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Report
on
Morbidity Management and Disability Prevention Mapping, 2079/080 (2023)



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Foreword

I am pleased that the Health Office, Morang, has successfully completed Morbidity Management and Disability Prevention Mapping (MMDP) of Morang district and has been able to bring out the findings in this report. This report has provided intensive information on prevalence of lymphoedema and hydrocele in Morang district along with giving a picture of these conditions in category of different sex and age groups, that will further be used for policy making, developing plans and resource allocation to mitigate the challenges brought by lymphatic filariasis.

The findings of this report are precise to the current situation of Morang district. In support of accelerating the sustainable control and elimination of lymphatic filariasis in Nepal, Morang district continued MDA campaign for twelve years. Nepal is aspiring to achieve its goal of eliminating lymphatic filariasis from Nepal by 2030. In this regard, this report will help in the identification of prone areas where the government should focus on alleviating the suffering of the affected population through a minimum package of care for every person with lymphoedema, elephantiasis or hydrocele. Similarly, the data and information this report holds will be beneficial across other relevant sectors, for evidence-based planning to contribute to achieve the national development goals of Nepal.

I would acknowledge the effort of the entire team of Health Workers and Female Community Health Volunteers (FCHVs), that tirelessly led the overall management of data collection and verification in different levels. Besides, I also want to appreciate the professional competency of the entire medical team that successfully completed the case verification. I also want to acknowledge the cooperation and support from all levels of governments and FAIRMED Foundation Nepal for their contribution.

Finally, I would like to acknowledge Ms. Pramila Parajuli and Mr. Manish Subedi for their continuous effort to assemble data, analyze it and generate this report. Also, thanks are due to all who have contributed to the different stages of MMDP mapping process.

Suresh

Dr. Suresh Mehata

May 2024

Table of Contents

Abbreviations	1
1. Introduction	2-5
1.1. Background	2
1.2. Lymphatic Filariasis in Nepal	3
1.3. Lymphatic Filariasis in Morang	4
2. Materials and Methods	5-7
2.1. Process	5
2.2. Area Coverage	6
2.3. Data Used	6
2.4. Variables and Tools	7
3. Result	7-10
3.1. Prevalence of Lymphoedema	7
3.2. Prevalence of Hydrocele	8
3.3. Prevalence of Lymphoedema or Hydrocele or both cases in Morang District	9
3.4. Number of having both condition of Hydrocele and Lymphoedema	10
4. Findings and Discussion	11-14
5. Conclusion	15
6. References	16-17
7. Annex	I-III
Annex 1: Form used for data collection by FCHVs (form 1)	I
Annex 2: Compiled register of data prepared by Health Office/Local Government (form 2)	II
Annex 3: Compiled register of data prepared by District (form 3)	III

Abbreviations

1. ALB Albendazole
2. DEC Diethylcarbamazine
3. DTOT District Training of Trainers
4. EDCCD Epidemiology and Disease Control Division
5. FCHV Female Community Health Volunteers
6. GIS Geographical Information System
7. GPELF Global Program to Eliminate Lymphatic Filariasis
8. ICT Immunochromatographic tests
9. IDA Ivermectin Diethylcarbamazine citrate and albendazole
10. LF Lymphatic Filariasis
11. MDA mass drug administration
12. MF Microfilaremia
13. MMDP Morbidity Management and Disability Prevention
14. MPC Metro Politian City
15. MTOT Masters' Training of Trainers
16. NTD Neglected Tropical Diseases
17. PHCC Primary Health Care Center
18. TAS Transmission Assessment Survey
19. WHO World Health Organization

1. Introduction

1.1. Background

Lymphatic Filariasis (LF) is a vector borne neglected tropical disease of human caused by *Brugia malayi*, *Brugia timori* and *Wuchereria bancrofti*, and transmitted by *Culex*, *Anopheles* and *Aedes* spp. mosquitoes. Infection with filarial worms can cause significant morbidity (primarily lymphedema of legs, arms, and breast, and hydrocele) and disability, impeding socioeconomic development in many endemic countries (Richards et al., 1991)

The adult filarial worms reside in the lymphatic vessels interrupting the normal function of the lymphatic system. During the lifespan of 6-8 years, these adults produce millions of immature larvae called microfilariae which circulate in blood. When the mosquitoes bite a person having microfilariae in their body, the mosquitoes get infected with it and the microfilariae matures into infective larvae stage inside the body of infected mosquitoes. When these infected mosquitoes bite people, the mature parasite larvae travel to the human body and migrate to the lymphatic vessels where they develop into adult worms and thus, continues the cycle of transmission. The filarial infection causes a variety of clinical manifestations, including lymphoedema of the limbs, genital diseases such as hydrocele, chylocele and recurring painful attacks followed by fever. The symptoms can take a longer period to be visible in the human body and it may take years to manifest chronic and disfiguring conditions resulting in mental, social, and financial losses as well as contributing to social stigma and poverty.

Globally, 120 million people are estimated to be affected by LF and 40 million suffer from chronic disability and covert lymphatic changes caused by LF. The Global Program to Eliminate Lymphatic Filariasis (GPELF) was established by the World Health Organization (WHO) in 2000 with the aim to eliminate LF by 2020. To achieve GPELF targets, endemic countries conduct annual mass drug administration (MDA) of the population at risk of LF using diethylcarbamazine (DEC) and albendazole (ALB) to interrupt the transmission of filarial worms, along with the management of the disease's chronic manifestations (Ojha et al., 2017).

In addition to reporting drug coverage information following each round of MDA, WHO recommended population-based cluster surveys are conducted to verify reported MDA

coverage data. To date, the program has conducted at least one coverage survey in each of the endemic districts that have had an MDA. WHO LF elimination guidance recommends that after 5–6 MDA rounds impact of MDAs on district Ag prevalence is assessed using a pre-transmission assessment survey (pre-TAS) in sentinel and spot-check sites. Furthermore, districts in which sentinel and spot check sites passed a cut-off LF Ag <2% and exceeded 65% coverage in all MDA rounds are considered to meet criteria for conducting a transmission assessment survey (TAS) to evaluate that LF transmission has been interrupted (WHO, 2016).

1.2. Lymphatic Filariasis in Nepal

In 2021, the estimated population at high risk of LF infection was about 884.9 million and the latest estimation of infected population was 51.4 million all over the world (WHO, 2022). Nepal was one of the 73 countries listed by WHO as being endemic for lymphatic filariasis. In Nepal, *W. bancrofti* is the filarial worm that causes LF and *Culex quinquefasciatus* is the main vector. (Ojha et al., 2017). Of Nepal's 75 districts, 61 are considered LF endemic, corresponding to an estimated 25 million people at risk of infection and disease. Nine districts have historical evidence of chronic cases of LF. Fifty-two were classified as endemic following mapping of 54 districts between 2001 and 2005 using immunochromatographic tests (ICTs) to test for antigenemia (Ag) and using night blood films to test for microfilaremia (mf). Twelve districts are not suspected to be LF endemic and were not mapped. Mapping surveys indicated that prevalence in endemic districts' surveyed villages ranged from <1% to 39% (Government of Nepal, 2015).

Up to 39 percent prevalence of LF is recorded in some districts with an average of 13 percent of the total population (WHO Annual Report, 2022). Almost 25 million people residing in these districts are at risk of getting infected with LF. This indicates that quite a significant number of people are estimated to be living with symptomatic and asymptomatic infections which caters as a source of infection to others.

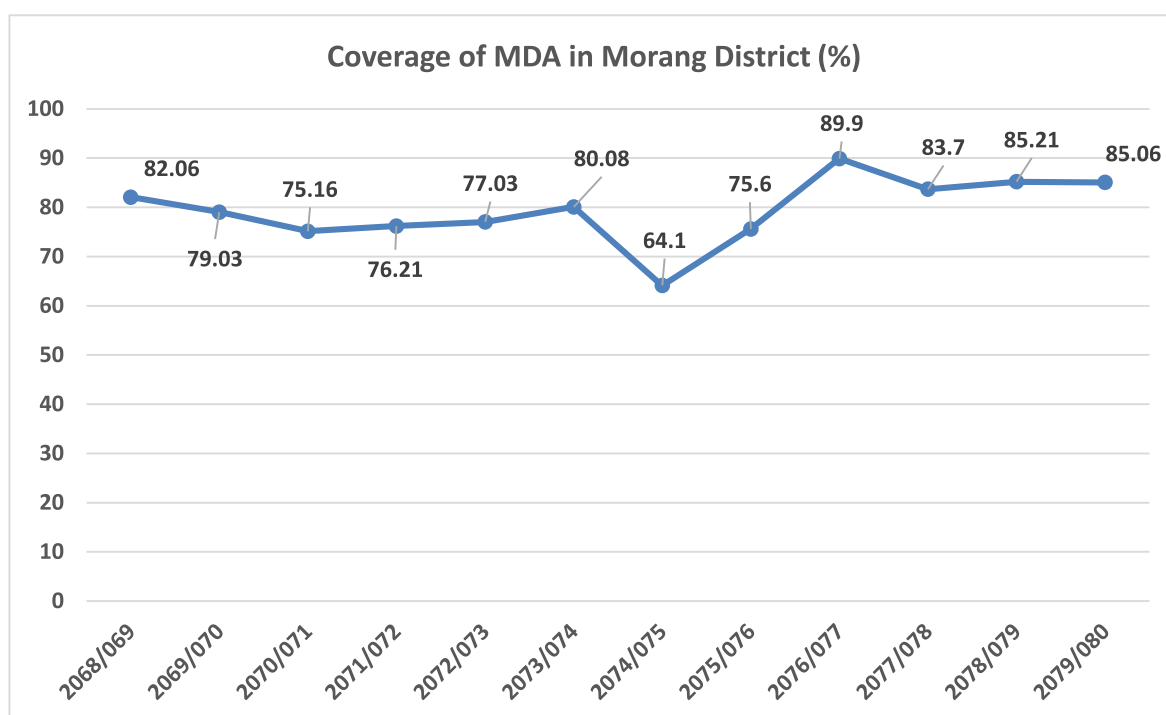
In 2013, the Government of Nepal developed a Plan of Action to eliminate LF by 2020 via implementation of six MDA rounds in all endemic districts until 2018 (Adhikari et al., 2015). Nepal started LF MDAs in Parsa district in 2003 and achieved 100% geographical coverage of all districts in 2013. By 2016, 16 out of the 61 endemic districts had

conducted six MDA rounds. Effectiveness of MDAs at reaching the target population, as measured by epidemiological coverage, ranged from 22% to 89%, with differences noted both among districts and years. Reasons for low MDA coverage included fear of side-effects, lack of advice from health workers, and fear of weakness. Though the initial plan of LF elimination was set to 2020, the repeated pre TAS failure in some of the districts and recrudescence of transmission in MDA stopped districts, Nepal Government has shifted its goal of elimination to 2030 to align with WHO NTD roadmap (EDCD, 2017).

Nepal has adopted two major strategies recommended by WHO to combat with LF i.e Stop the spread of infection (interrupting transmission) through Mass Drug Administration (MDA) and alleviate the suffering of affected populations (controlling morbidity) through Morbidity Management and Disability Prevention (MMDP). Morbidity Management and Disability Prevention is one of the pillars of Lymphatic Filariasis Elimination Program, besides Mass Drug Administration. Annual mass drug administration of single dose of Albendazole plus Diethylcarbamazine is being implemented, treating the entire population at-risk. To achieve the aim of alleviating the suffering of the affected population, a minimum package of care for every person with lymphedema, elephantiasis or hydrocele is to be provided. With the objective of providing this care package, an assessment is done to identify the number of patients with condition.

1.3. Lymphatic Filariasis in Morang

In support of accelerating the sustainable control and elimination of LF in Morang district, MDA campaign was started from fiscal year 2068/069 B.S. The MDA campaign continued till fiscal year 2078/079 and was followed by Ivermectin Diethylcarbamazine citrate and albendazole (IDA) campaign in fiscal year 2079/080 B.S.



Source: Progress report of IDA/MDA prepared by Health Office, Morang

Simultaneously, with IDA, EDCD has conducted LF MMDP mapping in Morang district in 2023 (2079/80). The major objective of conducting MMDP was to identify people in the catchment area with lymphoedema and hydrocele and provide them with basic advice on management of their condition.

2. Materials and Methods

2.1. Process

Before the implementation of MMDP mapping, health professionals and volunteers were trained in different stages. In the initial phase, the Masters' Training of Trainers (MTOT) was conducted by Epidemiology and Disease Control Division (EDCD) targeted to district level health units. After that, District Training of Trainers (DTOT) was carried out with the aim of training health professionals from health offices, hospitals, PHCCs, who further trained health professionals and Female Community Health Volunteers in rural/municipalities level. The process of training human resource and implementing the process of data collection began from the end of Chaitra 2079 B.S.

2.2. Area Coverage

The mapping was targeted to be carried out in 17 rural/municipalities including the Metropolitan city of Morang district with a coverage of 965,370 population residing in this district. After receiving one day orientation, Female Community Health Volunteers (FCHVs) were mobilized for primary data collection. The household survey with designated questionnaire developed by EDCD was done by FCHVs. FCHVs covered 100% household for data collection which



PICTURE 1: HEALTH WORKERS IN DATA VERIFICATION PROCESS IN RANGELI

took 3 days of intensive home visit. After the primary data were collected and submitted by FCHVs, the data were verified by health workers in palika level. As per the guidelines of EDCD, 10% case verification was done by a verification team which consisted of a Medical Officer, Chief of Health Office, MMDP focal person and Paramedics/Nursing staffs. The overall process of household assessment was completed within 3 months of fiscal year 2079/080, in which the mobilized health workers had validated the diagnosis and the data was acceptable with more than 80% of compatibility in diagnosis.

2.3. Data Used

The primary data collected and verified by health professionals working in different levels of Morang district was used as numerator in analysis process. The secondary data of total population of Morang district derived from National Population and Housing census 2021 was used as denominator disaggregated by age, sex and palikas. Secondary literatures published by WHO, Nepal Government and other agencies on LF have been referred during the process of data analysis.

The data used for the analysis is composed of the patients who are affected either with lymphoedema, hydrocele or both conditions. The survey questionnaire was designed to

gather information on an individual basis, so the assumption of household coverage is excluded from this study. Also, the sample population is limited to the patients having specific condition induced by LF and excludes the rest of the population of Morang district. Hence, the finding of this mapping cannot be generalized to a larger context.

2.4. Variables and Tools

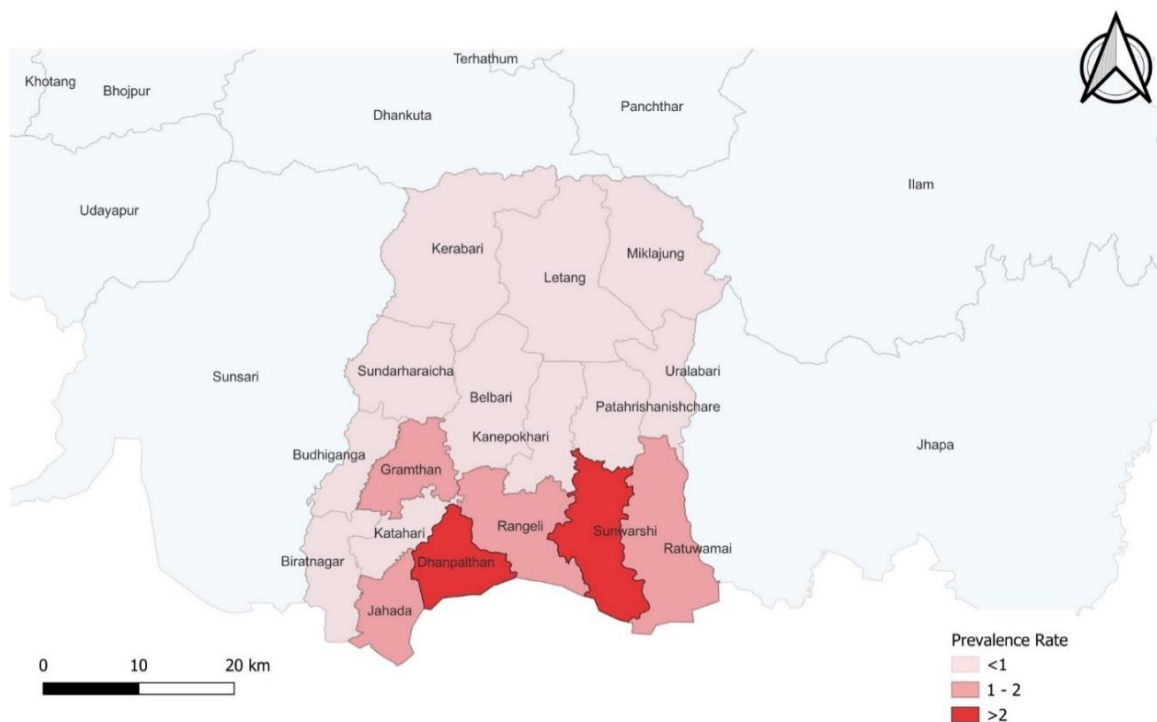
Statistical analysis between areas (rural/municipalities) and variables including condition, severity of lymphoedema, age range, sex and ethnicity was carried out. Data were first entered in Excel and STATA was used for primary data management and analysis, to compare the prevalence of lymphoedema and hydrocele in the study area. Maps highlighting the study areas and the number of cases with lymphoedema, hydrocele or both have been produced using Geographical Information System (GIS).

3. Result

3.1. Prevalence of Lymphoedema

FIGURE 1: PREVALENCE OF LYMPHOEDEMA

Prevalence of Lymphoedema in Morang (Per 1000 Population)



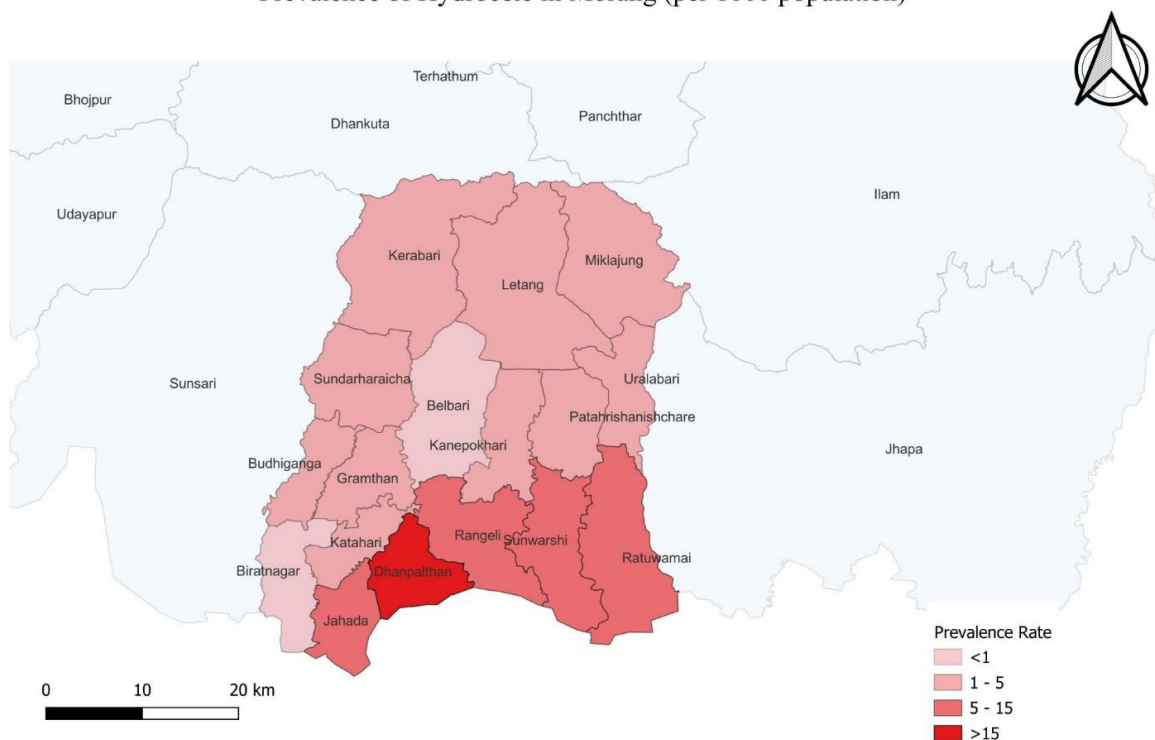
The higher prevalence of lymphoedema is seen in Sunwarsi Municipality and Dhanpalthan Rural Municipality which is more than >2 per 1000 population i.e. Six rural/municipalities are found to be more prone to lymphoedema cases out of seventeen rural/municipalities as the prevalence is found to be more than 1 per 1000 population. 11 rural/municipalities of Morang district have <1 prevalence of lymphoedema.

3.2. Prevalence of Hydrocele

According to this mapping, the prevalence of hydrocele is found to be more than 15 per 1000 population in Dhanpalthan area, which shows an alarming situation. Similarly, the adjoining palikas Jahada, Rangeli, Sunwarsi and Ratuwamai also have a prevalence of 5-15 per 1000 male population. Only Belbari and Biratnagar are found to have less prevalence of hydrocele cases i.e. <1 while other remaining rural/municipalities still have prevalence of 1-5.

FIGURE 2: PREVALENCE OF HYDROCELE IN MALE POPULATION

Prevalence of Hydrocele in Morang (per 1000 population)

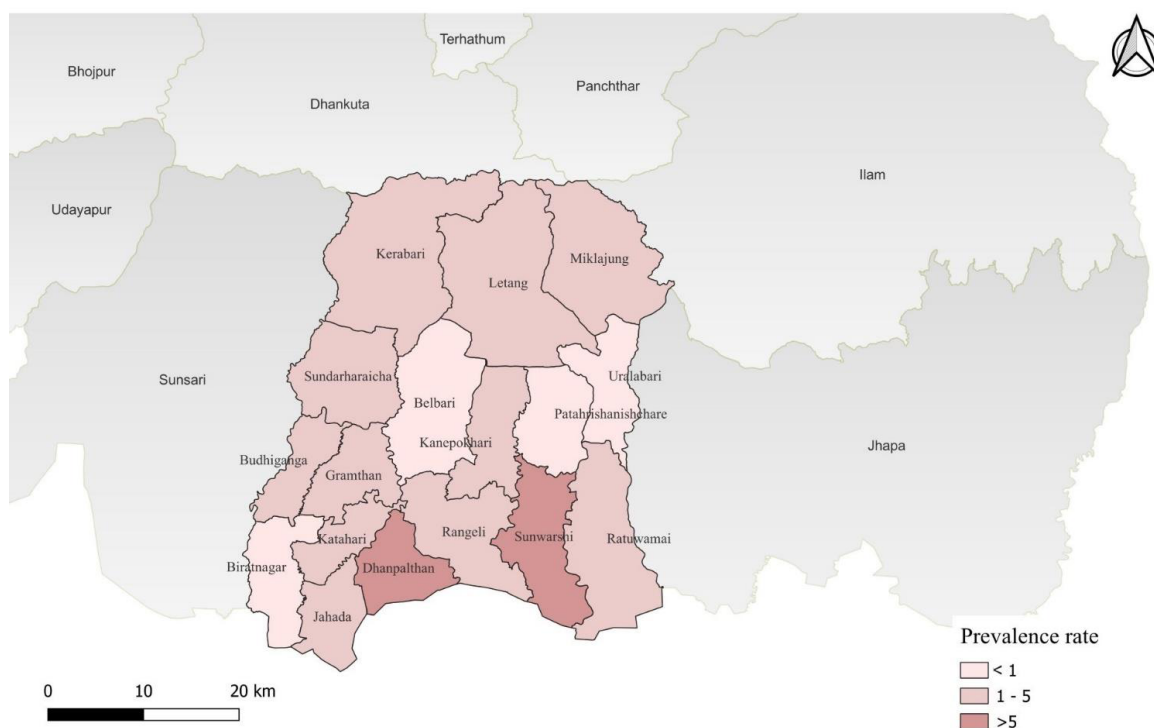


3.3. Prevalence of Lymphoedema or Hydrocele or both cases in Morang District

The mapping shows that the population residing in Dhanpalthan Rural Municipality and Sunwarsi Municipality is found at higher risk as the prevalence of lymphoedema case or hydrocele case and both cases i.e >5 in per 1000 population. Belbari, Biratnagar, Patharisanishchare and Urlabari have lower prevalence i.e <1. In rest of the rural/municipalities, the prevalence is in between 1-5.

FIGURE 3: PREVALENCE OF LYMPHOEDEMA OR HYDROCELE OR BOTH

Prevalence of Lymphoedema or Hydrocele or Both in Morang District (Per 1000)

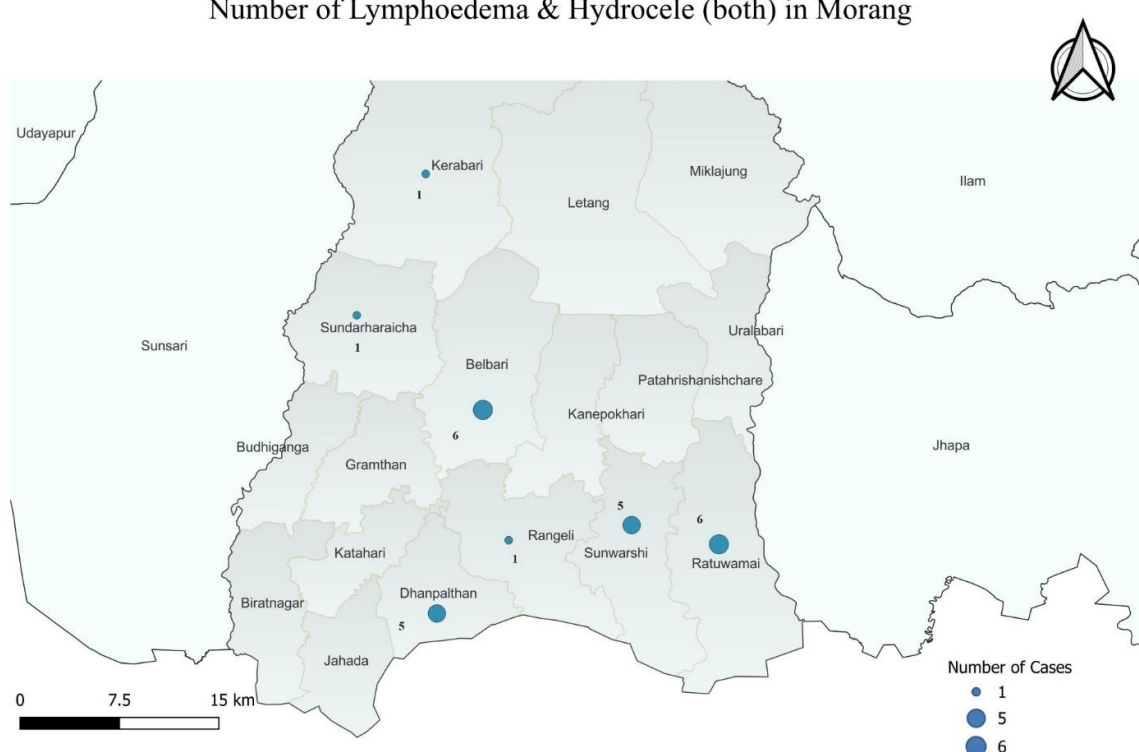


3.4. Number of having both condition of Hydrocele and Lymphoedema

The cases of both conditions (hydrocele and lymphoedema) are found in seven rural/municipalities among seventeen rural/municipalities. Out of those seven rural/municipalities, Belbari, Dhanpalthan, Sunwarshi and Ratuwamai have a higher number of cases having both clinical manifestations while rest of three rural/municipalities have fewer cases.

FIGURE 4: NUMBER OF BOTH CASES OF HYDROCELE AND LYMPHOEDEMA

Number of Lymphoedema & Hydrocele (both) in Morang



4. Findings and Discussion

This study presents the results of the community level survey carried out in MMDP in seventeen Palikas (rural/municipalities) of Morang district. The finding of this study shows that per 1000 population 2.64 of the population is affected either by lymphoedema or hydrocele.

CHART 1: POPULATION AFFECTED BY LYMPHOEDEMA OR HYDROCELE (PER 1000)

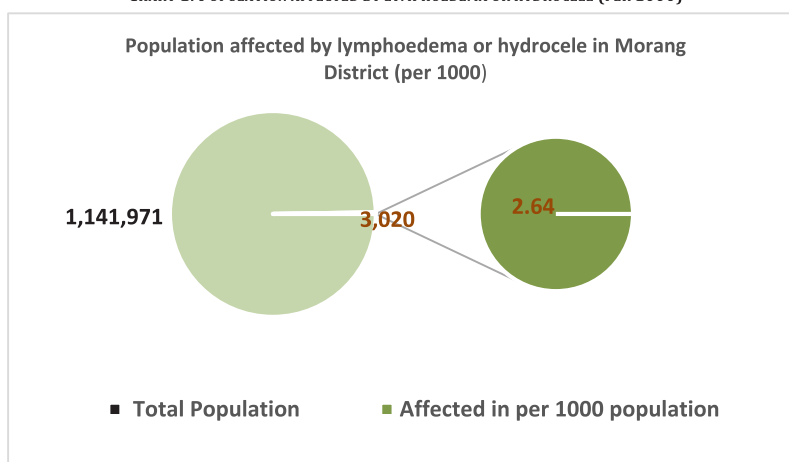


Table 1. presents the data of existing cases of lymphoedema measured in per 1000 population in each rural/municipalities of

Morang district. The data shows that the presence of lymphoedema is found higher in Sunwarshi Municipality i.e 3.55, followed by Dhanpalthan Rural Municipality i.e 2.78 per 1000 population. Similarly, Rangeli, Gramthan, Ratuwamai and Jahada also have more than 1 cases per 1000 population. Comparing with the size of population, Biratnagar MPC and Sundarhariacha Municipality have the higher population but have low cases of lymphoedema i.e 0.49 percent and 0.83 per 1000 population of respective rural/municipalities simultaneously.

TABLE 1: LYMPHOEDEMA IN EACH R/M (PER 1000 POPULATION)

S.N	Rural/Municipalities	Total Population	Lymphoedema (per 1000 population)
1	Belbari M	81,771	0.45
2	Biratnagar MPC	243,927	0.49
3	Budiganga RM	51,497	0.45
4	Dhanpalthan RM	45,348	2.78
5	Gramthan RM	36,024	1.80
6	Jahada RM	47,639	1.32
7	Kanepokhari RM	43,193	0.21
8	Katahari RM	48,510	0.35
9	Kerabari RM	34,504	0.43
10	Letang Bhogateni M	38,152	0.79
11	Miklajung RM	33,167	0.60
12	Patharisanischare M	72,451	0.26
13	Rangeli M	57,494	1.91
14	Ratuwamai M	61,139	1.72
15	SundarHaraicha M	120,213	0.83
16	Sunwarshi M	56,034	3.55
17	Urlabari M	70,908	0.34

The rural/municipalities having higher ratio of population affecting from lymphoedema are the areas surrounded by numerous small ponds and have the traditional housing structures, that might have contributed to a more conducive environment for vector breeding which drives the transmission of *W.bancrofti*, as well as having higher number of cases in these areas make the transmission more rapid. Several factors affecting Water Sanitation and

TABLE 2: HYDROCELE IN MALE POPULATION (PER 1000)

S.N	Rural/Municipalities	Male Population	Hydrocele (per 1000 population)
1	Belbari M	38,297	1.07
2	Biratnagar MPC	121,954	0.40
3	Budiganga RM	25,307	4.07
4	Dhanpalthan RM	22,196	22.21
5	Gramthan RM	17,497	2.29
6	Jahada RM	24,035	6.74
7	Kanepokhari RM	20,405	2.60
8	Katahari RM	24,342	2.75
9	Kerabari RM	16,415	2.25
10	Letang Bhogateni M	18,038	2.83
11	Miklajung RM	15,888	1.13
12	Patharisanischare M	33,984	1.53
13	Rangeli M	27,974	5.18
14	Ratuwamai M	28,999	5.86
15	SundarHaraicha M	57,018	1.46
16	Sunwarshi M	26,995	12.52
17	Urlabari M	33,356	1.05

Hygiene have played a major role in increasing cases of lymphoedema.

Table 2. shows that the ratio of population affected by hydrocele is calculated in total male population. The data shows that the male population of Dhanpalthan Rural Municipality having the condition of hydrocele is higher comparing to other rural/municipalities i.e 22.21 per 1000 male population of this area. Following the similar

status, 12.52 in per 1000 population of Sunwarshi Municipality have the condition of hydrocele. If we see the population size of various other rural/municipalities of Morang district, there is not much difference in number among these two highly affected areas and others, but the prevailing condition of hydrocele cases in these two rural/municipalities present an alarming condition. Even with the highest population burden in Biratnagar MPC, the population affected by hydrocele is minimum. Table 1. and table 2. show that Sunwarshi and Dhanpalthan have an alarming number of cases, either in hydrocele or in lymphoedema.

According to the national census 2021 of Nepal Government, the total population of female in Morang district is 3.20 percent more than the population of male. The data in table 3 presents that the population of female is found more affected by lymphoedema comparing to the population of male. When calculating in per 1000 population of each sex

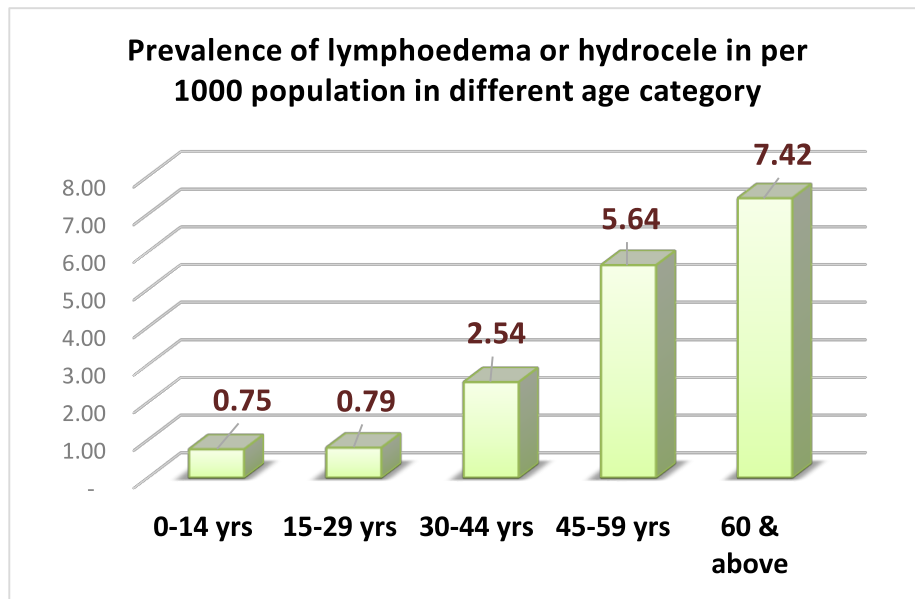
group, it is found that the female population of 1.22 is affected in per 1000 population while the affected male population is seemed below 1 i.e 0.65 per 1000 male population. Even while comparing the ration of population, the cases are found more in females, such as the population of female is only 3.65 percent higher than of male population in Sunwarshi Municipality but if we see the prevalence of the cases, it is found more than 3 folds in female population than male. A similar scenario is observed in other rural/municipalities that have higher cases, like in Ratuwamai and Rangeli. This signifies that the prevalence of lymphoedema is higher in females comparing to male, in Morang district. The population residing in Sunwarshi and Dhanpalthan seem to be at high risk of transmission, despite of any sexual orientation.

Sunwarshi has affected female population 5.34 and male population 1.63 per 1000 of each total population. Like wise, Dhanpalthan has 4.10 female affected while 1.40 male affected in per 1000 population. If the data is looked upon separately, Gramthan Rural Municipality seems to have higher prevalence among male population i.e 1.71 per 1000 and Sunwarshi seems to have higher prevalence among female population i.e 5.34 per 1000.

TABLE 3: COMPARATIVE DATA OF LYMPHOEDEMA IN MALE AND FEMALE (PER 1000)

S.N	Rural/Municipalities	Male Population	lymphoedema in male (per 1000)	Female Population	lymphoedema in female (per 1000)
1	Belbari M	38,297	0.52	43,474	0.39
2	Biratnagar MPC	121,954	0.39	121,973	0.59
3	Budiganga RM	25,307	0.55	26,190	0.34
4	Dhanpalthan RM	22,196	1.40	23,152	4.10
5	Gramthan RM	17,497	1.71	18,527	1.89
6	Jahada RM	24,035	0.71	23,604	1.95
7	Kanepokhari RM	20,405	0.20	22,788	0.22
8	Katahari RM	24,342	0.37	24,168	0.33
9	Kerabari RM	16,415	0.37	18,089	0.50
10	Letang Bhogateni M	18,038	0.61	20,114	0.94
11	Miklajung RM	15,888	0.69	17,279	0.52
12	Patharisanishare M	33,984	0.24	38,467	0.29
13	Rangeli M	27,974	0.93	29,520	2.85
14	Ratuwamai M	28,999	1.00	32,140	2.36
15	SundarHaraicha M	57,018	0.82	63,195	0.84
16	Sunwarshi M	26,995	1.63	29,039	5.34
17	Urlabari M	33,356	0.21	37,552	0.45
	Total Population	552,700	0.65	589,271	1.22

CHART 2: AGE CATEGORY WISE DISTRIBUTION OF LYMPHOEDEMA OR HYDROCELE



Age-wise distribution of the data in chart 2. shows that the highest population affected from either hydrocele or lymphoedema falls under the age group of more than 60 years i.e 7.42 per 1000 population despite having the total population of this age group less than of other age groups. Similarly, the population affected by these conditions in the age group 45-59 years is 5.64 per 1000 population. The overall scenario shows that the population affected by either hydrocele or lymphoedema are of higher age group i.e above 30 years, which also signifies that the productive working age population is vulnerable, and it has been affecting in the income generation of households, which ultimately contributes to deciding economic status of the family. The percentage of affected population below the age range of 29 years is less i.e 0.08 percentage of total population, which also provides a hopeful insight into the future, as the burden of these conditions could be less in coming years. In addition, it also signifies that visible impairment in affected cases occurred in later stage of life, after 30 years of old due to long incubation periods and negligence of infected patient to get timely treatment. Yet it is still not a condition to be relieved as the threats of transmission are found high as in pathophysiology, the untreated LF infected person shows the manifestation related to lymphoedema and hydrocele in later stage due to incubation period.

5. Conclusion

The persistent high prevalence of hydrocele and lymphoedema cases in Morang district requires a more substantial move towards an integrated approach and strategies that include vector control, social and behavioral changes, and case management. Also, in comparison to the population of female in Morang district, the overall cases of



PICTURE 2: FEMALE AFFECTED WITH LYMPHOEDEMA TAKING CARE OF HER LEG

lymphoedema have been found low. This aspect also needs to be explored to identify whether the prevalence of cases in female is low in a fact or the socio-cultural barriers are preventing the affected population to come out in light. This study also should show a further potentiality of studying lymphoedema and hydrocele from socio-cultural and ethnic perspective to gain a better and strong understanding of how these grey areas left behind are contributing to transmission. The approaches of LF elimination and morbidity management need to

be implemented in integrated approaches, incorporating the sentiments and values of the communities rather treating it only as a single component of health.

6. References

1. Adhikari, R., Acharya, D., & Wagle, A. (2022). Sociodemographic characteristics as predictors of knowledge regarding mode of transmission of Lymphatic Filariasis among population of Nepal. *PLOS Global Public Health*, 2 (10), e0000082. <https://doi.org/10.1371/journal.pgph.0000082>
2. Adhikari, R., Sherchand, J., Mishra, S., Ranabhat, K., & Wagle, R. (2015). Awareness and coverage of mass drug administration for elimination of lymphatic filariasis: a community based cross sectional study in Nepal. *J Community Health*, 40(1), 10.1007/s10900-014-9891-1. PMID: 24996654.
3. Aniaku, I., Onyishi, G., Nwosu, C., Urama, C., Akobe, N., Nnawuihe, O., & Obodo, C. (2021). Predisposing factors to lymphatic filariasis among residents in Igbo-Eze North: an endemic area in Nigeria. *Iran J Parasitol*, 16(4), 10.18502/ijpa.v16i4.7879. PMID: 35082895; PMCID: PMC8710194.
4. Arjyal, A., Parajuli, A., Kharel, C., Del Barrio, M. O., & Baral, S. (2023). Understanding gender and its intersection with social stratifiers on prevention and care seeking behavior of lymphatic filariasis in Nepal. *Infectious Diseases of Poverty*, 12(1). <https://doi.org/10.1186/s40249-023-01126-8>
5. Epidemiology and Disease Control Division (2017). Lymphatic Filariasis Program. <http://www.edcd.gov.np/lymphatic-filariasis-program>.
6. Graves, P. M., Sheridan, S., Fuimaono, S., & Lau, C. L. (n.d.). Demographic, socioeconomic and disease knowledge factors, but not population mobility, associated with lymphatic filariasis infection in adult workers in American Samoa in 2014. *Parasites & Vectors*, 13(1). <https://doi.org/10.1186/s13071-020-3996-4>
7. Government of Nepal. (2015). Annual Report. *Department of Health Services 2071/72, 2015/2015*.
8. Khanal, G. (2020). Socio-economic Status of Dalit Community: An Evidence from Nepal. *The Journal of Economic Concerns*, 11(1).
9. Njenga, S. M., Wamae, C. N., Njomo, D. W., Mwandawiro, C., & Molyneux, D. (2007). Chronic clinical manifestations related to *Wuchereria bancrofti* infection in a highly endemic area in Kenya. *Transactions of the Royal Society of Tropical Medicine and Hygiene*, 101(5), 439–444. <https://doi.org/10.1016/j.trstmh.2006.09.006>

10. Ojha, C. R., Joshi, B., Kc, K., Dumre, S. P., Yogi, K. K., Bhatta, B., Adhikari, T., Crowley, K., & Marasini, B. R. (2017). Impact of mass drug administration for elimination of lymphatic filariasis in Nepal. *PLOS Neglected Tropical Diseases*, 11(7), e0005788. <https://doi.org/10.1371/journal.pntd.0005788>
11. Richards, F., Eberhard, M., Bryan, R., McNeeley, D., Lammie, P., McNeeley, M., Bernard, Y., Hightower, A., & Spencer, H. (1989). Comparison of high dose ivermectin and diethylcarbamazine for activity against bancroftian filariasis in Haiti. *Am J Trop Med Hyg*, 44(1), PMID: 1996738.
12. Senkwe, M. N., Berta, K. K., Logora, S. M. Y., Sube, J., Bidali, A., Abe, A., Onyeze, A., Pita, J., Rumunu, J., Maleghemi, S., Ndenzako, F., & Olu, O. O. (2022). Prevalence and factors associated with transmission of lymphatic filariasis in South Sudan: a cross-sectional quantitative study. *PubMed*, 42(Suppl 1), 9. <https://doi.org/10.11604/pamj.supp.2022.42.1.33895>
13. Bishwamber, S., Pyakuryal, T., Bastola, S., Subba, M., Raut, N., & Karki, B. (2013). A study on the Socio-Economic status of Indigenous peoples in Nepal. *LAHURNIP*, www.lahurnip.org.
14. Szuba, A., & Rockson, S. G. (1998). Lymphedema: Classification, diagnosis and therapy. *In Vascular Medicine*, 3.
15. Upadhyayula, S., Mutheneni, S., Kadiri, M., Kumaraswamy, S., & Nagalla, B. (2012). A cohort study of lymphatic filariasis on socio economic conditions in Andhra Pradesh, India. *PLoS One*, 7(3), e33779. doi: 10.1371/journal.pone.0033779. Epub 2012 Mar 19. PMID: 22442721; PMCID: PMC3307764.
16. World Health Organization (2016). The Weekly Epidemiological Record (WER). <http://www.who.int/wer/en/>.
17. World Health Organization. (2022). Annual Report 2022. *WHO's Response to Health Emergencies*, <https://www.who.int/publications/i/item/9789240074644>. <https://www.who.int/publications/i/item/9789240074644>

7. Annex

Annex 1: Form used for data collection by FCHVs (form 1)

फारम नं- १

हात्तीपाइले रोगीहरुको नक्साङ्कन सर्भे

महिला स्वास्थ्य स्वयम् सेविकाले घरभेटगरी हात्तीपाइले बिरामीको विवरण लिने फाराम

तथ्याङ्क संकलक (म स्वा से) को नाम:..... जिल्ला:.....
गा पा /न पा..... वडा नं:..... मिति:

क्र.सं.	गाउँ/टोल	बिरामीको नाम थर	बिरामीको बा आफन्त/नातेदार को सम्पर्क नं	लिङ्ग	उमेर	अवस्था - हातखुट्टा, स्तन सुन्तीएको/अण्डकोष सुन्तीएको (हाइड्रोशिल)/दुबै	पछिल्लो ६ महिनामा बिरामी भएको पटक	हातखुट्टा सुन्तीएको अवस्था (सामान्य/मध्यम/ गम्भीर)	कैफियत

हात्तीपाइले रोगीहरुको नक्साङ्कन सर्भे

स्वास्थ्य संस्था/स्थानीय तहले एकमुष्ट रुपमा तयार पारेको विरामीको तथ्याङ्क रजिष्टर

जिल्ला:..... स्थानिय तह :..... मिति:

क्र.सं.	वडा नं	गाउँ/टोल	विरामीको नाम थर	विरामीको वा आफन्त/नातेदारको सम्पर्क नं	लिङ्ग	उमेर	अवस्था - हातखुट्टा, स्तन सुन्तीएको /अण्डकोष सुन्तीएको (हाइड्रोशिल) /दुबै (H/L/B)	पछिल्लो ६ महिनामा विरामी भाएको पटक (0,1, 2..)	हातखुट्टा सुन्तीएको अवस्था (सामान्य/मध्यम /गम्भीर) (Mild/Moderate/Severe)	प्रतिबेदन गर्ने स्वास्थ्य कर्मीको नाम थर:	स्वास्थ्य संस्थाको नाम

हात्तीपाइले रोगीहरुको नक्साङ्कन सर्भे

जिल्लाले एकमुष्ट रुपमा तयार पारेको विरामीको तथ्याङ्क रजिष्टर

प्रदेश:.....

जिल्ला:.....

मिति:

क्र.सं.	गा पा/न पा वडा नं	गाउँ/टोल	विरामीको नाम थर	विरामीको वा आफन्त/नातेदारको सम्पर्क नं	लिङ्ग	उमेर	अवस्था - हातखुट्टा, स्तन सुन्ती एको/ अण्डकोष सुन्तीएको (हाइड्रोशिल)/दुबै (H/L/B)	पछिल्लो ६ महिनामा विरामी भएको पटक (0, 1, 2..)	हातखुट्टा सुन्तीएको अवस्था (सामान्य/ मध्यम/गम्भीर) (Mild/Moderat e/Severe)	तथ्याङ्क संकल न गर्ने स्वास्थ्य कर्मीको नाम थर:	स्वास्थ्य संस्थाको नाम

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