum (from prevention to palliative care) | 3.80 | 0.808 |
| 48. Provide care across the disease continuum (from prevention to palliative care) | 3.99 | 0.795 |

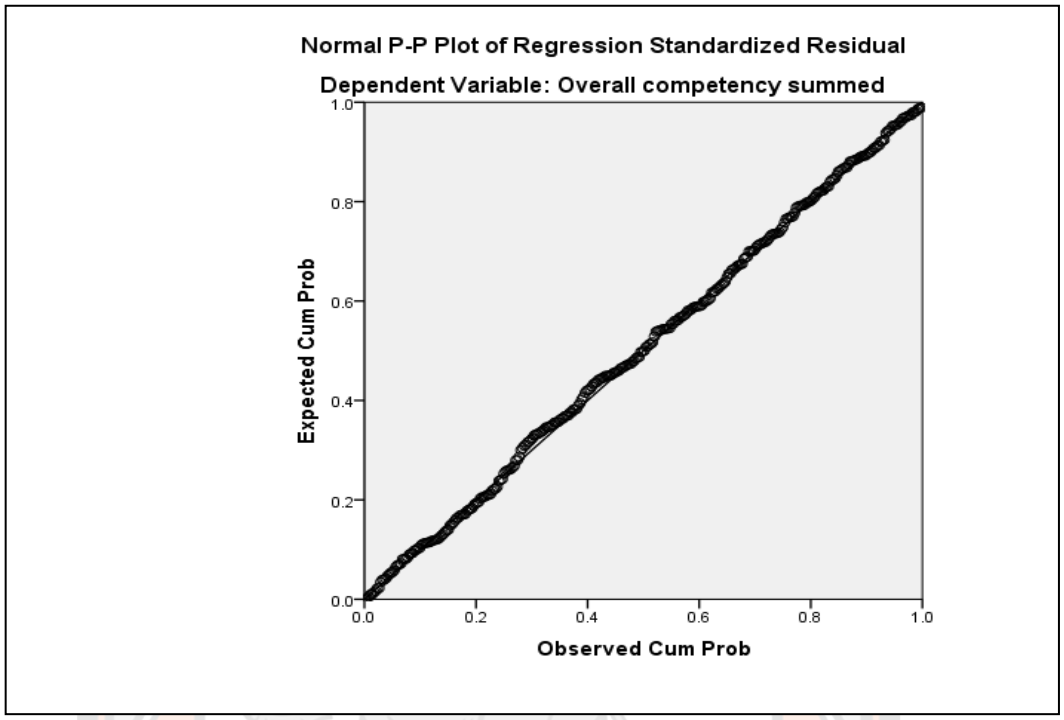
## APPENDIX B ASSUMPTION OF MRA; TOLERANCE/VIF TO ASSESS MULTICOLLINEARITY

| Model | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. | Collinearity Statistics | |
|---|---|---|---|---|---|---|---|
| | B | td. Error | Beta | | | Tolerance | VIF |
| (Constant) | 107.612 | 8.929 | | 12.051 | 0.000 | | |
| Work environment | 1.891 | .229 | .473 | 8.269 | .000 | .644 | 1.553 |
| Sex | 6.456 | 2.425 | .126 | 2.662 | 0.008 | .949 | 1.054 |
| Location of health facility | -7.010 | 2.856 | -.114 | 2.455 | 0.015 | .980 | 1.020 |
| Organizational support | .600 | 292 | .117 | 2.054 | .041 | .654 | 1.528 |

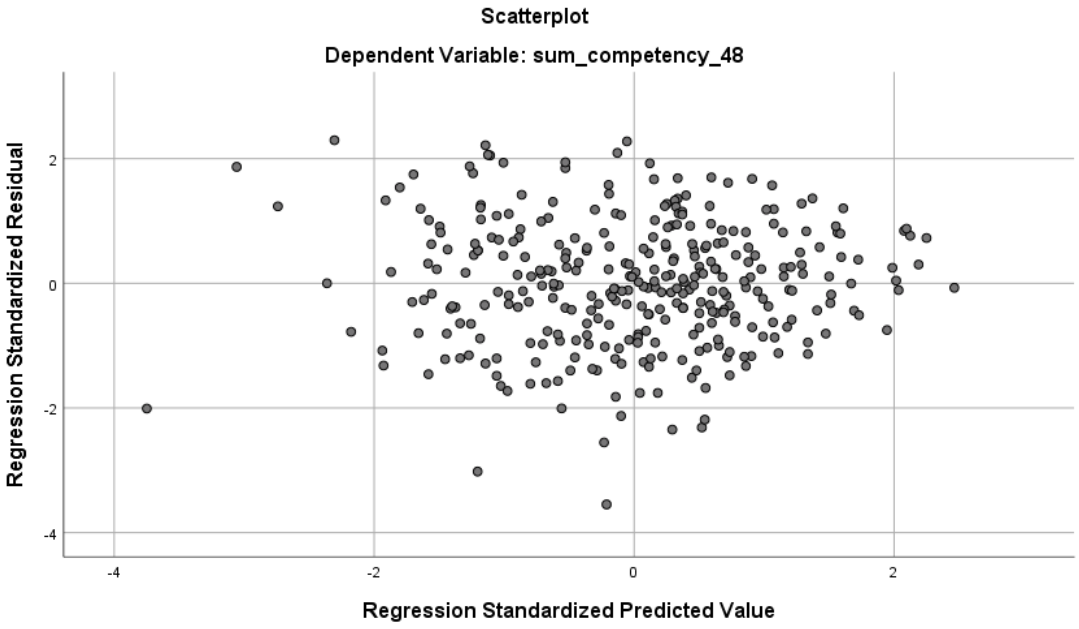
## APPENDIX C ASSUMPTION OF MRA, DURBIN-WATSON STATISTIC

| Model Summary | | | | | |
|---|---|---|---|---|---|
| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate | Durbin-Watson |
| 1 | .524[a] | .275 | .272 | 21.928 | |
| 2 | .539[b] | .290 | .286 | 21.724 | |
| 3 | .552[c] | .305 | .299 | 21.525 | |
| 4 | .560[d] | .314 | .306 | 21.420 | 1.870 |

## APPENDIX D NORMAL P-P PLOT




## APPENDIX E ASSUMPTION OF MRA; SCATTERED PLOT TO TEST HOMOSCEDASTICITY



**APPENDIX F ASSUMPTION OF MRA; CORRELATION MATRICES R OF VARIABLES**

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| Competency | | 1 | | | | | | | | |
| Sex | -0.043 | 1 | | | | | | | | |
| Age in years | 0.002 | .260** | 1 | | | | | | | |
| Education level | 0.063 | -0.058 | -.443** | 1 | | | | | | |
| Location of your health facility | -.123* | -0.102 | .165** | -.108* | 1 | | | | | |
| Work experience | -0.027 | 0.105 | .569** | -.681** | .172** | 1 | | | | |
| Years in current health center | -0.009 | -0.040 | .324** | -.301** | .139* | .337** | 1 | | | |
| Work satisfaction | .212** | 0.066 | .132* | -0.068 | 0.044 | 0.072 | 0.036 | 1 | | |
| Work environment | .524** | .153** | .119* | -0.066 | -0.025 | 0.060 | -0.024 | .265** | 1 | |
| Organization support | .399** | -0.017 | 0.035 | -0.065 | -0.083 | -0.037 | -0.043 | .232** | .573** | 1 |

# APPENDIX G CERTIFICATE OF APPROVAL FROM NU-IRB

AF 11/6.0

COA No. 252/2022

IRB No. P2-0161/2565

**คณะกรรมการจริยธรรมการวิจัยในมนุษย์ มหาวิทยาลัยนเรศวร**

**99 หมู่ 9 ตำบลท่าโพธิ์ อำเภอเมือง จังหวัดพิษณุโลก 65000 เบอร์โทรศัพท์ 05596 8642**

**หนังสือรับรองโครงการวิจัยครั้งแรก**

คณะกรรมการจริยธรรมการวิจัยในมนุษย์ มหาวิทยาลัยนเรศวร ดำเนินการให้การรับรองโครงการวิจัยตามแนวทางหลักจริยธรรมการวิจัยในคนที่เป็นมาตรฐานสากล ได้แก่ Declaration of Helsinki, The Belmont Report, CIOMS Guideline และ International Conference on Harmonization in Good Clinical Practice หรือ ICH-GCP

**ชื่อโครงการ** : ปัจจัยที่ส่งผลต่อสมรรถนะการป้องกันและควบคุมโรคเรื้อรังของผู้ปฏิบัติงานด้านสุขภาพในระดับปฐมภูมิ ของประเทศภูฏาน

**ผู้วิจัยหลัก** : Ms.Tshewang Lhadon

**สังกัดหน่วยงาน** : คณะสาธารณสุขศาสตร์

**วิธีทบทวน** : การพิจารณาแบบเร่งรัด (Expedited Review)

**รายงานความก้าวหน้า** : ส่งรายงานความก้าวหน้าอย่างน้อย 1 ครั้ง/ปี หรือส่งรายงานฉบับสมบูรณ์หากดำเนินโครงการเสร็จสิ้นก่อน 1 ปี

**เอกสารรับรอง**

1. AF 01-10 เวอร์ชั่น 2.0 วันที่ 24 พฤษภาคม 2565
2. AF 02-10 เวอร์ชั่น 2.0 วันที่ 24 พฤษภาคม 2565
3. AF 03-10 เวอร์ชั่น 1.0 วันที่ 29 มีนาคม 2565
4. AF 04-10 เวอร์ชั่น 1.0 วันที่ 29 มีนาคม 2565
5. AF 05-10 เวอร์ชั่น 1.0 วันที่ 29 มีนาคม 2565
6. Protocol Synopsis for Ethical Review เวอร์ชั่น 2.0 วันที่ 13 มิถุนายน 2565
7. Full Proposal Research เวอร์ชั่น 2.0 วันที่ 13 มิถุนายน 2565
8. Curriculum vitae เวอร์ชั่น 1.0 วันที่ 29 มีนาคม 2565
9. Questionnaire เวอร์ชั่น 2.0 วันที่ 13 มิถุนายน 2565

นักวิจัยทุกท่านที่ผ่านการรับรองจริยธรรมการวิจัยต้องปฏิบัติดังต่อไปนี้

1. ดำเนินการวิจัยตามที่ระบุไว้ในโครงการวิจัยอย่างเคร่งครัด
2. ใช้เอกสารแนะนำอาสาสมัคร ใบยินยอม (และเอกสารเชิญเข้าร่วมวิจัยหรือใบโฆษณาถ้ามี) แบบสัมภาษณ์ และหรือแบบสอบถาม เฉพาะที่มีตราประทับของคณะกรรมการจริยธรรมในมนุษย์ มหาวิทยาลัยนเรศวรเท่านั้น และส่งสำเนาเอกสารดังกล่าวที่ใช้กับผู้เข้าร่วมวิจัยจริงรายแรกมาที่คณะกรรมการจริยธรรมการวิจัยในมนุษย์ เพื่อเก็บไว้เป็นหลักฐาน
3. รายงานเหตุการณ์ไม่พึงประสงค์ร้ายแรงที่เกิดขึ้นหรือการเปลี่ยนแปลงกิจกรรมวิจัยใด ๆ ต่อคณะกรรมการจริยธรรมการวิจัยในมนุษย์ มหาวิทยาลัยนเรศวร ภายในระยะเวลาที่กำหนดในวิธีดำเนินการมาตรฐาน (SOPs)
4. ส่งรายงานความก้าวหน้าต่อคณะกรรมการจริยธรรมการวิจัยในมนุษย์ ตามเวลาที่กำหนดหรือเมื่อได้รับการร้องขอ
5. หากการวิจัยไม่สามารถดำเนินการเสร็จสิ้นภายในกำหนด ผู้วิจัยต้องยื่นขออนุมัติใหม่ก่อน อย่างน้อย 1 เดือน
6. หากผู้วิจัยส่งรายงานความก้าวหน้าหลังใบรับรองหมดอายุ และยังไม่ได้ใบรับรองฉบับใหม่ ผู้วิจัยจะต้องหยุดดำเนินการวิจัยส่วนที่เกี่ยวข้องกับการรับอาสาสมัครใหม่ นับตั้งแต่หลังวันใบรับรองหมดอายุจนกว่าจะได้รับใบรับรองฉบับใหม่
7. หากการวิจัยเสร็จสมบูรณ์ผู้วิจัยต้องแจ้งปิดโครงการตามแบบฟอร์มของคณะกรรมการจริยธรรมในมนุษย์ มหาวิทยาลัยนเรศวร

*รายชื่อของคณะกรรมการจริยธรรมการวิจัยในมนุษย์ (ชื่อและตำแหน่ง) ที่เข้าร่วมประชุม ณ วันที่พิจารณารับรองโครงการวิจัย (หากร้องขอล่วงหน้า)

10. THESIS RESEARCH BUDGET PROPOSAL เวอร์ชั่น 1.0 วันที่ 29 มีนาคม 2565

ลงนาม

(ผู้ช่วยศาสตราจารย์ ดร.วนาวัลย์ ดาตี้)

ประธานคณะกรรมการจริยธรรมการวิจัยในมนุษย์

**วันที่รับรอง** : 04 กรกฎาคม 2565

**วันหมดอายุ** : 04 กรกฎาคม 2566

ทั้งนี้ การรับรองนี้มีเงื่อนไขดังที่ระบุไว้ด้านหลังทุกข้อ (ดูด้านหลังของเอกสารรับรองโครงการวิจัย)

# APPENDIX H ADMINISTRATIVE CLEARANCE FROM MINISTRY OF HEALTH, BHUTAN

དཔལ་ལྡན་འབྲུག་གཞུང་། གསོ་བ་ལྡན་ཁག།

**ROYAL GOVERNMENT OF BHUTAN**
**MINISTRY OF HEALTH**
**THIMPHU BHUTAN**
**P.O BOX: 726**

**MoH/PPD/ADM.CL/9/2022/014** **18/05/2022**

Ms. Tshewang Lhadon
Faculty of Public Health
Naresuan University, Thailand

Subject: **Administrative Clearance**

Dear Ms. Tshewang,

The Ministry of Health is pleased to issue Administrative Clearance for the study titled "**Factors Influencing competency in prevention and control of chronic diseases among primary health care providers (Health Assistants) in Bhutan"**, after reviewing its purpose, objectives, and intended outcome(s). However, the following conditions needs to be fulfilled in order for the clearance to be valid:

1. Obtain technical and ethical clearance from Research Ethics Board of Health (REBH) or KGUMSB Institutional Review Board (*if the sites of the study are confined to KGUMSB or its affiliated teaching hospitals)* prior to the conduct of study and ensure strict adherence to its requirements, terms and conditions.
2. Abide by national policies and laws applicable to the study; **and strictly adhere to the Protocols, rules and regulations for containment of Covid-19 during the study data collection and other field works**
3. Seek approval from work site(s) prior to the conduct of study;
4. Ensure no interference with routine delivery of health services at the study site(s);
5. Concurrence for movement of health staff (if any) for the purpose of the study from Department of Medical Services and study sites from the concerned authorities at least one month prior to the conduct of the study;
6. Respond within 10 working days to queries (if any) from the Ministry of health with regard to the implementation of the study: and
7. Share a signed copy of the report with the Planning and Policy Division, Ministry of Health.

Thanking you.

Yours sincerely,

(TashiPenjor)
**Chief Planning Officer**

# APPENDIX I EXEMPTION LETTER FROM REBH BHUTAN

ROYAL GOVERNMENT OF BHUTAN
MINISTRY OF HEALTH
RESEARCH ETHICS BOARD OF HEALTH
THIMPHU : BHUTAN
P.O. BOX : 726

*Ref. No. REBH/PO /2022/022* Date: 21/06/2022

**EXEMPTION LETTER**

**Protocol No:** PO2022022

**Protocol Title:** Factors influencing the competencies in prevention and control of chronic diseases among primary healthcare workers in Bhutan (Version 1, Dated: 20/06/2022)

**Principal Investigator:** Ms. Tshwang Lhadon
**Institute:** Faculty of Public Health, Naresuan University, Phitsanulok, Thailand
**Co-Investigator (s)**: Associate Prof. Dr. Nithra Kitreerawutiwong

This is to state that Research Ethics Board of Health (REBH) has determined that the above protocol, submitted to REBH for ethical approval, qualify for exemption from ethics review based on the criteria specified in the Standard Operating Procedures (SOP) of REBH.

Therefore, the need for REBH approval is exempted for the protocol. Nonetheless, the investigator(s) shall be responsible to;

1. Seek all other clearances/approvals required by law/policy including permission from the study sites before conducting the study/project,
2. Report any major changes on the protocol or related documents to REBH before implementation. The changes can be implemented only after receiving approval from REBH.
3. Submit Final Report of the study/project, at the end of the study/project, for review and protocol file closure.

Note: Technical and ethical soundness of protocols are not assessed by REBH for the protocols that qualify for exemptions of REBH review.

(Dr. Chhabi Lal Adhikari)
**Chairperson**

**For further information please contact:** *REBH Secretary:* at *Tel: +975-2-322602* or email at rebhsecretary@gmail.com

## APPENDIX J STUDY INSTRUMENT

### Section 1: Demographic data

**Instruction:** Please select the best answer that is relevant to your situation and click to fill in the box next to the answered you have selected

1. Sex

   ☐ Male ☐ Female

2. Age …… years

3. Marital status

   ☐ Single ☐ Married

   ☐ Divorced ☐ Widowed

4. Education level

   ☐ Certificate

   ☐ Diploma

   ☐ Bachelor's Degree

   ☐ Other ……...

5. Current workplace

   ☐ Referral Hospital

   ☐ District Hospital

   ☐ 10 bedded Hospital

   ☐ PHC

   ☐ THC

   ☐ Sub-post

6. Location of your health facility

   ☐ Rural ☐ Urban

7. Job position

   ☐ Health Assistant,

   ☐ Basic health worker

   ☐ Assistant nurse

8. Number of years of in service…… years (mention years in number)

9. Number of years in current this health facility …… years (mention years in number)

10. NCD related training *(Three to four days in-service training on PEN or PEN-HEARTS/SCC guideline either by national master trainers or district level team or through online PEN course developed by KGUMSB/WHO).*

10.1. Have you ever been trained on NCD/WHO PEN/PEN HEARTS(SCC)

☐ Ever (continue with question 10.2)

☐ Never (If "Never" go to question 11)

10.2 Mode of training for WHO PEN/PEN HEARTS (SCC) *(there is a possibility of more than one answer)*

☐ Training of trainer

☐ District level training

☐ Online course/training

☐ Other (Please specify) ……...

11. Generally, how satisfied are you with your work?

☐ Very satisfied

☐ Satisfied

☐ Neutral

☐ Unsatisfied

☐ Very unsatisfied

**Section 2 working environment**

**Instruction:** Please indicate the degree of agreement or disagreement against each statement by clicking on the space provided on the table below that best represents your perception for work environment. The 5-point scale represents as 1- Strongly disagree, 2- Disagree, 3- Neutral, 4- Agree, 5- Strongly agree. Please select one response in each row.

| **Work environment** | **Level of agreement** |
|---|---|

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| **Adequate resources** | | | | | |
| 1. The number of staff at workplace is adequate | | | | | |
| 2. Workload is manageable most of the days | | | | | |
| 3. Learning material in the format of online and hard copies are easily available and accessible | | | | | |
| 4. The stock of essential NCD medicine is adequate throughout the year | | | | | |
| 5. The equipment such as BP instrument, weighing scale, stadiometer, glucometer with stripes and measuring tape for screening of NCD are always adequate | | | | | |

**Section 3 organizational support**

| **Organizational support** | **Level of agreement** | | | | |
|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4** | **5** |
| 1. I am being rewarded and recognized according to my achievement | | | | | |
| 2. Salary and benefits are generally fair based on the amount and merit of the work performed | | | | | |
| 3. People who turn ideas into actions are rewarded | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| 4. Receive fair opportunities to attend continuous professional developments programs (trainings and workshops) | | | | | |
| 5. My opinion and ideas are valued at work by the colleagues and supervisors | | | | | |

**Section 4 Competency in prevention and control of chronic disease**

**Instruction:** The assessment scale for primary care worker's competency in prevention and control of chronic diseases consists of the questions to measure the competency that you performed to provide chronic disease prevention and control services at your facility.

Please indicate your perception on your level of competency in each area by clicking on the space provided on the table below against each statement that best represents your level of competency indicating 1- lowest performing, 2- low performing, 3- moderate performing, 4- high performing, 5- highest performing. Please select one response in each row.

| **Competency domain**<br>In your opinion what is your level of competency in the following competency domains | **Level of competency** | | | | |
|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4** | **5** |
| **Patient-centered care** | | | | | |
| 1. Respect the individual patient's preferences, values, differences, and health needs | | | | | |
| 2. Relieve pain and suffering of chronic diseases for patients | | | | | |
| 3. Listen and communicate with empathy obtaining information from the patient's point of view | | | | | |

# BIOGRAPHY

**Name-Surname** Tshewang Lhadon

**Date of Birth**

**Address**

**Current Workplace** Department of Public Health
Ministry of health
Thimphu
Bhutan

**Current Position** Student

**Work Experience** Community health worker 10 year
Public health program officer 4 years

**Education Background** Bachelor degree in Public health