Assessing Household Out-of-Pocket Expenditures for Non-communicable Diseases in a 4th Class Municipality: A Cross-sectional Study

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ABSTRACT

Background and Objective. Non-communicable diseases (NCDs) are medical conditions that are associated with long durations, slow progress, and lifetime medications. This study aimed to assess the household out-of-pocket (OOP) expenditures on NCDs in a 4th class municipality.

Methods. This cross-sectional study was conducted to determine the characteristics of the households and household heads, healthcare needs, expenditures on medicines, health, and household, and alternative coping strategies to avail healthcare needs.

Results. This study surveyed 200 households from all ten barangays of Ternate, Cavite. Top NCDs recorded include hypertension, diabetes, heart diseases, and asthma, while top NCDs medicines recorded were Losartan, Amlodipine, Metformin, and Glimepiride. Blood tests were the most needed medical laboratory service, while X-ray was the most needed diagnostic imaging service. Although more than half of the households have a member with only one NCD—the most prevalent being hypertensive disease, diabetes mellitus and other metabolic diseases—it is also common to have household members taking medicines for two to three NCDs.

To cope with healthcare expenses, households often resorted to seeking alternative or cheaper treatments (61.0%), borrowing money (39.5%), or relying on existing funds/savings (29.0%). The median proportion of expenditures on medicines for NCDs over the total health expenditures is 59.41%. Meanwhile, the median proportion of all medicine expenditures over the total health expenditures is at 77.57%. 74.00% of households incurred catastrophic health expenditures (CHE) using the 10% threshold, while only 30.50% incurred CHE using the 25% threshold. Finally, the univariable analysis found that households with one NCD member had lower odds of CHE (OR=0.316, p=0.004 at 10%, OR=0.39, p=0.003 at 25%), while those with two NCD members had higher odds at 10% (OR=2.365, p=0.034) and those with three members had nearly six times higher odds at 25% (OR=5.88, p=0.012).

Conclusion. This study highlights the need to address issues with lack of access and availability of essential medicines for NCDs especially in the primary health care setting. This study provides evidence on the minimal financial risk protection provided for medicines with data suggesting that it is the primary cause of CHEs for NCDs. Households covered by the Primary Care Benefit Packages were excluded from the study, thus, the estimates derived from the sample may be an overestimate of the true prevalence of CHE in the municipality. Therefore, there is a need to have mechanisms in place to expand insurance coverage and increase government programs catering to certain population groups to reduce the financial burden of medicines for NCDs.

Keywords: non-communicable diseases, out-of-pocket expenditures, households

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INTRODUCTION

Among the Association of Southeast Asian Nations, the Philippines has the most expensive drugs due to the limited domestic production and high import prices relative to international standards for both generic and branded pharmaceuticals. Over the years, multiple efforts have been made to address this problem and to improve the access of medicines in the country.[1] These efforts included, but were not limited to, the enactment of Republic Act No. 6675 or the "Generics Act of 1988" and the enactment of Republic Act No. 9502 or the "Universally Accessible Cheaper and Quality Medicines Act of 2008". Multiple Botika ng Bayan were also established to provide access to free essential medicines for common diseases in the community. Furthermore, the Republic Act No. 11223 or the "Universal Health Care Act" was also created to achieve Universal Health Coverage and to provide people equitable access to quality and affordable health care goods and services, and protection against financial risk or hardships.

However, since drug prices have continued to escalate over the last decade, individuals in need of medication were continuously burdened and were forced to face financial problems. Regardless of income group, payments for pharmaceutical products have been found to be one of the main drivers of out-of-pocket (OOP) and catastrophic health spending (measured at the 10 percent threshold). In the National Health Expenditure Survey (NHES) report and other studies cited by Javier et al., medicines account for 90% or more of the total expenditure outside of health facilities for both inpatient and outpatient care. Limited PhilHealth coverage of outpatient care services may also contribute to high household OOP costs.[1-3] Based on consumer demand, prescription drugs account for 55% of all household spending in homes with catastrophic spending. On the other hand, based on income, drugs accounted for 76% of OOP spending in poor households, which is 18% more than those in wealthy households.[3,5] In support of the previous statement, based on the Ulat ng Bayan September Report of Pulse Asia last 2019, medicine is indeed one of the major components of OOP spending.[3,4] Low-income households, households with elderly members, households with persons with disabilities (PWDs) members, and households with members requiring healthcare for chronic illnesses are more likely to experience the negative impact. Hence, challenges have been faced by the government, even the consumers, in finding other ways to increase investments on health care coverage and to reduce the OOP expenses.[6,7]

To measure financial hardships of households, the concept of catastrophic health expenditures (CHE) was developed. It is defined as the "proportion of population with large household expenditures on health as a share of total household expenditure or income." CHE was used as an indicator by the United Nations Sustainable Development Goals to achieve the Sustainable Development Goal (SDG) 3: Good Health and Well-being. CHE can be measured using two thresholds: (1) greater than 10% and (2) greater than 25% of total household expenditure or income. In essence, it is based on a ratio of two concepts: the household expenditure on health or out-of-pocket payments over the expenditure on household consumption or household income.[8] Households experiencing CHE are forced to cut down on basic needs and expenses, sell assets, incur debts, or be impoverished.[9,10]

Currently, large scale studies have already been conducted globally and on a national level regarding CHE of households. However, the data and results do not immediately reflect or take into account the situation in specific communities which have different characteristics, average incomes, and prevailing diseases. Given this present landscape, an assessment of OOP health expenditures in relation to the most prevalent diseases in a low income area would be significant and beneficial. The data can be used to help the government have an idea on how the current health financing system can be improved to promote financial protection among households. Through assessment of CHE, governments and organizations may sense the current situation of households, thereby creating programs to fill in the gaps in healthcare and to build stronger financial protection mechanisms.[6,7]

According to the World Health Organization (WHO), NCDs are the leading cause of death worldwide, responsible for 74% of the total number of deaths each year. NCDs, also known as chronic diseases, are medical conditions that are associated with long durations and slow progress. NCDs can impact people from all age groups, regions, and countries, and are tightly linked to poverty.[11] Vulnerable and socially disadvantaged people tend to become more exposed to harmful activities such as smoking, drinking alcohol, or eating unhealthy dietary practices. As a result, they become more at risk of getting sick and of dying sooner. Treatment for NCDs is costly since it demands multiple health needs including periodic laboratory diagnostics, physician consultations, maintenance medications, and expensive hospitalizations for complications.[12] This compromises the initiatives to reduce poverty, especially in low-income countries. Unlike the more well-off part of the population, those who are living in poverty have limited access to health services.[11] In countries like the Philippines, where OOP payments remain as the major source of health spending, poor and "near poor" households can be subjected to catastrophic expenditures when they face large and recurring health expenditures from the chronic nature such as NCDs.

The study therefore aimed to assess the household out-of-pocket (OOP) expenditures on NCDs in a 4th class municipality. Specifically, this study aimed to: (1) describe the characteristics of households and household heads in a 4th class municipality; (2) describe the health resources needed by households; (3) describe alternative coping strategies of households to adequately procure medicines and other health services; (4) determine the household's monthly expenditures on healthcare needs including NCD medicines purchases; (5)

determine the prevalence of catastrophic health expenditures for health using the 10% and 25% thresholds; (6) determine the proportion of medicine expenditures in relation to the total household health expenditures; and (7) describe the effect of selected household characteristics on CHE.

MATERIALS AND METHODS

Study Design

This study adopted an observational, cross-sectional design which was conducted from March to April 2024.

Study Site

Low-income households are particularly vulnerable to financial burdens associated with health expenditures due to limited financial resources, increasing their susceptibility to CHE. With this, the researchers selected a site in Cavite, specifically within a lower municipality class. Additionally, population density was considered to facilitate more economical and efficient data collection, ensuring adherence to the established timeframe for the study._Eventually, Ternate was chosen as the study site. It is a 4th class coastal municipality with a total population of 24,653, and population density of 567/km^2, with a total number of households of 6,344 households and an average household size of 3.9.[13]

Sampling Plan

The target population of this study was the households in Ternate, Cavite that have at least one household member currently diagnosed with NCD and is currently on NCD medications. Sample size was determined using the Stata 17.0 software to take the covariates into account, in which the sample size obtained was 187. To take into account possible nonresponse and attrition, this number was increased to 200 households. This number was divided among the ten barangays in Ternate, Cavite, in which the number of households to be surveyed per barangay depends on the percentage of the proportion of the number of households in each barangay. The ten barangays are Poblacion I, Poblacion II, Bucana, Poblacion III, San Jose, Poblacion IA, San Juan II, Sapang II, San Juan I, and Sapang I. Systematic sampling of every three households was employed, which was determined through a randomizer to prevent selection bias and minimize including too many households from the same extended family.

The inclusion criteria for this study were: (1) households, including one-person households, that have at least one member that has any of the following NCDs will be included: hypertensive diseases, NCDs of the urinary system, diabetes mellitus, ischaemic heart diseases, other forms of heart disease, cerebrovascular diseases, metabolic disorders, malignant neoplasms, and chronic lower respiratory diseases; (2) households that are currently residing in the barangay and have been residing in the same barangay for at least one year; and (3) households that have a member, at least 18 years of age, who was willing to become a research respondent and have met at least three of the following criteria: main health care decision maker; most knowledgeable about health of household members; most knowledgeable about health expenditures of the household; most knowledgeable about health utilization by household members; or designated caregiver for sick household members.

The exclusion criteria were: (1) households that have no present members during the time of data collection; and (2) households with at least one member that is under a free medicines access program (i.e., PhilPEN, MAP). Regarding the withdrawal criteria, participants can rightfully withdraw from the study at any time during the survey. A respondent may also be refused participation if they refuse to answer many questions or provide numerous incomplete answers, rendering the data collected not useful.

Instrumentation

The study utilized a structured questionnaire derived from a combination of multiple survey questionnaires and findings of systematic reviews, primarily drawing from the WHO Household Survey, the insights of one study, and the pre-validated questionnaire from another study.[14-16] This structured questionnaire comprised three separate parts aimed at gathering information on: (1) Household Characteristics, (2) Household Expenditures, and (3) Household's Alternative Coping Strategies for Acquiring Medicines and Other Healthcare Services. Operational definitions are provided in Appendix A.

The formulated questionnaire was written in English, and was translated into Filipino by the Sentro ng Wikang Filipino (SWF) of UP Manila. Subsequently, it was sent to two selected experts in the field of public health pharmacy to assess its content validity and to determine if any necessary revisions were needed.

Field testing was done in Kalayaan, Laguna, in which each researcher conducted an interview-administered survey to five households to gain practice and ensure familiarity with the questionnaire. The field testing of this study involved selecting of households, introducing the study, discussing the contents of the informed consent, signing of the informed consent form, and interviewing the household respondent based on the contents of the questionnaire. After the field testing, the researchers discussed issues that need to be addressed in order to standardize the methods and revise the questionnaire. This testing was conducted in March 2024.

Data Collection Procedure

During data collection, the data collector started at the barangay hall, and a random starting household was selected using an online arrow spinner to determine the direction. Households that have no present members during the time of data collection were excluded due to logistical constraints and time limitations. Households with at least one member that is under a free medicines access program (i.e., PhilPEN, MAP) were also excluded. In such cases, the next household

was chosen as a replacement. After completing an interview or scheduling one for a later time, researchers skipped three households before selecting another one in the barangay. The researchers introduced themselves and built rapport with household members. If a household member wished to participate but found the timing inconvenient, the researchers offered to reschedule the visit. Assistance and guidance were sought from the Barangay Office staff to enhance efficiency and ensure safety, though they were not involved in the data collection procedure. Participants were assured that their participation or nonparticipation would not affect any benefits or services from the barangay or the Local Government Unit (LGU).

Within this process, the researchers showed the copy of endorsement letters from the municipal mayor and the Punong Barangay of the specified barangay, as well as the paper-based informed consent form to inform the respondents about the study. If the respondent agreed to participate, he/she was asked to sign the two copies of the informed consent form. The data collection only proceeded when the informed consent has been signed by the respondent.

Data collectors were trained and hired to conduct interviews alongside the research investigators. These data collectors were barangay health workers (BHWs) from the surveyed barangays. During the training, the researchers explained the study's background, purpose, and the roles and responsibilities of a data collector to ensure their capability and willingness. They were also familiarized with the questionnaire, taught unfamiliar terms and questions, and informed about the expected data for each section.

The questionnaires were interview-administered, meaning, the questionnaire was accomplished with the presence of at least one of the researchers or the hired data collectors. Using interviews as the data collection method helped to prevent the occurrence of missing data. The researchers utilized Google Forms to fill up digital copies of the questionnaire. Meanwhile, to anticipate the possible lack of device and fast internet connection, physical copies of the questionnaire were printed to be utilized during the interviews. The physical copies of the signed informed consent and filled questionnaires that were collected during the imple-mentation of this research were compiled in a secure envelope that was only accessible to the researchers and protected with utmost confidentiality. Similarly, access to the answers from Google Forms were only accessible to the researchers. Refer to Appendix B for the flow diagram of the data collection process.

Data Processing and Analysis

Data cleaning was done to check for errors in data collection. All extracted information from the Google Forms were encoded and compiled into a Google Spreadsheet for easier and more efficient records management.

Data on (1) characteristics of households, on (2) health resources needed by households, and on (3) alternative coping strategies done by households to afford medicines and other health services and subgroup analyses were described through frequency statistics (i.e., the number of times the value occurs in the data) and percentages (%). For (4) household's monthly expenditures on healthcare needs and subgroup analyses, measures of central tendency (i.e., mean and median) were used. Monthly costs were directly asked for household needs and most of the healthcare costs except for inpatient care services, medical laboratory services, and diagnostic imaging services wherein expenditures made within six months were acquired and finally divided by six to compute for average monthly cost. To determine the (5) prevalence of catastrophic health expenditures of households in relation to health and household expenditures, calculations were based on Two Thresholds used in SDG 3.8.2. for global reporting: a lower threshold of 10% and a higher threshold of 25%. These calculations identify household expenditure on health or CHE as a share of total household consumption. These calculations can be simplified into the formula in Figure 1.

For lower threshold, 10%

$$\text{CHE= 1 if } \frac{\text{OOPh}}{\text{THh}} \geq \text{to 0.1}$$

$$\text{CHE= 0 if } \frac{\text{OOPh}}{\text{THh}} < \text{to 0.1}$$

For higher threshold, 25%

$$\text{CHE= 1 if } \frac{\text{OOPh}}{\text{THh}} \geq \text{to 0.25}$$

$$\text{CHE= 0 if } \frac{\text{OOPh}}{\text{THh}} < \text{to 0.25}$$

where:
CHE is the catastrophic health expenditure;
OOPh is the out-of-pocket expenditures of the household for health; and
THh is the total household expenditures, or if unavailable, disposable income.

Figure 1. Formulas for catastrophic health expenditure.

The CHE variable acts as a dummy variable, where 1 signifies a household experiencing CHE and 0 denotes a household without such expenditure. The count of households incurring CHE for each threshold was divided by the total sample size to determine the percentage of households facing CHE.

Lastly, data on (6) the proportion of medicine expenditures on NCDs in relation to total health expenditures were determined by calculating the percentage (%) of medicine expenditures compared to the total amount of health expenditures. The proportion of expenditures on other healthcare needs to the total health expenditures were also determined for comparison purposes. The data were presented through the use of percentages (%) and measures of central tendency_(i.e., mean and median). A subgroup analysis was done to assess the proportion of expenditures on specific NCD. Included households for this analysis were households with only one member with NCD, and this one member should only have one NCD. For this analysis,

frequency statistics (i.e., the number of times the value occurs in the data) and measures of central tendency (i.e., mean and median) were used.

Ethical Considerations

This study was submitted to the UP Manila Research Ethics Board for ethical review, and approval was granted with the code UPMREB 2023-0832-UND. Ethical requirements were strictly followed throughout the study.

RESULTS

Characteristics of Households

A total of 200 households from the 10 barangays of Ternate, Cavite were interviewed for the study. Table 1 presents a summary of the different sociodemographic characteristics of households. Most households (53%) in the study were composed of 4-6 members. Most households (44.5%) have at least one household member who is 60 years old and above. Only 17.5% of the households have PWD members. Only 6% of the households reported having a member who is pregnant. More than half (51%) do not have a member aged 18 years and below. While nearly half (45%) have at least one employed member.

As seen in Figure 2, most households (66%) have only one member taking medicines for NCDs. The most prevalent condition amongst households is hypertensive disease (n=213), followed by diabetes mellitus (n=71), then metabolic diseases (e.g., hyperlipidemia and thyroid diseases) (n=70).

In terms of adherence to medication, 65% of household members have taken or purchased all medicines as recommended. This percentage is higher than those non-compliant with their medications (35%).

As shown in Table 2, more females (54.5%) were identified as household heads than males (45.5%). Most of the identified household heads were between 53-65 years old (39%), were married (53.0%), and have only finished either elementary (27.5%) or high school (29.5%). As for employment status, the household heads were either currently unemployed (36.0%), or employed (34.5%).

Table 1. Sociodemographic Characteristics of Households

Variable	Frequency (N=200)	Percentage (%)
Number of Household Members		
1-3	78	39.00
4-6	106	53.00
7-9	12	6.00
10-13	4	2.00
Older Member (60 years old or above)		
None	61	30.50
1	89	44.50
2	48	24.00
3	1	0.50
More than 3	1	0.50
Persons with Disability		
None	165	82.50
1	34	17.00
2	1	0.50
Pregnant		
None	192	94.00
1	8	6.00
Under 18 years old		
None	102	51.00
1	43	21.50
2	30	15.00
3	17	8.50
More than 3	8	4.00
Employed with Working Members		
None	32	16.00
1	90	45.00
2	59	29.50
3	14	7.00
More than 3	5	2.50

Table 2. Sociodemographic Characteristics of Household Head

Variable	Frequency (N=200)	Percentage (%)
Sex		
Male	91	45.50
Female	109	54.50
Age (years)		
27-39	22	11.00
40-52	33	17.00
53-65	78	39.00
66-78	57	28.00
79-91	10	5.00
Educational Attainment		
Did Not Finish Elementary	27	13.50
Elementary	55	27.50
Did Not Finish High School	27	13.50
High School	59	29.50
Undergraduate	14	7.00
College	16	8.00
Postgraduate	1	0.50
Did Not Attend School	1	0.50
Employment Status		
Self-employed	37	18.50
Employed	69	34.50
Unemployed	72	36.00
With Pension	21	10.50
Retired Without Pension	1	0.50
Marital Status		
Single	34	17.00
Partnered But Not Married/Live-in	14	7.00
Married	106	53.00
Annulled / Divorced	0	0.00
Separated	15	7.50
Widowed	31	15.50

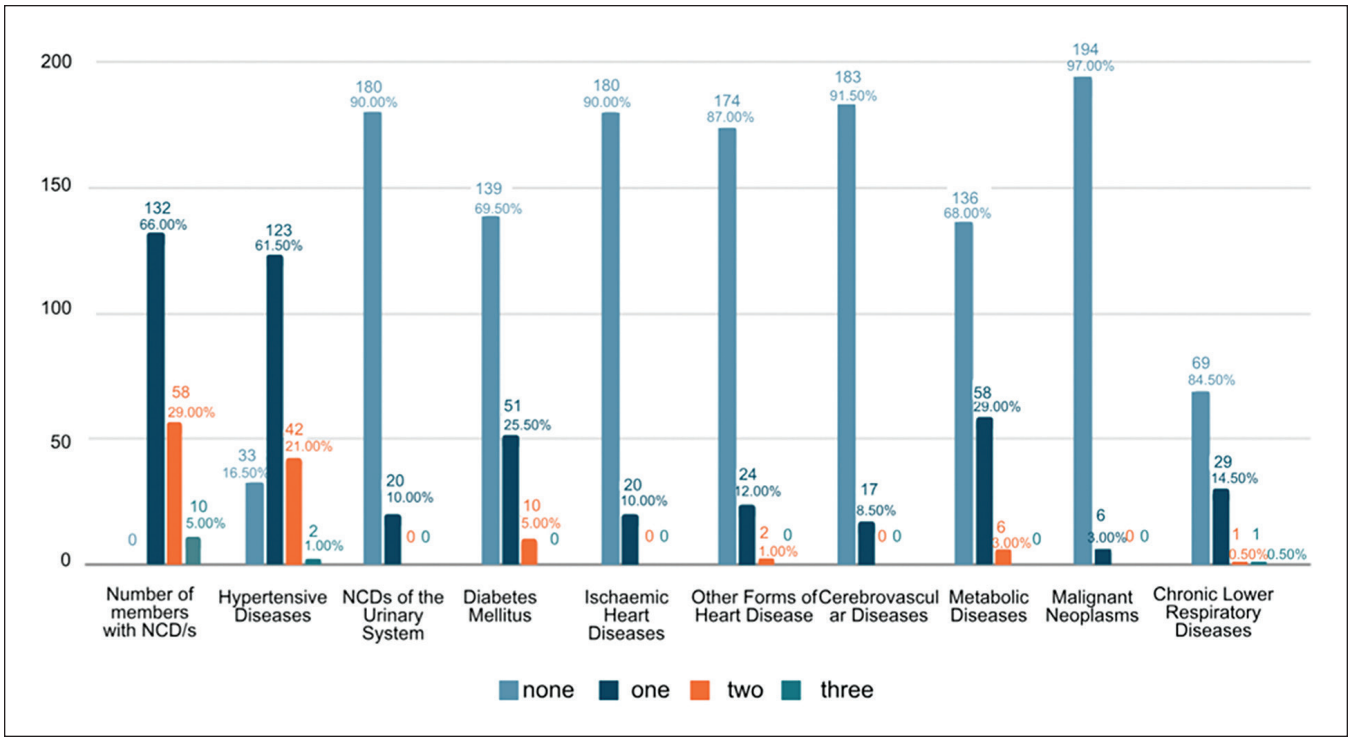

Figure 2. Sociodemographic characteristics of household member/s with NCD/s.

Health Resources of Households

As shown in Table 3, hypertension drugs, such as Losartan (n=141) and Amlodipine (n=76), are among the most purchased monthly NCD medicines by households in terms of drug indication.

Meanwhile, in terms of drug class, Angiotensin Receptor Blockers (n=146) were the most purchased for hypertensive diseases; Biguanides (n=43) for diabetes mellitus; Antiplatelet (n=13) for heart diseases; Statins (n=43) for hypercholesterolemia; and Short-Acting Beta-2 Adrenergic Agonist (n=12) for asthma (Table 4).

Aside from medicines for NCDs, one hundred nineteen households (n=119; 59.50%) also avail medicines for other diseases and health products monthly. Furthermore, one hundred six households (n=106; 53.00%) avail outpatient care services monthly. Lastly, fifty eight households (n=58; 29.00%) avail inpatient care services monthly.

Medical laboratory services that were separately identifiable from outpatient preventive services were included in the survey. One hundred sixty six households (n=166; 83.00%) avail blood test monthly, while eighty nine households (n=89; 44.50%) avail urine test monthly. In addition, diagnostic imaging and other services were also included in the survey. Majority of the households avail X-ray (n=79; 39.50%) monthly, followed by Sonography (n=21; 10.50%) such as Ultrasound and 2D Echocardiography, Electrocardiogram (n=15; 7.50%), Computed Tomography (CT) Scan (n=13; 6.50%), and lastly, Magnetic Resonance Imaging (MRI) (n=7; 3.50%).

Table 3. Most Frequently Purchased NCD by Households according to Indication

Generic Drug	Indication	Frequency (N)
Losartan	Hypertension	141
Amlodipine	Hypertension	76
Metformin	Diabetes	42
Atorvastatin	Hypercholesterolemia	35
Clopidogrel	Heart Disease	13
Aspirin	Heart Disease	12
Glimepiride	Diabetes	12
Salbutamol	Asthma	12
Carvedilol	Heart Disease	10
Gliclazide	Diabetes	9
Insulin	Diabetes	9
Montelukast	Asthma	9
Metoprolol	Heart Disease	7
Prednisone	Asthma	7
Trimetazidine	Heart Disease	7
Isosorbide Mononitrate	Heart Disease	6
Rosuvastatin	Hypercholesterolemia	6

Alternative Coping Strategies of Households to Avail Medicines and Other Health Services

Figure 3 shows the prevailing alternative coping strategies utilized by households to overcome healthcare expenses. The most prevalent is borrowing money (n=79; 39.50%). The 6.00% that have opted for "others" indicated strategies such as asking other family members for extra money, applying for medical assistance from the government and/or politicians, joining cooperative savings or "paluwagan", and engaging in illegal gambling or "jueteng".

A subgroup analysis was conducted to determine the coping strategies of households that incur CHE. As presented in Figure 4, borrowing money remained the most utilized strategy by households with CHE at 10% (n=60; 40.54%) and 25% (n=28; 45.90%) thresholds. Other strategies, pawning assets, and selling assets were utilized only by few households at both thresholds. 22.30% of households with CHE at 10% threshold, and 19.67% of households with CHE at 25% do not employ coping strategies at all.

On the other hand, when it comes to strategies in reducing household expenditures, the highest is seeking alternative or cheaper treatment for both thresholds (n=92; 62.16%; n=44; 72.13%), followed by reducing expenditure for household needs (n=49; 33.11%; n=21; 34.43%), and then delaying or stopping treatment (n=25; 16.89%; n=12; 19.67%). 20.27% of households with CHE at 10% threshold, and 22.95% of households with CHE at 25% do not employ coping strategies at all. These data were depicted in Figure 5.

Table 4. Most Frequently Purchased NCD by Households according to Drug Class

Indication	Drug Class	Frequency (N)
Hypertensive Diseases	Angiotensin Receptor Blockers	146
Diabetes Mellitus	Biguanides	43
Heart Diseases	Antiplatelet	13
Hypercholesterolemia	Statins	43
Asthma	Short-Acting Beta-2 Adrenergic Agonist	12

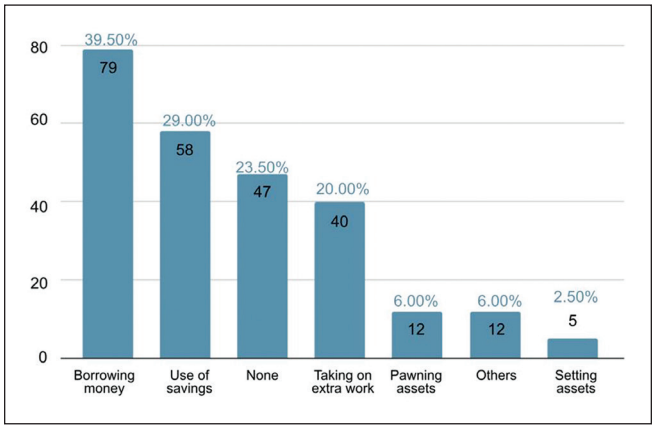

Figure 3. Strategies of households to add or increase household budget for medicines and other healthcare needs.

Health Expenditures of Households

Table 5 presents the household's health expenditures in a month. In terms of NCD medicines expenditures, 40.50% of the households have an average monthly spending of below PhP 1,000.00; the rest have an average monthly spending of above PhP 1,000. The largest spending on NCD medicines was PhP 35,000.00, the lowest was PhP 70.00, and the median cost was PhP 1, 140.00. For other medicines and health products, the median cost was PhP 295.00. For outpatient care services, the median cost was PhP 300.00. For inpatient care services, the median cost was PhP 0.00, similar to the median cost for diagnostic imaging and other services.

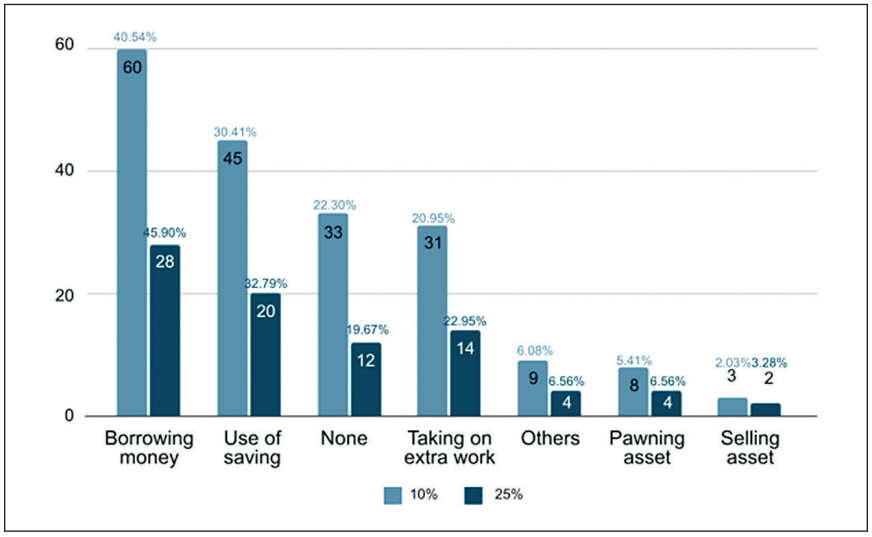

Figure 4. Strategies of households that incur CHE to increase budget.

Table 5. Household's Health Expenditures in a Month

Household's Health Expenditures in a Month	Mean (PhP)	Median (PhP)	Min (PhP)	Max (PhP)
NCD Medicines	2,140.00	1,140.00	70.00	35,000.00
Other Medicines and Health Products	508.57	295.00	0.00	4,000.00
Outpatient Care Services	569.26	300.00	0.00	7,000.00
Inpatient Care Services	5,012.75	0.00	0.00	300,000.00
Medical Laboratory Services	160.06	83.33	0.00	2,000.00
Diagnostic Imaging and Other Services	132.16	0.00	0.00	3,466.67
Total	8522.80	1,818.33	70.00	351,466.67

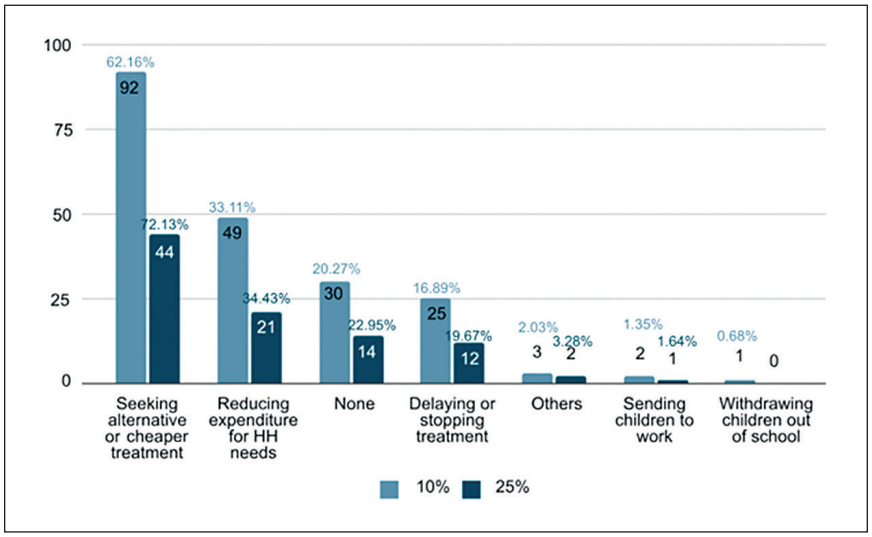

Figure 5. Strategies of households that incur CHE to reduce expenditures.

Lastly, for medical laboratory services, the median cost was PhP 83.33.

A subgroup analysis was conducted to determine the difference in mean and median expenditures for households that availed inpatient care services (n=60; 30%) compared to all households (n=200), including those that did not avail inpatient care services. This analysis noted that the computed mean expenditure for all households (PhP 5,012.75) is much higher than the computed mean expenditure for households that availed inpatient care services (PhP 2,880.89). This could mean that the data distribution of expenditures for all households is skewed, with a small number of certain households having very high expenditures pulling up the overall mean. In contrast, for the computation on households that availed inpatient care services, data distribution might have uniformly lower expenditures. Furthermore, when it comes to the computed median expenditure, it can be noted that for all households, it has PhP 0.00. This could indicate that the data distribution is highly skewed, with a large number of households reporting zero expenditure. This could also indicate that many households did not engage in the inpatient care spending during the period of interest.

Another subgroup analysis was conducted to determine the mean and median percentage expenditures for households that availed diagnostic imaging and other services (n=85; 42.50%) compared to all households (n=200), including those that did not avail diagnostic imaging services. The mean expenditures of households that availed diagnostic imaging and other services in a month is PhP 316.05, a higher value than the mean expenditures of all households. Meanwhile, the median expenditure in a month is PhP 87.50 for households that availed diagnostic imaging and other services. This shows that when only considering those who spent on diagnostic services and other services, we could obtain mean and median values that represent their spending.

Proportion of Households OOP Expenditures on Health Care Needs

The proportion of medicine expenditures in relation to the total health expenditures was analyzed to assess the contribution of NCD medicines to the overall healthcare spending. The median was determined to be 59.41%, indicating that the higher half spends higher than 59.41% of their health budget on medicines. On the other hand, the proportions of expenditures on other healthcare needs to the overall healthcare expenditures were also determined for comparison purposes. For medicine and health products excluding NCD medicines, the median percentage was

Table 6. Households OOP Expenditures on Health Care Needs

Health Care Needs	Median (PhP)	Percent (%)
All Medicines	1,575.00	77.57
NCD Medicines	1,140.00	59.41
Other Medicines and Health Products	295.00	6.93
Outpatient Care Services	300.00	5.75
Inpatient Care Services	0.00	0.00
Medical Laboratory Services	83.33	2.63
Diagnostic Imaging and Other Services	0.00	0.00

6.93%. Other median values and percentages for outpatient care services, inpatient care services, medical laboratory services, and diagnostic imaging and other services were presented in Table 6. The minimum percentage of all health needs except NCD medicines is 0.00%, which indicates that some households did not spend any of their health care budget on these health care needs. NCD medicines have the highest median proportion, indicating that surveyed households' medicine expenditures are higher than the rest of their healthcare needs. In addition, the proportion of the overall medicine expenditures to the total health expenditures is 77.57%, meaning that the expenditures of households are highly due to medicines.

To assess the proportion of expenditures on specific NCD, a subgroup analysis was conducted. Households with only one member with one NCD are included in this analysis. After filtering the data, the total sample for subgroup analysis was identified (n=70). Types of NCDs included are hypertension (n=53), other diseases of the urinary system (n=2), diabetes mellitus (n=6), metabolic disorders (n=4), and chronic lower respiratory diseases (n=5). For hypertension, the median is 34.54%, while the mean is 48.84%. The highest percentage is 100.00%, while the lowest is 3.45%. The median and mean of diabetes mellitus (75.00%; 75.55%), chronic lower respiratory diseases (76.43%; 66.06%), metabolic disorders (34.14%; 29.94%), and other diseases of the urinary system (85.70%; 85.70%) were also determined.

Catastrophic Health Expenditures

The prevalence of CHE on households was determined based on two thresholds used in SDG 3.8.2. for global reporting: a lower threshold of 10% and a higher threshold of 25%. In this study, the data for OOP expenditure on health were obtained from all household's OOP on medicines, health products, outpatient care services, inpatient care services, medical laboratory services, and diagnostic imaging services and other health services. Meanwhile, the data for the total household expenditures were obtained from all expenditures on food, nonfood nondurable goods (e.g., clothes, toiletries, cosmetics etc.), internet connection, water, electricity, laundry, telephone/cell phone load/data subscriptions, transportation, house rent, and imputed items (e.g., food and material benefits provided by the employer, free items like food that is acquired from backyard).

Findings revealed that on average, an amount of PhP 4,900.00 was spent for food, PhP 750.00 for nonfood nondurable goods, PhP 600.00 for laundry, PhP 0.00 for internet connection, PhP 250.00 for water, PhP 1,200.00 for electricity, PhP 10.00 for telephone/cell phone load/data subscriptions, PhP 400.00 for transportation, PhP 2500.00 for house rent, and PhP 0.00 for imputed items. Based on the computations for CHE, households that incurred catastrophic expenditures for health at the 10% threshold accounted for 74% (148) of the total households surveyed, while households that incurred catastrophic expenditures for health at the 25% threshold accounted for 30.5% (61) of the total households surveyed.

Catastrophic Health Expenditure Based on Number of Household Members with NCDs

A univariable analysis was done to determine the effect of some of the household characteristics (i.e., household head's educational attainment and number of household members with NCDs) on CHE. At the 10% CHE threshold, households where household heads did not finish elementary education are 96% less likely to face CHE (OR=0.040, p=0.032). Additionally, households with one member with NCDs have significantly lower odds of CHE expenditure (OR=0.316, p=0.004), while households with two members show significantly higher odds (OR=2.365, p = 0.034), meaning they are more than twice as likely to incur CHE.

At the 25% threshold, households with household head who have graduated college are more than three times as likely to incur CHE (OR = 3.26, p = 0.026). Furthermore, households with one member with NCD are 61% less likely to experience CHE (OR = 0.39, p = 0.003), and those with three members are nearly six times more likely to do so (OR = 5.88, p = 0.012). The summary of analysis can be found in Table 7.

DISCUSSION

Characteristics of the Households

In this study, the majority (53.00%) of the households had 4-6 members, a result greater than the latest data on an average household size of Ternate (3.9).[13] Unsurprisingly, more than half (69.50%) of the households have at least one member that is 60 years old or above. Having an older member in a household can be attributed to the Filipinos' value of filial piety and is also due to the lack of institutional elderly care in the country, necessitating home-based caregiving.[17] Half of the households only have one employed member making them financially vulnerable if the primary earner faces job loss, wage cuts, illness, or other disruptions.[18] 54.50% of the household heads are female, which may be explained by Filipino women's vital role in family health decisions and could not be attributed to the lack of present adult men in the household as the majority of the household heads were married and only a few are separated, single,

Table 7. Univariable Analysis of Catastrophic Health Expenditure with Number of Household Members with NCDs

Variable	Odds Ratio (OR)	*P*-value	95% CI	
			Lower	Upper
CHE at 10% Threshold				
Educational Attainment of the Household Head				
No school		omitted		
Did not finish elementary	0.040	0.032*	0.177	0.925
Graduated elementary	1.150	0.706	0.558	2.370
Did not finish high school	1.268	0.631	0.482	3.338
Graduated high school	1.353	0.409	0.660	2.773
Did not finish college	0.609	0.394	0.194	1.907
Graduated college	1.573	0.494	0.330	5.755
Postgraduate		omitted		
No. of household members with NCDs				
1	0.316	0.004*	0.143	0.696
2	2.365	0.034*	1.067	5.241
CHE at 25% Threshold				
Educational Attainment of the Household Head				
No school		omitted		
Did not finish elementary	0.898	0.811	0.372	2.168
Graduated elementary	0.836	0.611	0.419	1.667
Did not finish high school	0.953	0.916	0.393	2.315
Graduated high school	0.794	0.502	0.404	1.558
Did not finish college	1.290	0.661	0.414	4.021
Graduated college	3.264	0.026*	1.155	9.220
Postgraduate		omitted		
No. of household members with NCDs				
1	0.389	0.003*	0.208	0.727
2	1.798	0.074	0.945	3.425
3	5.877	0.012*	1.465	23.564

or widowed.[19] A considerable number of household heads are between 53 to 65 years old, which indicates that most are already in the later stages of their working lives and possibly approaching retirement age. In addition, most of the household heads are either elementary or high school graduates, which indicates that they have completed only the basic levels of education and lack higher education qualifications. For the economic benefits of education, data show that at each additional level of educational attainment, there are improved labor market outcomes for individuals. Individuals with higher levels of education are more likely to secure jobs, maintain employment, acquire new skills on their work, and earn higher incomes compared to those with lower levels of education.[20] This is evident in the study results as a large portion of the household heads are unemployed (36.00%). The most prevalent NCDs among households are hypertension, diabetes, and metabolic diseases, correlating with recorded mortality rates.[15] However, 35% of households reported medication non-adherence that may be influenced by social/economic, therapy, disease, patient, and healthcare system factors. These factors could affect intentional and unintentional non-adherence.[21]

Adequacy of Health Resources Accessed by Households

The top most accessed medicines by households are medicines for cardiovascular risk factors, that is hypertension, diabetes, and hypercholesterolemia. As presented earlier, the number one medicine accessed by households in Ternate is Losartan, followed by Amlodipine, with significantly higher frequency than the remaining medicines on the list. Following these is Metformin, then followed by Atorvastatin. Efforts to improve access to healthcare have long been started with the Local Government Code of 1991 or Republic Act No. 7160 (1991).[22] With this, LGUs are required to procure medicines for their communities as a part of the devolution of health services outlined in the law. Through their Local Health Boards (LHBs), health needs of their communities are determined and health programs and services are set, which include the procurement of medicines. Given these, ideally, medicines commonly needed by households should be provided for free and readily available in Rural Health Units (RHUs) and Barangay Health Stations (BHS). However, availability of NCD medicines in RHU and BHS is not always guaranteed. This is supported by two studies, wherein both showed that mean availability of medicines in the public sector were low.[23,24]

When it comes to outpatient care services (i.e., consultations witha physician), 106 out of 200 households spent money to avail this service. Few of the households have health insurances that cover the expenses, while the rest do not regularly go to the health care facilities. This is a concerning scenario, as it indicates that a considerable portion of the population may not be receiving the necessary medical attention for managing their health conditions effectively. Not availing outpatient care services for regular consultations and checkups can lead to several critical issues. For instance, without regular medical oversight, patients' medications may not be adjusted based on their changing needs, potentially resulting in ineffective treatment or adverse effects.[25] Additionally, these individuals may miss out on crucial information and guidance from healthcare professionals on how to manage their disease, such as dietary recommendations, lifestyle modifications, and monitoring strategies. While a study showed that health checks were not associated with reduced mortality, it is found to be associated with risk factor control, preventive service uptake, and improved patient-reported outcomes.[25]

The Local Government Code of 1991 mandates that LGUs ensure the provision of basic health services, which includes the presence of doctors in RHUs to cater to the healthcare needs of their constituents.[22] With this, there should be a physician in the municipality that could cater to the NCD patients. However, this is not reflected in the results of the study, as there are still households who do not seek outpatient care, which could be due to accessibility, e.g., geographic barriers, inconvenient clinic hours, that households sometimes could not avail themselves of outpatient care services.

Findings of the study revealed that, 58 out of 200 households availed inpatient care services, 166 households utilized medical laboratory services, and 85 out of 200 households accessed diagnostic imaging and other related services. These services are mostly covered by PhilHealth packages, providing some financial relief to the households. However, in reality, households often still incur OOP expenses for these services. These additional costs can be attributed to several factors, including the unavailability of specific services within local health facilities, the need for transportation to more distant healthcare providers, and the coverage gaps in PhilHealth packages that do not fully subsidize all necessary treatments and procedures.[3] As a result, the financial burden on households can be substantial, impacting their overall economic stability and access to essential healthcare.

When not available in the RHUs or BHS, medicines are accessed privately through retail pharmacies. In addition, when there are barriers to access free healthcare services conveniently, individuals and households seek these services in private institutions, leading to more costs. In the study, a significant proportion (59.50%) of the households spends more than PhP 1,000.00 monthly for NCD medicines. This could be due to the presence of inadequacy of free medicines at the primary health care level or inaccessible medicines in the community. In addition, with the lack of presence of pharmacies in town, patients have no other choice but to visit other towns for their healthcare needs. Aside from the expenditures for NCD medicines, the median out-of-pocket expenditures of households for other medicines and health products is PhP 295.00; PhP 300.00 for outpatient care services; PhP 0.00 for inpatient care services; PhP 83.33 for medical laboratory services; and PhP 0.00 for diagnostic imaging and other services. If combined, the OOP cost for health per month of a single household would be at least PhP 1,678.33. This is already 13.95% of the monthly income of a household (for a family of five) who lives below the poverty threshold and whose per capita income cannot sufficiently meet the individual basic food and non-food needs. Likewise, this is also 20% of the monthly income of a household (for a family of five) whose income is not enough to meet even just the basic food needs.[26]

Based on the analysis, the odds of experiencing CHE at the 10% threshold is significantly lower for households with one member with NCD (OR=0.316), while households with two members show significantly higher odds (OR=2.365). Similarly, at 25% threshold, increasing likelihood of experiencing CHE is also evident for increased number of household members with NCDs wherein odds of CHE occurrence is nearly six times more for households with three members with NCDs (OR = 5.88) unlike households with only one household member with NCDs (OR = 0.39) whose odds are significantly lower. This finding is similar to the results of a systematic review, which highlighted that patients with multimorbidities, particularly NCDs, face higher OOP expenses for medicines.[27] Other determinants of OOP for health were systematically reviewed by another study and it showed that the main determinants of OOP health expenditure includes age, gender, place of living, education and income level, household size, and presence of comorbidities. Other determinants were marital status, insurance status, payments for medical supplies and pharmaceuticals, and distance to health facilities.[28] In addition, another systematic review showed that household sociodemographic characteristics, household location, and health insurance all influenced OOP payment of health care costs in low- and middle-income countries.[29] Based on the results of this study, the odds of incurring CHE at 10% threshold is 96% less likely to happen if the household head did not finish elementary school, which could be influenced by health-seeking behaviors, lifestyle, or other socio-economic and contextual factors.

Health Literacy

There is an observed low reporting of other medicines, which is attributed to the recall ability of respondents. While some are familiar with their drugs or have records of their prescriptions and/or medicine purchase receipts, others do not remember the names of their drugs and would simply state the indication or the appearance of their drug. Most respondents, even though they are the most knowledgeable

about the health status and expenditures of their households, trust the healthcare providers' instructions implicitly. This could be attributed to the varying levels of health literacy among respondents.

This finding shows the importance of healthcare professionals' patient education during prescribing and dispensing so that the health literacy of patients is improved, ensuring they understand and remember their medications accurately. Effective patient education can help as previous studies have shown that health literacy interventions have positive effects on the health status, as well as self-efficacy of patients, and health literacy was positively associated with adherence to treatment.[30,31]

Catastrophic Health Expenditures

Households were found to out-of-pocketly spend largely on medicines and other healthcare services. As a result, the study showed that the majority of the households incurred catastrophic health expenditures, 76% and 33% for thresholds 10% and 25%, respectively. These results are higher than that of the regional data. However, since households covered by the Primary Care Benefit Package were excluded from the study, the estimates above cannot be generalized to the totality of the whole 4th class municipality. These results may also overestimate the true prevalence of catastrophic health spending in the community. Nevertheless, the results coincided with the data from the WHO, wherein there is an observed increasing trend of CHE in the Western Pacific region, with the latest data being 19.44% using the 10% threshold, and 5.26% using the 25% threshold in 2019.[32] Similarly, when compared to studies focusing on households with NCD, the findings of this study show a significantly higher percentage of CHE. Other studies also explored CHE in households with NCDs but found lower percentages compared to the findings of this study.[33,34]

Overall, the results of this study revealed a disparity between the occurrence of CHE at different thresholds, specifically 10% and 25%, with a 40% difference in CHE incidence. This substantial variation may be attributed to the sample size used in the study, as it exceeds the data from the WHO, which shows a variation of 12% or less in catastrophic OOP health spending across all WHO regions. Additionally, there is limited data on the usage of these two thresholds in studies on CHE of households, as most research typically uses the 40% threshold. This indicates a lack of CHE studies utilizing the thresholds from SDG 3.8.2. However, one study utilized the 10% and 40% thresholds, finding CHE incidences of 16.50% and 8.70%, respectively[35]. Although this study employed a larger second threshold, it reported a smaller variation in CHE incidence between the two thresholds. This highlights the need to conduct more CHE and impoverishment studies within the country to generate data that is directly applicable to the local context. Such research would provide a clearer understanding of the financial burden of healthcare on households and inform policy decisions aimed at reducing this burden.

Medicines and CHE

The study reveals that medicines are the largest contributor to catastrophic expenditures for households, with a median of 59.41% for NCD medicines and a median of 77.57% for total medicine expenditures. This aligns with discussions in a one study, where it was identified that almost half of the OOP spending (49.7%) goes to pharmaceutical products, followed by professional services (34.5%), and hospital services (15.8%).[36]

The implementation of Section 109-AA of Republic Act 10693, known as the "Tax Reform for Acceleration and Inclusion Law," in 2019, aimed to lower the prices of NCD drugs by exempting certain prescribed medicines from the 12% value-added tax (VAT). Specifically, this exemption applies to medicines for diabetes, hypercholesterolemia, and hypertension that are listed in the formulary approved by the Food and Drug Administration (FDA) of the Philippines. While this legislative measure has helped reduce drug prices to some extent, access to these medicines for Filipinos remains suboptimal.[24]

Low availability of NCD medicines in the public sector which hinders medicine access in primary care settings may be attributed to issues in the Philippines' decentralized procurement system and chronic underfunding for medicines.[37] Potential problems may easily arise from the mismanagement of medicines as poor decisions and actions related to processes, such as the selection, procurement, distribution, and appropriate use of drug products, as well as inadequate allocation of limited budget for medicines can hinder access to and appropriate use of safe and affordable pharmaceuticals.[38] These systemic issues, which often contribute to the frequent stock shortages of medicines in public health facilities, may force patients to buy their medicines from private sector outlets like pharmacies, thereby increasing their OOP expenses.[24]

Coping Strategies to Access Healthcare

Experiencing illness in low and middle-income countries (LMICs) can incur very high OOP payments for healthcare and this is particularly relevant in cases of chronic illnesses that require consistent, long-term OOP payments.[15] Specifically in the Philippines, the majority share of medical expenses is still primarily paid out-of-pocket by households despite having a national health insurance program.[4] Not all households are able to pay large sums from current income or savings to pay healthcare bills, and so must resort to most commonly used alternative strategies, often borrowing money or selling assets that allow households to outright pay for care for short periods.[15] In the study, a range of alternative strategies were adopted by households to cope with medicine costs and other health services. Like similar studies, the most prevalent strategy used by households in Ternate, Cavite to increase their budget for healthcare is to borrow money. This is followed by reliance on the use of existing funds or savings to cover for medical costs. Some households also chose to

take on extra work while there are a few who engage in selling and pawning of assets. Besides these methods, other similar strategies revealed by respondents were to ask extra money from close relatives, apply for medical assistance from the government, ask financial assistance from politicians, join cooperative savings or "paluwagan", and others engage in illegal gambling.

Likewise, coping by reducing total household expenses and consumption were also explored in the study. Amongst them, seeking alternative treatment or cheaper treatment for illness was most common where households opt to buy less expensive, alternative treatment or generic medicines to reduce costs. A few of the households also reduce spending on necessities such as food while some delay or even stop seeking medical treatment. Although uncommon, there were households that had to resort to withdrawing children from school and sending them to work to alleviate financial burdens. Additionally, it has been determined that some households result in asking for medicines they need from relatives or neighbors.

These most commonly used strategies were also described in a study in Bangladesh showing that in a lower-middle income country, even a small amount of health care spending can push poor households to CHE, for which they finance by borrowing, selling assets, or seeking assistance from friends or family.[39] A review looked into financial risk protection in LMICs has identified common coping strategies for out-of-pocket healthcare costs from 26 studies which include borrowing/loans (100.0%), sale of assets (88.5%), contributions from family and friends (26.9%), and use of savings (26.9%).[40] It was also discussed that when households that use their income to meet OOP expenses are not financially protected due to catastrophic or impoverishing effects of costs, they also forgo the consumption of other (welfare-augmenting) necessities. Similarly, a systematic review of studies conducted in low and middle-income countries describing at least one coping strategy for chronic illness OOP payments, determined coping strategies proven to cause long term detrimental effects. Amongst those mentioned were taking children out of school or sending them to work, reducing expenditure on food, education or social activities, and taking on extra work.[15] Coping strategies with more immediate potential impacts on health were also identified and these include seeking alternative treatment, seeking cheaper treatment, and delaying treatment or stopping treatment altogether.[15] One study was able to further investigate how health financing occurs in the Philippines and similar coping strategies were identified.[41] The employed practices include borrowing money from relatives, loaning money from the workplace and informal money lenders, pawning assets, seeking alternative treatments, self-medication, and soliciting financial assistance from politicians, government agencies or non-government agencies. Patients were able to seek help from agencies like the Philippine Charity Sweepstakes Office (PCSO), the Department of Social Welfare and Development (DSWD), and the Philippine Amusement and Gaming Corporation (PAGCOR). This kind of financial assistance has become more accessible after the implementation of Republic Act no. 11463 known as the Malasakit Center Act which institutionalized Malasakit centers in public hospitals to serve as a one-stop-shop which accepts applications for financial assistance and directs people to various government agencies such as PhilHealth, PCSO, and the DSWD all at once so that Filipinos can access financial and medical assistance.[42,43]

Seeking alternative treatments, like generic or herbal medicines, as the most common coping strategy to reduce household expenses can be attributed to the implementation of the Generics Act of 1988, also known as the Republic Act (RA) 6675 which has promoted and helped ensure a sufficient supply of medicines in the country at the lowest possible cost. It has since prevented the limitation of consumer choice on the type of medicine, whether branded or generic, one could purchase so that people can choose to substitute branded and more expensive medicines with cheaper generic equivalents. As the ultimate endpoint, the use of generic drugs results in reduction of drug costs, increased access to drug use, as well as, the prevention of drug shortages.[44] Besides generic medicines, herbal medicines are also alternative treatments used by some households. Herbal medicine is part of the Philippine primary health care system and medicinal plants are widely used for their affordability and wide availability, especially in rural, geographically isolated, and disadvantaged areas.[45,46]

National Strategies to Reduce Catastrophic Health Expenditures

The country has already initiated national policies aimed at improving medicine access to healthcare and reducing financial burden of medical costs. This includes Universal Healthcare Law which provides comprehensive health care services and ensures financial risk protection through expansion of the National Health Insurance Program (NHIP), and the Local Government Code of 1991 which promotes medicine availability in RHU and BHS of LGUs likewise initiate health programs/services that target community needs. Other implemented laws and health sector reforms targeting high medicine costs and OOP expenditure include Republic Act No.9502 known as the Universally Accessible Cheaper and Quality Medicines Act that enables government monitoring and regulation of select drug retail prices with Executive Order No. 155, s. 2021 imposing maximum retail price and maximum wholesale price on drug molecules and formulas of selected medicines targeting leading causes of morbidity in Filipinos.[47] Republic Act No. 10606 or The National Health Insurance Act of 2013 which established a compulsory National Health Insurance Program has also helped the shift to full national subsidy of the indigent sector.[48] UHC was integrated into the NHIP through PhilHealth to improve access to quality healthcare and medicines while reducing OOP expenses.[49] PhilHealth coverage was associated with decreased occurrence of financial catastrophe

specially in patients availing inpatient care services.[50] With the devolution of primary and secondary health services to LGUs, provision of healthcare services have also been more direct and efficient which also helped PhilHealth achieve high insurance coverage rates throughout provinces.[36] Since PhilHealth began financing a range of outpatient services, it has successfully increased access to primary health care services and medicines through various packages and ensured quality of healthcare through its accreditation system. PhilHealth Konsulta as subjected in PhilHealth Circular No. 2020-0002 has integrated the existing Primary Care Benefit (PCB) and Expanded Primary Care Benefit (EPCB) packages that shall be made available to all Filipinos which improved access to individual-based health services such as but not limited to initial and follow up consultations, health screening and assessment, diagnostic services, and medicines. Through PhilHealth Konsulta, Filipinos are ensured financial access to a primary care provider that delivers basic essential services at every life stage for the promotion and maintenance of health.[51] These services are provided through both private and public providers certified by the DOH and accredited by PhilHealth.[52] However, since health care service providers are required to meet certain DOH criteria and other PhilHealth requirements, Philhealth services may be underutilized as there are LGUs who can't comply with PhilHealth requirements to establish the necessary capitation trust fund (ensuring that the money would go exclusively to its health facilities), to formally enroll all poor households with an RHU and to document services rendered as well as the eligibility status of patients.[36] There are also encountered problems during the reimbursement process, where a study of Querri et al. on challenges faced by Philhealth for universal health coverage, has found that for some health centers, reimbursements were not being paid despite claims being filed, and other health centers have simply given up claiming for reimbursements despite provision of health services. Both underutilization and reimbursement issues have direct consequences on the quality and access to healthcare as these ultimately hinders continuous supply of medications and provision of medical services.[52]

Given the high prevalence of CHE determined for households in the study, there is still a need to strengthen these existing laws and programs, and continuously assess to improve policy implementation to help further reduce the health expenditures of households particularly on medicines.

Strengths and Limitations of the Study

This study, conducted in the municipality of Ternate, had several strengths. One notable strength is that it assessed expenditures on medicines for NCDs. Additionally, it examined the CHE of households in a low-income municipality, an area lacking sufficient data in the country. Furthermore, the study identified the healthcare needs of households with members suffering from NCDs, rather than merely focusing on the expenditures incurred.

However, the study had some limitations, primarily due to its cross-sectional design. This design meant that the researchers observed the population at a single point in time without conducting follow-ups or collecting retrospective data. As a result, the study could only gather information on expenditures on medicines, healthcare needs, and other household expenses at the time of data collection, which might vary at different times. Additionally, the study was susceptible to recall bias, as some respondents did not present their prescriptions or purchase receipts, relying solely on memory. Such bias can undermine the reliability of the results, making the findings potentially less dependable. Thus, the study heavily relied on the accuracy and honesty of the participants' recollection of events. Furthermore, possible sampling bias may have occurred due to the exclusion of households with no present members during the time of collection.

Lastly, the study was conducted in only one municipality in the Philippines and limited surveyed households to those with members having NCDs and those not enrolled in free medicines programs such as PhilPEN and MAP, which limits its generalizability. The findings may not accurately reflect the situations of municipalities of different socioeconomic conditions, as variations in income levels can influence health behaviors and access to health care. Excluding households enrolled in free medicines programs also limits the findings to those relying entirely on OOP expenditures for healthcare, which limits insights regarding the impact of the policies on household expenditures.

CONCLUSION

There is a high prevalence of incurred CHE for non-communicable diseases in both the 10% threshold (74.00%) and 25% threshold (30.50%) in the 4th class municipality of Ternate, Cavite. However, since households covered by the Primary Care Benefit Package were excluded from the study, these estimates cannot be generalized and may overestimate the true prevalence of catastrophic health spending in the municipality. Medicine costs accounted for the highest share (77.57%) in household health spending where the cost increases by PhP 1,576.682 as the number of household members taking medicine for NCD increases ($p < 0.001$). Average costs or expenditures were identified regarding purchase of NCD medicines (PhP 2, 140.00), payment for inpatient care services provided in a hospital (PhP 5,012.75), as well as outpatient care services (PhP 569.26), and the use of additional health products (PhP 508.57), where in total, households may have spent an average of PhP 8,522.80 monthly for healthcare needs. In a low income setting, households incurring CHE struggle to afford OOP expenses for health with medicine prices accounting for a substantial share in health and household spending. This brings households in low-income municipalities like Ternate, Cavite to adopt alternative coping strategies that help increase total budget and reduce total household expenses with the most

common being borrowing of money (39.5%) and seeking alternative or cheaper treatment for their disease (61%). However, even with the ability to pay for short periods, these risks may still push households further into poverty due to potential longer-term economic consequences. With this, it has become vital to address issues surrounding the lack of access and availability of essential medicines for NCD particularly, and strengthening financial risk protection mechanisms like expansion for a more comprehensive insurance coverage that includes outpatient medicine costs in an outpatient setting to reduce costs.

Findings from this study provide insights for the LGU of Ternate, Cavite to develop evidence-based community health projects, programs, and activities aimed at addressing prevalent non-communicable diseases (i.e. hypertension, diabetes, and dyslipidemia). Furthermore, the LHB may also utilize the study's results in strengthening existing programs such as operationalizing a Botika ng Barangay and improving the RHU services, thereby increasing the affordability and accessibility of health services and medicines within the municipality.

For future researches that will execute or adopt similar topic related to this study, the following may be conducted for improvement: (1) Expand the scope of the study site or the target disease to ensure more generalizability of data; (2) Consider conducting follow-up visits during collection of data for households with no present member during the time of data collection to prevent sampling bias; (3) Study health-seeking behaviors and preferences among individuals with NCDs to understand how these behaviors influence healthcare costs and CHE outcomes; and (4) Assess the effectiveness of current health insurance schemes, subsidy programs, and other financial protection mechanisms available in LGUs in reducing CHE for NCDs.

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Statement of Authorship

All authors certified fulfillment of ICMJE authorship criteria.

Author Disclosure

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APPENDICES

Appendix A. Operational Definitions

For the purpose of this research, the following concepts have been operationalized as follows:

Alternative Coping Strategies to Adequately Procure Medicines and Other Healthcare Services refers to the alternative solutions of households done to increase household budget or reduce household expenses to allow for procurement of medicines and other healthcare services. In the quantitative questionnaire, the following specific and categorical variables were acquired:

- Alternative financial solutions for increasing finances
- Options include use of savings, borrowing money, selling of assets, pawning of personal assets like jewelry etc., and taking on extra work
- Alternative financial solutions for reducing household expenses
- Options include withdrawing or taking children out of school, sending children to work, reducing expenditure for food and other household needs, seeking alternative or cheaper treatment for illness, and delaying or stopping treatment for illness.

Catastrophic Health Expenditure is when the ratio between household expenditure on health and total household consumption expenditure or, when unavailable, income exceeds a threshold.[9] Two thresholds are used to define catastrophic household expenditure on health: a lower threshold of greater than 10% and a higher threshold of greater than 25% of total household expenditure or income. This study will make use of these two thresholds.

Health Expenditures refer to "any expenditure incurred at the time of service use to get any type of care (promotive, preventive, curative, rehabilitative, palliative or long-term care), including all medicines, vaccines and other pharmaceutical preparations, as well as all health products, from any type of provider and for all members of the household."[9] In this study, expenditures for health that will be gathered are expenditures over the past four weeks during the date of collection. To determine this, discrete variables will be collected and to obtain total health expenditures, the following expenditures will be gathered:

- Expenditures on medicine and health products
- Outpatient care services that do not require an overnight stay in a hospital
- Inpatient care services provided during an overnight stay in a hospital
- Medical laboratory services, diagnostic imaging services, and other services

Health Resources include health spending and health human resources. Health spending measures the consumption of health services and goods, while health human resources play a vital role in delivering health services.[20] In this study, health resources cover the following categories: medicine and health products, outpatient care services that do not require an overnight stay, inpatient care services provided during an overnight stay, medical laboratory services, and diagnostic imaging and other services.[53]

- **Medicines and health products** include medicines, vaccines, pharmaceutical preparations, medical devices, assistive products, and other health-related products used for the prevention, diagnosis and treatment of illnesses, diseases, injuries, and purchased by individuals or households, either with or without a prescription, usually from pharmacies, health facilities or medical/assistive equipment suppliers and from Internet reliable sources. They are intended for consumption or use outside a health facility or institution;
- **Outpatient care services** cover all preventive, dental, curative, rehabilitative and long-term care services not provided during an overnight stay. The admission criteria are irrelevant as well as the setting where the outpatient care occurs or the type of provider. As such outpatient care services may be delivered in a hospital setting or outside a hospital setting including at home or even on the street by any type of health care provider. Outpatient care services include all medicines and health products supplied directly by a health care provider for consumption or use outside a health facility/institution, if not separately identifiable from the service;
- **Inpatient care services** comprise curative, dental, and rehabilitative care that requires an overnight stay in a hospital. Inpatient curative care comprises health care contacts that require an overnight stay during which the principal intent is to relieve symptoms of illness or injury, to reduce the severity of an illness or injury, or to protect against exacerbation and/or complication of an illness and/or injury that could threaten life or normal function. Inpatient rehabilitation services that require an overnight stay aiming at achieving and maintaining optimal functioning;
- **Medical laboratory services** include all tests that are separately identifiable from outpatient preventive services (i.e., urine tests and blood tests); and
- **Diagnostic imaging and other services** include all diagnostic imaging methods (i.e., X-ray, Computed Tomography (CT) Scan, Magnetic Resonance Imaging (MRI), Sonography, and other services (e.g., Electrocardiogram) that are separately identifiable from outpatient preventive services.

Household Expenditure is generally "defined as the sum of the monetary values of all items consumed by the household on a domestic account during a common reference period", including expenditures on food, non-food non-durable goods, services that are consumed, and imputed values of goods and services that are procured for consumption (e.g., value use of durables and value use of owner-occupied housing).[9] In the study, household consumption will be collected, but if unavailable, disposable income may be collected instead. To determine this, discrete variables will be collected.

Household Income refers to disposable income, which is the total income minus direct taxes, compulsory fees, and fines.[9] In the study, consumption is the priority since it is less variable than income. Disposable income will be gathered to serve as an alternative denominator if the respondent cannot provide information regarding the consumption of their household. To determine this, discrete variables will be collected.

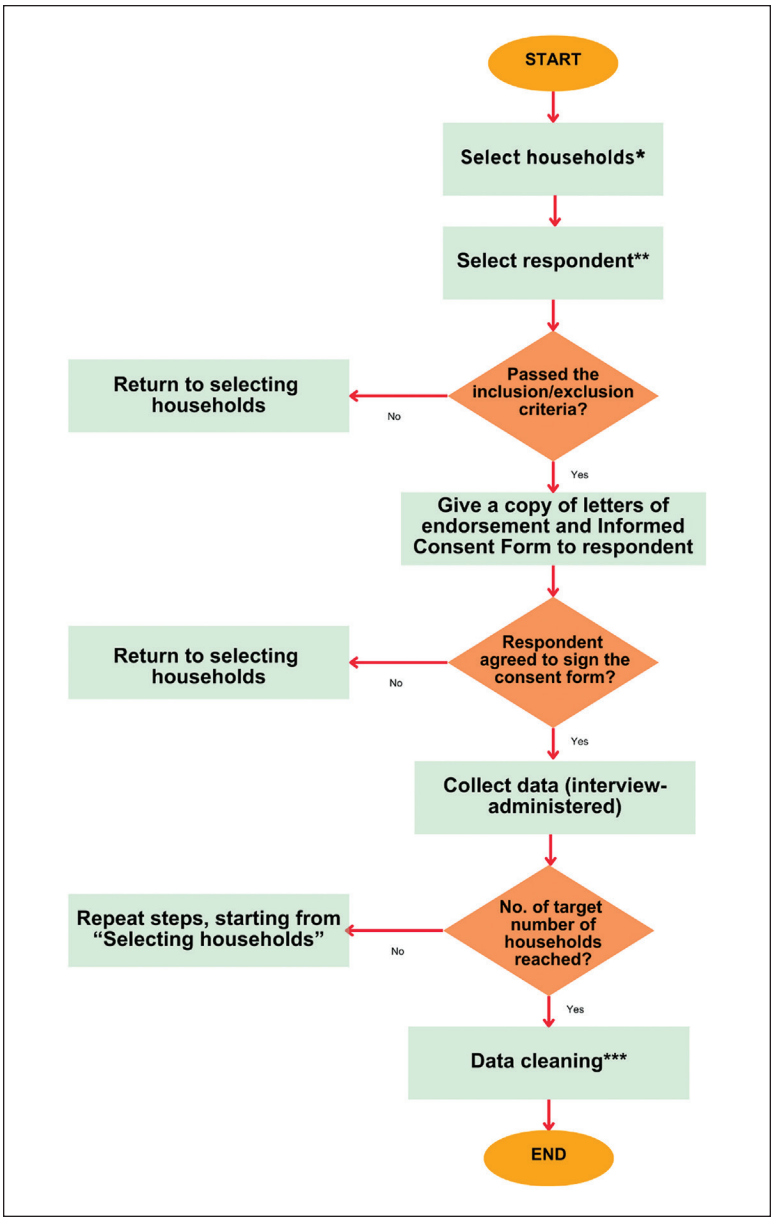
Household Characteristics refers to the characteristics that the household have that are relevant to the study. In this study, this includes sociodemographic factors of the household head and sociodemographic characteristics of the household. Using the quantitative questionnaire, data of each variable will be acquired in terms of percentage after getting their frequency per household. These are categorical and numerical variables that will be measured using a questionnaire in which the respondents will be asked to choose from. The following are the specific variables to be acquired for the study:

- Sociodemographic characteristics of household head
  - Age
  - Sex
  - Highest level of education
  - Employment status
  - Marital status
- Sociodemographic characteristics of the household
  - Family size
  - Number of children <18
  - Number of elderly household members
  - Number of household members with disability
  - Number of pregnant household members
  - Number of employed or working household members

Non-Communicable Disease, also known as chronic diseases, are medical conditions that are associated with long durations and slow progress. For this study, the only NCDs included are those belonging in the top 10 causes of morbidity and mortality in the Province of Cavite:[13]

- Hypertensive Diseases
  - Hypertension, also known as high or raised blood pressure, is a condition in which the blood vessels have persistently raised pressure (140/90 mmHg or higher). It is a serious medical condition and can increase the risk of heart, brain, kidney and other diseases.
- NCDs of the Urinary System
  - This includes presence of kidney stones, and Chronic Kidney Disease (CKD) which is characterized by the presence of kidney damage or an estimated glomerular filtration rate (eGFR) of less than 60 mL/min/1.73 m^2, persisting for three months or more.
- Diabetes Mellitus
  - Diabetes is a chronic, metabolic disease characterized by elevated levels of blood glucose (or blood sugar), which leads over time to serious damage to the heart, blood vessels, eyes, kidneys, and nerves. The most common is type 2 diabetes, also known as Diabetes Mellitus, which occurs when the body becomes resistant to insulin or doesn't make enough insulin.
- Ischaemic Heart Diseases
  - Ischemic heart disease, also called coronary heart disease (CHD) or coronary artery disease, is the term given to heart problems caused by narrowed heart (coronary) arteries that supply blood to the heart muscle.
- Other Forms of Heart Disease
  - This includes heart failure, arrhythmias, cardiomyopathy, valvular heart disease, congenital heart disease.
- Cerebrovascular Diseases
  - This includes Stroke or Cerebrovascular Accident (CVA), which is an acute compromise of the cerebral perfusion or vasculature, and Carotid Artery Disease, which occurs when fatty deposits, called plaques, clog the blood vessels that deliver blood to the brain and head.
- Metabolic Disorders
  - These are characterized by a constellation of metabolic abnormalities, including Hypercholesterolemia and Hypothyroidism. Diabetes is excluded and has a separate category.
- Malignant Neoplasms
  - Malignant neoplasm is a cancerous tumor, which can then invade adjoining parts of the body and spread to other organs; the latter process is referred to as metastasis. Widespread metastases are the primary cause of death from cancer.
- Chronic Lower Respiratory Diseases
  - This includes Asthma, which is the inflammation and narrowing of the small airways in the lungs causing symptoms such as cough, wheeze, shortness of breath and chest tightness, and Chronic Obstructive Pulmonary Disease (COPD), which is a common lung disease causing restricted airflow and breathing problems. It is sometimes called emphysema or chronic bronchitis.

OOP Medicine Expenditures for NCD refers to individuals' direct payments for medicines used for the management of NCDs. The costs paid out of pocket or from patients' own finances are the net total after any reimbursement that patients have received or expect to receive from their health insurance programs.[54] Using the quantitative questionnaire, data for this variable will be acquired as the total amount of expenditures for medicines specifically paid out-of-pocket for NCD drugs procured recently over a duration of four weeks.



Appendix B. Flow Diagram of Data Collection Process.

Notes:
**Starting point: barangay hall; use an online arrow spinner to determine which direction to go; Households should be every 3 houses*
***Refer to inclusion criteria; if the respondent is not present, ask for a scheduled appointment*
****For unclear answers, contact respondent within 5 days*