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KNOWLEDGE PRACTICES WITHIN THE HEALTH KNOWLEDGE SYSTEMS IN VIRAC, CATANDUANES, PHILIPPINES

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This paper prepared by **ALECZA A. MARTIZANO** with the title: **KNOWLEDGE PRACTICES WITHIN THE HEALTH KNOWLEDGE SYSTEMS IN VIRAC, CATANDUANES, PHILIPPINES** is hereby accepted by the Faculty of Information and Communication Studies, U.P. Open University, in partial fulfillment of the requirements for the degree Program.

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Biographical Sketch

Alecza Araojo Martizano, the researcher, was born on June 17, 1992 in Virac, Catanduanes. She graduated from the University of the Philippines Los Baños in 2013 with a Bachelor of Science Degree in Development Communication, majoring in Educational Communication. She worked as a Project Management Officer at Catanduanes State University, overseeing CHED-funded programs focused on mangrove biodiversity conservation and mangrove crab sustainability. Currently, she serves as a college instructor at the same university.

In addition to her academic and professional experience, the author also worked as a Corporate Communications Officer for real estate and finance companies in Metro Manila before she finally settled in her hometown province. She is actively involved in various social activities, supporting and participating in the initiatives of Delta Lambda Sigma Sorority and UP Catandungan Los Baños. Both organizations are dedicated to social responsibility and philanthropy. Furthermore, she is a strong advocate for women's empowerment and rural development.

Acknowledgement

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and willingness to guide me all throughout made this arduous journey manageable. I will never be able to thank her enough.

Above all, I want to give praise to the creator who has provided me with the strength to overcome challenges and the wisdom to complete my rigorous graduate studies.

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Dedication

I dedicate this paper to the people who have supported me in ways they will never imagine.

To my mother, Mama Au, for taking care of my son whenever I am swamped at work or busy writing my thesis, for inspiring me to push boundaries and be a better version of myself, for encouraging and supporting me throughout this journey.

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ABSTRACT

To investigate the knowledge practices within the health knowledge systems in Virac, Catanduanes which includes the provincial and municipal health offices, the rural health unit (RHU), and barangay health workers (BHWs), key-informant interviews, focus-group discussion, and survey were conducted. The study, guided by the Knowledge Utilization Theory of Verkasalo and Lappalainen (1998), examined the following practices on health emergency management: knowledge acquisition, knowledge capture and retrieval, and knowledge transfer among health authorities, as well as the knowledge receival, knowledge perception and knowledge utilization among BHWs.

The study found that health authorities adopt various approaches to acquire knowledge on health emergency management. Explicit knowledge is acquired through formal and systematic structures, while tacit knowledge is acquired through open, spontaneous knowledge sharing. To ensure knowledge transfer to barangay health workers (BHWs), health authorities also conduct various activities such as, but not limited to, training, seminars, meetings, and mentoring. The most popular method of knowledge transfer was found to be the use of the group chat system on Facebook Messenger that enables health authorities to directly connect with BHWs without meeting them face-to-face.

Knowledge sharing practices were also investigated to check whether the tacit knowledge that BHWs have acquired through experience are being communicated to the provincial and municipal level. The findings showed that BHWs are more inclined to share their knowledge with their barangay nurse/midwife supervisors rather than directly with health authorities at the provincial and municipal levels.

Other challenges are organizational, as well as technological barriers that hinder seamless communication among health workers, thereby impeding the sharing of critical knowledge on health emergency management.

Despite these gaps, BHWs still possess and highly utilize the critical knowledge on health emergency management they have received.

Chapter I

INTRODUCTION

Background of the Study

As the economy becomes increasingly knowledge-based, individuals, private enterprises, governments, organizations, and communities must leverage on existing knowledge and find ways to organize and share ideas to continuously innovate, thrive, and survive. On the other hand, business companies and profit-oriented organizations need knowledge to gain sustainable competitive advantage while technologies rapidly advance and competitors multiply.

In healthcare systems, the exponential increase in complex medical knowledge that needed to be captured, stored, shared, and utilized during the COVID-19 outbreak was seen as one of the major concerns. Healthcare practitioners struggle to keep on top of every new piece of information which can have an impact on patient care (Corish, 2018).

Knowledge, however, is not always available and documented. Knowledge could reside in the minds of people as personal experiences, beliefs, feelings, and perceptions (Tovstiga et al., 2010) which can only have value once it is extracted and converted into explicit form through interviews, documentation of decision-making, and mentoring among others (Nonaka, 1994). Therefore, management of explicit and tacit knowledge is needed as it could help answer questions, solve problems, and support decisions (Wickramasinghe, 2010).

Knowledge management, according to the American Productivity and Quality Center (APCQ), is a discipline that involves systematic effort to create and manage organizational process to get the right knowledge to the right people at the right time. It helps drive people to share and act on information in order to improve an organization's overall performance.

The study of Camarinta et al. (2014), is one of the relevant literatures for this study which acknowledged the use of knowledge management in the healthcare delivery system specifically in the Province of Laguna, Philippines. According to the study, knowledge management could help healthcare delivery become more organized and systematic. With COVID-19 putting a spotlight on the global health systems, sustainable investments on health care must be ensured to be able to effectively manage health emergencies moving forward.

The Department of Health recognizes knowledge management as an important strategy to effectively manage the healthcare services in the country. In fact, DOH has a knowledge management division that provides services including collection, dissemination, sharing and access to various information using various technologies. Although knowledge management is recognized as an indispensable strategy by DOH, only few studies were conducted and published regarding the application of knowledge management in the health sector.

Moreover, it is important to investigate the knowledge practices in the local level as heath emergencies and disaster consequences initially affect localities. The local governments are also expected to take the lead when health emergencies such as disease outbreaks and environmental catastrophes occur.

Thus, this study attempted to describe the knowledge practices within the health knowledge systems in Virac, Catanduanes. Specifically, it investigated the knowledge practices on health emergency management based on the knowledge utilization theory by Verkasalo and Lappalainen (1998). These processes include the following knowledge acquisition, knowledge capture and retrieval, knowledge transfer, knowledge receival, knowledge perception, and knowledge utilization.

The study has also taken a holistic approach in exploring the practices within the health knowledge systems in Virac which include the provincial and municipal health offices, rural health unit, and the barangay health workers.

The results of this study aimed to serve as a reference to address management gaps and improve the knowledge practices on health emergency management within the health knowledge systems in Virac. This study could also help propel studies on knowledge management and health emergency management.

Statement of the Problem

Effective management of information and knowledge should be one of the major concerns in managing public health emergencies as it concerns critical decisions to save lives, and improve people's lives and quality of life (Rastegar, 2004). Thus, this study aimed to look at how knowledge on health emergency management is acquired, captured and retrieved, and transferred by the health authorities from provincial health office (PHO), municipal health office (MHO), as well as nurses and midwives from rural health unit (RHU) of Virac.

Health emergencies require intensive collaboration with various stakeholders. Thus, this also investigated how knowledge on health emergency management is received and perceived by the knowledge users which are the barangay health workers (BHWs) who are tasked to become the frontrunners and serve as first line of care in the communities they serve. The extent of their utilization was also investigated.

This study aimed to answer the general question: What are the knowledge practices on health emergency management within the health knowledge systems in Virac, Catanduanes?

Specifically, this study aimed to answer the following questions:

1. What are the critical knowledge on health emergency management according to the health authorities from PHO and MHO, as well as nurse and midwife supervisors from Virac RHU?
2. What are the knowledge practices of PHO and MHO, as well as nurse and midwife supervisors from Virac RHU on health emergency management in terms of:
    a. Knowledge acquisition
    b. Knowledge capture and retrieval
    c. Knowledge transfer
3. What are the knowledge practices of BHWs on health emergency management in terms of:
    a. Knowledge receival
    b. Knowledge perception
    c. Extent of knowledge utilization

4. How do BHWs share new knowledge on health emergency management to health authorities at the provincial and municipal levels?
5. What are the barriers to knowledge sharing within the health knowledge systems in Virac?
6. What are the benefits of these knowledge practices within the health knowledge systems in Virac, Catanduanes?

Objectives of the Study

This study aimed to describe the knowledge practices on health emergency management within the health knowledge systems in Virac which include the health authorities from provincial health office (PHO) and municipal health office (MHO) and rural health unit (RHU), as well as the knowledge users which are the barangay health workers (BHWs).

It specifically sought to:

1. Identify the critical knowledge on health emergency management according to health authorities from PHO and MHO, as well as nurse and midwife supervisors from Virac RHU;
2. Describe the knowledge practices of health authorities from PHO and MHO, as well as nurse and midwife supervisors from Virac RHU in terms of:
    a. Knowledge acquisition
    b. Knowledge capture and retrieval
    c. Knowledge transfer;

3. Describe the knowledge practices of BHWs on health emergency management in terms of:
    a. Knowledge receival
    b. Knowledge perception
    c. Extent of knowledge utilization;
4. Discuss how BHWs share new knowledge on health emergency management to health authorities at the provincial and municipal levels;
5. Identify the barriers to knowledge sharing within the health knowledge systems in Virac; and
6. Discuss the benefits of these knowledge practices within the health knowledge systems in Virac, Catanduanes.

Significance of the Study

This study focused on the knowledge practices on health emergency management within the health knowledge systems in Virac, Catanduanes which include the provincial and municipal health offices, rural health unit, and barangay health workers. Specifically, it looked into the knowledge acquisition, knowledge capture and retrieval, and knowledge transfer in the provincial and municipal levels, as well as the knowledge receival, knowledge perception, and knowledge utilization in the barangay levels.

The results of the study aimed to primarily benefit the BHWs in Virac as this study highlighted the importance of BHW's active participation in knowledge practices to be able to handle health emergencies thus better serve communities.

Through this study, their economic and social well-being as front liners during health emergencies will be given importance as the LGU Virac will be able to formulate local policies and increase government support to provide enhanced monetary and non-monetary incentives for BHWs.

Moreover, results of the study could serve as a reference for the provincial health office to improve the knowledge practices within the local health system, as well as to incorporate these practices to other municipalities in Catanduanes. Through this, the barangays at the grassroots level would be able to provide better primary care, save lives, and improve the quality of life of their constituents through informed decision-making.

Lastly, the results of the study aimed to serve as a basis to increase budget allocation for information, communication and technology (ICT) facilities to improve knowledge sharing within the health knowledge systems, as well as programs to integrate knowledge practices on other primary care services such as family planning, maternal and child health, and nutrition.

Scope and Limitations of the Study

This study attempted to describe the knowledge practices within the health knowledge systems in Virac, Catanduanes using the knowledge utilization model of Verkasalo and Lappalainen (1998).

The health knowledge systems included in the discussions were the health authorities at the provincial and municipal level, nurse and midwife supervisors from

the rural health unit, as well as barangay health workers at the community level. It did not include other health units such as public and private hospitals and clinics; health workers such as barangay nutrition scholars and clinicians; and other personnels such as barangay chairperson, and barangay councilor on health.

On the other hand, the knowledge practices that were discussed in the study were acquisition, capture and retrieval, transfer, receival, perception and utilization that are present in the knowledge utilization model. Results do not encompass discussions on the knowledge content, nor knowledge creation, generation and production.

This study also zeroed in on the knowledge on medical emergencies such as epidemics, and emerging and re-emerging diseases that are managed by the local health knowledge systems. Health emergencies such as transportation emergencies, natural calamities, civil disturbance, poisoning, and weapons of mass destruction were not included in the study.

Operational Definition of Terms

Critical Knowledge – refers to the explicit and tacit knowledge that must be acquired by the BHWs with regards to health emergency management. In this study, critical knowledge, gathered through key informant interviews and focus group discussion, covered disease surveillance and monitoring, basic case management, early detection, prevention and control of diseases, and proper reporting.

Knowledge Practices – pertains to the activities and approaches present in Verkasalo and Lappalainen's Knowledge Utilization Model. These practices are included in a process flow that starts with knowledge acquisition, knowledge capture and retrieval, knowledge transfer, knowledge receival, knowledge perception and ends with knowledge utilization. Below are their operational definitions:

A. Knowledge Acquisition – refers to the approaches health authorities from PHO, MHO and Virac RHU undertake to elicit critical knowledge on health emergencies. In this study, the knowledge acquisition activities were categorized into two: acquisition of explicit knowledge and acquisition of tacit knowledge.

B. Knowledge Capture and Retrieval – this refers to the conversion of tacit to explicit knowledge on health emergency management of health authorities from PHO, MHO and Virac RHU. This also includes activities and means by which explicit knowledge are shelved or stocked for future use. Findings were gathered through key informant interviews and focus group discussion.

C. Knowledge Transfer – refers to the activities and practices to make knowledge available for BHWs. Through key informant interviews and focus group discussion, data gathered were categorized into two: forced knowledge transfer and open knowledge access.

D. Knowledge Receival – refers to the activities and approaches on how BHWs acquire knowledge on health emergency management from health authorities at the provincial and municipal levels, as well as RHU nurses and midwives deployed to the barangays. The data gathered through survey was measured through frequency count and percentage.

E. Knowledge Perception – refers to BHW's understanding of the critical knowledge on health emergency management acquired from health authorities at the provincial and municipal levels, as well as RHU nurses and midwives deployed to the barangays. The perception was measured through frequency count and percentage.

F. Knowledge Utilization – refers to the extent of utilization of knowledge on health emergency management at the barangay level. To capture the extent to which the BHWs utilize their knowledge, a four—point Likert scale was used with the following categories: 4 – highly utilized, 3 – moderately utilized, 2 – rarely utilized, and 1 – not utilized.

Knowledge Sharing – refers to the activities undertaken by BHWs in order to share field knowledge on health emergency management within the barangay level, as well as with the health authorities at the provincial and municipal health levels. In this study, the findings were collected through survey and were measured through frequency count and percentage.

Chapter II

REVIEW OF RELATED LITERATURE

Various studies were already conducted regarding the use of knowledge management in institutions such as business corporations, military, banking, engineering as well as the government and healthcare. According to the literature and studies, knowledge management deals with the management of intellectual capital (Flor, 2019) and organizational processes (APCQ, n.d.) with the goal of improving efficiency and performance to reach higher levels of innovation.

Knowledge management was also studied in the public sector, disaster risk reduction and management, education, agriculture. Its application on local governance and development were also explored.

However, there are a limited number of studies that tackle knowledge management in emergency management or disease management at the local level which should gain more attention because of the COVID-19 pandemic and the series of devastating natural calamities.

Thus, the review of related literature will look at the concepts and studies on knowledge management particularly its application on health emergency management and the health sector.

Health Emergency Management in the Philippines

Natural and human-caused risks related to health such as emerging and re-emerging infectious diseases, natural disasters, environmental catastrophes have drawn attention to the importance of boosting the global health systems to better protect communities.

In the Philippines, various approaches and programs have been developed to address healthcare needs in general, such as the creation of Republic Act 11223 or the Universal Health Care Act that serves as the policy of the state to protect and promote the right to health of all Filipinos.

The Department of Health (DOH) serves as the over-all steward and technical authority, mandated to develop national plans, technical standards, and guidelines on health in the Philippines. It works with the local government units (LGUs) at the subnational levels to “enhance provision of services in the grass roots level as well as improve the efficiency in resource allocation. Further, it sought to widen the decision-making space by encouraging the participation of stakeholders, especially at the local level.”. This dual governance in health is due to the enactment of Local Government Code (LGC) in 1991 or Republic Act 7160.

The importance of LGU in healthcare was also underscored in RA 11223, “LGU shall strengthen and broaden existing health policies, implement effective programs that promote health literacy and healthy lifestyles among their constituents”.

Indeed, LGUs are indispensable partners in delivering government services from the national down to the barangay levels, most especially during health

emergencies and disasters which initially affect the local level. LGUs are expected to take the lead when health emergencies such as disease outbreaks and environmental catastrophes occur. They are expected to be prepared to coordinate with various agencies and stakeholders to be able to mitigate the adverse impacts in their jurisdictions.

LGUs, through their Provincial Health Offices (PHO), operationalize the applicable programs from the provincial to the municipal, down to the barangay levels. Meanwhile, municipal health offices provide primary care and other public health programs through the rural health units (RHUs) and barangay health stations (BHS), which serve as the primary contact for government support on health in the localities (Dayrit, et al., 2018).

Role of Community or Barangay Health Workers

Barangay Health Workers (BHWs) are volunteer health workers that are tasked to assist the government in rendering primary health care to communities they serve. Through Republic Act 7883 or the Barangay Health Workers' Benefits and Incentives Act of 1995, BHWs receive allowances, incentives, and other benefits from the government for their voluntary services.

However, due to, BHWs across regions face varying challenges including: 1) varied process of recruiting and retaining health workers per barangay, 2) low remuneration due to limited fiscal resource, 3) inadequate access to additional training due to constraints in budget, and 4) influence of local political leaders in the governance of BHW program (Dodd et al., 2021).

Despite these challenges, BHWs alongside doctors, nurses and other health workers from RHUs are tasked to become the frontrunners and serve as first line of care. Being in tough working conditions, they are considered as vulnerable and most susceptible during health threats and natural hazards. With the COVID-19 pandemic, their duties have become more vital yet hazardous. They are expected to assist in educating communities to prevent diseases, monitor people in quarantine and isolation units (Bacani, 2020), help in contact tracing, and be assigned to other health-care facilities that have shortage of hands (Bautista, 2020).

Dodd et al (2021), suggests building the capacities of local government to properly allocate resources for BHWs and the BHW program. House Bill 6557 or the Magna Carta for Barangay Health Workers if passed into law will also help strengthen the barangay health program by providing allowances and other benefits such as insurance coverage, vacation and maternity leaves to the BHWs.

Knowledge Management in the Health Sector

Managing knowledge in the healthcare industry is crucial considering the complexity of such environments (Metaxiotis, 2010). Unlike other industries, healthcare concerns with:

1) critical decisions to save lives, and improve people's lives and the quality of life, but not to provide fulfilling careers for health professionals (Rastegar, 2004);
2) intense diversity having multiple professional communities that need to communicate within and across departments; and

3) intensive collaboration with various stakeholders in and outside of the industry.

Thus, effective management of information and knowledge should be one of the major concerns of the healthcare systems (Metaxiotis, 2010).

Despite the importance of having a knowledge management strategy in healthcare industries and the health sector in general, knowledge management requires additional resources such as time, money, as well as investments on IT infrastructure. Starting a KM strategy would also require experts in the field to assess organizational processes and oversee the implementation. With the limited budget of LGUs in the Philippines, incorporating a knowledge management system would be tough.

However, according to the study of Dorow, et al. (2019), there are ways to stimulate the flow of knowledge between individuals and groups. In their case study, they found that health organizations in Southern Brazil enhance work processes through the use of digital technologies such as virtual discussion forums, virtual group space and databases; and through collaboration and dialogue such as storytelling, mentoring, sharing of best practices and lessons learned, benchmarking, and peer review.

In the Philippines, there are limited studies focusing on knowledge management in the health sector. One of the few studies found was the study of Camarinta et al. (2014) on the application of knowledge management practices in the healthcare delivery system in the Province of Laguna. Here, the researchers found that 1) municipalities produce their own Information, Education and Communication (IEC) materials to be distributed to communities, and 2) health

workers attend capability seminars and training. Unfortunately, more gaps in knowledge management surfaced than the practices which was the original intention of the research. Some of the gaps in knowledge management processes - knowledge creation and utilization, access and technology support, collection and storage – are as follows:

1) No standard IEC material
2) Limited internet facility
3) Poor knowledge sharing
4) Weak digital literacy
5) Lack of knowledge repository

It was also found that the knowledge sharing among health workers is affected by budget availability, *plantilla* position and attitude of health workers.

This was supported by the study of Farbood et al. (2022), wherein they found barriers to knowledge management implementation in Fasa Health Center in Iran. The results of the study showed that the organizational culture, information technology, individual factor, organizational structures, and management factor are some of the barriers that hamper the success of knowledge management implementation. The organizational culture which was considered as the most important barrier include gaps such as lack of experts in knowledge management, and lack of time and training to implement one.

Knowledge Management Technology in the Health Sector

Medical knowledge and health information, as estimated by Densen (2011), doubles in amount every 73 days. In 1950, doubling time for medical knowledge was 50 years. This is primarily due to the rapid advancement in technology in general. Healthcare professionals can now gather, store, and share big data easily and rapidly. This improvement allows clinicians to conduct studies, collect and analyze data for larger and more diverse populations while staying on top of the latest techniques and trends in their field (HealthManagement.org, 2020).

Thus, healthcare industries should also incorporate an in-house knowledge management technology to be able to cope with the growing complexity in medical knowledge. As studied by Belay, et al. (2021), knowledge management technology are good bases or tools to support decision-making in Ethiopian hospitals, thus improving healthcare services in general. Examples of these are databases, libraries, and artificial intelligence systems.

In public health, knowledge exchange portals (KEPs) are one of the tools that can assist in knowledge management. According to the study of Quinn et al. (2014), KEPs provide access to evidence-based content, help in the creation of new knowledge, and are effective platforms to transfer and exchange knowledge through its collaborative features.

However, Zambrano et al. (2019) highlighted the limited documentation about the organizational experiences in knowledge repositories among health and safety companies in Colombia which could be a knowledge source for new staff or the less experienced. This implies that investments on IT infrastructure alone is not enough to manage knowledge in the health sector. Technologies are powerful tools to store

and retrieve knowledge, but a culture of knowledge sharing must also be investigated to be able to devise an enduring knowledge management system.

In the Philippines, the health information system (HIS), is currently implementing the Philippine eHealth Strategic Framework and Plan. With a goal to institutionalize knowledge management systems (KMS) to promote data, information and knowledge exchange and utilization, especially at subnational levels, the framework created the Knowledge Management and Information Technology Service [KMITS] (DOH, 2018).

With ICT enabling KMS, the Knowledge Management Division under KMITS provides services including collection, dissemination, sharing and access to various information through the use of various technologies (DOH, n.d)

However, LGUs in the Philippines do not have KMS or databases of their own. LGUs need for a health information system, or a database managed by them to generate local information on hazards, vulnerabilities, capacities and actual losses due to disasters. (Dayrit et al, 2018). This could also potentially be a tool for knowledge sharing and transfer across the health units and communities.

The country's HIS, unfortunately, has been the target of criticisms due to its complexity and inadequacies (Nieva, 2020). A good health information system brings together all relevant partners to ensure that users of health information have access to reliable, authoritative, usable, understandable, and comparative data (Kayode & Adegbesan, 2021). HIS may improve data generation, storage and sharing but it would require quality standards to be effective and useful.

Knowledge Management during COVID-19 pandemic

Effective management of information and knowledge is one of the major concerns of the healthcare systems (Metaxiotis, 2010). This problem was amplified by the COVID-19 outbreak due to the exponential increase in complex medical information that needed to be captured, stored, shared, and utilized. Thus, healthcare practitioners struggle to keep on top of every new piece of information which can have an impact on patient care (Corish, 2018).

There is also the global issue of mis/disinformation and false news shared online by the general public which affected the measures taken to control the spread of COVID-19 as well as manage other health emergencies and disaster risk.

The study of Chaturvedi & Singh (2021) titled “Knowledge Management Initiatives Tackling the COVID-19 Pandemic in India” is one of relevant literatures for this study. To address “misinfodemics” or the misinformation or unverified news about the pandemic, researchers found that the Indian government had been collaborating since Ebola crisis with epidemiologists for technical assistance as well as anthropologists to understand behavioral changes in people that were affected by the disease.

Other KM initiatives mentioned in the study were: 1) database for skilled laborers to provide them local opportunities, 2) coordination with important agencies and institutional leaders, 3) lessons learned from the epidemic of SARS in 2002, 4) best practices from Taiwan and New Zealand, and 5) knowledge sharing among healthcare providers.

The researchers also found that the organizations with existing knowledge management systems even before the pandemic, were able to transition to digital platforms quicker and easier. This emphasized the need to incorporate a knowledge-intensive strategy instead of data-driven approach in addressing the pandemic.

In the Philippines, managing knowledge was an important endeavor that could effectively help with the COVID-19 response (Tayag, 2021). Thus, DOH rebooted its KM4Health framework and included various approaches and tools, namely: 1) e-learning platforms to address training needs, 2) in-house data collect apps of DOH such as the bed capacity tracker that may be downloaded by policymakers and other stakeholders to check whether hospitals are already in full capacity, 3) telemedicine that provide medical services such as consultations through the use of ICTs, 4) daily virtual huddles for knowledge sharing, 5) COVID-19 webinars to combat fake news and mis/disinformation, and 6) timely release of IATF resolutions.

These approaches were integrated in DOH's knowledge management strategy which involves: 1) knowledge acquisition, the activities that increases available knowledge 2) knowledge production, the creation of new knowledge 3) knowledge innovation or adaptation, the easy integration and utilization by stakeholders 4) knowledge utilization, the application of knowledge to improve the health sector's performance, and 5) knowledge sharing, the exchange of information and experiences within and outside the organization (Tayag, 2021).

Figure 1. *Knowledge Management for Health (KM4Health) Framework of DOH as presented by Tayag (2021)*

Knowledge management not only addresses mis/disinformation, but it also improves access to information and knowledge across levels and it enables evidence-based decision-making to improve the quality of healthcare (Metaxiotis, 2010). Through knowledge management, the health sector will be able to transform itself into a knowledge-based community, while ensuring the delivery of quality healthcare services and improve the society it serves.

KNOWLEDGE MANAGEMENT

Knowledge

There are three building blocks in knowledge management. First is data, the unprocessed representations, raw facts, and concepts. It can be textual, numeric, graphic, narrative, and audiovisual. Second is information which is created when data are valued and interpreted in a systematic fashion. Third is knowledge which is practically defined as information in action (Hubert, 2012).

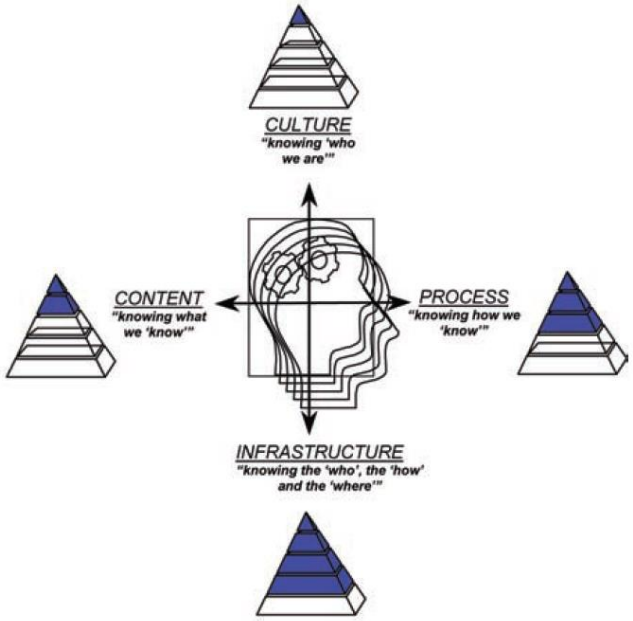
Information becomes knowledge when critical thinking, evaluation, structure, or organization are applied to answer questions, support decisions, understand concepts and solve problems (Alivelu et al., 2015). Knowledge, unlike information and other physical assets, is difficult to manage because of its dynamic nature.

Lam (2000) argues that knowledge could be: 1) engrained, 2) embodied, 3) encoded, and 4) embedded. Meanwhile, Nonaka (1994), introduced the two realms of knowledge – tacit and explicit.

Explicit knowledge is the knowledge that is available in written, spoken, and electronic form, while tacit knowledge resides in the minds of people, thus difficult to document and communicate. It can only have value once it is converted into explicit form through interviews, documentation of decision-making, and mentoring among others.

Examples of tacit knowledge are personal experiences, beliefs, feelings, and perceptions which are often difficult to express, therefore difficult to capture and transfer. Thus, knowledge and knowledge management require the understanding of culture, content, process and infrastructure (Tovstiga et al., 2010).

Figure 2. *Organizational knowledge domains (Tovstiga & Korot, 1999)*



In Figure 2, the solid colors indicate the estimate of explicit knowledge portion while the unfilled areas are the tacit knowledge. All the four knowledge domains cover the tacit and explicit knowledge. However, knowledge culture and knowledge content predominantly contain tacit knowledge while infrastructure and process have more explicit knowledge. Toystiga et al. (2010) defines the domains as follows:

Knowledge culture or "knowing who we are" is the most elusive domain but is the prime determinant in the success of knowledge management. In this domain, we can find the values, beliefs, and behavioral norms of an individual.

Knowledge content comprises the previous experiences (tacit) and the formal knowledge (explicit) of an individual.

Knowledge process incorporates how knowledge is created, transmitted, utilized and discarded. These knowledge process or learning process involve the conversion of tacit to explicit (externalization), explicit to tacit (internalization), tacit to tacit

(socialization), and explicit to explicit (combination) (Nonaka, 2008). Figure 3. shows the interaction between tacit and explicit knowledge.

Figure 3. *Learning modes and knowledge object inputs and outputs (as cited by Wijnhoven, 2010)*

Learning mode	Knowledge object inputs	Knowledge object outputs
Socialization	Individual norms and values	Collective knowledge
Externalization	Automatic and collective knowledge	Shared body of knowledge and related representations
Internalization	Shared body of knowledge	Automatic knowledge and accepted collective and shared body of knowledge
Combination	Conscious knowledge and individual owned information	Shared body of knowledge and information

Knowledge infrastructure supports and facilitates the management of knowledge. The one that drives this is information and communication technologies (ICTs). However, the process or cycle of KM doesn't end with the use of ICTs. Knowledge may be dynamic, and difficult to measure because of its tacit nature, but without it no organization can grow and survive (Roy, 2015).

Knowledge Management

According to Flor (2019), knowledge management considers an organization's intellectual capital – individual talents and tacit knowledge - as a manageable and profitable asset. It involves sharing of insights and experiences in ways that enable business success (Roy, 2015). Aside from the unarticulated knowledge of the

organization, KM also involves the approach of managing knowledge assets such as systems, documents and procedures (Cepeda-Carrion, 2010).

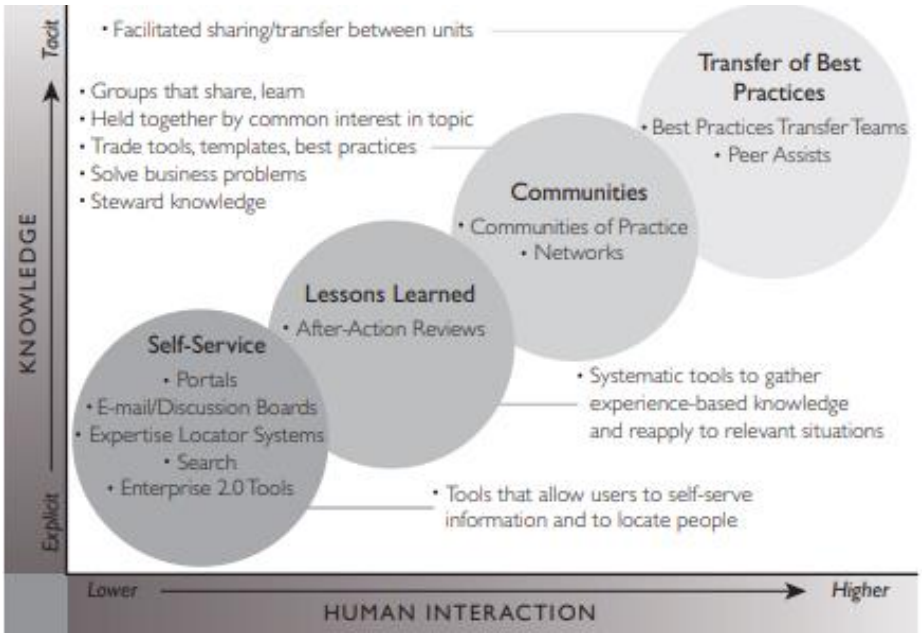
According to O'Dell and Hubert (2011), knowledge management could accelerate the rate of learning, avoid the risks of making and repeating mistakes, and retain knowledge assets even members of the organization leave or retire.

Thus, for knowledge management to be successful, it must consider people, technologies and processes as seen in figure 4, the KM triad. The triad shows that the knowledge can be produced by people and technologies. It can also be engrained in processes (Wickramasinghe, 2010).

Figure 4. *The KM Triad*

Organizations then should implement various approaches to address their knowledge needs while considering people, processes, and technologies. As seen in figure 5, O'Dell and Hubert (2011) provided four approaches to knowledge management. Here they presented the categories of knowledge managament approaches which show that some approaches heavily rely on technology, and some are people intensive.

Figure 5. *Categories of KM Approaches (O'Dell & Hubert, 2011)*



Self-service category has the lowest human interaction as it is technology-based. It enables access to explicit knowledge through the intranet, portals, discussion boards, and other content management tools.

Lessons Learned refers to the experiences and problems encountered that could help organizations better understand situations. Examples of which are assessment and evaluations, debriefs and post-mortems. These experiences could guide them in addressing future situations with the same context. This particular approach has special power in high-stake industries such as military and emergency response (O'Dell and Hubert, 2011).

Communities of Practice (CoP), on the other hand, engage in information exchange to offer solutions to problems (Flor, 2015). They are groups that are held together with common interest, with the goal to share and learn. This approach elicits tacit knowledge thus involves a lot of human interaction.

Transfer of Best Practices has the highest human interaction which extracts tacit knowledge from the members of the organization. Examples of this approach are apprenticeships, mentoring and peer assists. This is also the approach that focuses on implementation of proven practices; thus, it provides highest gains for the organization. (O'Dell & Hubert, 2011).

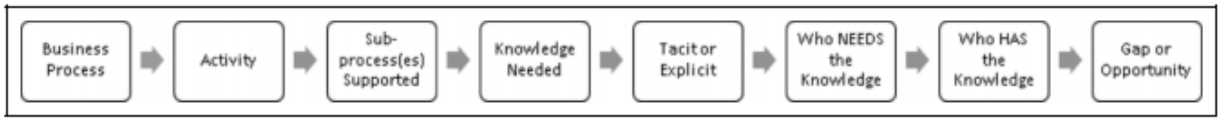
Knowledge management is, indeed, critical to organizations most especially in this era wherein the primary commodity is no longer traditional production inputs but information and knowledge. Collaboration and continuous sharing of ideas, lessons learned, and best practices are essential to manage and reuse knowledge assets in an organization to further enhance its value (McInerny, 2002).

Knowledge Management Flows and Processes

Knowledge Management encompasses numerous approaches and practices used in an organization.

Knowledge mapping is one of the strategies employed by businesses and organizations which helps them identify the critical knowledge required as well as the gaps and opportunities to immediately improve performance (O'Dell & Hubert, 2011).

Figure 6. *Knowledge Map (as cited by Salzano et al., 2016)*

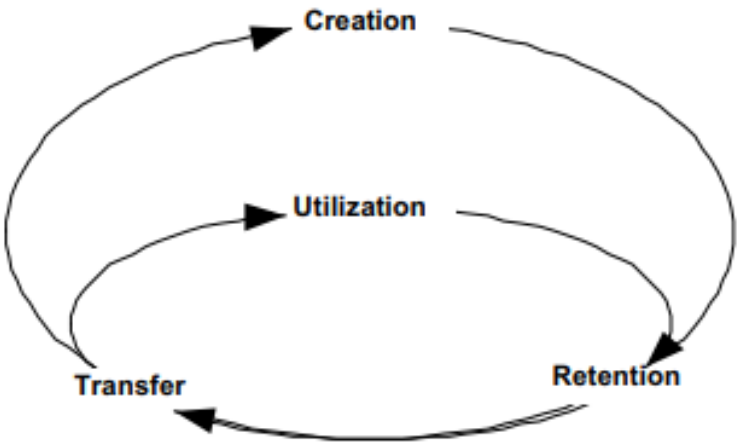


This process as seen in figure 6, also known as knowledge auditing, is an important step in order to build an effective knowledge management strategy that is

tailor fit to the needs of the organization. In the healthcare industry, for example, knowledge mapping could help identify and capture the knowledge of doctors and clinicians on specific issues such as diseases and treatments, which could in turn help identify gaps in knowledge.

Besides knowledge auditing or mapping, knowledge processes within the organization must also be looked into. According to Conrad & Newman (1999), the knowledge flows into four activities as seen in their General Knowledge Management Model (Figure 7) described in their paper *"A Framework for Characterizing Knowledge Management Methods, Practices, and Technologies".*

Figure 7. *The General Knowledge Management Model (Conrad & Newman, 1999)*

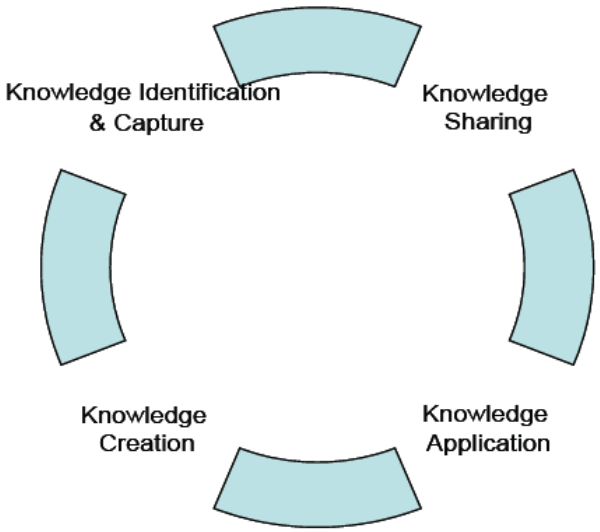


The first activity is knowledge creation which is the entry of new knowledge into the system. Second is knowledge retention which stores the knowledge in the system. Third is knowledge transfer which refers to the flow of knowledge from one party to another. Lastly, knowledge utilization is the application of knowledge in the business process.

The general knowledge management model can be a good tool in the analysis of health emergency management activities. As explained by Conrad and Newman (1999), this model focus on the role of knowledge on complex systems such as the health sector.

In fact, the general knowledge management model is similar to the healthcare knowledge management model which was adopted by Metaxiotis (2010) from Schwartz et al.'s (2000) Acquire, Organize, and Distribute (AOD) model. As seen in figure 8, the model also presents knowledge creation, knowledge capture, knowledge sharing, and knowledge application.

Figure 8. *Knowledge Management Process Cycle (adopted from Schwartz, Divitini & Brasethvik AOD Model)*



Knowledge Identification and capture. Health care professionals have their own expertise or specialized knowledge in the medical field such as knowledge on diseases and therapy among others. These are critical knowledge that must be

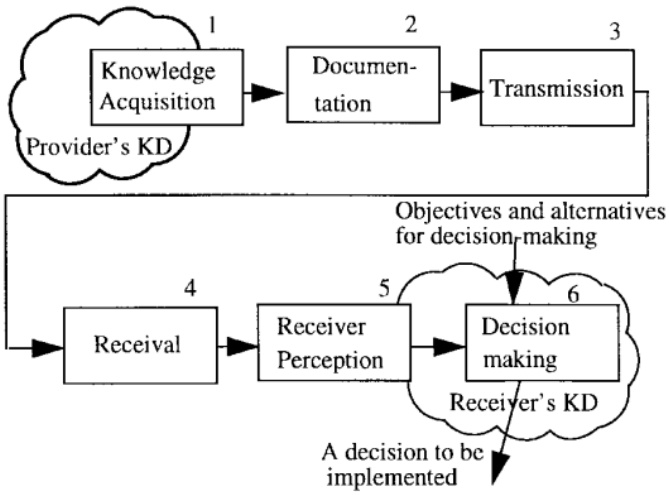
captured in the healthcare organization. Metaxiotis (2010) suggested the conduct of knowledge audit to develop a KM strategy in the organization. The use of intranet was also suggested to implement directory services, communities of practice, and lessons learned.

Knowledge Sharing. Effective knowledge management requires a "knowledge sharing culture" (Metaxiotis, 2010). However, with the associated status and power within the organization, not everyone is willing to share his or her knowledge. Unfortunately, this is true in the healthcare industry. Having numerous professional within the organization, health care professionals act competitively, hence the refusal to share knowledge.

Knowledge Utilization. According to Flor (2019), the goal of knowledge management is to enable the sharing and reusing of knowledge within the organization and its environment. Without action, the value of knowledge diminishes (O' Leary, 1998). Hence knowledge utilization may be divided into two levels: organizational level and environmental level.

In the organizational level, particularly in businesses, the process could foster innovation, improve customer service, boost revenue, enhance employee retentions, and streamline operations (Bhattacharya & Chaudhury, 2004). On the other hand, knowledge utilized and/or applied in the environmental level could solve a problem, improve a process, or make an informed decision (O'Dell & Hubert, 2011).

Figure 9. *Knowledge Utilization Process (Verkasalo & Lappalainen, 1998)*



As shown in fFigure 9, the decision-making process is the last stage in the knowledge utilization because it is the important stage that adds value to knowledge. As long as a "receiver" is willing to partake in the knowledge transfer and use the knowledge to solve problems, this process would be useful in the health emergency management.

Knowledge Management in the Public Sector

As defined by Asian Productivity Organization (APO), "public sector" refers to the "functioning agencies and units at all federal, state, country, municipal, and local levels of government." The sector includes all agencies that engage in public service.

According to APO's report *Knowledge Management for the Public Sector,* the greatest challenge to public-sector organizations is the mindset of compliance to the government and its policies, as well as the periodic discontinuity of leadership. The aging workforce and the need to capture their knowledge is also a concern. It was

viewed that knowledge management could address these issues. Some of the mentioned benefits of knowledge management in the report are collaboration and innovation while overcoming bureaucracy.

The municipality of Cabuyao is one of the LGUs that practices knowledge management. In the case study of Gimutao et al. (2011), the municipality employed various knowledge management practices while forming their corporate arm called Cabuyao Investment and Development Authority (CIDA). It practiced activities such as knowledge sharing which involved mainly of tacit knowledge of the municipality's vice mayor, and knowledge storage and knowledge generation through municipal ordinances. Knowledge generation also involved alliances and linkages with chief executives of multinational companies, and researchers from academic institutions to better prepare for the operation of CIDA. However, it was found that there was poor linkage within the municipal council.

Sorsogon, on the other hand, should leverage on knowledge management more as it was found to have difficulties in storing and accessing data and information. In the study of Naz (2019), results showed that Sorsogon lacks sufficient data that can aid decision-making. Thus, knowledge management was suggested to be able to obtain gaps in data, convert data and information to knowledge, and utilize knowledge to push for sustainable development.

Knowledge Management in Other Sectors and Organizations

Before implementing a knowledge management strategy, several literatures have brought up the need for knowledge mapping as well as the assessment of perceptions and familiarity of organizations on knowledge and the processes of knowledge management. Thus, this section will discuss the gaps in knowledge management in other sectors such as educational institutions, disaster risk reduction and management, and indigenous groups.

Education

In the study of Barredo-Carmen (2018), results showed that public secondary school administrators in Masbate are only moderately familiar with knowledge management, with one of the respondents saying that knowledge management is new in the Philippines when in fact the first knowledge management division was created in the year 2000 by DOH. The results also showed that the respondents practice knowledge creation, knowledge retention, knowledge transfer and knowledge utilization, but not consistently.

Private universities in CALABARZON also showed same results. In the study of Agawin et al. (2019), it was found that employees of the private universities are only moderately aware of knowledge management. Among all the knowledge management practices, only knowledge creation and dissemination are most practiced.

In order for knowledge management to be put into place in educational institutions, factors such as organizational culture, leadership, information technology as well as employee motivations should be considered. These factors where studied by Fiscal (2019) and found out that employee motivation including monetary and non-monetary incentives, has the greatest contribution to the success of knowledge management processes in an educational organization. This was followed by the leadership or the initiatives and management of authorities in the institution.

DRRM

The National Disaster Risk Reduction and Management considers knowledge management as one of the effective strategies in developing sustainable solutions and building resilient communities against disasters. At the local level, knowledge management on disaster risk reduction and management was explored by Regalado & Tatlonghari (2014).

The study was conducted in Catanduanes, the same locale of this study. Using triangulation, the results of the study showed that leading agencies as well as the barangays practice knowledge management in DRRM. Storytelling, public announcement or *bandillo*, media and other documents were some of the sources of information of the community. However, in terms of knowledge storage and retrieval, community members rely on their memory and the barangays rely on a disorganized file management system. Lack of participation was also seen as a problem in knowledge sharing. This concern was also mentioned in APO's report on *Knowledge Management for the Public Sector* as one of the critical challenges in public organizations. When knowledge management is seen as an additional work, it

becomes difficult to get the buy-in from staff. Thus, knowledge management will not move forward.

Indigenous Communities

One of the most important considerations in designing development programs is indigenous knowledge. Indigenous knowledge pertains to experiential, locality-specific knowledge, and practices of medicine, as well as healing, hunting, fishing, education and environmental conservation (Ngulube, 2002). In the case of Africa, this knowledge that has been passed on from one generation to the other is in danger of being lost if not captured and documented.

Though held in the minds and practices of people, indigenous knowledge is still society's knowledge resource. It should then be managed and preserved to be able to create programs that are tailor fit to the needs of indigenous communities as well as design sustainable development policies and practices.

Hunter (2005) suggests the use of technologies to capture indigenous knowledge such as digital video camera and audio recorders for capturing techniques, songs, dances and other practices of the indigenous peoples. Since indigenous people are also tied to their land, community mapping projects to strengthen land, fishing and hunting claims. Documenting native land boundaries could help indigenous people to preserve their knowledge.

From the review of related literature, several gaps were discerned: First there were no studies yet on knowledge flows and knowledge management during health emergencies. Second, there are limited studies tackling health sectors at the local

level. Third, several studies mentioned problems in knowledge-sharing within the organizations. Fourth, studies mentioned were focused on the knowledge management within the organizations. Lastly, related studies focused on healthcare in general and not health emergency management. This research, therefore, will attempt to bridge the identified research gaps.

Theoretical Framework

This study focused on the knowledge practices on health emergency management within the health knowledge systems in Virac, Catanduanes using the Knowledge Utilization Theory by Verkasolo and Lappalainen (1998). This specific study employed the said theory to investigate the flow of knowledge from the provider's knowledge domain (health authorities from PHO, MHO, RHU) to the receiver's (BHWs) knowledge domain. The knowledge practices that were included are knowledge acquisition, knowledge capture and retrieval, knowledge transfer, knowledge receival, knowledge perception, and knowledge utilization which involves decision-making, the last and most important part of the process because of the added value.

Other important properties of the said theory as identified by Verkasolo and Lappalainen (1998) are as follows:

1. Motivation of the provider to share knowledge with a receiver to solve a problem.
2. Motivation of the receiver to accept knowledge, be open and get involved.
3. Forced and open information access.

To investigate the knowledge sharing culture and the practices of converting and sharing of explicit to tacit (internalization) and tacit to explicit (externalization) knowledge among the local health workers, the study also employed the Knowledge Creation Theory by Nonaka and Takeuchi (1995). The result of this theory stimulates the creation of a satisfactory decision-making process (Haradhan, 2017) which is the last phase of the knowledge utilization process.

Analytical Framework

Figure 10. *Conceptual Framework of the Study*

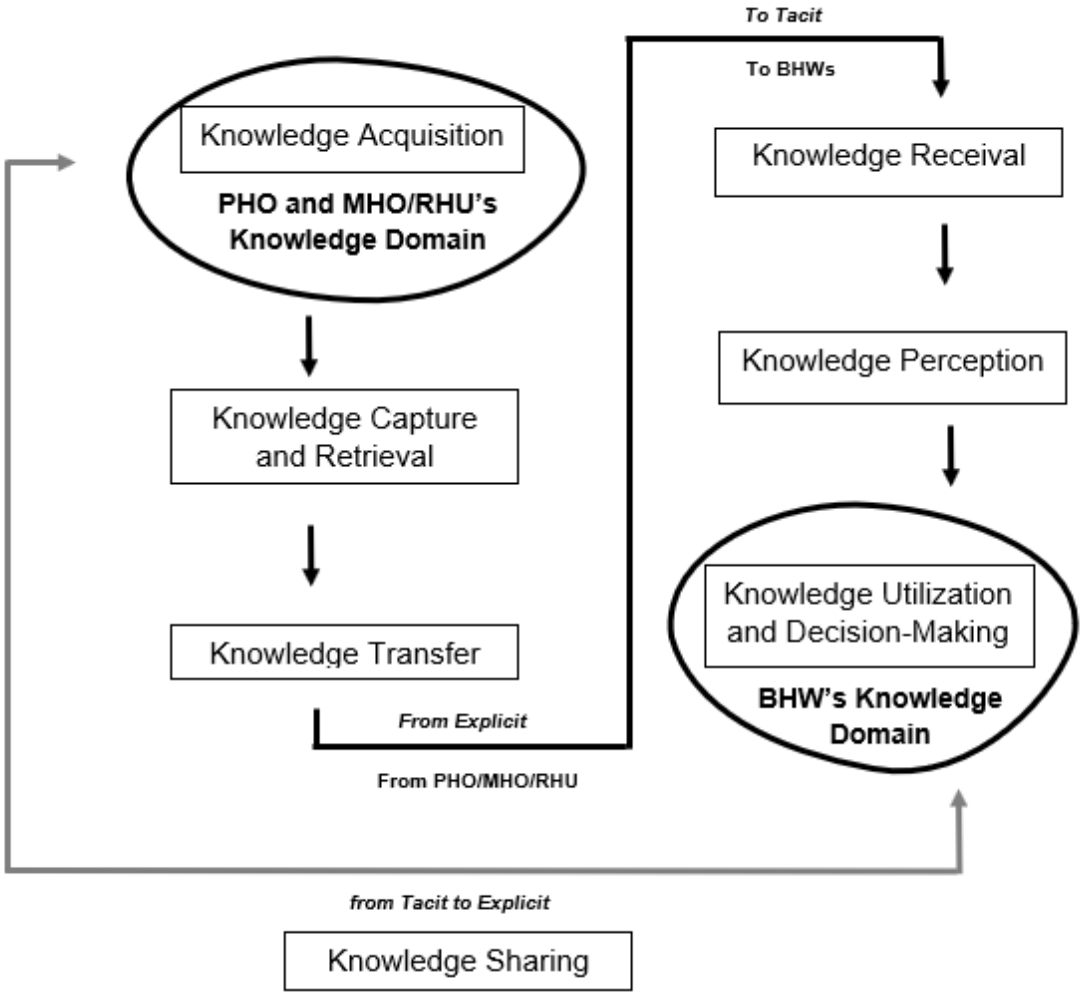


Figure 10 shows how knowledge flows from the PHO, MHO/Virac RHU's knowledge domain, down to the BHWs knowledge domain which initiates the decision-making process.

The whole process starts with knowledge acquisition done by the health authorities from PHO, MHO and Virac RHU which is then followed by knowledge capture and retrieval or knowledge documentation. Knowledge transfer, on the other hand, is when knowledge is made available to the receiver which are the BHWs.

When the knowledge becomes available, BHWs then start receiving knowledge directly from the provider (forced) or they intentionally access it by themselves (open). When BHWs understand the new piece of knowledge from the provider (knowledge perception) in relation to their existing knowledge, knowledge utilization and decision-making will take place.

This knowledge flow drives the health knowledge systems to achieve their goal which includes improved primary healthcare and health emergency management.

From the receiver's knowledge domain, knowledge sharing must also be stimulated to convert BHWs knowledge from tacit to explicit. Through this, the provider will be able to create policies and recommendations for the improvement of health emergency management and the local health system in general.

Chapter III

METHODOLOGY

Research Design

In investigating the application of knowledge practices within the health knowledge systems in Virac, Catanduanes, this study employed the mixed methods research design to collect and analyze both quantitative and qualitative data. This research design was best suited to gain an all-inclusive view of the knowledge practices in Virac, from the provincial level down to the barangay level.

Locale of the Study

The study was conducted in Virac, a first-class municipality and the capital of the province of Catanduanes, an economically and geographically isolated province from the Bicol Peninsula. Virac lies at approximately 13.35 degrees north and 124.14 degrees east in the island of Catanduanes (*Virac, Catanduanes Profile - PhilAtlas*, 1990). Based on the Philippine Statistics Authority (2020, p.19), Virac has recorded 76,520 total population in 2020 which represents 28.14% of the total population of Catanduanes.

Being the capital of Catanduanes, Virac is the province's political, economic and educational center. It is also the center of public and private healthcare facilities, and the domicile of Eastern Bicol Medical Center (EBMC), a government-run medical

institution which serves 25,000 Catandunganons annually, 80% of whom are indigents (Eastern Bicol Medical Center, n.d).

Figure 11 shows the map of Catanduanes with Virac being highlighted.

Figure 11. *Map of Catanduanes (Wikipedia, 2022)*

Located right in the middle of the “typhoon belt”, Virac, Catanduanes is one of the most disaster-prone areas in Bicol (OCHA, 2006). According to the Department of Health, those areas that are frequently visited by typhoons can potentially record increase in the transmission of communicable diseases due to damage to water and sanitation networks, crowded evacuation centers and ecological changes, among others.

Virac indeed wrestles with health challenges. In the past four years, there was an increase in preventable diseases in the province (Panti, 2020). However, health centers in the province are underequipped and under-staffed that they could only respond to basic illnesses. Those with more serious health conditions and require

complex medical procedures have to seek help outside the province. Poor network and data signals in the province also hamper communication between authorities during health emergencies.

Respondents of the Study

The study involved three groups of respondents which comprise the health knowledge systems. The first group comprised health authorities from the provincial and municipal levels.

The second group included Rural Health Unit (RHU) nurses and midwives who were deployed to the barangays. Purposive sampling was used, taking into account their capacity and willingness to cooperate in the research.

The third group consisted of barangay health workers. Out of the 461 total BHWs in Virac, 337 questionnaires, or 75.39%, were retrieved. Below is the table for the distributed and retrieved questionnaire per catchment area. Catchment area is composed of several barangays. Grouping the barangays per catchment area give a more accurate picture of where patients could access their health services. In the municipality of Virac, out of a total of 63 barangays there are 12 catchment areas. Below is the table of the number of respondents of the study per catchment area, number of questionnaires distributed and retrieved and percentage of retrieval.

For purposes of this study, the total population of the BHWs was taken. The table shows that there are 461 BHWs in Virac. Out of the 447 questionnaires distributed, 337 questionnaires were retrieved or 75.39 percent retrieval rate.

Table 1. *Population of the Study and Percentage of Questionnaires Retrieved.*

Catchment areas	No. of BHWs	No. of questionnaires distributed	No. of questionnaires retrieved	Percent of questionnaires retrieved
Antipolo	33	33	31	93.94%
Dugui	18	14	10	71.43%
Danicop	56	56	44	78.57%
Calatagan	34	28	25	89.29%
Buyo	48	48	29	60.42%
Hawan	38	38	29	76.32%
Ilawod	38	38	34	89.47%
Palnab	66	66	44	66.67%
Palta	33	33	25	75.76%
Rawis	30	30	26	86.67%
Sto. Domingo	30	30	19	63.33%
Sta. Elena	37	33	21	63.64%
Total	**461**	**447**	**337**	**75.39%**

These three groups were selected because they are the authorities and key actors in health emergency management in the province.

Research Instrument

To meet the objectives of the study, this research employed methodological triangulation using the following instruments: survey, key informant interviews, and focus-group discussion.

Survey

A survey was conducted among the barangay health workers. The survey was written in the Bicol language so the respondents can easily understand the questions. The survey included questions on the following topics:

Part I of the instrument delved into the socio-demographic characteristics including age, sex, years of service as BHW, and educational attainment. The data on the socio-demographic profile is used for profiling purposes only.

The second part focused on the knowledge processes of BHWs along knowledge receival, knowledge perception, and knowledge utilization. To capture the extent to which the BHWs utilize their knowledge on health emergency management, a Likert scale was devised. Hereunder is the scale used.

4 – Highly utilized

3 – Moderately utilized

2 – Rarely utilized

1 – Not utilized

The third part was on the knowledge sharing activities conducted to transfer knowledge from the barangay to the provincial and municipal level. Respondents were asked about the activities conducted after health emergencies, and the authorities they prefer to share knowledge with.

The last two parts were focused on the barriers to sharing knowledge and the BHWs' perceived benefits of knowledge practices in the health emergency management in the barangay.

Focus group discussion

This was conducted among the RHU nurses and midwives who supervise BHWs. The questions asked included the following topics: critical knowledge BHWs must have or be familiar with; knowledge practices in terms of knowledge acquisition, knowledge capture and retrieval, and knowledge transfer; barriers to sharing knowledge; and benefits of knowledge practices on the health emergency management and within the health knowledge systems in Virac.

Key Informant Interview

The key informant interview (KII) was conducted with health authorities at the provincial and municipal level. Specifically, the researcher interviewed the provincial health emergency management officer, the head of the provincial epidemiological surveillance unit, and the head of the municipal epidemiological surveillance unit who is also the municipal BHW coordinator. The questions asked during the KII were the same as those included in the focus group discussion.

Data Gathering Procedure

Preliminary interviews with retired rural health unit (RHU) nurse in Virac, RHU nurse in the municipality of San Andres, and previous RHU nurse from Virac were conducted to identify critical knowledge on health emergencies that BHWs must possess. Through this interview, key informant interview and focus-group discussion

guide questions were pre-tested and finalized. This also served as the basis for revising the questionnaire for the barangay health workers. The questionnaire was written in the Bikol language and underwent face validation conducted by an MHO personnel to ensure comprehensibility and readability. Comments and suggestions were then incorporated to finalize the questionnaire for the BHWs.

Prior to the actual distribution, three (3) enumerators were trained to aid the researcher during the survey. Each enumerator was assigned catchment areas where they distributed and collected the questionnaires. Before the distribution, permission from the barangay chairperson was sought, and the letter of request approved by the municipal mayor was shown.

Throughout the data-gathering process described above, respondent participation was voluntary. Volunteers were informed about the potential benefits and risks associated with participating in the study, and they were given the opportunity to ask the researcher questions to better understand the study's purposes. Any information provided by the respondents was treated with anonymity and confidentiality.

Data Analysis

The data obtained from KIIs and FGDs was thematically analyzed to explore the knowledge practices within the health knowledge systems which include health authorities at the provincial and municipal levels, as well as rural health unit nurses and midwives stationed in the barangays. On the other hand, descriptive statistics, such as frequency, percentage, and weighted mean were utilized to analyze

knowledge practices at the barangay level in Virac, Catanduanes. Methodological triangulation was employed to confirm findings and enhance the validity of the results. Based on the findings, recommendations were made to strengthen health emergency management as well as improve the knowledge practices within the health knowledge systems in the municipality of Virac.

Chapter IV

RESULTS AND DISCUSSION

This chapter presents, analyzes and interprets the data gathered through key-informant interviews with health authorities at the provincial and municipal levels, focus-group discussion with nurse and midwife-supervisors in the barangays, and administered questionnaires to barangay health workers (BHWs) in Virac, Catanduanes. Instead of discussing a knowledge management system or strategy, the results and discussion primarily focused on the process framework or knowledge flow based on Verkasalo and Lappalainen's knowledge utilization model.

Socio-Demographic Profile of Barangay Health Workers in Virac, Catanduanes

This section describes the socio-demographic characteristics of barangay health workers (BHWs) in terms of sex, age, years of service and highest educational attainment.

Sex. Table 2, reveals that community healthcare in Virac is dominated by women, with 322 or 95.55 percent of the respondents being female, while only 2.37 percent are males. This could be attributed to the traditional gender roles assigned to women in the society, which are often associated with nurturing and caregiving (Baliolaa et al., 2023). As a result, women are also expected to take on caregiving responsibilities in their communities. Thus, gender should be taken into account when developing activities and training programs for BHWs.

Table 2. *Socio-demographic Characteristics of Barangay Health Workers* in Virac, Catanduanes*

Variables	*Frequency*	*Percentage*
Sex:		
Female	322	95.55%
Male	8	2.37%
No Response	7	2.08%
Total	**337**	**100%**
Age:		
60-above	42	12.46%
50-59	73	21.67%
40-49	86	25.52%
30-39	82	24.33%
20-29	29	8.60%
No Response	25	7.42%
Total	**337**	**100%**
No. of Years as BHW:		
31 Above	8	2.37%
21-30	19	5.64%
11-20	46	13.65%
1-10	153	45.40%
less than 1 year	45	13.35%
No Response	66	19.58%
Total	**337**	**100%**
Highest Educational Attainment		
Elementary Undergraduate	1	0.30%
Elementary Graduate	13	3.86%
High School Undergraduate	14	4.15%
High School Graduate	125	37.09%
College Undergraduate	77	22.85%
College Graduate	77	22.85%
Post-Graduate	0	0%
No Response	30	8.90%
Total	**337**	**100%**

**n=337*

Age. The majority of BHWs in Virac are over the age of 30, accounting for 83.98 percent of the respondents. Within this group, 24.33 percent fall within the 30-39 age bracket, 25.52 percent are aged 40-49, 21.66 percent are aged 50-59, and 12.46 percent are 60 years old or older. Meanwhile, only 8.61 percent of the BHWs are below the age of 30. The mean age was also determined to be 45.27. This result implies that BHW in Virac, Catanduanes are in the middle age which means that they still possess the energy and stamina to work in the community thus, still productive. Taburnal (2020) supports the notion that as individuals get older, their level of understanding of the community they serve tends to increase. This is because aging allows community health workers to gain valuable life experiences and a deeper understanding of their community

Years of Service. According to Taburnal (2020), the length of service is a determining factor for the competence of BHWs. The BHWs who have been in service for several years have established a strong foundation, gained confidence in delivering health information and education, and developed the ability to handle challenging situations due to their familiarity with the job (Taburnal, 2020). In Virac, however, only 21.66 percent of BHWs have served for more than 10 years, while the majority (58.75%) are relatively young in the field, with most of them having a service duration of 0-10 years.

This could presumably be attributed to the authority granted to LGUs by the Local Government Code of 1991 to handle the recruitment, retention, and removal of health workers in each barangay. This is backed up by reports which indicate that over 80,000 BHWs were dismissed from their posts by newly elected barangay officials after the 2023 Barangay and Sangguniang Kabataan Elections (GMA News,

2023). However, terminating tenured BHWs would result in the loss of expertise in health emergency management, as well as additional expenses for training new replacements. Furthermore, it would lead to a decrease in productivity until the new BHWs become proficient in their roles.

Education. Table 2 shows that 82.79 percent of the BHWs in Virac are high school graduates. This implies that most of the BHWs possess basic critical and analytical thinking skills, as well as basic communication skills.

Although education alone does not guarantee competence (Taburnal, 2020), the educational attainment of BHWs should still be considered, given the numerous training they are required to attend. Furthermore, the possible enactment of the Bibong BHW Act of 2022 would expand the scope of their job, as they will receive training in various areas such as basic community organizing, local health research, social health insurance navigation, basic local source generation and mobilization, training needs analysis, basic report writing and communication skills, and program planning and development.

Critical Knowledge on Health Emergency Management by Health Authorities from Provincial Health Office and Municipal Health Office

Knowledge auditing is a crucial step in developing an effective knowledge management strategy tailored to the organization's needs (Metaxiotis, 2010). It helps identify the organization's knowledge requirements and essential knowledge for immediate performance improvement (O'Dell & Hubert, 2011).

As such, the researcher conducted a knowledge audit to identify the critical knowledge on health emergency management (HEM) that barangay health workers (BHWs) should possess or be familiar with. This involved interviews with provincial health office (PHO) personnels specifically the provincial health emergency management coordinator and provincial epidemiological surveillance unit head, and municipal health office (MHO) personnel specifically the municipal epidemiological surveillance unit head who is also the municipal BHW coordinator, as well as focus-group discussion (FGD) with barangay nurse and midwife supervisors.

The interview results revealed that BHWs need to possess knowledge in disease surveillance, monitoring, and basic case management.

Furthermore, it was emphasized that BHWs must be competent in early detection, prevention, and control of diseases. On the other hand, results of the focus-group discussion showed that BHWs should have a basic understanding of disease origins and causes. They should also be familiar with their roles in health education, promotion, and teaching within their respective barangays.

Proper reporting skills were also mentioned by both PHO and MHO personnels as a fundamental competency for BHWs. Therefore, BHWs should be proficient in measuring vital signs such as blood pressure, temperature, oxygen level, as well as height and weight.

Knowledge Practices on Health Emergency Management among Health Authorities in Virac, Catanduanes

This study aimed to look into the knowledge practices on health emergency management within the health knowledge systems in Virac using Verkasalo and Lappalainen's model on knowledge utilization as a basis for analysis.

Specifically, this study applied the theory to investigate how knowledge flows within the health knowledge systems – from the provider's knowledge domain, which includes the health authorities at the provincial and municipal health offices and nurses/midwives from the rural health unit, to the receiver's knowledge domain, which comprises the barangay health workers (BHWs).

To gather data, the researcher conducted interviews with provincial health emergency management coordinator and provincial epidemiological surveillance unit head, municipal epidemiological surveillance unit head who is also the municipal BHW coordinator, as well as focus-group discussion with rural health unit nurses and midwives who supervise BHWs.

This part of the study focused on the following knowledge practices: knowledge acquisition, knowledge capture and retrieval, and knowledge transfer at the provincial and municipal levels.

Knowledge Acquisition

In this study, knowledge acquisition refers to the activities and approaches used to obtain critical knowledge on health emergency management at the provincial and municipal levels.

The researcher then classified the knowledge acquisition activities into two categories, based on the two types of knowledge identified by Nonaka (1994) – explicit and tacit knowledge. Explicit knowledge refers to knowledge that is easy to document or is available in written, spoken, and electronic forms, while tacit knowledge is knowledge that exists within individuals' minds and is therefore difficult to document and communicate.

A. Acquisition of Explicit Knowledge

In the municipality of Virac, knowledge about health emergency management (HEM) is mainly acquired from the Department of Health (DOH) through the Provincial Health Office (PHO) of Catanduanes. PHO then takes charge in disseminating this knowledge to the different municipal health offices (MHO). In this study, knowledge acquisition activities were group into three: face-to-face interaction, document retrieval and technology-aided activities.

Face-to-face interaction. Based on the interview findings, DOH regularly holds seminars and training on HEM. In cases where in-person interaction is limited, webinars are also arranged. The PHO then shares the knowledge acquired from these training with the various MHOs in the province through both regular and special meetings. These meetings are the main sources of information on health

emergencies at the provincial and municipal levels. Emergency meetings are also conducted to gain understanding in handling potential disease outbreaks in affected barangays. The knowledge gained from these meetings is then disseminated to the barangays through additional meetings, seminars, and training.

In the barangay level, monthly meetings as well as emergency meetings are also conducted. This is attended by key health actors such as the barangay chairperson, councilor on health, barangay nurse/midwife and the BHWs. These individuals also compose the Barangay Health Emergency Response Team (BHERT) which takes the lead in the management of health emergencies in their respective barangays. Initially established to address the spread of disease during the COVID-19 pandemic, BHERT is now activated whenever necessary. Based from the interview with PHO personnels, BHERT serves as a valuable source of knowledge for health authorities in formulating health policies, as it is responsible for handling health emergencies at the grassroots level.

During the interview with MHO personnel, the importance of knowledge from the grassroots level was also emphasized. He highlighted that the BHWs have a deep understanding of their assigned areas within the barangays. Thus, it is crucial to maintain regular communication with them.

The personnel stated:

> *"Lahat ng balita sa barangay sila ang nakakaalam and sila 'yong magrereport sa amin"* (BHWs are the ones who have knowledge about everything that happens in the barangay and they report it to us).

He added that open communication between health authorities and BHWs is vital for effectively managing health emergencies in the municipality of Virac.

On the other hand, health authorities conduct an Annual Program Implementation Review (PIR). The PIR serves as an assessment of the performance of health workers in their respective health programs and allows for the review and revision of policies and activities related to health on a yearly basis.

Document retrieval. The interviews also revealed that health authorities at the provincial and municipal levels acquire knowledge from memoranda, ordinances, as well as updates and orientations provided by the DOH.

Aside from those, DOH provides the province with information education and communication (IEC) materials such as manuals, flyers, and brochures, which are distributed to the MHOs. These manuals, as stated by the MHO personnel, contain comprehensive information about various diseases, including basic information, monitoring, and management.

Technology-aided activities. In situations where face-to-face contact is limited due to a nationwide health emergency, DOH organizes webinars (seminars conducted over the internet) to easily cascade knowledge to various health offices.

During the focus-group discussion, another technology that was mentioned was the DOH Academy. This online portal, managed by DOH, contains materials on health. Barangay nurses and midwives utilize this e-learning platform for their

continuing professional development (CPD) activities, as the online courses offered in the DOH Academy count towards this requirement.

B. Acquisition of Tacit Knowledge

According to Kothari et al. (2012), relying solely on explicit knowledge may not be sufficient for effectively planning public health programs, as it may not consider the specific local context of public health issues. Therefore, it is important to tap into the BHWs' tacit knowledge which they have accumulated through years of practice. In this study, the researcher discovered that tacit knowledge on HEM is acquired through debriefs and post-mortems as well as storytelling or sharing stories.

Debriefs and post-mortems. To elicit the knowledge gained at the barangay level, MHO conducts quarterly meetings with BHWs. During these meetings, problems encountered, as well as the best practices and lessons learned from health emergencies are discussed. According to the MHO personnel interviewed, BHWs are encouraged to speak out, share their personal experiences, and suggest suitable solutions, as they possess a deeper understanding of their communities compared to the health authorities.

O'Dell and Hubert (2011) argue that this experiential knowledge plays a crucial role in emergency response, as it enables organizations to gain a better understanding of the situation. Kothari et al. (2012) support this idea, stating that drawing upon the tacit knowledge gained through experience can guide health authorities in making decisions regarding the management of health emergencies.

Storytelling or Sharing stories. The interview findings also revealed that health authorities place importance on the sharing of personal experiences.

The PHO personnel stated:

> *"Sa Batag, last year, nag-outbreak kami ning Cholera duman, dai man ito sa regular meetings. Saro ito duman sa way of gaining knowledge is through going down to the barangay and sharing experiences and also getting something from the barangay"* (Last year, we had a Cholera outbreak in Batag which is was not included in our regular meetings. One of the ways of gaining knowledge is through going down to the barangay and sharing experiences and also getting something from the barangay).

Sharing of stories was also pointed out during the FGD as one way of acquiring knowledge between barangay nurses/midwives and BHWs. Based from the FGD, storytelling with BHWs is the most common practice to share and acquire knowledge, as well as facilitate learning in the barangay level.

According to Kothari et al. (2012), storytelling or sharing stories are important methods to share not only experiences but also successes and difficulties. It is a basic form of knowledge as it provides meaning and depth to information (Reamy, 2002). Therefore, there must be a participatory storytelling program in the local health system to reveal how health workers address or manage health emergencies in the local context.

Communities of Practice (CoP). Though the health authorities and barangay nurse and midwife-supervisors were not familiar with the concept of CoP, interviews and FGD revealed that the health workers engage in regular knowledge exchange with people they have common interest with.

Interviews revealed that this knowledge exchange is done through the use of group chat system of Facebook Messenger. Based on the interviews, there are group chats among BHWs, among health authorities, and among nurse and midwife supervisors. Through these group chats, health workers are able to regularly engage in knowledge sharing, and are able to share problems and issues they encounter in their respective stations. This system is also their way to immediately share updates from DOH, as well as other critical knowledge on health emergencies and other health-related issues. The BHWs also formed the Municipal Federation of BHW. This organization also holds meetings with BHWs to tackle issues, problems and other health-related matters in their respective barangays.

Knowledge Capture and Retrieval

Another knowledge practice that was investigated in this study was knowledge capture and retrieval. In the healthcare industry, professionals have their own expertise or specialized knowledge on health emergencies which should be captured and stored, and eventually shared with other organizational units or end users if the need arises. Successful documentation of this knowledge could aid in the decision-making process during health emergencies. Thus, the researcher aimed to study the knowledge capture and retrieval mechanisms within the health knowledge

systems of Virac. In this section, data was gathered through interviews with health authorities at the provincial and municipal levels, as well as focus-group discussion (FGD) with rural health unit nurses and midwives assigned to the barangays.

The interview and FGD findings revealed that knowledge about HEM is recorded in minutes of meetings. The minutes are written and stored in a logbook, with digital copies saved by the municipal health office's secretary on a computer in the municipal health officer's station. Thus, retrieving of documents was found to be a challenge as it requires visiting the head of office's room and requesting permission, as mentioned by the MHO personnel during the interview. Additionally, reports on diseases are encoded, printed, and filed in the offices of public health nurses who are responsible for specific health programs.

Barangays also practice manual documentation. They use logbooks to store knowledge, with the barangay secretary or assigned personnel responsible for this task. Based on the interviews, logbooks are preferred for knowledge storage because not all barangays have computers, and not all BHWs are familiar with using technology. Therefore, manual documentation remains the top choice to capture knowledge at the barangay level. However, access to this knowledge can only be obtained by visiting the barangay hall or requesting the document from the official in possession of it.

At the provincial level, on the other hand, the Field Health Services Information System (FHSIS), handled by PHO's information technology (IT) department, is being used to store knowledge documented through reports. FHSIS is a management information tool that generates data from the local health system, consolidates it, and transmits it to the next administrative level until it reaches DOH.

However, in the PHO, FHSIS is only utilized as a knowledge repository, and a channel to submit reports to the regional and national level. Additionally, FHSIS cannot be accessed by other offices in the PHO even with their local network. Thus, retrieval of reports was still seen as a challenge. Even with printed copies of reports shelved in various offices of unit heads, retrieval was still noted as a problem since materials are not readily accessible for reading.

Without technology for capture and retrieval, the health knowledge systems in Virac will have difficulty in implementing an effective knowledge management strategy. According to Flor (2019), one of the prerequisites of knowledge management is a technology for capture and retrieval which would allow the sharing and reuse of knowledge across health units and communities. The other prerequisites are knowledge processes and a culture of knowledge sharing.

Therefore, LGUs should consider allocating a budget for an in-house knowledge management technology as well as other ICT facilities to support this such as additional computers, mobile phones and other electronic gadgets that will enhance the capture and retrieval capabilities during health emergencies. This is backed up by studies of Dayrit et al. (2018), in which it was found that databases could help generate local information on hazards, vulnerabilities, capacities and actual losses due to disasters. The knowledge management technology could also be used for knowledge sharing and transfer across the health offices and barangays, as well as a knowledge source for new staff or the inexperienced. Moreover, it was found that organizations with existing KM technology even before the COVID-19 pandemic, were able to transition to digital platforms quicker and easier (Chaturvedi & Singh, 2021). Moreover, there must be additional training for unit heads on the use

of knowledge management systems as they are the individuals who have the ability to access confidential information, distribute critical knowledge during health emergencies, and use the knowledge to solve problems and make ideal decisions.

Knowledge Transfer

This study also explored the practices of transferring knowledge on health emergency management within the health knowledge systems of Virac. In this particular study, knowledge transfer occurs when knowledge is made available by the health authorities to the receiver who are the BHWs.

Data gathered through interviews and FGD were categorized into two: Forced knowledge transfer and open knowledge access as discussed in the theory of Verkasalo and Lappalainen (1998). Forced knowledge transfer is when BHWs receive knowledge directly from the provider, while open knowledge access is when BHW intentionally access information by themselves.

A. Forced Knowledge Transfer

According to the health authorities, they directly provide knowledge to BHWs through activities such as meetings, information and education drives, use of a group chat system on Facebook Messenger, training and seminars, as well as mentoring or peer assists. These activities were discussed in detail below:

Meetings with BHWs. Based on the interview, MHO holds quarterly meetings with BHWs throughout the year. In order to accommodate all 461 BHWs from the 63 barangays in Virac, the barangays are divided into 12 catchment areas. Each quarter, 1-3 catchment areas are selected to attend the meetings.

The MHO personnel stated:

> "*Firstly, we conduct quarterly meetings with BHWs and during those quarterly meetings, 'yong apat na nurses na available dito sa amin ngayon, 'yong mga programs ninda, gabos ito piga-allocate-an ning time to discuss. Halimbawa ako sa communicable diseases, 'yong isa sa maternal and child health, 'yong isa sa family planning,'yong isa sa non-communicable diseases..."* (Firstly, we conduct quarterly meetings with BHWs wherein nurses of different health programs such as my program on communicable diseases, and other programs such as maternal and child health, family planning, and non-communicable diseases are given time to discuss).

MHO also calls for special meetings whenever DOH releases new guidelines on health programs. However, it was found that budget concerns and rising cost of transportation discourage other BHWs to attend these meetings. This could be due to the fact that BHWs do not have fixed salaries as they are regarded as volunteer health workers. Thus, there must be support mechanisms in the barangays such as budget allocation to be able to assist BHWs.

Information and Education Drive. Whenever there is an alarming increase in cases of a particular disease, the MHO organizes intensified information and education drive.

The MHO personnel revealed:

> "*Last year, meron kaming alarming cases sa Dengue so ang ginawa namin, talagang intensified 'yong information education campaigns. Katulad no'ng mga BHWs – pumupunta kami sa barangay, nag-IEC kami…"* (Last year, we received reports of alarming cases of dengue, so we organized intensified information education campaigns. The same with BHWs, we go to the barangays to conduct IEC).

Moreover, the MHO conducts "bandillo" or a roving announcement around the barangay as part of their information drives.

Group Chat System on Facebook Messenger. This online platform which allows users to create group chat is used by health authorities to directly coordinate with BHWs. According to the interviews and FGD, group chat is the fastest way to communicate with BHWs during health emergencies. At the same time, BHWs use this to directly connect with managers and supervisors and share their concerns. Updates from DOH are also delivered easily and immediately to BHWs via this group chat system.

Aside from connecting with BHWs, group chat is also used by health authorities from PHO and MHO to remind nurses and midwives to properly supervise

BHWs, according to the MHO personnel. This online platform provides opportunity for both health authorities and BHWs to share information and provide feedback.

According to Parolin and Pellegrinelli (2022) group chat applications and social media have the potential to allow, encourage, prevent, afford, influence or change a course of action. However, not all BHWs are proficient in using this system. The MHO personnel stated that those who are not “techy” like the elderly can only access or reply to their group chat with the help of other BHWs or with their family members. Other challenges mentioned were poor mobile and data signals in far-flung barangays and non-provision of prepaid load or cell cards by local government for BHWs as not all barangays have free wi-fi access or wireless connection.

Training/Seminars. To evaluate the knowledge and basic competencies of BHWs, MHO regularly conducts training and seminars. Informal training are also included during quarterly meetings with BHWs to ensure that they are kept up to date. According to the MHO personnel interviewed, there will be a mandatory three-day training for BHWs in July 2024, during which their basic competencies will be tested and evaluated.

Another way knowledge is transferred to BHWs is through the BHW Congress, which takes place every December. During this event, speakers from PHO, as well as public health doctors and nurses, are given the opportunity to address the BHWs, provide reminders, and share updates from DOH.

Storytelling. Results of the FGD revealed that sharing stories with BHWs is a common practice at the barangay level since it is the most effective way to share knowledge. Also, it was found to be the most effective way to change one's opinions and behavior. During the COVID-19 outbreak, storytelling emerged as an effective mechanism to change the community's perspective on vaccines, according to one of the barangay nurses. Moreover, it was found to be an effective and captivating method to educate BHWs as it makes complex health information easier to understand.

According to Sachania (2021), storytelling allows tacit knowledge to be shared seamlessly. It also encourages group interaction, learning and conflict resolution in a non-confrontational way (Mamabolo, 2014).

Mentoring and peer assists. At the barangay level, nurse/midwife supervisors ensure regular communication and informal orientations and training for the BHWs assigned in their barangays. To ensure that BHWs have the necessary skills, nurses and midwives often provide mentoring and peer assists to transfer their best practices on health emergency management such as safe care for patients. According to O'Dell and Hubert (2011), this approach focuses on implementing proven practices and yields the greatest benefits for the organization.

B. Open Knowledge Access

Health authorities also transfer knowledge to BHWs through various materials such as information, education and communication (IEC) materials, and manual of procedures which were obtained from the Department of Health (DOH), as discussed below:

Information, Education, and Communication (IEC) Materials. Based on the interview, it was found that almost all of the IEC materials found in the barangay health stations are provided by DOH. Thus, the MHO attempted to translate these materials into the local language in order to address health concerns specific in the communities. However, due to heavy workload and the challenges involved in the translation process, this initiative was eventually discontinued. This could be attributed to the inadequate personnel in the municipal health office of Virac where there only four public health nurses (PHN) handling various health programs for a population of 76,520 (PSA, 2020, p.19). According to DOH (2018), there should be one PHN for every 10,000 people.

Moreover, it was found during interviews that there are no *plantilla* positions for a public health communication specialist or any job related to it. Thus, health workers are obliged to do public health information campaigns such as designing printed materials and developing health-related announcements, on top of their jobs as healthcare providers.

Manual of Procedures. According to the health authorities, manuals on health emergencies are distributed to barangays, with each manual focusing on a specific type of disease. These manuals provide comprehensive information about the

disease, covering everything from its basics to prevention and management strategies.

Knowledge Practices on Health Emergency Management at the Barangay Level in Virac, Catanduanes

Presented hereunder are the knowledge practices undertaken by barangay health workers (BHWs) in Virac, Catanduanes. These were described using Verkasalo and Lappalainen's knowledge utilization model, which include processes such as knowledge receival, knowledge perception, and knowledge utilization.

Knowledge Receival

As defined by Verkasalo and Lappalainen (1998) and as operationalized in the study, knowledge receival refers to the activities and approaches on how BHWs acquire knowledge on health emergency management from PHO/MHO and nurse/midwife supervisors from RHU. The data for this section was elicited through survey.

There were various knowledge receival activities of BHW in Virac, Catanduanes and these are shown in Table 3. The table shows that BHWs in Virac often receive knowledge directly from health authorities through training, symposiums/seminars, and regular meetings. Seventy percent (70%) of the respondents answered that they receive knowledge through training while 69.73

percent received through symposiums/seminars. Likewise, 44.51 percent of the BHW receive knowledge through holding of regular meetings while 35.31 percent mentioned that they receive knowledge through emergency meetings. It is also noteworthy to mention that BHW receive knowledge through *bandillo*, an information dissemination activity initiated by the Barangay Captain through announcing in the microphone while roaming around the barangay. IEC distribution and mentoring which are important knowledge receival activities were not much practiced by rural health authorities in the municipality according to BHWs.

Table 3A. *Knowledge Receival Activities of Barangay Health Workers* in Virac Catanduanes*

Activities*	***Frequency***	***Percent***
Training	236	70.00%
Symposium/Seminar	235	69.73%
Regular meetings	150	44.51%
Emergency meetings	119	35.31%
Bandillo	92	27.30%
IEC distribution	73	21.66%
Mentoring	55	16.32%

**n=337*
***Multiple responses*

Responses of BHWs confirm the knowledge transfer activities that were mentioned by health authorities from PHO and MHO during the interviews, and nurse/midwife supervisors during the FGD.

Corollary to the knowledge receival activities, this study also looked into the sources of information of BHW on health emergency management that they intentionally access. Results of the study showed that 235 or 69.73 percent of BHWs obtain their HEM knowledge from manuals, which are mostly provided by MHO, as

reported by 148 or 43.92 percent of the respondents. Additionally, 63.50 percent acquire their HEM knowledge through radios. However, radios are not available in all barangays. Only 122 or 36.20 percent of the respondents stated that radios can be found in their respective communities, as shown in the table. Furthermore, radio was not mentioned during the interviews and FGD as a channel to communicate HEM knowledge to BHWs.

Internet was also identified as a major source of knowledge by 192 or 56.97 percent of BHWs in Virac. However, 144 or 42.73 percent of the respondents stated that they have to find their own internet connection.

Table 3B. *Sources of knowledge on Health Emergency Management of Barangay Health Workers* in Virac, Catanduanes*

Sources of Knowledge*	***Place where knowledge is sourced or can be accessed***				
	Frequency (%)				
	PHO	**MHO/RHU**	**Barangay**	**Others**	**Total**
Manual	24 (7.12%)	148 (43.92%)	53 (15.73%)	10 (2.97%)	235 (69.73%)
Radio	9 (2.67%)	17 (5.04%)	122 (36.20%)	66 (19.58%)	214 (63.50%)
Internet	3 (0.89%)	5 (1.48%)	40 (11.87%)	144 (42.73%)	192 (56.97%)
Pamphlet	14(4.15%)	126 (37.39%)	46 (13.65%)	5 (1.48%)	191(56.70%)
Bulletin board display	4 (1.19%)	15 (4.45%)	51 (15.13%)	82 (24.33%)	152 (45.10%)
Television	7 (2.08%)	11 (3.26%)	28 (8.31%)	80 (23.74%)	126 (37.39%)
Brochure	17 (5.04%)	63 (18.69%)	30 (8.90%)	6 (1.78%)	116 (34.42%)
Newspaper	17 (5.04%)	59 (17.51%)	29 (8.60%)	7 (2.08%)	112 (33.23%)
Magazine	8 (2.37%)	37 (10.98)	25 (7.42%)	21 (6.23%)	91 (27.01%)

**n=337 respondents*
***Multiple responses*

However, when asked if their barangays utilize technology, 320 or 94.95 percent of respondents answered yes. As seen further in table 3D, group chats ranked as the most commonly used technology in the barangay. However, it should

be pointed out that this system requires an internet connection, and only 58.46 percent of the respondents reported having internet access in their barangays.

Table 3C. *Responses to the question: Do you utilize technology in your barangay?*

Response	***Frequency***	***Percent***
Yes	320	94.95%
No	9	2.67%
No response	8	2.38%

It is also important to note that relying solely on group chat, which is the commonly used technology in the barangay, should not be considered a reliable primary communication channel. Vital information that BHWs relay may be compromised, as there is no guarantee that this information is kept securely. This strengthens the recommendation for a knowledge management technology owned and managed by the local health system or local government, as this could include functions such as chat and messaging capabilities

Table 3D. *Technologies Used in the Barangays Health Stations**

Technology*	***Frequency***	***Percent***
Group Chat	253	75.07%
Internet/Intranet	197	58.46%
Computer	130	38.58%
Virtual forum	47	13.95%
Database	32	9.49%

**n=337 respondents*
***Multiple responses*

While most of the BHWs use group chat, they also complained of lack of internet connectivity. Without a reliable internet connection, other BHWs will be unable to receive updated information from health authorities or be promptly notified of emergency or special meetings. According to the information from the focus-group

discussion, BHWs without internet access may require in-person visits to their homes in order to be informed.

Similarly, when the respondents were asked about the activities done in seeking and verifying information on health emergency management, varied responses were given. The study found that more than two-thirds of BHWs consult their barangay nurse and midwife-supervisors for information verification (Table 3E). Specifically, 235 BHWs (69.73%) consult their barangay nurse, while 232 BHWs (68.84%) consult their barangay midwives. It is worth noting that barangay midwives, despite being responsible for essential healthcare for mothers and infants, provide additional health services like HEM due to the lack of access to professional healthcare practitioners in the province. The interview findings, however, assure that barangay midwife-supervisors have sufficient knowledge on HEM since they underwent rigorous training on health emergency management.

Table 3E. *Activities done by Barangay Health Workers* Involving Seeking and Verifying Information on Health Emergency Management*

Action to take**	Frequency	Percent
Consult barangay nurse	235	69.73%
Consult barangay midwife	232	68.84%
Consult the barangay chairperson	199	59.05%
Read IEC materials available in the barangay health station	192	56.97%
Search through the internet	102	30.27%
Ask other BHWs	99	29.98%
Ask a family member	40	11.87%
Ask the neighbor	22	6.53%

**n=337*
***Multiple responses*

During the COVID-19 outbreak, unverified news and misinformation spread widely, hindering efforts to control and treat the disease effectively. In light of this, the researcher asked the respondents where they verify their information. As one of the barangay nurses emphasized in the focus-group discussion, BHWs are responsible for health education and promotion in the barangays. Hence, it is assumed that they know how and where to verify critical knowledge on HEM.

Another crucial aspect to consider for successful knowledge management is **motivation** (Verkasalo and Lappalainen, 1998). In a study conducted by Fiscal (2019), both monetary and non-monetary incentives were found to contribute to effective knowledge management within organizations.

In this study, it was discovered that the overwhelming majority of BHWs are intrinsically motivated to acquire knowledge from health authorities (Table 3F). This is similar to the responses of barangay nurse and midwives during FGD. They believe that BHWs are primarily driven to help the community.

Specifically, 272 or 80.71 percent of BHWs are motivated by the opportunity to gain knowledge, while 253 or 75.07 percent believe that receiving knowledge contributes to the welfare of the community. The voluntary nature of serving as a BHW may explain these findings. According to RA 7883, the BHW Benefits and Incentives Act Implementing Rules and Guidelines, *"the principle of volunteerism shall be consistently promoted and observed by all parties concerned".* While the dedication of BHWs to their communities is commendable, normalizing volunteerism could undermine their role by treating it as unpaid labor. Therefore, it is crucial to enhance the incentives and benefits provided to BHWs and to strictly enforce RA 7883. Health authorities at the provincial and municipal levels also concurred that

BHWs should receive a reasonable package of incentives and benefits, as well as job security, considering their frontline contribution and the risks they face to their health and well-being during health emergencies.

Table 3F. *Motivation of Barangay Health Workers* to receive knowledge from health authorities*

Motivation*	***Frequency***	***Percent***
To gain additional knowledge *(Dagdag kaaraman)*	272	80.71%
Helps the community *(Nakakatabang sa komunidad)*	253	75.07%
Cash and gift incentives *(Dagdag benepisyo arog kan imo, asin goods o regalo)*	207	61.42%
Helps to achieve decent work *(Nakakatabang para magkaigwa nin kalidad na trabaho)*	54	16.02%
Social status of being a health worker *(Estado ning pagiging health worker)*	49	14.54%
Honorarium	42	12.46%
Job security *(Seguridad sa trabaho)*	24	7.12%
Part of the job *(Parte nin trabaho)*	17	5.04%

**n=337*
***Multiple responses*

Based on the findings in table 3F, it is evident that 207 or 61.42 percent of BHWs considered cash and gift incentives as their main motivation for acquiring knowledge. While health authorities gave emphasis to social status, honorarium, job security as motivating factors of BHWs, the respondents only found them least important, with only 15% of BHWs answered social status, 12% chose honorarium, 7% chose for job security. However, the outcome of the study still supports the need for implementing formal laws and policies that can maximize the advantages for BHWs in Virac, Catanduanes.

Knowledge Perception

Verkasalo and Lappalainen (1998) define knowledge perception as the receiver's understanding of knowledge. The questions in this section were derived from preliminary interviews conducted with retired RHU nurse, former RHU nurse, and RHU nurse from a different municipality. These interviews aimed to identify the critical knowledge that BHWs must possess in order to effectively manage health emergencies.

The study found that the perceived roles and responsibilities of BHWs during health emergencies are: information dissemination (52.22%), monitoring (49.26%), and implementation of health protocols (41.54%). These expectations align with the responses provided by health authorities during interviews and FGD. These results affirm that BHWs are fully aware of their roles and responsibilities within their communities.

Table 4A. *Roles and Responsibilities of Barangay Health Workers* in Virac, Catanduanes During Health Emergencies*

Roles and Responsibilities	***Frequency***	***Percent***
Information Dissemination	176	52.22%
Monitoring	166	49.26%
Health Protocol	140	41.54%
Preparedness	22	6.53%
Participation and Cooperation	12	3.56%
Disinfection/Cleaning of Environment	8	2.37%
Conduct of Meeting	1	0.30%

**n=337*
***open-ended*

Health authorities have also emphasized the importance of BHWs knowing who to report to in the event of health emergencies. As reflected in Table 4B, results

revealed that 221 or 66% of BHWs consider their barangay nurse/midwife as the primary authority during these emergencies. Following closely is the municipal health officer (65%) and thirdly, the barangay chairperson (59%). These findings highlight the significant role of health authorities as technical experts, and LGU as a leader in reinforcing and expanding existing health policies as stated in RA 1123.

Table 4B. *Authorities Barangay Health Workers* Coordinate and Report to During Health Emergencies*

Authorities*	***Frequency***	***Percentage***
Nurse / Midwife	221	65.6%
Municipal Health Officer	220	65.3%
Barangay Chairperson	199	59.1%
Provincial Health Officer	143	42.4%
Rural Health Unit	33	9.8%

**n=337*
***Multiple responses*

During health emergencies, particularly the COVID-19 outbreak, BHWs have the responsibility of monitoring patients in their communities. As a result, health authorities have recognized the importance of equipping BHWs with knowledge on proper monitoring and surveillance, including the early detection of signs and symptoms of diseases that are prone to epidemics. This is supported by the findings of Luo et al. (2020), who discovered that early detection can effectively control the spread of diseases and lead to improved health outcomes.

As to the type of information to report during health emergencies, the study revealed that almost all of BHWs (92.28%) consider symptoms to be the most crucial information that needs to be reported to health authorities. Another information to report pertains to temperature (152/45.10%), pulse and oxygen level with 16.02 percent and 15.73 percent, respectively.

Table 4C. *Information Barangay Health Workers* need to report during health emergencies*

Data to be reported*	***Frequency***	***Percent***
Symptoms	311	92.28%
Temperature	152	45.10%
Pulse	54	16.02%
Oxygen Level	53	15.73%
Height and weight	49	14.54%
Others: Blood Pressure	1	0.30%

**n=337*
***Multiple responses*

With respect to the symptoms to monitor during health emergencies, the Barangay Health Workers watch out for various symptoms. Results of the study along this are shown in Table 4D.

According to the Center for Disease Control and Prevention (CDC), fevers and chills are general symptoms that are common in several infectious diseases. This study revealed that BHWs are well-informed about this matter, with 302 or 89.61 percent of respondents stating that fever is a symptom to be vigilant about during epidemics. Loss of sense of taste and/or smell (81.30%) and shortness of breath or difficulty breathing (75.96%) were also considered by BHWs as symptoms to watch out for. These are also commonly associated with respiratory tract infections like COVID-19 (CDC).

Table 4D. *Symptoms Barangay Health Workers* must monitor during health emergencies*

Symptoms*	***Frequency***	***Percentage***
Fever or chills	302	89.61%
Loss of sense of taste and/or smell	274	81.30%
Shortness of breath or difficulty breathing	256	75.96%
Runny or stuffy nose	234	69.44%
Sore throat	227	67.36%
Headache	207	61.42%
Muscle aches	193	57.27%
Nausea or vomiting	189	56.08%
Stomach ache	175	51.93%
Fatigue or tiredness	159	47.18%

**n=337*
***Multiple responses*

The respondents showed good knowledge about the basic management of fever as reflected in Table 4D. A total of 248 respondents, or 73.59 percent, stated that taking paracetamol could help reduce body temperature. Additionally, 36.79 percent mentioned the importance of resting, while 2.55 percent emphasized the need to stay cool by wiping the body with a soaked towel.

Table 4E. *Treatment for Fever according to Barangay Health Workers**

Treatment*	***Frequency***	***Percent***
Take Paracetamol	248	73.59%
Rest	124	36.79%
Wipe the body down with soaked towel	76	22.55%
Drink juice/tea made with natural herbs	57	16.91%
Apply ointment	34	10.09%
Massage Therapy	26	7.71%

**n=337*
***Multiple responses*

Relative to the BHW's knowledge on the prevention of spread of diseases, results of the study revealed that BHWs were also knowledgeable about strategies to reduce the spread of diseases. According to the respondents, the top answer was

getting vaccinated (91.39%), followed by wearing a face mask (76.85%), self-isolation (74.48%), practicing physical distancing (72.11%), and practicing good hygiene (68.55%).

Table 4F. *Prevention of spread of diseases according to Barangay Health Workers**

Prevention Strategies	***Frequency***	***Percent***
Get vaccinated	308	91.39%
Wear proper face mask	259	76.85%
Self-isolate	251	74.48%
Practice physical distancing	243	72.11%
Practice good hygiene	231	68.55%

**n=337*
***Multiple responses*

In connection with the BHWs knowledge on the effect of pandemic or disease outbreak, various responses were gathered. The responses are shown in Table 4G.

Although epidemic-prone diseases, including emerging and re-emerging diseases, pose significant public health concerns, most BHWs view them more as social disruptions rather than health concerns. Among the respondents, 164 or 49% answered that these diseases lead to poverty, while 145 or 43% chose unemployment. Health-related issues were ranked only 3rd (anxiety) and 4th (health issues).

This perspective may be influenced by the fact that women dominate the community healthcare field. According to the study of Dempere and Grassa (2023), women have experienced more significant job and income losses than men during the COVID-19 pandemic, as they are often concentrated in the informal sector and low-paying jobs.

Table 4G. *Effect of epidemics/pandemics and disease outbreak according to Barangay Health Workers**

Effect	***Frequency***	***Percent***
Poverty	164	49%
Unemployment	145	43%
Anxiety	132	39%
Health Issues	23	6.8%
Limited Mobility/ Physical Interaction	13	3.9%
Death	5	1.5%
Government Expenditure	4	1.2%
Inflation	4	1.2%
School Dropout	3	0.9%
Malnutrition	2	0.6%

**n=337*
***open-ended*

Knowledge Utilization

Knowledge Utilization is the last step in the Knowledge Utilization Theory by Verkasalo and Lappalainen (1988). In this process, decision-making takes place. Thus, this is the most important step as it adds value to knowledge.

In this study, knowledge utilization was examined through determining the extent of utilization of the barangay health workers' new knowledge on HEM and their existing COVID-19 knowledge. According to Verkasalo and Lappalainen (1998), knowledge utilization and decision-making can only take place if the receiver of knowledge understand the new knowledge in relation to their existing knowledge. Thus, the researcher asked respondents through survey whether they will be utilizing the knowledge gained during the COVID-19 pandemic on other health emergencies that might arise in their community.

In determining knowledge utilization of BHW, several questions were asked and answers to these questions are reflected in the tables. Table 5A shows that two-thirds (224/66.47%) of the respondents are willing to utilize COVID-19 knowledge on other health emergencies.

Table 5A. *Response to the question: Will you be utilizing COVID-19 knowledge on other health emergencies?*

Response	***Frequency***	***Percent***
Yes	224	66.47%
No	5	1.48%
No response	108	32.05%

To assess the extent of utilization, a four-point Likert scale was employed by the researcher. The response categories included: (1) not utilized, (2) rarely utilized, (3) moderately utilized, and (4) highly utilized.

The findings revealed that BHWs highly utilize their knowledge of COVID-19, with an average rating of **3.60.** Specifically, knowledge regarding social distancing **(3.81),** the importance of technology **(3.75),** and people's capacity for resilience **(3.75)** were highly utilized. In contrast, knowledge related to telehealth **(3.23)** and the unequal treatment of people during the pandemic **(3.34)** were moderately utilized.

Table 5B. *Extent of Utilization of COVID-19 Knowledge by Barangay Health Workers* in Virac, Catanduanes*

Indicators of Knowledge	WM	QnR	QIR
Masks are useful tools not only during the pandemic but everyday *(Importante an masks bako lang sa panahon nin pandemya kundi sa gabos na aldaw)*	3.53	4	Highly utilized
Telehealth might become a new normal *(An pagpa doctor sa paagi nin teknolohiya posibleng maging normal na)*	3.23	3	Moderately utilized
Vaccines are power tools *(An bakuna importante pag igwa ning epidemya o pandemya)*	3.77	4	Highly utilized
People are not treated equally during pandemic *(Igwa nin pagkaka iba-iba an pag tratar sa pasyente sa oras nin pandemya)*	3.34	3	Moderately utilized
We need to take mental health seriously *(Taw-an nin atensiyon an kalusugan nin kaisipan)*	3.64	4	Highly utilized
People have the capacity for resilience *(Lambang saro igwa nin kapasdidad na maging matibay sa panahon ning problema)*	3.75	4	Highly utilized
Technology is important during an epidemic/pandemic *(Importante an teknolohiya sa panahon ning pandemya o epidemya)*	3.75	4	Highly utilized
Social distancing is a must during epidemic/pandemic *(Importante ang "social distancing" sa panahon ning pandemya o epidemya.)*	3.81	4	Highly utilized
OVERALL WEIGTED MEAN	**3.60**	**4**	**Highly utilized**

Legend: *WM – Weighted Mean*
QnR – Quantitative Rating
QIR – Qualitative Rating

4 – Highly Utilized
3 – Moderately Utilized
2 – Rarely Utilized
1 – Not Utilized

On the other hand, Table 5C presents that BHWs highly utilize *(pirming nagagamit)* their HEM knowledge. The most utilized knowledge is about promotion of vaccination **(3.76),** surveillance of people exhibiting symptoms **(3.70)** and surveillance of vulnerable people **(3.68).** On the other hand, BHWs only moderately utilize *(madalas nagagamit)* the knowledge on monitoring patients in isolation units **(3.34).**

Table 5C. *Extent of Utilization of HEM Knowledge by BHWs in Virac, Catanduanes*

Indicators of Knowledge	***WM***	***QnR***	***QIR***
Provide information about the disease – transmission and prevention *(Pagtao ning impormasyon manungod sa helang – painano ini gakalat asin painano matutunong)*	3.65	4	Highly utilized
Determine the persons who are ill or showing symptoms like sore throat, cough, or fever. *(Pag-monitor sa mga tawo na nakakamati ning mga kamataen arog ning kulog ning halunan, abo, kalintura*	3.70	4	Highly utilized
Monitor the families who are under home quarantine. *(Pag-monitor sa mga pamilya na naka-home quarantine)*	3.54	4	Highly utilized
Monitor and provide care for the patients who are in Community Isolation Units. (*Pag-monitor buda pag-alaga sa mga pasyente na nas community isolation units*)	3.34	3	Moderately utilized
Encourage people to get vaccinated to prevent the spread of disease. *(Pag engganyo sa mga tawo na magpabakuna)*	3.76	4	Highly utilized
Monitor people with higher risk of serious symptoms and those with certain medical conditions *(Pag-monitor sa mga high-risk o tawong igwa na dating namamati arog kan diabetes, helang sa puso, etc.)*	3.68	4	Highly utilized
OVERALL WEIGHTED MEAN	**3.61**	**4**	**Highly utilized**

Legend: *WM – Weighted Mean*
QnR – Quantitative Rating
QIR – Qualitative Rating

4 – Highly Utilized
3 – Moderately Utilized
2 – Rarely Utilized
1 – Not Utilized

Knowledge Sharing of Barangay Health Workers on Health Emergency Management to Health Authorities at the Provincial and Municipal Levels

Knowledge sharing is simply exchanging of information between people, teams, or organization. These exchanges in information, which may be done through formal means such as meetings or through unintended ways such as personal exchanges, are crucial for the whole health knowledge system in Virac in order to solve public health emergencies and other health issues collectively.

It is imperative in crisis management as it enables various knowledge systems such as professional communities, health authorities, policymakers and community workers to collaborate within and across their organizational units, and collectively act to solve health problems. Most importantly, knowledge sharing enables improved decision-making to save lives, and improve people's lives and the quality of life (Metaxiostis, 2010)

Thus, an effective knowledge sharing strategy in the entire health knowledge systems in Virac, from the provincial level down to the barangay level and back, must be encouraged and practiced if not formally implemented.

Aside from addressing health concerns, knowledge sharing is crucial for health workers since it will foster a culture of learning among them. Leadership skills of the health personnel will likewise be developed since employees will be encouraged to share what they know instead of keeping it for themselves.

In this study, knowledge sharing refers to the activities undertaken in order to impart knowledge about health emergency management from the barangay level to

the municipal and provincial level. According to Flor (2019), the primary goal of knowledge management is to enable the sharing and reusing of knowledge within the organization and its environment.

The study revealed that knowledge sharing occurs between and among the BHWs. As seen in Table 6A, 295 or 87.54 percent of the BHWs share their knowledge with their colleagues.

Table 6A. *Response to the question: Do you share knowledge to other BHWs?*

Response	***Frequency***	***Percent***
Yes	295	87.54%
No	4	1.18%
No response	38	11.28%

Out of these, 251 or 74.48 percent share their knowledge during meetings while 203 BHWs or 60.24 percent share their knowledge through storytelling. This confirms that storytelling or sharing stories among BHWs is indeed a common practice for sharing knowledge. On the other hand, only 157 or 46.59 percent of BHWs use the internet or Facebook Messenger to share knowledge with other BHWs, despite the fact that 75.07 percent of the BHWs use group chat, as mentioned earlier. This discrepancy could be attributed to the lack of or poor internet connectivity for some BHWs, which limits their ability to engage in knowledge sharing.

Table 6B. *Knowledge sharing activities on Health Emergency Management in the Barangay**

Knowledge sharing activities*	***Frequency***	***Percent***
During meetings *(pag igwang meeting)*	251	74.48%
Through storytelling *(pag-istorya)*	203	60.24%
Through internet or Facebook messenger *(paggamit ning internet o messenger)*	157	46.59%
Through writing *(pagsurat)*	43	12.76%
By using books or manual *(paggamit ning libro o manual)*	31	9.20%

**n=337*
***Multiple responses*

Interestingly, there were some BHW who share through writing (43/12.76%) and using books or manuals with 31 respondents or 9.20 percent.

The study also looked into the means of knowledge sharing of BHWs with health authorities. As stated by health authorities in the interviews, BHWs know what works because they know their communities more than anyone. Thus, their explicit knowledge along with the tacit knowledge they have gained through experience on HEM must be documented. This knowledge could be used to review and evaluate current health programs, strengthen health policies and improve HEM in the municipality of Virac.

Table 6C. *Activities done by Barangay Health Workers* to Share Knowledge on Health Emergency Management with Health authorities*

Knowledge Sharing Activities	***Frequency***	***Percent***
Through the barangay nurse/midwife *(Sa paagi ning nurse o midwife)*	226	67.06%
Through internet or messenger *(Sa paagi ning internet o messenger)*	115	34.12%
Directly meeting with provincial and municipal health officers *(Direkta na paki-meeting sa PHO buda MHO)*	77	22.85%
Through writing *(pigasurat)*	23	6.82%

**n=337*
***Multiple responses*

The study found that 226 or 67.06 percent of BHWs prefer sharing their knowledge with their barangay nurse/midwife supervisors rather than directly with health authorities, who are the primary point of contact for government support on health. Only one third (34.12%) of the respondents prefer sharing their knowledge with health authorities through the internet or messenger and only 22.85% directly share their knowledge with health authorities.

Unfortunately, this flow of communication is susceptible to message distortion. According to Coiera (2015), messages often get distorted during transmission due to limitations of the communication channel or the interpretation by individuals. This supports the statement of one of the health authorities that open communication within the organization is necessary for effectively managing health emergencies. A study of King and He (as cited by Schwartz & Te'eni, 2011), also revealed that individuals are more inclined to share explicit knowledge such as those documented on reports and memorandums since it may be considered as a property of an

organization. Tacit knowledge, on the other hand, is difficult to share with others as it resides in the minds of people, thus considered as something that belongs to them. It was also mentioned in the study that people's fear of losing ownership to the knowledge hinders knowledge sharing in an organization.

Therefore, it is recommended to engage in regular knowledge sharing, rather than limiting it to reviews or meetings. Health authorities should actively lead the knowledge sharing process by collecting and seeking knowledge from BHWs. Open communication can encourage engagement and elicit the tacit knowledge or experience-based knowledge on HEM from BHWs. Additionally, provision of monetary and non-monetary incentives may be considered to encourage BHWs to treat their valuable, personally-held knowledge as a public good that is imperative to collectively solve public health issues not just in the local level but on a global scale.

Barriers to Knowledge Sharing
Within the Health Knowledge Systems in Virac, Catanduanes

Participation and engagement in knowledge sharing is of paramount importance in knowledge management. There are however, impediments for employee's participation and engagement in sharing what they know about HEM. This study also looked into the barriers and/or challenges encountered by local health workers when it comes to knowledge management (Table 7).

According to 215 BHWs, which represents 63.80 percent of the total, the main issue hindering knowledge sharing in the municipality is internet connectivity. This finding aligns with the results mentioned earlier. Insufficient or unreliable internet

connection can hinder BHWs from accessing group chats, which are the primary means of communication during health emergencies. Additionally, it can obstruct their access to the internet, a key source of HEM knowledge. Consequently, this can impede open communication and hinder effective knowledge sharing within the organization.

Table 7. *Barriers to Knowledge Sharing in Virac According to Barangay Health Workers**

Challenges	***Frequency***	***Percent***
No or limited internet connection *(Dai o mabagal na koneksyon sa internet)*	215	63.80%
No cellphone or laptop *(Daing cellphone o laptop)*	159	47.18%
Barangay lacks budget for KM *(Daing budget ang barangay)*	137	40.65%
Inadequate training *(Kulang ang training)*	129	38.28%
Calamities *(Kalamidad)*	117	34.72%
Gadgets are outdated *(Luma na ang gadgets)*	91	27.00%
Heavy workload *(Dakol na trabaho)*	90	26.71%
Understaffing *(Kulang ang tawo)*	67	19.89%
at iba pa: *Lack of attendance during meetings* *Lack of cooperation among BHWs*	16	4.75%

**n=337*
***Multiple responses*

Other key challenges according to BHWs are: lack of gadgets (47.18%) and lack of budget for knowledge sharing in the barangay (40.65%). This supports the statement of one of the health authorities that some barangays are not equipped with wi-fi access and some are even lacking computers.

It is also important to note that some of the BHWs considered lack of attendance and lack of cooperation (4.75%) as a barrier to knowledge sharing. This could be due to budget constraints given the inadequate local government support fund for BHWs.

On the other hand, health authorities from the provincial and municipal health offices, as well as barangay nurse and midwife-supervisors pointed out the following challenges:

Lack of personnel plantilla position. According to DOH (2018), there should be one public health nurse (PHN) for every 10,000 people. However, in Virac, there are only four (4) public health nurses despite a population of 76,520 (PSA, 2020, p.19). The lack of sufficient staff may result in ineffective knowledge management due to overlapping duties and responsibilities within the organization. Additionally, this shortage could lead to poor quality healthcare and increased stress levels among healthcare professionals (National Economic and Development Authority, 2019).

Influence of local political leaders. Due to local autonomy, barangay chairpersons have the authority to determine the BHWs who will serve in their jurisdictions. This impedes knowledge retention and continuity as there is no security of tenure. Moreover, removal of BHWs, most especially those who have served for several years, would result in loss of knowledge and the financial investments made in their training.

Inadequate training on technology use. Ibones (personal communication, 2024) pointed out that some health workers, most especially the elderly, are unreceptive to

the use of technology. This obstructs knowledge management as knowledge nowadays is often transmitted through technology.

Lack of Knowledge Management System (KMS) and other ICT facilities. Interviews and FGD revealed that the local health system of Virac does not utilize KMS for its data generation, storage, and sharing. This study has found that health workers, from the provincial down to the barangay level, still rely on manual document filing, which is susceptible to mishandling and misplacement. Additionally, in the event of typhoons and other calamities, these documents are at risk of damage and loss since they may not be backed up. Furthermore, the slow retrieval of knowledge has been identified as a significant challenge. It was also found that not every personnel in the health offices has access to a computer or laptop. And if they do, the specifications are already outdated. Thus, the MHO personnel revealed that he personally stores some files in his external hard drive as a backup in case of computer break-down.

Benefits of Knowledge Practices
Within the Health Knowledge Systems in Virac, Catanduanes

Respondents of the study were also asked their perceived benefits of knowledge practices on HEM within the health knowledge systems. Health authorities were asked through interviews and FGD while BHWs were asked through survey.

Table 8A. *Response to the question: Does the knowledge from provincial and municipal level help you on health emergency management?*

Response	***Frequency***	***Percent***
Yes	285	84.57%
No	0	0.00%
No Response	52	15.43%

The study showed that 285 or 84.57 percent of BHWs agreed that the knowledge cascaded to them are helpful in HEM. According to BHWs, knowledge gained from the knowledge practices on HEM in the local health system of Virac, helps them in the organizational level and environmental level.

Organizational level. The study revealed that knowledge practices improve efficiency among BHWs thus organization becomes more productive (51.63%) and improve decision-making process (47.48%). Others also noted that it encourages cooperation, increases confidence and helps in problem-solving.

Environmental level. Outside the organization, knowledge practices make it easier for BHWs to educate community on the effects of epidemic/pandemic (67.95%), make it easier to encourage community to support barangay programs (62.91%), and provide community with new ideas and perspective (58.16%).

Table 8B. *Benefits of Knowledge Processes on the Health Emergency Management in Virac, Catanduanes according to Barangay Health Workers*

Benefits	Frequency	Percent
Makes it easier to educate community on the effects of epidemic/pandemic *(Madari na an pagpapasabot sa mga tawo kan epekto nin epidemya/pandemia)*	229	67.95%
Makes it easier to encourage community to support barangay programs *(Napapadari ang pag-engganyo sa mga tawo na suportahan ang programa ning barangay)*	212	62.91%
Provides new ideas and changes perspective on epidemics/pandemics in the community *(Nakadagdag ning bagong ideya or nakabag-o ning pananaw manungod sa pandemya o epidemya sa komunidad)*	196	58.16%
Improves efficiency thus organization becomes more productive *(Napapadari ang trabaho kaya mas produktibo sa laog ning organisasyon)*	174	51.63%
Improves decision-making process *(Nakakatabang na mapaayos ang mga desisyon)*	160	47.48%
Others **encourages cooperation, increases confidence, helps in problem-solving**	10	2.97%

It can be concluded that the knowledge gained by BHWs through the knowledge practices conducted within health knowledge systems is being utilized or applied to improve their performance.

Interviews and FGD also revealed the following benefits of knowledge processes: improve security of confidential and sensitive information through the KMS; improve access, filing and organization of knowledge; improve decision making; improve performance of health workers; and help achieve organizational goals.

Knowledge gained and shared from the grassroots level could also aid in the development of policies to improve overall quality of healthcare in the municipality of Virac.

Chapter V

Summary, Conclusion, and Recommendation

Summary

This study aimed to investigate knowledge practices within the health knowledge systems in Virac, Catanduanes through the knowledge processes present in the Knowledge Utilization Model of Verkasalo and Lappalainen (1998) . Specifically, it focused on the knowledge practices such as acquisition, capture and retrieval, transfer, receival, perception, and utilization. Also, it zeroed in on the knowledge on health emergencies caused by epidemic-prone diseases, including emerging and re-emerging diseases.

Key-informant interviews were conducted with health authorities at the provincial and municipal levels, and a focus-group discussion was held with rural health unit nurses and midwives deployed to the barangays. This aimed to explore their knowledge acquisition, knowledge capture and retrieval, and knowledge transfer. Additionally, a survey was conducted with barangay health workers (BHWs) to examine their knowledge receival, knowledge perception and knowledge utilization. The method of triangulation took on a holistic approach as public health emergencies require collective problem solving, from the provincial level down to the barangay level.

The data from the key-informant interviews and focus-group discussion were thematically analyzed. On the other hand, descriptive statistics, such as frequency

count, percentages and weighted mean, were used to analyze the survey data from BHWs.

The findings revealed that health authorities rely on face-to-face interactions, such as meetings, seminars, and training, to acquire knowledge on health emergency management. They also use technology-aided activities and document retrieval to obtain explicit knowledge on this topic. Additionally, they elicit tacit knowledge through post-mortem discussions, storytelling, and communities of practice (CoP).

To capture and store this knowledge, health authorities use manual documentation and filing. However, the absence of a knowledge management infrastructure such as database and knowledge repositories make these documents vulnerable to mishandling, misplacement, damage, and loss. Slow retrieval was also noted as a challenge.

When it comes to transferring knowledge to BHWs, health authorities arrange meetings, provide information and education drives, and conduct training and seminars. In case of emergencies or updates from the Department of Health (DOH) that needed to be disseminated immediately, they also use a group chat application to communicate directly with BHWs. BHWs are also given Information, Education, and Communication (IEC) materials and manuals to read. Barangay nurses and midwives, on the other hand, rely on storytelling, mentoring, and peer assists to share their best practices.

The survey results confirmed that BHWs do receive knowledge through training, seminars, and regular meetings, but not much from mentoring and peer

assists. Results also showed that they rely on radio and the internet as additional sources of knowledge. Notably, some barangay health stations do not have access to these resources. Despite this limitation, BHWs still manage to acquire and share knowledge using a group chat platform.

To assess the understanding of knowledge on health emergency management among BHWs, a survey was conducted. The results indicated that they have a good understanding of their roles and responsibilities during health emergencies, as well as proper coordination, surveillance and monitoring, and basic case management. The study also measured their knowledge utilization and found that they highly utilize the knowledge they receive from health authorities, as well as the knowledge they gained from the COVID-19 outbreak.

Knowledge sharing practices were also investigated to check whether the tacit knowledge that BHWs have acquired through experience are being communicated to the provincial and municipal level. The findings showed that BHWs are more inclined to share their knowledge with their barangay nurse/midwife supervisors rather than directly with health authorities at the provincial and municipal levels. This knowledge flow, unfortunately, is prone to message distortion.

Barriers to knowledge sharing were also explored. It was discovered that the main issue hindering knowledge sharing in the municipality, according to BHWs, is unreliable internet connectivity. Other issues raised included the lack of personnel, influence of local political leaders, inadequate training on technology use, and absence of a Knowledge Management System (KMS) and other ICT facilities.

The motivation of local health workers was also examined. It was discovered that these workers have an intrinsic motivation to gain and accept knowledge, which is commendable. However, it was observed that they are also motivated by both monetary and non-monetary incentives. This finding emphasizes the importance of local government funding to prevent the glorification of volunteerism or unpaid labor.

Local health workers at all levels believe that addressing these barriers could significantly improve knowledge management processes and enhance efficiency, decision-making, performance, and organizational goals. Moreover, the knowledge gained and shared from the grassroots level could contribute to the development of policies aimed at improving the overall quality of healthcare in the municipality of Virac.

Conclusion

This study determined the knowledge practices within the health knowledge systems in Virac, Catanduanes which includes provincial and municipal health offices, rural health unit, and barangay health workers.

Hereunder are the research questions and the findings:

1. **What are the critical knowledge on health emergency management according to health authorities from the provincial and municipal health offices, as well as nurse and midwife supervisors from Virac RHU?**

    Critical knowledge on health emergency management include: disease surveillance, basic case management, early detection, prevention and

control, basic information about a disease, roles and responsibilities, and proper reporting. These are the knowledge barangay health workers (BHWs) must possess in order to effectively manage health emergencies at the community level.

2. **What are the knowledge practices on health emergency management among health authorities in Virac, Catanduanes in terms of: a. knowledge acquisition, b. knowledge capture and retrieval, and c. knowledge transfer?**

Health authorities adopt various approaches to acquire knowledge on HEM. Explicit knowledge is acquired through formal and systematic structures such as seminars, meetings, documents and technology-aided activities, while tacit knowledge is acquired through open, spontaneous knowledge exchange such as discussion of lessons learned, storytelling and interaction with communities of practice (CoP). However, there is room for improvement in the capture and retrieval of knowledge through the addition of ICT facilities such as computers, laptops, and database as well as possible integration of a knowledge management technology which could be designed to aid in the sharing and reuse of knowledge within and across the health units.

To ensure knowledge transfer to barangay health workers (BHWs), health authorities also conduct various activities such as seminars, training, storytelling, mentoring, and IEC and manual distribution. The most popular method of knowledge transfer was found to be the use of the group chat system on Facebook Messenger that enables health authorities

to directly and immediately connect with BHWs without meeting them face-to-face. This platform also allows BHWs to directly communicate with their superiors and share their concerns in their respective communities.

3. **What are the knowledge practices of BHWs in terms of: a. knowledge receival, b. knowledge perception, and c. extent of knowledge utilization?**

The activities conducted by health authorities in order to transfer knowledge were confirmed by the BHWs as results revealed that they receive knowledge through a range of activities which include training and seminars, as well as access to documents. However, they also make use of radio and internet which are not available in all barangays. Mentoring was also rarely practiced which is an important method of transferring tacit knowledge such as best practices.

Despite these gaps, BHWs still understand and highly utilize the critical knowledge on health emergency management, which they have gained through the knowledge practices within the health knowledge systems.

4. **How do BHWs share field knowledge on health emergency management to health authorities at the provincial and municipal levels?**

Public health emergencies require collective action in order to be addressed, thus knowledge sharing at all levels of the health knowledge systems in Virac, most especially at the community level, should be underscored. Barangay health workers, unfortunately, are more inclined to share their knowledge with their barangay nurse/midwife supervisors rather

than directly with health authorities at the provincial and municipal levels. This kind of communication is prone to message distortion.

5. **What are the barriers to knowledge sharing in the health knowledge systems in Virac, Catanduanes?**

Although the health knowledge systems in Virac incorporate various knowledge practices, it still faces organizational challenges such as devolved health system and inadequate personnel, as well as technological barriers such as lack of KM technology and other ICT facilities, that hinder seamless communication among health workers, thereby impeding the sharing of critical knowledge on health emergency management.

6. **What are the benefits of these knowledge practices within the health knowledge systems in Virac, Catanduanes?**

Knowledge practices can significantly improve work processes and enhance efficiency, decision-making, performance, and organizational goals. Moreover, the knowledge gained and shared from the grassroots level could contribute to the development of policies aimed at improving the overall quality of healthcare in the municipality of Virac.

Implication

Although the health knowledge systems in Virac incorporate various knowledge practices in their respective health units, they have not yet developed a structured knowledge management strategy tailored to the needs of the entire system. Additionally, the system lacks the necessary technology to efficiently capture, retrieve, share, and reuse knowledge - a crucial requirement for creating a knowledge management strategy within every organization.

Without an established knowledge management strategy, the health knowledge systems in Virac may encounter difficulties in harnessing their intellectual capital as knowledge is not properly captured and organized. Moreover, given that health emergencies initially affect the local level, there must be a knowledge-intensive strategy employed to get the evidence-based knowledge to the community level at the right time to help in the decision-making process. This is especially helpful in a disaster- and typhoon-prone area like Virac. Relying solely on traditional methods such as manual retrieval of documents or through face-to-face interactions for knowledge acquisiton would entail slow response during health emergencies, potentially leading to loss of lives, adversely affecting the quality of life in the entire locality and the province in general.

Implementing a knowledge management strategy in the health knowledge systems in Virac may seem challenging due to budget constraints and lack of experts in the field; however, they can begin by further stimulating their knowledge practices through investments in ICT facilities such as internet connection and up-to-date gadgets such as smartphones and laptops for health

workers. In addition, establishing databases or knowledge repositories within the health offices can be beneficial to avoid mishandling and loss of knowledge. Harnessing the potential of group chat systems for regular knowledge sharing and as a tool to mobilize community health workers should also be highlighted. All of these could support the possible implementation of knowledge management in the entire local health system in the future.

Finally, it is important to note that while technologies are powerful tools for knowledge sharing, the health knowledge systems in Virac should prioritize the improvement of their knowledge sharing culture. This can be achieved by fostering open communication, strengthening collaboration, and improving knowledge exchange across health units, especially at the barangay level. Storytelling, mentoring, and peer assistance can be effective methods for enhancing knowledge sharing in the communities. Furthermore, the support of the LGU in enhancing monetary and non-monetary incentives, as well as creating additional *plantilla* positions to address overlapping workload, could further motivate health workers to share their knowledge.

Additional *plantilla* positions could be for nurses and other health practitioners to fill the gaps in understaffed health units as well as for a public health communication specialist or information officer who will be in-charge with public health advocacy campaigns such as creating IECs (Information, Education, and Communication materials), designing public health announcements, and coordinating community activities, seminars, and training.

Recommendations

The following are the recommendations to improve the knowledge practices within the health knowledge systems in Virac, Catanduanes:

1. Allocate budget for ICT facilities such as computer, mobile phones, and other electronic gadgets that will enhance storage and retrieval capabilities. These facilities could support the possible implementation of a knowledge management strategy in the entire local health system.

2. Regular knowledge mentoring and peer assists to share tacit knowledge on health emergency management which could enhance the competence of both BHWs and health authorities.

3. Budget allocation for prepaid load cards for BHWs for data connection, or free internet connectivity in all barangay halls or health stations in Virac, Catanduanes to foster regular knowledge sharing among health workers through group chat, as well as to get promptly notified of emergency meetings as well as other health emergency updates.

4. Collaborate with Catanduanes State University (CatSU) through the College of Health Sciences (CHS) to design training programs that will be broadcast on Airlinks, the official community and education AM radio station of CatSU. Utilizing this platform will help to reach a wider audience, as radio is one of BHWs primary sources of information. Additionally, the radio programs could serve as a valuable supplement to the training conducted by the municipality.

5. Motivate BHWs to actively share their field knowledge through enhancing both monetary and non-monetary incentives for BHWs to give consideration to

their frontline duties during health emergencies, and to further motivate them to participate in knowledge practices

6. Conduct mentoring with BHWs who still lack knowledge in monitoring symptoms, treating fever, and preventing spread of diseases.
7. Engage in regular knowledge sharing, rather than limiting it to reviews and meetings. Health authorities should actively lead the knowledge sharing process by collecting and seeking knowledge from BHWs.
8. Ensure knowledge retention and continuity at the barangay level by strictly implementing JMC 2023-001 (Retention and Continued Service of Barangay Health Workers).

Moreover, the following are the recommendations for future study:

1. Explore studies on knowledge management on other primary care services such as family planning, maternal and child health, and nutrition.
2. Explore knowledge acquisition activities to tap into the tacit knowledge of local health workers
3. Look into the effectiveness of knowledge management systems in the regional and local levels
4. Further studies on the tacit knowledge of barangay health workers
5. In-depth studies on knowledge auditing and knowledge mapping in the local health system

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ANNEXES

ANNEX A: Letters

University of the Philippines
OPEN UNIVERSITY
FACULTY OF INFORMATION AND COMMUNICATION STUDIES

February 29, 2024

OFFICE OF THE MAYOR
VIRAC
RECEIVED
DATE: 2-29-24 TIME: 10:52
SIGNATURE:

HON. SAMUEL V. LAYNES
Municipal Mayor
Virac, Catanduanes

ATTN:
DR. ELVA M. JOSON
Municipal Health Officer
Rural Health Unit of Virac
Virac, Catanduanes

Dear Mayor Laynes,

MUNICIPAL HEALTH OFFICE
VIRAC
RECEIVED
TIME: 1:50PM DATE: 2-29-2024
SIGNATURE:

Good day!

I am Alecza Araojo Martizano, a Master of Development Communication student from University of the Philippines Open University, and a fellow Viracnon. I am currently working on my master's thesis entitled **"Knowledge-based Practices on Health Emergency Management Among Local Health Workers in Virac, Catanduanes, Philippines".** This particular study seeks to determine the knowledge acquisition, knowledge capture and retrieval, and knowledge transfer in the provincial and municipal levels, as well as the knowledge receival, knowledge perception, and knowledge utilization in the barangay levels. I believe that this study would help us explore areas for improvements on the health emergency management in Virac, Catanduanes, and become a benchmark for other provinces when it comes to the management of knowledge on health.

With this, I would like to humbly ask if I could conduct an interview with Dr. Joson at her most convenient time within the dates of March 1-10, 2024. Also, I would also like to ask permission to distribute survey forms to BHWs within Virac, and conduct a focus group (small discussion group) among Virac RHU nurses and midwives who are directly supervising and/or working with barangay health workers.

Should you have any questions or concerns, you may contact me at **0966-674-9431 or e-mail me at aearaojo@up.edu.ph.** I would be most grateful it if you could grant this request.

Respectfully yours,

ALECZA A. MARTIZANO
MDC Student

Noted:

(ORIGINAL SIGNED)
DR. MELINDA F. LUMANTA
Thesis Adviser

DRA. BANO,
FOR YOUR CONSIDERATION.

BY AUTHORITY OF MUNICIPAL MAYOR
JOSE G. TARAYA
MUN ADMINISTRATOR

University of the Philippines
OPEN UNIVERSITY
FACULTY OF INFORMATION AND COMMUNICATION STUDIES

February 28, 2024

DR. HAZEL A. PALMES
Provincial Health Officer II
Provincial Health Office
Virac, Catanduanes

PROVINCIAL HEALTH OFFICE
CATANDUANES
RECEIVED
Date: 2/28/24 Time: 4:19
By:

Dear Dr. Palmes,

Good day!

I am Alecza Araojo Martizano, a Master of Development Communication student from University of the Philippines Open University, and a fellow Viracnon. I am currently working on my master's thesis entitled **"Knowledge-based Practices on Health Emergency Management Among Local Health Workers in Virac, Catanduanes, Philippines".** This particular study seeks to determine the knowledge acquisition, knowledge capture and retrieval, and knowledge transfer in the provincial and municipal levels, as well as the knowledge receival, knowledge perception, and knowledge utilization in the barangay levels. I believe that this study would help us explore areas for improvements on the health emergency management in Virac, Catanduanes, and become a benchmark for other provinces when it comes to the management of knowledge on health.

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Should you have any questions or concerns, you may contact me at **0966-674-9431 or e-mail me at aearaojo@up.edu.ph.** I would be most grateful it if you could grant this request.

Respectfully yours,

ALECZA A. MARTIZANO
MDC Student

Noted:

(ORIGINAL SIGNED)
DR. MELINDA F. LUMANTA
Thesis Adviser

Annex B: Survey (For Barangay Health Workers)

April __, 2024

Sir/Ma'am:

Mayad na aldaw tabi!

Ako si **Alecza A. Martizano**, sarong estudyante hale sa *Faculty of Information and Communication Studies (FICS)* ning Unibersidad ng Pilipinas *Open University*. Saro man tabi akong Viracnon.

Bilang pagkumpleto sa sakong kurso na *Master of Development Communication*, gaggibo ako ning research o pag-adal manungod sa pag-maneho ning kaaraman sa *health emergency management* uya sa satong munisipalidad. Kabali sa sakong mga *respondents* ang mga Barangay Health Workers (BHWs).

Segun uya, mahagad lamang tabi ako ning saindong kooperasyon buda tabang sa pagsimbag sa *survey* na ini. Makakatabang an saindong simbag para maisihan kung painano mas magiging maayos an pamamahala ning kaaraman sa problemang pangkalusugan sa satong munisipalidad.

Lubos na gumagalang,

ALECZA A. MARTIZANO
MDC Student

Instrukyon: Kanghan ning tsek (√) ang mga hapot na igwang pilian na naaayon sa saimong kasimbagan. Isurat man ang saimong simbag para sa mga hapot na daing pilian.

I SOSYO-DEMOGRAPIKO

Pangaran: _____
Edad: _____
Kasarian: ___ Babaye _____ Lalaki
Address: _____
Numero nin taon sa serbisyo bilang BHW _____

Inadalan:
___ Bako graduado sa elementarya
___ Graduado sa elementarya
___ Bako graduado sa sekondarya (hayskul)
___ Graduado sa Sekondarya (hayskul)
___ Kolehiyo (Bako graduado)
___ Graduado sa kolehiyo
Ano pong kurso? _____

II PAG-AKO NING KAARAMAN O KAMATIDAN

1. Ano ang mga paagi ang pigagibo nin probinsya buda munisipyo para handa kamo sa panahon nin epidemya?_
   __Seminar/Symposium
   __Training
   __Drills
   __Pagtao ning IEC materials
   __Regular meetings
   __Biglaan o emergency meetings
   __Bandillo
   __Iba pa (isurat):_____

2. Sa wala, bilugan kung iyo o dai ka gakua ning kaaraman sa mga binanggit na sources. Kung iyo, paki tsekan tabi an lugar kung sain mo ini nakukua.

		Sources	Lugar kun saen nakukua an kaaraman			
			PHO	RHU	Barangay	Others
Iyo	Dai	1. Magazine				
Iyo	Dai	2. Pampleta				
Iyo	Dai	3. Flyer				
Iyo	Dai	4. Manual				
Iyo	Dai	5. Brochure				
Iyo	Dai	6. Dyaryo				
Iyo	Dai	7. Internet				
Iyo	Dai	8. Radio				

Iyo	Dai	9. Television				
Iyo	Dai	10. Bulletin Board display				
Iyo	Dai	11. Bandillo				
		12. Others (Please specify)				

3. Ga gamit ba ang barangay health station ning teknolohiya?
   __Iyo __Dai

4. Kung iyo ang simbag mo sa bilang 5, arin sa minasunod ang ginagamit sa barangay?
   __Computer __Internet/Intranet __Virtual forum ___Database __Group Chat
   __Iba pa: _____

5. Painano mo masisigurado na tama ang impormasyon mo manungod sa mga helang o iba pang problemang pangkalusugan?
   __Pagbasa nin IEC materials arog kan brochure buda flyers sa barangay health
   station
   __Pagkua ning impormasyon sa internet
   __Pagkonsulta sa midwife
   __Pagkonsulta sa nurse
   __Paghapot sa ibang BHW
   __Paghapot sa kapamilya
   __Paghapot sa kanatad
   __Iba pa: _____

6. Ano ang nakamotibar saimo para mag-ako nin kaaraman hale sa probinsya asin munisipyo?__Dagdag kaaraman
   __Seguridad sa trabaho
   __Estado ning pagiging health worker
   __Honorarium
   __Dagdag benepisyo *(Cash/Gift incentives)*
   __Nakakatabang sa komunidad
   __Nakakatabang para magkaigwa nin kalidad na trabaho
   __Parte nin trabaho
   __Iba pa (isurat): _____

III PAKASABOT SA KAARAMAN

7. Ano ang saimong mga responsibilidad o dapat gibuhon sa panahon nin epidemya o pagkalat ning helang sa komunidad?
   Isurat:
   _____
   ___

8. Kisay ka dapat mag-report o maki-coordinate manungod sa mga problemang pangkalusugan sa barangay
   __Nurse/Midwife
   __Punong Barangay
   __RHU
   __MHO
   __PHO

9. Ano ang mga mga impormasyon na kaipuhan mareport kung igwang gakalat na helang sa barangay?
   __Sintomas o kamatean
   __Temperatura
   __Langkaw buda gabat
   __Pulso
   __*Oxygen Level*
   __Iba pa: _____

10. Arin sa mga minasunod ang mga kamatean na dapat bantayan sa panahon kan pandemya o epidemya?
    __Kalintura
    __Kulog ning payo
    __Kulog ning tulak
    __Kulog ning ginhawa
    __Kulog ning halunan
    __Sakit sa paghangos
    __Pagkangalo
    __Pagkawara ning pangnamit asin panghangop
    __Sip-on
    __Pagsuka
__Iba pa: _____

11. Pumili ning saro sa mga kamataen na pig-checkan mo sa bilang 3. Isurat ang kamataen na napili mo sa blanko:_____

    Painano kaya mapapaayad an helang na ini?

    __Pag-inom ning paracetamol
    __Pag-banyar
    __Pagpahingalo
    __Pag-masahe
    __Pag-inom ning herbal
    __Pag-lahid ning ointment
    __Iba pa (isurat): _____

12. Ano ang dapat gibuhon para dai mahawa an iba o matunong an pagkalat nin helang sa komunidad?
    __Pagpabakuna
    __Pag-isolate

__Paggamit ning facemask
__Paghugas ning kamot
__Physical distancing
__Iba pa: _____

13. Ano ang epekto ning epidemya sa komunidad?
    Isurat:
    _____
    _____

IV. PAGGAMIT NING KAARAMAN

14. Panuto: Sa ibaba, igwa ning mga kaaraman manungod sa *health emergency management*. Sa toong parte kaini, igwa nin mga numero kun saen ma dedeterminar kun inano piga gamit an mga kaaraman. Kun igwa ka nin kaaraman, paki bilugan an "iyo" tapos bilugan an numero na ayon sa saimong pag gamit kan kaaraman:
    4 – Pirming nagagamit an kaaraman
    3 – Madalas na magamit an kaaraman
    2 – Minsan sana magamit an kaaraman
    1 – Dai nagagamit an kaaraman

		Mga kaaraman sa *health emergency management*	**Paggamit ning Kaaraman**			
Iyo	Dai	Kapag igwa na naman kitang maranasan na epidemya o magkaigwa na naman helang na madari magkalat, ikonsidera mo ba ang mga ginibo kan panahon kan COVID-19?				
		Ano ang mga namatidan mo sa pagresponde sa COVID-19 na pwede mong magamit sa pagresponde sa ibang helang na madaring makahawa?				
Iyo	Dai	Importante an masks bako lang sa panahon nin pandemya kundi sa gabos na aldaw	4	3	2	1
Iyo	Dai	An pagpa doctor sa paagi nin teknolohiya posibleng maging normal na	4	3	2	1
Iyo	Dai	An bakuna importante pag igwa ning epidemya o pandemya	4	3	2	1
Iyo	Dai	Igwa nin pagkaka iba-iba an pag tratar sa pasyente sa oras nin pandemya	4	3	2	1
Iyo	Dai	Taw-an nin atensiyon an kalusugan nin kaisipan (mental health)	4	3	2	1
Iyo	Dai	Lambang saro igwa nin kapasdidad na maging matibay sa panahon ning problema	4	3	2	1
Iyo	Dai	Importante ang komunidad buda teknolohiya sa panahon ning pandemya o epidemya.	4	3	2	1
Iyo	Dai	Importante ang "social distancing" sa panahon ning pandemya o epidemya.	4	3	2	1
		Asin iba pa, paki surat kun ano an mga ini				

			4	3	2	1
			4	3	2	1
			4	3	2	1
		Sa panahon ning epidemya, painano ka makakatabang sa komunidad para sa pag control buda responde?				
Iyo	Dai	Pagtao ning impormasyon manungod sa helang – painano ini gakalat asin painano matutunong	4	3	2	1
Iyo	Dai	Pag-monitor sa mga tawo na nakakamati ning mga kamataen arog ning kalintura, abo, sipon, etc	4	3	2	1
Iyo	Dai	Pag-monitor sa mga pamilya na naka-home quarantine	4	3	2	1
Iyo	Dai	Pag-monitor buda pag-alaga sa mga pasyente na nas community isolation units	4	3	2	1
Iyo	Dai	Pag engganyo sa mga tawo na magpabakuna	4	3	2	1
Iyo	Dai	Pag-monitor sa mga high-risk o tawong igwa na dating namamati arog kan diabetes, helang sa puso, etc.	4	3	2	1
Iyo	Dai	Asin iba pa, paki surat kun ano an mga ini				
			4	3	2	1
			4	3	2	1
			4	3	2	1

V PAGBAHAGI NING KAARAMAN

15. Gabahagi ka ba ning kaaraman o kamatidan sa ibang barangay health worker?
    __Iyo ___Dai

16. Kung iyo, painano ka gabahagi ning bag-ong kaaraman sa ibang barangay health worker?
    __pag igwang meeting
    __pag-istorya
    __paggamit ning internet o messenger
    __paggamit ning libro o manual
    __pagsurat
    __iba pa: _____

17. Sa painanong paagi niyo naitatao ang bagong kaaraman niyo patungkol sa health emergency management sa probinsya buda munisipyo?
    __Direkta na paki-meeting sa PHO buda MHO
    __Sa paagi ning nurse/midwife
    __Sa paagi ning internet o messenger
    __pigasurat
    __Iba pa: _____

VI. MGA KAULANGAN SA PAGBAHAGI NING KAARAMAN

18. Ano ang mga naging problema o kaulangan pag-abot sa pagbahagi ning kamatidan saindong barangay?
    __Daing cellphone o laptop
    __Luma na ang *gadgets*
    __Dai o mabagal na koneksyon sa internet
    __Dakol na trabaho
    __Kulang ang training
    __Kulang ang tawo
    __Daing budget
    __Kalamidad
    __Iba pa (Isurat): _____

VII. BENEPISYO NING PAGBAHAGI NING KAARAMAN

19. Masasabi mo bang dakulang tabang ang kaaraman na nakukua mo hale sa probinsya buda munisipyo sa pagresponde sa epidemya?
    ___Iyo ___Dai

20. Kung iyo ang simbag sa hapot sa taas, ano ang naging tabang kaini sa pagresponde mo sa health emergency?
    __Nakabag-o ning pananaw manungod sa pandemya o epidemya
    __Napapadari ang trabaho kaya mas produktibo sa laog ning organisasyon
    __Nakakatabang na mapaayos ang mga desisyon
    __ Madari na an pagpapasabot sa mga tawo kan epekto nin pandemya
    __ Napapadari ang pag-engganyo sa mga tawo na suportahan ang programa ning barangay
    __Iba pa (isurat): _____

Annex C: Guide Questions for Key-Informant-Interviews

1. **What are the critical knowledge on health emergency management that must be acquired by BHWs according to PHO?**

(Ano ang mga dapat o importante na mamatidan o maaraman nin mga BHWs manungod sa health emergency?)

KNOWLEDGE BASED PRACTICES

2. **What are the knowledge practices of health authorities from PHO and MHO in terms of:**

A. Knowledge acquisition

1. How does PHO acquire or obtain knowledge on health emergency management within its organization? *(Sa painanong paagi nakakua ning kaaraman manungod sa health emergencies ang PHO?)*

2. Are there other activities held to elicit knowledge within the organization? Please name them. *(Sa painanong paagi nakakua ning kaaraman sa laog kan PHO?)*

3. How do you capture knowledge from your monthly meetings? *(Sa painanong paagi niyo piga-record ang kaaraman na nababanggit sa monthly meetings?)*

4. During meetings, do participants voluntarily share the knowledge they gained regarding health emergency management? *(Masasabi mo ba na interesado and mga staff sa pagbahagi nin saindang sadiling kaaraman? Sa painanong paagi?)*

5. If so, where do you usually attribute their willingness to share knowledge? Is it because of strong motivation or some other reasons? If not, what could possibly be the reasons why they do not share their knowledge? *(Kung iyo, ano kaya ang dahilan kaini? Kung dai man, ano ang mga rason ngata dai sinda gabahagi ning kaaraman?)*

6. Some of our employees were in the service for quite some time now and may have lots of personal experiences about health emergencies which they could share and which could also be beneficial to the MHO. How do you obtain knowledge regarding personal experiences of your staff? *(Igwa kitang mga empleyado na awat na sa serbisyo, sa painanong paagi ta kaya nadodokumento ang saindang kaaraman?)*

7. Do you also gather information from external sources? If yes, which media do you use? *(Gakua ba ang PHO ning impormasyon hale sa external sources? Anong media ang saindong pigagamit?)*

B. Knowledge Capture and Retrieval

1. What materials does PHO have to store knowledge? *(Ano ang mga gamit sa PHO para sa pagkolekta o pagrecord ning kaaraman?)*

2. Can you tell me more about your database? What are the usual contents of these materials? *(Ano ang laog kan saindong database na nakakatabang sa pagpreparar o pagresponde sa health emergency?)*

3. Aside from computer, how does the office store knowledge about health emergency management? *(Maliban sa computer, sa painanong paagi pa kamo nakakolekta o nakarecord nin bagong kaaraman manungod sa health emergency?)*

4. Is there a manual on health emergency management? *(Igwa ba ang PHO nin manual manungod sa health emergency management? Ano ang mga madalas na laog kaini?)*

5. If you need information on health emergencies, how do you retrieve knowledge? *(Kung nangangaipo ka nin impormasyon manungod sa health emergency, painano o sain kamo gakua nin kaaraman?)*

6. What are the challenges you encounter when it comes to storage and retrieval of knowledge? *(Ano ang mga kaulangan na pag-abot sa pagkolekta buda pagrecord ning kaaraman?)*

C. Knowledge transfer

1. For many years we have been exposed to varied trainings and seminars, conferences, fora and the like. What do you think motivates you to share your knowledge to others? *(Ano ang naka-motibar saimo magbahagi nin kaaraman sa laog kan saindong organisasyon?)*

2. Do health authorities share knowledge among themselves? *(Gabahagi ba nin kaaraman manungod sa health emergency ang mga autoridadsa lambing saro?)*

3. If yes, how often do you share knowledge? Is this a common practice? *(Kung iyo, gaano kadalas ini pigagibo?)*

4. Would you explain how PHO implements activities regarding health emergency management? *(Painano nag-implementar ang PHO nin activities manungod sa health emergency?)*

5. How does PHO ensure that the midwife-in-charge is well-equipped with knowledge on health emergency considering the nature of job? *(Sa*

painanong paagi nasisiguro na kumpleto ang kaaraman nin mga midwives manungod sa health emergency?)

6. Do you hold capability seminars for BHWs? If yes, what are the usual topics discussed related to health emergencies? *(Nag-organisa ba ang PHO nin seminar para sa BHWs? Ano ang mga madalas na pigapaghurunan manungod sa health emergency?)*

7. Are there digital technologies such intranet, virtual discussion forums or database being utilized to transfer knowledge to BHWs? *(Ano kaya ang mga modernong teknolohiya ang pigagamit para makatao nin kaaraman sa BHWs?)*

8. Aside from capability seminars and technology (if any), what are the other means to transfer knowledge to BHWs? *(Ano pa ang ibang paagi para makatao nin kaaraman sa BHWs?)*

3. **What are the issues and challenges you encounter when it comes to managing knowledge on health emergencies?** *(Ano ang mga kaulangan pag-abot sa pag-manage ning kaaraman manungod sa health emergency?)*

4. **What are the benefits of these knowledge practices to the local health system?**
(Anong ang mga benepisyo sa health system pag igwang knowledge management ang organisasyon?)

Annex D: Guide Questions for Focus-group discussion

1. **What are the critical knowledge on health emergency management that must be acquired by BHWs according to MHO/Virac RHU?**

(Ano ang mga dapat o importante na mamatidan o maaraman nin mga BHWs manungod sa health emergency?)

KNOWLEDGE BASED PRACTICES

2. **What are the knowledge practices of health authorities from MHO/Virac RHU in terms of:**

A. Knowledge acquisition

1. How do RHU nurses and midwives acquire or obtain knowledge on health emergency management within its organization? *(Sa painanong paagi nakakua ning kaaraman manungod sa health emergencies ang RHU nurses buda midwives?)*

2. Are there other activities held to elicit knowledge within the organization? Please name them. *(Sa painanong paagi nakakua ning kaaraman sa laog kan RHU?)*

3. How do you capture knowledge from your monthly meetings? *(Sa painanong paagi niyo piga-record ang kaaraman na nababanggit sa monthly meetings?)*

4. During meetings, do participants voluntarily share the knowledge they gained regarding health emergency management? *(Masasabi mo ba na interesado and mga staff sa pagbahagi nin saindang sadiling kaaraman? Sa painanong paagi?)*

5. If so, where do you usually attribute their willingness to share knowledge? Is it because of strong motivation or some other reasons? If not, what could possibly be the reasons why they do not share their knowledge? *(Kung iyo, ano kaya ang dahilan kaini? Kung dai man, ano ang mga rason ngata dai sinda gabahagi ning kaaraman?)*

6. Some of our employees were in the service for quite sometime now and may have lots of personal experiences about health emergencies which they could share and which could also be beneficial to the MHO. How do you obtain knowledge regarding personal experiences of your staff? *(Igwa kitang mga empleyado na awat na sa serbisyo, sa painanong paagi ta kaya nadodokumento ang saindang kaaraman?)*

7. Do you also gather information from external sources? If yes, which media do you use? *(Gakua ba ang RHU ning impormasyon hale sa external sources? Anong media ang saindong pigagamit?)*

B. Knowledge Capture and Retrieval

1. What materials does RHU have to store knowledge? *(Ano ang mga gamit sa RHU para sa pagkolekta o pagrecord ning kaaraman?)*

2. Can you tell me more about your database? What are the usual contents of these materials? *(Ano ang laog kan saindong database na nakakatabang sa pagpreparar o pagresponde sa health emergency?)*

3. Aside from computer, how does the office store knowledge about health emergency management? *(Maliban sa computer, sa painanong paagi pa kamo nakakolekta o nakarecord nin bagong kaaraman manungod sa health emergency?)*

4. Is there a manual on health emergency management? *(Igwa ba ang RHU nin manual manungod sa health emergency management? Ano ang mga madalas na laog kaini?)*

5. If you need information on health emergencies, how do you retrieve knowledge? *(Kung nangangaipo ka nin impormasyon manungod sa health emergency, painano o sain kamo gakua nin kaaraman?)*

6. What are the challenges you encounter when it comes to storage and retrieval of knowledge? *(Ano ang mga kaulangan na pag-abot sa pagkolekta buda pagrecord ning kaaraman?)*

C. Knowledge transfer

1. For many years we have been exposed to varied trainings and seminars, conferences, fora and the like. What do you think motivates you to share your knowledge to others? *(Ano ang naka-motibar saimo magbahagi nin kaaraman sa laog kan saindong organisasyon?)*

2. Do RHU nurses and midwives share knowledge among themselves? *(Gabahagi ba nin kaaraman manungod sa health emergency ang mga RHU nurses buda midwives sa lambing saro?)*

3. If yes, how often do you share knowledge? Is this a common practice? *(Kung iyo, gaano kadalas ini pigagibo?)*

4. Would you explain how RHU implements activities regarding health emergency management? *(Painano nag-implementar ang RHU nin activities manungod sa health emergency?)*

5. How does RHU ensure that the midwife-in-charge is well-equipped with knowledge on health emergency considering the nature of job? *(Sa painanong paagi nasisiguro na kumpleto ang kaaraman nin mga midwives manungod sa health emergency?)*

6. Do you hold capability seminars for BHWs? If yes, what are the usual topics discussed related to health emergencies? *(Nag-organisa ba ang RHU nin seminar para sa BHWs? Ano ang mga madalas na pigapaghurunan manungod sa health emergency?)*

7. Are there digital technologies such intranet, virtual discussion forums or database being utilized to transfer knowledge to BHWs? *(Ano kaya ang mga modernong teknolohiya ang pigagamit para makatao nin kaaraman sa BHWs?)*

8. Aside from capability seminars and technology (if any), what are the other means to transfer knowledge to BHWs? *(Ano pa ang ibang paagi para makatao nin kaaraman sa BHWs?)*

3. What are the issues and challenges you encounter when it comes to managing knowledge on health emergencies? *(Ano ang mga kaulangan pag-abot sa pag-manage ning kaaraman manungod sa health emergency?)*

4. What are the benefits of these knowledge practices to the local health system?
(Anong ang mga benepisyo sa health system pag igwang knowledge management ang organisasyon?)