Medicine Supply Chain Management Practice by Health Extension Workers, in selected Primary Health Care Units in North Shewa Zone, Amhara Region, Ethiopia: A qualitative Study

Haregewoin Kassa (B Pharm)

Under the supervision of Dr. Bruck Messele

A Thesis Submitted to the Department of Pharmaceutics and Social Pharmacy, presented in Partial Fulfillment of the Requirements for the Degree of Master of Science in Pharmacoepidemiology and Social Pharmacy

Addis Ababa University

Addis Ababa, Ethiopia

April 2019

Addis Ababa University

School of Graduate Studies

This is to certify that the thesis prepared by Haregewoin Kassa, entitled: Medicine supply chain management practice by HEWs, in selected primary health care units in North Shewa zone and submitted in partial fulfillment of the requirements for the degree of Master of Science in Pharmacoepidemiology and Social Pharmacy, compiles with the regulations of the university and meets the accepted standards of originality and quality.

Signed by examining committee:

Examiner: Dr. Mesfin Kahissay **Signature_____Date_____**

Examiner: G/Medhen Beedemariam (MSc.) **Signature_____ Date_____**

Advisor : Dr.Bruck Messele **Signature_____Date_____**

_____

Chairman of the Department

Acknowledgment

I would like to forward my deepest gratitude to my advisors Dr. Bruck Messele for his unreserved guidance and support throughout the study. I am also very much grateful to Mr. Zelalem Tilahun (MSc), Dawit Teshome (MSc) and Gashaw Shegaw (MSc) for their constructive comments from the beginning to the end.

And I would like to acknowledge North Shewa Zone and Basona Worena Health offices for the provision of information and support. I am also indebted the HEWs and Pharmacy professionals of the HC as well as community members who participated in the study for taking their time and share their experiences. Finally, my deepest gratitude goes to Association of African Universities (AAU) for providing financial support for the study.

Abstract

Introduction: Health Extension Workers (HEWs) play key roles in the health care system of Ethiopia. They do health promotion, prevention and curative activities as well as manage a number of items including medicines at the community and health post level in which access to health care is limited. Even though HEWs manage various medicines, they come across challenges when they order, receive, store and distribute medicines to the community. The extent of challenges they face may vary from region to region and from time to time. However, in Ethiopia few studies have conducted on supply chain management of medicines by HEWs and challenges faced.

Method: A qualitative study design was used. In depth interview of HEWs, key informant interviews with pharmacy professionals, two focus group discussions among female community members and observation were carried out. The data was coded and analyzed thematically, based on objectives.

Result: HEWs receive a list of drugs from the cluster health center by calculating for a month or two months. And they put medicines on the shelf and cartons without being well arranged. Based on Integrated community case management booklet, HEWs treat patients who are under 5 of age and give medicines for the disease that defines. If it is out of their scope they refer them to the HC. HEWs in North Shewa are dissatisfied with their job because of their salary scale, lack of incentives, unable to upgrade their career. They also feel that they are not as beneficiary as other health workers in terms of other job opportunities. They are also overloaded by nonprofessional activities. The overall HEWs training focuses on family planning whereas medicine management practice training is minimal.

Conclusion: HEWs are front line health workers in the rural community. From this study they receive, store and distribute or dispense medicines to consumers not in line with the recommended guidelines. This is due to lack of adequate training, transport, overload with other tasks, and resources limitation including medicines. So the woreda or zonal health offices need to intervene by giving regular and detail medicine supply chain training and in turn improving HEWs supply chain of medicine management practices.

Keywords: *Medicine, Medicine supply chain management, Health Extension Workers*

Table of Contents

List of Tables

List of Annexes

Acronyms

AIDS	Acquired Immune Deficiency Syndrome
AMREF	African Medical Research Foundation
ANC	Anti Natal Care
ARHB	Amhara Regional Health Bureau
BCG	Bacille Calmette Guerin
BoFED	Bureau of Finance & Economic Development
BWDHO	Basona Worana District Health Office
CCM	Community Case Management
CHW	Community Health Worker
DOT	Directly Observable Treatment
DT	Dispersible Tablet
FGD	Focus Group Discussion
FDRE	Federal Democratic Republic of Ethiopia
FMHACA	Food, Medicine and Healthcare Administration and Control Authority
FMOH	Federal Minister of Health
HC	Health Center
HEP	Health Extension Program
HEW	Health Extension Worker
HF	Health Facilities
HMIS	Health management Information System
HO	Health Office
HP	Health Post
HPMRR	Health Post Monthly Report and Resupply form
ICCM	Integrated Community Case Management
IMCI	Integrated Management of Childhood Illnesses
IPLS	Integrated Pharmaceutical Logistic System
IPV	Inactivated Polio Vaccine
LHW	Lady Health Worker
MDGs	Millennium Development Goals
MOH	Minister Of Health

MSH	Medicine Science for Health
OPV	Oral Polio Vaccine
ORS	Oral Rehydration Salt
PCV	Pneumococcal Conjugate Vaccine
PFSA	Pharmaceutical Fund and Supply Agency
PHCWs	Primary Health Care Workers
PHCU	Primary Health Care Unit
PIH	Partners In Heath
RDT	Randomized Diagnostic Test
SPSS	Statistical Package for Social Sciences
TT	Tetanus Toxoid
UNICEF	United Nations Children's Fund
USAID	United States Agency International Development
VVM	Vaccine Vital Monitor
WHO	World Health Organization

1. Introduction

1.1. Background of the study

Health systems in Sub-Saharan African countries often suffer from weak infrastructure, lack of human resources, and poor supply chain management systems. Access to health services is low particularly in rural areas, where the majority of the population still lives (Kedir et al., 2011). The contribution of community health workers (CHWs) in filing this gap is very critical. The 1978 Declaration of Alma-Ata described CHWs as a major vehicle for the advancement of primary health care in areas with limited resources (WHO, 1978).

They are major actors in promoting healthy behaviors and extending the reach of health systems in low and middle income countries (Kane et al., 2016). They are men and women who work to improve the health outcomes and general well-being of their fellow community members in the world (PIH, 2011).

According to World Health Organization (WHO), CHWs embraces a variety of community health aides selected, trained and working in the communities from which they come (WHO, 2007). WHO has promoted the wider use of CHWs like to provide select clinical interventions and to promote healthy behaviors at the community level, since the 1978 Declaration of Alma-Ata (USAID, 2010).

And over 38,000 Health Extension Workers (HEWs) have been deployed to over 15,000 health posts. HEWS are the one who brings basic health services to the doorstep of Ethiopia's large,

rural population, facilitating closer contact between health workers and communities and most importantly mobilizing communities to change behaviors(UNICEF,2014).

Their major task is educating communities and households to deal with preventable disease and use nearby clinics and hospitals. In addition to promoting family health education and sanitation, they also supervise intake of community Directly Observable Treatment short course (DOTs) for TB and antiretroviral treatment for HIV/AIDS; conduct rapid diagnostic test for malaria and administer malaria drugs; attend uncomplicated childbirth and collect vital statistics (Banteyerga and Kidanu ,2011).

They also provide services at the health post including immunization, growth monitoring, Anti Natal Care (ANC), delivery, family planning, and referral to health centers (Kussia,2009). Among the services given by HEWs preventive and curative services are largely dependent up on the provision of essential medicines, to prevent infection, reduce pain, and treat illness for mothers and under 5 children.

The type of essential drug that needs to be available at Health Posts are Amoxicillin dispersible tablet, Oral Rehydration Salts, Zinc dispersible tablet, Gentamycin Sulphate injection, Medroxyprogesterone Injection, Arthmeter+Lumfanthrine (Coartem) tablet (any packing) ,Ferrous Sulphate + folic acid, Implanon and Plumpynut(FMOH,2017).

To carry out their tasks effectively, CHWs need a regular replenishment of supplies, medicines, and equipment. When the supply of needed materials is disrupted not only will productivity decrease but there may be other equally detrimental consequences, such as losing the respect of the community without which a CHW can rarely be productive, in Pakistan (Jaskiewicz and Tulenko,2012). The HEW who works as CHWs in Ethiopia manage medicines at the health post based on the minimum standards for HP. The standard explains about premises and how shelves and resources could be arranged in the HP. Medicines should be arranged in dry, clean and well ventilated places/shelves. The HP should have enough rooms for the provision of every service. And also the HEWs should store and dispense medicines to consumers with provision of adequate information (FMOH, 2011).

This paper will assess HEWs' medicine supply chain management practice and associated challenges by comparing with the national standards of HPs.

1.2. Statement of the Problem

More than half of all medicines are inappropriately prescribed, dispensed or sold. Such practices deemed to be more prevalent in healthcare settings in the developing world where mechanisms for routine monitoring of medicines use are still not strong (Ofori et al., 2016).

One of the reasons for having high rate of inappropriately prescribed, dispensed or sold medicines in developing countries is shortage of adequately trained human resource (Ofori et al., 2016). For instance, HEWs in Ethiopia are trained for one year but they are making invaluable contribution to the rural communities. Although the range of cases they handle are relatively limited, getting regular supply of the essential medicines and supplies needed to effectively discharge their responsibilities is a problem. They are expected to do more without adequately being equipped with necessary knowledge, skills, supplies and equipment (Jaskiewicz and Tulenk, 2012).

So medicines should be available and stored appropriately. If storage don't follow the required recommendations, the drug stability can be affected which in turn leads to ineffective drug therapy (Wondimu et al., 2015).

Several studies have conducted on health extension workers in Ethiopia. For example, Medhanyie et al. (2012), assess knowledge and performance of the Ethiopian HEWs on antenatal and delivery care. Similarly, Tezera et al., (2017) assessed knowledge, attitude, and practice (KAP) of HEWs in prescribing anti-malarial in Benishangul Gumuz region. The study conducted in Central Ethiopia indicated that there is a knowledge and practice gap of HEWs on storing of vaccines (Rogie, 2012). And Shuke (2014) conducted a study to assess knowledge and practice of HEWs in medicine handling practice in southern Ethiopia. All these studies give little attention to HEWs' medicine supply chain management practice.

Therefore, this study aimed to fill the gaps in information on the HEWs' medicine supply chain management practice in selected primary health care units in North Shewa Zone.

2. Literature Review

This chapter discusses on the literature review conducted on HEP in Ethiopia, the role of HEWs' in Medicine management, and challenges of HEWs while they manage medicines.

2.1. Health Extension Program in Ethiopia

The Health extension program is an innovative community based Program started in 2003. The aim of the program is to increase public access to basic health services, mainly by producing model households. These are households which attend at least 75% of the training given by health extension workers and implement at least 75% of the Health Extension Program packages (Yitayal *et al*., 2014).

In addition, HEP in Ethiopia helps to minimize the problem of medicine inaccessibility and human resource constraints in rural settings since it is based up on active community involvement in interventions, and focuses mainly on promotive, preventive and some curative health care that encompasses 80% of the health problems in the country (Kussia,2009). The program also facilitates closer contact between health workers and communities by mobilizing communities to change behaviors (UNICEF, 2014).

There are about 34,000 HEWs in Ethiopia, each of which is a full-time, salaried employee of the public sector (UNICEF, 2014). Once deployed to their respective communities, HEWs divide their time between providing services at health posts and undertaking community promotion programs at household level. At health posts, HEWs spend a certain percentage of their time (25 percent at the initial stage of the program and 50 percent currently) providing services that include immunizations, injectable contraception, and limited basic curative services such as provision of anti-malaria treatment, first aid, and management of diarrheal diseases and intestinal parasites (Huihui *et al.*,2016).

The program encourages families to be responsible for their own health by promoting knowledge dissemination and adoption of hygiene practice, feeding practice, appropriate health seeking

behavior from professionals and proper environmental management. This community outreach ensures a sense of ownership and sustainable changes in communities (Huihui *et al.*, 2016).

The speedy and good quality implementation has benefitted from government leadership, coordinated implementation support by the development partners, skilled base training and clinical mentoring, enhanced supervision and improved supply and logistics system to avoid stock outs of essential drugs and commodities (Admasu, 2014).

2.2. The role of Health Extension Workers in medicine management

Health extension workers have two important aspects in medicine provision.On the one hand, the goal of making essential medicines available at the lowest feasible cost to the population at the peripheral level. On the other hand, their involvement in medicine provision may result in strengthening their position in the community (WHO, 1995).

Medicines are unique commodities that can bring great benefits to an individual's health status. However, they can also result in individual and wider community (regional and global) adverse outcomes if they are poorly manufactured, prescribed, distributed, stored or used as compared with globally established standards for preserving safety, quality and efficacy (Joshua *et al.*, 2015).

A study conducted in Tigry region, Ethiopia indicated that if household storage of medicines don't follow the required recommendations, the medicine stability can be affected which in turn leads to ineffective drug therapy (Wondimu *et al.*, 2015).

The HEWs provide medicines to families and rely on the family to administer the doses. Depending on the program, the HEWs may also monitor compliance with treatment; counsel care-givers or families about drug administration; promote and provide insecticide-treated mosquito nets; provide intermittent malaria treatment for pregnant woman and distribute contraceptives ((Huihui *et al.*,2016).

Moreover, HEWs activities include providing such treatments as antipyretics, vitamins, ointments, anthelminthic, demonstrating the preparation and administration of ORS (UNICEF, 2006). Demonstrating how to feed children, providing basic counseling services, Management of

childhood, referral of patients, keeping health records, community surveys, peer education are also the activities of HEWs (AMREF, 2007).

Such community-level programs can be particularly effective for addressing the most common causes of pediatric mortality and morbidity, such as pneumonia, diarrhea, under nutrition, malaria, human immunodeficiency virus (HIV)infection or acquired immunodeficiency (UNICEF, 2006).

Having the knowledge of effective medicine management practice is the necessary element for the provision of such services.

2.3. Challenges of Health Extension Workers in managing medicine supply

2.3.1. Knowledge and training barriers

HEWs are widely used to provide care for a broad range of health issues. However, there is insufficient evidence about the effectiveness of their work in implementing comprehensive primary health care (Medhanyie *et al.*, 2012). The primary activity of HEW is educating a community about health. However, the community was hesitant to accept the HEWs' activities. They even used to unleash dogs at HEW's during house to house promotion service to show their disapproval. This is because they were expecting to get curative services, even though this attitude is changing (Banteyerga and Kidanu, 2008).

On top of the above mentioned, HEW have faced various institutional problems. For example, the effectiveness of the Rwanda CHWs system was hampered by an irregular system of supervision and trainings. At the individual CHW level, there were varying degrees of capacity noted, and many CHWs did not have an educational background in health prior to delivery of health services (Condo *et al.*, 2014). Similarly, the study conducted in Assosa zone of Benishangul Gumuz, in North Western Ethiopia indicated that the wider accessibility to antimalarial drugs needs to be balanced with appropriate use in order to minimize the problem of resistance and treatment failure by HEWs (Nahom, 2017).

For a correct diagnosis to be made a prescriber must have adequate knowledge. A study conducted on knowledge, attitude and skills of lady health workers (LHWs) in Pakistan showed

that 36% of the study participants had insufficient knowledge especially with regards to doses of common medicines, which is 18% as compared to other packages (Mohammad *et al.*, 2006).

Similarly a study conducted in Southern Ethiopia, Sidama Zone showed that there is a knowledge gap. Only 3.6% and 52.7% of HEWs reported correct doses of Amoxicillin and Cotrimoxazole, respectively. Among a total of 356 prescriptions, 14% were not consistent with recommended guidelines (Shuke, 2014).

CHWs competence, as defined by the knowledge and skills acquired through training as well as monitoring and follow-up through supportive supervision. Community perception of CHWs knowledge, skills, and overall ability to help them with their health needs is important for inspiring their respect and acceptance of CHW services (Jaskiewicz W and Tulenk K, 2012).

2.3.2. Resource limitation

Creating adequate working conditions are important in terms of enhancing effectiveness and efficiency at work, boosting morale of the workforce, reducing turnover and attrition (Teklehaimanot *et al.,* 2007).

The premises of the health post (HP) should be suitable for the management of medicines like: having adequate space for ventilation, appropriate shelf with standard position. The study conducted in Amhara region revealed that adequate space and shelf for drug store at the HP were found about 64% and 61% respectively. Also 28% of the HP has stock cards to monitor the status of drug stock outs and 22% have a well-documented written inventory and 55.6% of them use IPLS (Raifman *et al.*, 2013)

In Kalabo District, Zambia one of the most important factors behind the dysfunction of the CHWs Program was the shortage of medicines (Jaskiewicz and Tulenko, 2012). Supply chain bottlenecks that prevent community health workers from accessing essential medicines significantly increase under 5 child mortality, particularly in poor and rural areas (Chandani *et al*., 2016).

In addition a study conducted in Ethiopia, Malawi, Rwanda showed product availability to be weak in each country, with more than half of CHWs stocked out of at least one tracer product of

antibiotics for pneumonia, oral rehydration solution, and ready to use therapeutic food, zinc, and artemether/lumefantrine (Chandani *et al*., 2012).

The HEWs adequately comply with malaria treatment guidelines during diagnosis of malaria, as well as during the prescribing and dispensing of antimalarial drugs. However, there are some factors influencing the performance of HEWs. These are: shortage of diagnostic kit/RDT, shortage of antimalarial drugs, patient pressure to obtain coartem, work load, and community beliefs with regard to antimalarial medicine effectiveness, Southern Ethiopia Wolyta Zone (Daka, 2013).

Similarly, a study conducted in Amhara region, Ethiopia indicated that there is chronic shortage of maternal medicines. Among the listed items Gentamycin injection were not available (0%), Folic acid (2.8%), ferrous Sulfate (13.9%), tetracycline(16.7%) and vitamin A(86%) (Raifman *et al.,* 2013).

And also a study conducted in Brazil showed that CHWs faced a problem of integrating with the primary care team, inability to follow up on identified health needs due to limited resources as well as community members' lack of understanding of their work and undervaluing of preventive medicine (Grossman *et al.*, 2017).

In addition to this there is transportation problem when CHWs move from place to place. With regard to the work of CHWs in rural areas, one of the main challenges is accessing households, which are generally located in remote places and sometimes are almost inaccessible (Baptistini and Figueiredo, 2014).

Generally, HEWs are front line workers for rural communities in primary health care system. They have different activities to perform, like receiving, storing and distributing or dispensing medicines, vaccines and supplements to the one who need it. And they come across with various challenges that affect the proper medicine management practices at the health post, such as: lack of knowledge and training, lack of resources including medicines and being overloaded by other packages.

3. Objectives

3.1. General Objective

- To assess health extension workers' medicine supply chain management practice and associated challenges in selected primary health care units in North Shewa Zone.

3.2. Specific objectives

- To explore health extension workers' medicine storage practice at the health post.
- To assess health extension workers' medicine dispensing practice.
- To explore challenges of health extension worker's in medicine management.

4. Methods

4.1 Study area

North Shewa Zone is one of the 10 Zones in the Amhara Region of Ethiopia. The zone has 24 districts of which 3 are urban and 21 are rural districts. According to BoFED (2011) the zone has a total population 2,263,097. North Shewa Zone has 4 hospitals, 90 health centers and 408 heath posts. Basona Worena is one of the woredas, which has a population of 138,340 and 5 health centers, 31 health posts and 65 Health Extension Workers (BWDHO, 2009).

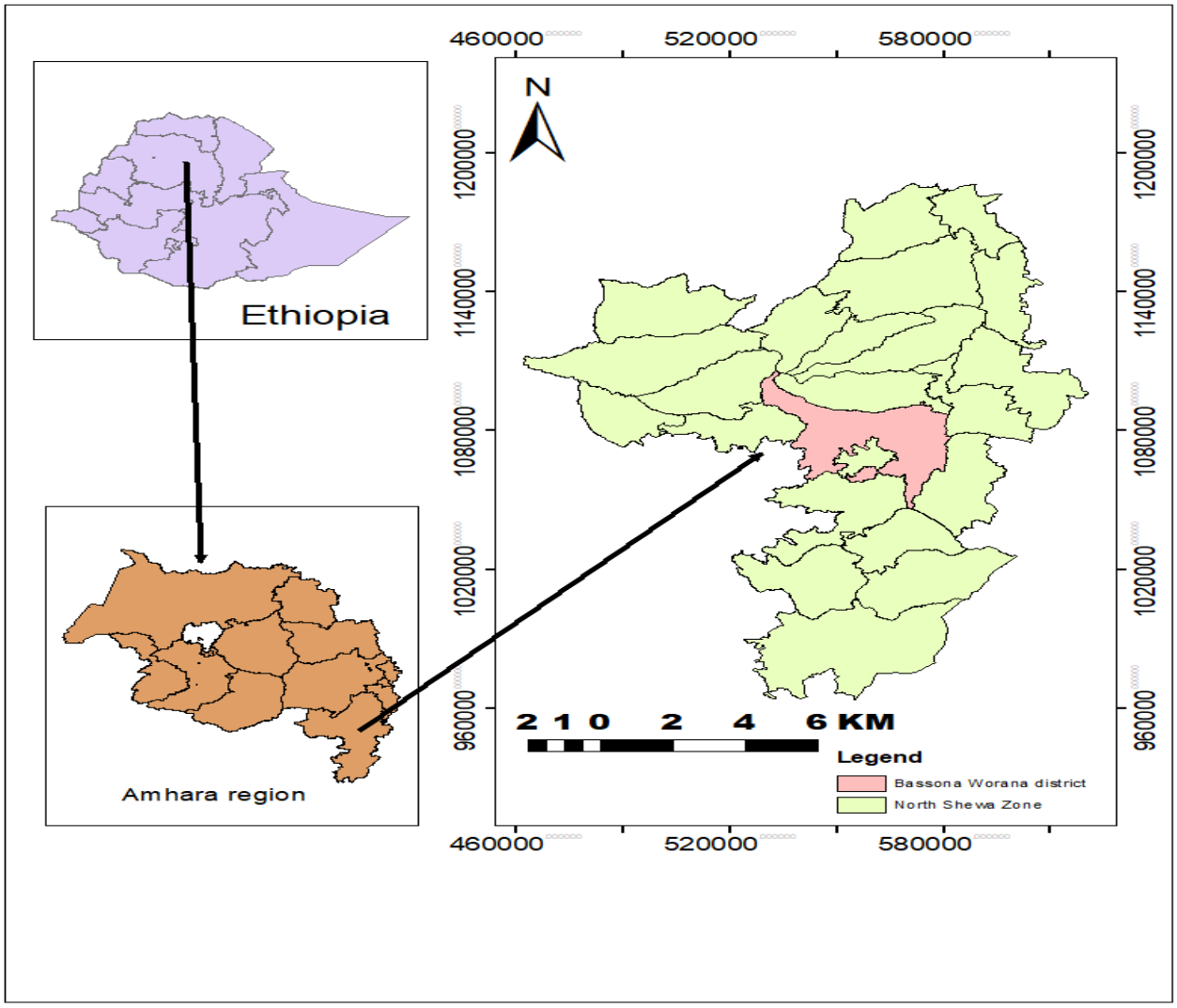

Figure I - Map of the study area

4.2. Study design

A qualitative study using in-depth and key informant individual interview, focus group discussion (FGD) and observation was conducted from June 1 to August 10, 2018 at the selected health posts of North Shewa Zone.

4.3. Sampling and recruitment

First the Amhara region and North Shewa Zone were selected because of the convenience to the principal investigator in terms of transport accessibility, financial constraint and language. In addition; the zone is one of the populous zones in Amhara regional states. Basona Worena woreda was selected randomly by lottery method. Then two Primary Health Care Units (PHCU) including all HPs were selected purposively based on their performance (high and low) on the previous year medicine management practice evaluation report of the Woreda's Health office (BWHO,2009) of which five of them are high and five of them are low performing health post. All HEWs working in the health posts of the selected PHCU and fulfill the inclusion criteria were included as study participants. The criteria for inclusion in the study were having worked for at least a year, being available at the time of the study period and giving informed consent. In addition, two pharmacy professionals from the health center who were supporting and supervising HEWs at the health post were involved as study participants. And to triangulate the information gained from the interview, community members who are users of the primary healthcare services were selected for FGD. Two groups of woman respondents were used because HEWs primarily gives service for women and under 5 children. The woman was selected because they frequently visited HP and are expected to explain more on medicine storage practices. In addition, all health posts in the selected PHCU were observed to check medicine management practice of Health Extension Workers.

4.4. Data collection tools and management

In-depth interviews data collection technique using open-ended questions was applied. Ten in-depth interviews were done with HEWs, it was saturation level .Six of the interviews were conducted at a health post and four were at health centers based on the interest of HEWs and

fifty minutes up to one hour were used for each interview. And two key informant interviews were conducted with pharmacy professionals at the HCs and the time taken for each interview was fifty minutes. Again FGD were conducted by the principal investigator with selected community members on the field using one hour for each FGD.And the community members were selected by Kebele members. The interviews were conducted in Amharic. Data collection tool was developed considering the local context. The tool was originally prepared in English. Then it was translated in to local language by the PI to make sure their linguistic and conceptual equivalence and cultural appropriateness of the area and it is clearly written in the annex part.

Before the actual data collection, the researcher pre-tested the interview guides. The pre-test for the HEWs interview was conducted with two rural HEWs in Debre Berhan Town Woreda. The entire interviews were audio recorded. In addition, key points were taken during the interview using notebook.

4.5. Data analysis and interpretation

The recorded data from the in-depth interviews and FGDs were transcribed daily immediately after the interviews in Amharic and the relevant data were translated in to English. The transcriptions were checked by members of HEWs whether there were misunderstandings or not. The collected data was analyzed concurrently through qualitative techniques. The investigator read them carefully and categorizes similar points based on the listed objectives and unnecessary or repeated ideas were ignored. And Observation checklists were also carefully filled and marked simply by observing. Based on objectives categorized points was coded in Amharic and translated to English very carefully. And the findings were analyzed and discussed thematically. To build up the information got from interview and FGD, observation method was used by comparing the interview data with the real situation of the health post and filling checklists. After the analysis, the data was interpreted based on the listed objectives of the research.

4.6. Data Quality Assurance

To increase the quality of data collected, interview guiding questions were piloted on HEWs from unselected kebeles and the investigator had taken training on qualitative and other data collection methods. Member checking with the participants especially with HEWs was applied

after the data collection and analysis. The questions that prepare in English language was translated in the local language in order to enhance the quality information gained from respondent and audio recorder was used after securing consent for the study participants and the information was transcribed and translated as soon as possible after the interview. Observational check lists are also used to assess HEWs inventory management systems in the selected health posts. Thus the different groups of study participants and data collection methods helped to triangulate the information obtained. Generally participant validation has been used.

4.7. Ethical Consideration

First the proposal was evaluated and approved by the School of Pharmacy Ethics Committee. Then supporting letter was written from the Department of Pharmaceutics and Social pharmacy to Amhara Regional Health Bureau (ARHB) to get permission for conducting the study.

Supporting letter was obtained from the ARHB to the concerned bodies of the study area, North Shewa Zone. Before the data collection, the purpose of the study was clearly explained to all respondents, and verbal informed consent was taken after they understood the information delivered. And the investigator makes sure that anonymity and confidentiality of all participants and health facilities were maintained at all times i.e. by using locked cabinets, using passwords for PCs and being reserved in talking such issues to others.

4.8. Principal investigator's Position and reflexivity

Principal investigator is a senior pharmacist worked for ten years and trained in qualitative data collection methods did data collection. Most of experience years were on academic areas like teaching in different medical colleges .The principal investigator has the same culture, language and religion with communities of the zone. Again the PI has the same gender and age with key informant interviewees and Focus group discussants as well. Such a background would bring common thinking among a number of the respondents which may have helped in a better acceptability by the respondents but also provided a situation where he/she had some understanding of the context.

4.9. Operational definition

Health extension workers: HEWs are female health workers with a minimum age of 18 years recruited from the communities in which they are expected to work. They are given one-year training and fieldwork on 16 packages developed in line with the Essential Health Service Package and assigned to a health post after completion.

Medicines: Are any chemical substances used to prevent, treat and cure disease. And also it includes supplements and vaccines. It is interchangeably used with drugs.

Medicine supply chain management: It is a process of controlling and checking of the requisition, storage and distribution of medicines at the health post.

Health Development Armies: are any members of the society who are working in collaboration with HEWs to improve the health status of the community.

High performing health post: The health post that scores the highest mark in the performance of supply chain management practices as compared to other health posts.

Low performing health post: The health post that scores the lowest mark in the performance of supply chain management practices as compared to other health posts.

5. Result

5.1. Socio demographic characteristics of respondents

As shown in Table 1, all (10 HEWs) of the in-depth interviewees were females. Majority of them were within the age of 33-40 years. The two pharmacy professional interviewees were males within the age of 24-30 year and both of them were 10^{+3}. Focus group discussants were all literate women (able to read and write) and aged between 29-40 year. All the participants were follower of Orthodox religion.

Table 1: Socio demographic characteristics of respondents (n=23), Basona Worena Woreda Health Posts

Health Extension Workers	
Sex	**Female**
Age	**25-32** **33-40**
Educational level	**10^{+3}** **10^{+4}**
Religion	**Christian (Orthodox)**
Pharmacy professionals	
Sex	**M**
Age	**24-30**
Educational level	**10^{+3}**
Community members	
Sex	**Female**
Age	**29-40**
Educational level **Elementary** **High school**	**Literate** **8** **2**
Religion	**Christian (Orthodox)**

5.2. Health Extension Workers' Medicine requisition and storage practice

It was observed that HEWs were responsible for receiving, storing and distributing of medicines at the health post. They have received medicine from the health center (HC) every two months. They fill the quantity of stock at hand and the received items using bin cards. The pharmacy professionals at the HC calculate the average monthly consumption and issue medicines for two months stock. One of the HEWs receives medicines from the HC and transferred to the HP using model 19 and dispensed (issued) to users using model 22.They also report the quantity consumed using Health Post Monthly Report and Resupply form (HPMRR) and resupplied accordingly.

When HEWs receive medicines from the HC, they check expiry of medicines and Vaccine Vital Monitoring (VVM) of vaccines. They stated that:

> *When we collect medicines we check expiry date of medicines, supplements and supplies. In case of vaccines we give more focus to VVM. VVM with black color shows the vaccine is not in good condition and cannot be used but if it is white it is good to use so we are going to take the white one. (HEW_1 from high performing HPs)*

HEWs are expected to check medicines' expiry date, batch number, packaging, color, etc., up on receiving. But, as interviewees (HEWs) of this study reported, they only check the VVM (Vaccine Vital Monitor) of vaccines and expiry date of medicines.

It was observed and explained from the interview that most of HEWs store or arrange medicines, supplies and equipment on shelves made of wooden and some of them keep on cartoons as it is. The observation revealed that almost all HPs were not clean and the room was also not ventilated. Medicines were arranged based on dosage forms. And vaccines were stored in the refrigerator based on susceptibility of hot temperature.

> *We put Iron and tablets on the top of a shelf and, liquids or bottles on the bottom of a shelf. Measles, polio and BCG are kept at the bottom since they are easily affected with hot temperature and Penta, PCV, TT, IPV are at the upper compartment of a refrigerator. While the near expiry medicines are arranged in front, the long ones at the back of the shelf. (HEW_3 from high performing HPs)*

The pharmacy professional explained that there was at times a problem of proper medicine storage at the health post:

> *HEWs have to get continuous training about medicine storage practice… because when I went to HP for support, I got expired items on the shelf because sometimes there is a problem of identifying production date, batch no and expiry date labeled on the medicine.(pharmacy professional $_2$ from low performing HC)*

> *As I told you they didn't take any regular training with regards to medicine storage, and management. Most of the time trainings focused on family planning rather than medicine management. Medicine shelves are not clean, full of spider's web; walls are cracked so it is exposed for dusts. So special attention must be given for medicine handling, at the same time HEWs should get regular and continuous training about medicine handling. (Pharmacy professional $_2$ from low performing HC)*

> Unlike the high performing health posts, the low ones weren't convenient to store and dispense medicines as it was observed. And 20% of the low performing HP arranged medicines on a shelf made of cartoons, while there was wooden shelf that were equipped with documents.

It was observed that all the HP shelf arrangements didn't follow the requirements of the regulatory body. The ceiling and walls of the low performing HP were not in a good condition (40%) so that shelves were not clean and ventilated (60%). And (20%) of the HP arranged a box of supplements on the floor. Bin cards were not complete in some of the HP and also HEWs mentioned that there was problem of sufficient room for the provision of medicine storage, medical treatment and dispensing at the HP.

The flow of medicines were controlled and managed using bin cards, each item has its own bin card. Even if there was bin cards most of them weren't completed at the time of observation especially the low performing ones that were 60%.

The health post has a studio which serves as diagnosis and drug store. This has made it difficult to properly manage medicines.(HEW$_4$ from low performing HPs)

Table 2: Storage practices of selected HPs in Basona Worana district (n=10, high=5, low=5 with frequency)

	High performing HP Yes (%)fr.	No (%)fr.	Low performing HP Yes (%)fr.	No(%)fr.
Medicines are stored in a dry, clean and ventilated place	60(3)	40(2)	40(2)	60(3)
Vaccines are stored in appropriate temperatures	80(4)	20(1)	20(1)	80(4)
Medicines arranged in appropriate shelf	100(5)	0	80(4)	20(1)
Pharmaceuticals and other sensitive medical supplies protected from exposure to direct sunlight?	80(4)	20(1)	100(5)	0
They use First Expire First Out stock rotation system	80(4)	20(1)	20(1)	80(4)
Are the premises according to the standard of FMHACA like, medicines arranging away 50cm away from the roof?	0	100	0	100(5)
Do they record refrigerator temperature daily? How frequently?	0	100	0	100
Are there medicines on the floor?	0	100	20(1)	80(4)
Do they have updated record keeping mechanisms like bin card?	60(3)	40(2)	40(2)	60(3)
Is the ceiling in good condition (not warped, free of holes, no leaking)?	80(4)	20(1)	60(3)	40(2)
Is there a refrigerator	80(4)	20(1)	60(3)	40(2)

5.3. Health Extension Workers dispensing practice

HEWs explained that they distribute medicines to consumers at the HP for children under 5, pregnant woman, family planning users, and first aid users. Prior to giving medicines the HEW asks, observes and took vital signs and then according to the guideline she will decide the medicines to be given, then medicines will be distributed with information. For example, some of the discussants explained that they took medicines with information from the nearby health post when their child is sick, when they become pregnant, in case of family planning and when they need first aid. During observation dispensing was not encountered.

> *HEWs are committed and dedicated to help us; they teach and advise us how to take medicine properly even they write down on the pack (FGD$_{1, 2}$ from high performing HPs).*

On the other hand even if they have been told, some of the consumers didn't put medicines properly at home:

> *When we take medicines from the health post we put them inside the bed mattress and boxes in order to hide from other people at home. (FGD $_{2, 3}$ from low performing HPs)*

And, the pharmacy professionals also explained that there was a problem of disease identification by HEWs.

> *Sometimes I observe that HEWs have a problem of identifying signs and symptoms of some complications. For example whenever a baby coughs and has fever they simply put on pneumonia therapy while it was a cold. (Pharmacy professional$_2$ from low performing HPs)*

The focus group discussants explained that HEWs helped them whenever their child is sick, they give medicines with information like to take medicines on time for a given period of time ,put medicines out of the reach of children, put medicines on dry and clean places.

> *The HEWs around us help us very much whenever our children get sick we immediately go to the nearby health post unlike the previous times. For example my baby was sick and took him to the HP. The HEW gave him medicine and he is now fine. (FGD $_{1, 4}$ from high performing HPs)*

The community members explained that the HEWs were busy working with community about

family planning, environmental sanitation and personal hygiene but not about rational medicine use.

> *I am one of the leaders of health development army, in our community. My major role is initiating the community to go to HP and get health services. Whenever there is a sick child, pregnant woman or a woman who need contraceptives and other health related issues. I encourage them to visit HP as fast as possible. However, I don't know about medicines and related issues. (FGD $_{1,1}$ from high performing HPs).*

5.4. Challenges of HEWs in the management of medicines

5.4.1. Knowledge and training barriers of HEWs

The study indicated that there is a knowledge gap of HEWs in storing and dispensing of medicines. Almost all of the training didn't focus on medicine handling practices as it is mentioned by HEWs and pharmacy professionals. These pharmacy professionals from the HC go to the HP to support HEWs; in this case they teach them how to properly handle medicines, how to prepare bin cards and how to report expired items.

> *There was no special training about medicine management practice but sometimes the woreda supervisors came on a week, a month or a two months and show us about inventory management but it is informal training (HEW$_2$ from low performing HPs).*

All HEWs explained that there was no conducive environment to study and upgrade them. And they explained that they lost trust by the community since they didn't train on implanon removal.

> *We have trained about implanon insertion but not removal; in this case when a woman wants to remove she must go to the remote health center, so it is very difficult. It was good if we get training on implano removal. (HEW$_1$ from high performing HPs)*

5.4.2. Lack of Resources including Medicines

It was observed that some of medicines were not available at the time of visit. For instance Amoxicillin 125mg and Tetracycline ointment were not available in the high performing health posts and gentamycin injection also not available in low performing.

If it is beyond their skill, lack of essential drugs and medical equipment, they give us referral letter for health center (FGD 2,3 from low performing PHCU).

Sometimes there is a shortage of medicine in our health post, at this time we will refer the patient to the health center. Essential drugs available in our health post are contraceptive (implano, pills and condom), Amoxicillin 250, zinc, ORS, TTC eye ointment, BCG, Polio, and others and first aid kits.(HEW from low performing PHCU)
Sometimes there were shortages of medicines like Amoxicillin 250 mg DT and Plumpynut, only first aid and contraceptive use tablets was available in our health post (HEW 5 from high performing HPs).

The HEWs explained that even if the availability of refrigerator solves the problem of work load and transportation problem, it causes wastage of vaccines.

Unlike the previous days the problem of refrigerator is minimized within a month ago. But this solar refrigerator can't produce ice so when we go far having vaccines without ice, the vaccine will be affected easily. We have talked this issue with the higher managements still we can't get any response. (HEW 1 from low performing HPs).

Table: 3 checklists for the availability of medicines, vaccines and supplies in selected health Posts (n=10, high performing=5 and low performing=5)

	High performance HP		Low performance HP	
1.Availability of medicines	Yes (%) (freq.)	No (%) (freq.)	Yes (%) (freq.)	No (%) (freq.)
Paracetamol tab/syrup	80(4)	20(1)	100(5)	0
Mebendazole/Albendazol tablet	80(4)	20(1)	100(5)	0
Tetracycline eye ointment	0	100(5)	20(1)	80(4)
Oral Rehydration Salt(ORS)	100(5)	0	100(5)	0
Zinc tablet	80(4)	20(1)	100(5)	0
Iron	100(5)	0	80(4)	20(1)
Amoxicillin 125mg DT	0	100(5)	20(1)	80(4)
Amoxicillin 250mg DT	80(4)	20(1)	100(5)	0
Gentamycin inj.	40(2)	60(3)	0	100(5)
Plumpynut	100(5)	0	100(5)	0
TB medicines	20(1)	80(4)	40(2)	60(3)
Aggregate availability of medicines	**61.82**	**38.18**	**69.09**	**30.90**
2.Availability of contraceptive				
Oral contraceptive pills(mini pills)	100(5)	0	80(4)	20(1)
contraceptive injection(depo)	100(5)	0	100(5)	0
male condom	100(5)	0	100(5)	0
Implanon	80(4)	20(1)	100(5)	0
Aggregate availability of contraceptive	**95**	**5**	**95**	**5**
3.Availability of vaccines				
Polio	60(3)	40(2)	40(2)	60(3)
BCG	20(1)	80(4)	40(2)	60(3)
Measles	20(1)	80(4)	40(2)	60(3)
PCV	60(3)	40(2)	40(2)	60(3)
PENTA	60(3)	40(2)	40(2)	60(3)
TT	20(1)	80(4)	0	100(5)
IPV	60(3)	40(2)	40(2)	60(3)
ROTA	40(2)	60(3)	0	100(5)
Aggregate availability of Vaccine	**42.5**	**57.5**	**30**	**70**

5.4.3. Transportation

Some of HEWs indicated that there were transportation problem especially if the health post is far from the health center and home.

> *Transport (vehicles are the basic problem for the HEW to move on the community as well as the woreda health centers to send patients and collect medicines (HEW 3 from low performing HPs).*

> *We collect medicines and supplies from the cluster health center, you know our health post is 10 km away from Debre Berhan, a place where I live and the HC is 17km away from Debre Berhan so it is very difficult since we pass Debre Berhan and go to health center and returned back to the HP again. Especially for vaccines it is difficult, now our refrigerator is not functional we have also transportation problem especially when we carry boxes from place to place. (HEW1 from low performing HPs)*

For instance other study indicated that distance was only a statistically significant factor in Ethiopia and Rwanda, where CHWs located farther away from their resupply points had significantly lower standardized product availability (Chandani, 2012).

5.4.4. Work overload and Job satisfaction

Work burden is one of the factors for improper medicine handling practice by HEWs.

> *We have many duties and responsibilities. Now we are again tasked to register and distribute ID card to every household for health insurance. When we go to community and give variety of service, a patient may go to the HP and back home without getting service. In this case he/she may be angry. Health insurance is good for the communities but we are extremely loaded this is completely out of profession even when a woman come to take her contraceptive(depo)in the health post she may not be free since people are there to take health insurance id .(HEW4 from high performing HPs).*

All HEWs said that they were not satisfied with their salary, and they only keep on work when they saw health changes in the communities.

We HEWs are happy and satisfied when we see changes in the community but the government never thought about us including our families. Our salary and effort is incomparable. Even if we upgrade ourselves there is no salary or any adjustments at all. Previously, most of the time we go to the communities to teach, follow or check every status of their health all the day and night. Generally we are over loaded and working under stressful condition .And oh we don't have equal chance to get a better job. We are human and need better life. Most of my friends left the job after they work for 11, 12 years or after they sacrifice their time and energy. Moreover now we are assigned to prepare health insurance ID for HH you know it is completely contrary to our work (HEW 5 from high performing HPs)

We carry medicines and travel long distance to serve our community. This makes us tired and no time to study and read referral books.(HEW4 from low performing HPs)

In this study, almost all HEWs agreed that their salary payment were below their expectation especially when they compared with their work.

5.4.5. Lack of Support provided to HEWs

The HEWs were getting support from the Zone, Woreda health office, respective HC and Kebeles**.**

We meet and contact HEWs directly when we provide support at health post. We provide refresher training about medicine storage and inventory management and others. During these times we conduct discussions on health work performance and build their capacity. (Pharmacy professionals 1 from high performing HC)

The HEWs explained that supervisors from the woreda didn't appreciate their work rather they discourage them.

If the Woreda supervisors come and see our work, we will be happy. We need encouragement from the woreda officials. We will be encouraged by the appreciation for our good work and management of medicine, but our morale will be affected when it is ignored. (HEW 3 from high performing HPs)

What makes us not to work hard is, when the woreda health office comes for supervision, they leave our strong parts and take very minor things and discourage us due to those things but we are happy working with community and sometimes I am in doubt about the knowledge of our supervisors. (HEW$_2$ from low performing HPs)

As HEWs explained that there was supportive supervision program. Pharmacy professionals from cluster health center came and gave us in-service training about how to control expiry dates by reporting before 6 months, how to control inventory using bin cards and medicine good storage practice for example, not to put medicines on the floor but the training isn't given regularly and detail. Also they mentioned that supervisors usually criticize their work instead of supporting the work they have done. In short monitoring and evaluation with regards to medicine management was minimal.

6. Discussion

This study tried to assess medicine supply chain management practice and associated challenges of HEWs in selected district of North Shewa Zone. An attempt was made to compare the findings of this study with the minimum standards of health post of FMHACA and draft implementation guideline for health service extension Programme.

The minimum standards of health post states that the storage condition shall provide adequate protection to medicines from all environmental factors until medicines is delivered to the patient. There shall be clean and safe place with adequate shelves dedicated to medicines. The health post shall have a minimum of the following: waiting area, examination /counseling /injection room, delivery & postnatal room, store room, toilet, area for placenta pit (FMHACA, 2011).

But as it was observed almost half of the HPs were not convenient to store and distribute medicines in an appropriate manner. As it was explained the rooms weren't spacious to accomplish all activities. Most of the shelves are made of wood attached with walls. It is either so short or so long standing. Medicines were arranged with equipment, documents and other materials so medicines were not well ventilated and arranged as it is mentioned by pharmacy professional and from observation. Of course medicines are protected from direct sunlight (100 %) in low and 80% in high performing HP, because they weren't directly to the door or window. And vaccines were stored in the solar refrigerator in different compartment; since it is auto regulated temperature registration wasn't practical in all the HPs.As a result if medicines don't arrange on appropriate places the stability and safety will easily be affected.

The flow of medicines were controlled and managed using bin cards, each item has its own bin card .Even if there was bin cards most of them weren't completed at the time of observation especially the low performing ones from this study.

Similarly, another study conducted in Amhara region, Ethiopia showed that 56% of HPs implement the new IPLS (Integrated Pharmaceutical Logistic System) and only 28%, had stock cards for monitoring drug stock outs in their facilities. For example, written inventories of drugs

were completed at only 22% of HPs (Raifman,2013).This implies that having incomplete inventory records affects medicine availability and causes wastage.

Community members from this study explained that they knew HEWs more on supporting them in maternal health, family planning and keeping personal and environmental hygiene but not on how to store medicines. But according to the draft implementation guideline for health service extension Programme, HEWs are expected to educate patients /clients and the community about the proper use of prescribed drugs and dispense medicines along with adequate information (FMOH, 2005).

Similarly, another study also revealed that none of the HEWs received specific or targeted training on rational use of drugs; however, HEWs have noted that topics related to rational drug use were discussed as a part of other trainings (Shuke, 2014).

Even though some of the community members explained that they got appropriate treatment and advice from HEWs, they store medicines at home inappropriately. This implies that there is information gap among HEWs and consumers with regards to medicine storage and dispensing practice.

As it was explained, HEWs had a limited knowledge or training in providing the right medicine to the right patient. Similarly, a study conducted in Sidama Zone indicated that only 14% of prescriptions were dispensed by HEWs according to the treatment guideline (Shuke, 2014).

While HEWs of this study were trained on the insertion of implanon, they were not trained on its removal so that they lost their confidence when a woman came to the HP for removal. For instance the study conducted on Wolaita Zone, Southern Ethiopia indicated that the in service training on Implanon insertion given to 56.1% of HEWs was inadequate (Ketsela, 2017).This indicated that HEWs had minimum training on medicine supply chain management practices so that patients are not getting adequate services at the HP particularly implanon removal.

HEWs have many activities to perform including in providing medicines to consumers after collecting from the respective HC. To do this there is also transport problem. And nowadays there is also additional work that is preparing Identification Card (ID) of health insurance for each household which is not part of their packages. So rather than visiting households they spent

more time at the health post.

Similarly, distance of health post from district health offices and health center, turnover of trained health extension workers in the health post, interest of trained health extension workers in providing Implanon and their job satisfaction to serve as a health extension workers were the predictors of current provision of Implanon by health extension workers in Wolaita zone (Ketsela, 2017).

And also a study conducted in China indicated that barriers challenging the sustainability of the CHWs led projects were transportation, nature of official support, quantity and quality of CHWs, training of CHWs, incentives for CHWs, and maintaining a good rapport between CHWs and target population (Huang et al., 2018).

The study conducted in Asgede Tsi'mbla District Lim'at T'abya Health Post in Tigray, the HEWs mentioned that the government expects them to deliver all the 16 components of health packages in the community. But the salary which is paid to them monthly is very low. When responsibilities and incomes are getting compared there is a large gap.Even the salaries of HEWs different with other agriculture extension workers which have not equal works with health extension workers (Seare H& Shaik Y, 2017).

Similarly, the HEWS from this study explained that, they are not satisfied with their job since there is low salary, overload, limited transport, training and resource. They also mentioned that most of their friends left the job. This implies that HEWs aren't as effective as previous times in performing their duties so the government should listen to them and motivate them by building their capacity, and improve salary based on their level and experiences

The result indicated that the aggregate availability of contraceptives was 95%, medicines 61.8 % and 69%, and vaccines 42.5 % and 30% in the high and low performing HP respectively. Similarly a study conducted in Burkina Faso showed that medicine stock-outs undermine CHWs' perception of being valued. They not only discredit their ability to treat malaria, but also reduce community participation in awareness sessions (Druetz, 2015).This implies that if medicine are not available at the HP, patients are enforced to go to HC so they lose trust on HEWs.

Generally, the high performing HPs had a better medicine supply chain management practice as compared to the low performing HPs. Distance, medicine availability, overload, salary and training affect the proper supply chain management practice of medicines.

7. Limitation of the study

- Lack of similar studies in the country and worldwide made comparison of results difficult
- Focus group discussions didn't include male participants.

8. Conclusion and recommendation

Conclusion

Medicine supply chain management is one of the duties and responsibilities of HEWs in the health post. They manage a number of medicines and treat patients, mostly those who are under 5 of age and mothers. However, in this study it was found that most of HEWs didn't receive, store and dispense medicines according to the recommended regulatory requirements. Some of the challenges mentioned by the HEWs include lack of training, overload, and lack of appropriate storage and transport facilities, resource limitation and low salary. And as compared to the higher performing HPs; the low performing HPs were not convenient for proper management of medicine, since transport and training gap is higher. This implies there is a need to make interventions that facilitate proper supply chain management of medicines by HEWs.

Recommendation

- There should be regular training and supervision for HEWs about medicine supply chain management practice.
- HEWs shouldn't be engaged in activities other than their main duty.
- Career development should be arranged for HEWs.
- Medicine and vaccine availability and wastage rate should be studied further.

References

Admasu (2014).Integrated Community Case Management(iCCM)at scale in Ethiopia:Evidence and Experience. Ethiopia Medical J. 52(3)

Ameen, Salaudeen,Bolarinwa,Uthman ,Musa and Aderibigbe(2013).Vaccine Storage and Handling Practices among routine immunization service providers in a metropolitan city of North-Central Nigeria. Journal of Community Medicine and Primary Health Care. 26 (2):18-28.

AMREF(2007). The changing role of community health workers in the health system in Africa. Accessed from www.tandfonline.com.Accessed on May 2017.

Banteyerga and Kidanu (2008).The Last Ten Kilometers Project. Rapid Appraisal of Health Extension Program: Ethiopia Country Report. JSI research and training institute. Miz-Hasab Research Center Addis Ababa Ethiopia. Ethiop Med J.55(319)

Banteyerga and Kidanu (2011). Ethiopia's Health Extension Program: Improving health through community Involvement. MEDICC Review 13(3).

Baptistini and Figueiredo(2014).Community Health Agents:the challenges of working in the Rural area. são paulo. 2: 53-68

BoFED (Bureau of Finance & Economic Development) (2011).The population report of Amhara region by Zone: Reports for north Showa Zone. Amhara National Regional state Bureau of Finance and Economic Development, Bahirdar.

BWDHO (2009). Bassona Worana district Health Office .Annual report

Chandani , Duffy , Lamphere , Noel , Heaton and Anderson (2016). Quality Improvement practices to institutionalize supply chain best practices for iCCM: Evidence from Rwanda and Malawi. Research in Social andAdministrative Pharmacy 13 :1095–1109

Chandani Y, Noel M, Pomeroy A,Andersson S,K. Pahl M, and Williams T (2012). Factors Affecting Availability of Essential Medicines among Community Health Workers in Ethiopia, Malawi, and Rwanda: Solving the Last Mile Puzzle.Am. J. Trop. Med. Hyg., 87: 120–126.

Condo , Mugeni , Naughton ,Hall , Antonia , Omwega ,Nwaigwe , Drobac , Hyder , Ngabo and Binagwaho A(2014). Rwanda's evolving community health worker system: a qualitative assessment of client and provider perspectives.Human Resources for Health 12 :71

Daka (2013). Evaluation of Antimalarial drug use practices of Health Extension Workers and

Patient Adherence in Southern Ethiopia/Wolyta Zone.A Doctoral thesis, University of South Africa.

Desalegn K,Loha E, and Meskele M (2017).The Current Status and Factors Associated With Implanon Service Provision by the Health Extension Workers at the Health Post Level,Wolaita Zone, Southern Ethiopia: A Cross-Sectional Study.Journal of family healh and reproductive health .11(1)

Druetz T,Kadio K,Haddad S, Kouanda S, and Ery V(2015).Do community health workers perceive mechanisms associated with the success of community case management of malaria? A qualitative study from Burkina Faso.Social Science & Medicine 124: 232-240.

FMOH(2005).)Health Service Extension Programme..Draft Implementation Guideline.

FMOH(2011).Minimum Standards for Health Post. Food, Medicine and Healthcare Administration andControl Authority.Addis Ababa,Ethiopia.

FMOH(2017).HMIS Indicator Reference Guide. Policy and Planning Directorate.

Grossman R, Schoen J,William J, Brentani A,Kaselitz E ,and Heisler M.Challenges facing community health workers in Brazil's Family Health Strategy: A qualitative study. Int J Health Plann Mgmt. 33:309–320.

Huang W,Long H,Li J,Tao S, Zheng P, Tang S, and S. Abdullah A (2018).Delivery of public health services by community health workers (CHWs) in primary health care settings in China: a systematic review (1996–2016). Global Health Research and Policy 3:18

Huihui W, Roman T, Gandham N. V. Ramana,and Chala T (2016). Ethiopia Health Extension Program an Institutionalized community approach for universal health coverage. Accessed on May, 2017 from www.world bank.org.

Jaskiewicz W and Tulenko K(2012). Increasing community health worker productivity and effectiveness: a review of the influence of the work environment. Human Resources for Health 10:38

Joshua and Sunderland (2015). An evaluation of the Essential Medicines List, Standard Treatment Guidelines and prescribing restrictions, as an integrated strategy to Enhancequality, efficacy and safety of and improve access to essential medicines in Papua New Guinea.Health Policy and Planning.31:4.

Kane , Ormel , Otiso ,Sidat , Namakhoma , Nasir , Gemechu , Rashid , Taegtmeyer , Theobald and de Koning(2016).Limits and opportunities to community health worker empowerment:A multi-country comparative study journal Social Science & . Medicine 164 : 27-34

Kedir,Herbst , Zhao, Soucat , and Lemiere.(2011).Health Extension Workers In Ethiopia: Improved Access and Coverage for the Rural Poor in Yes Africa Can Success stories from a dynamic continent.

Kussia (2009). Expanding or diluting? A review of the Health Extension Programme in Ethiopia. MA thesis

Medhanyie ,Spigt ,Kifle ,Schaay ,Sanders ,Blanco,GeertJan and Berhane (2012).The role of health extension workers in improving utilization of maternal health services in rural areas in Ethiopia: a cross sectional study. BMC Health Services Research 12 :352

Mohammad H, Naseem S, Saeed A, Najma B and Sameea(2006). Assessment of Knowledge, Attitude and Skills of lady health workers. Gomal Journal of Medical Sciences,4:2.

Ofori-Asenso, R. and Agyeman, A.A (2016). Irrational Use of Medicines.A Summary of Key Concepts. 4(4): 35

Ofori R, Brhlikova P and Pollock A (2016). Prescribing indicators at primary healthcare centers Within the WHO African region: a systematic analysis (1995–2015). BMC Public Health 16:724.Research Article.

Partners in Health (2011).Improving outcomes with community health workers. Programme Management Guide. Accessed from http://hdl.handle.net.on 30/5/2017.

Raifman S, Mellese S,Hailemariam K, Askew I and Erulkar A (2013). Assessment of the Availability and Use of Maternal health supplies in the Primary Health Care System in Amhara region, Ethiopia. Final Report, Population Council

Rogie B (2012). Assessment of Cold chain Status for Immunization in Central Ethiopia.

Shuke A (2014). Assessment of the Knowledge and Practice of Health Extension Workers Regarding the Medicine, they handle. MSc Thesis.University of Addis Ababa.

Seare Hadush Desta1 and Shaik Yousuf Basha(2017). The Role of Health Extension Workers in Primary Health Care in Asgede Tsi'mbla District: A Case of Lim'at T'abya Health Post. Int. J. Soc. Sc. Manage. 4(4): 248-266.

Teklehaimanot , Kitaw , G/Yohannes , Girma ,Seyoum , Desta and YeEbiyo (2007).Study of the Working Conditions of Health Extension Workers in Ethiopia.Ethiop.J.Health Dev 21(3).

Tezera, Alemseged and Gudeta (2017).knowledge, attitude, and practice (kap) of Health Extension Workers in Prescribing Antimalarials in Assosa Zone of Benishangul Gumuz Regional State (BGRS),North-Western Ethiopia. Original Article. Ethiop Med J,55(3)

UNICEF (United Nations Children's Fund) (2014) Access to healthcare through community health workers in East and Southern Africa. Maternal, Newborn and Child Health Working Paper.

UNICEF(2006). Management of sick Children by community Health Workers: Intervention Models and program examples. Accessed fromwww.unicef.org/health.on 31/5/2017.

USAID (2010). Community Health Worker Programs: A Review of Recent Literature WWW.hciproject.org.

WHO (1995). A community health workers and drug: A case study of Thailand, Geneva, World Health Organization.

WHO (1995). A community health workers and drug: A case study of Thailand, Geneva, World Health Organization

WHO (2007).Community health workers: What do we know about them?The state of the evidence on program, activities, costs and impact on health outcomes of using community health workers.

WHO (1978). Report of the International Conference on Primary Health Care, in collaboration with United Nations Children's Fund, Alma- Ata, USSR

Wondimu, A., Molla, F., Demeke ,B., Eticha, T., Assen, A., Abrha, S., Melkam,W. (2015). Household Storage of Medicines and Associated Factors in Tigray Region, Northern Ethiopia. PLOS; 10(8)

Yitayal ,Berhane, Worku and Kebede (2014).The community-based Health Extension Program significantly improved contraceptive utilization in West Gojjam Zone, Ethiopia. Journal of Multidisciplinary Healthcare 7 :201-2

Annexes

Annex I- Storage practices of selected HPs in Basona Worana district

	High performing HP		Low performing HP	
	Yes (%)fr.	No (%)fr.	Yes (%)fr.	No(%)fr.
Medicines are stored in a dry, clean and ventilated place				
Vaccines are stored in appropriate temperatures				
Medicines arranged in appropriate shelf				
Pharmaceuticals and other sensitive medical supplies protected from exposure to direct sunlight?				
They use First Expire First Out stock rotation system				
Are the premises according to the standard of FMHACA like, medicines arranging away 50cm away from the roof?				
Do they record refrigerator temperature daily? How frequently?				
Are there medicines on the floor?				
Do they have updated record keeping mechanisms like bin card?				
Is the ceiling in good condition (not warped, free of holes, no leaking)?				
Is there a refrigerator				

	High performance HP		Low performance HP	
1.Availability of medicines	Yes	No	**Yes**	**No**
Paracetamol tab/syrup				
Mebendazole/Albendazol tablet				
Tetracycline eye ointment				
Oral Rehydration Salt(ORS)				
Zinc tablet				
Iron				
Amoxicillin 125mg DT				
Amoxicillin 250mg DT				
Gentamycin inj.				
Plumpynut				
TB medicines				
Aggregate availability of medicines				
2.Availability of contraceptive				
Oral contraceptive pills(mini pills)				
contraceptive injection(depo)				
male condom				
Implanon				
Aggregate availability of contraceptive				
3.Availability of vaccines				
Polio				
BCG				
Measles				
PCV				
PENTA				
TT				
IPV				
ROTA				
Aggregate availability of Vaccine				

Verbal Consent form

An interview consent format used to obtain permission immediately before data collection time from respondents to assess HEWs' medicine supply chain management.

Dear Respondent:

Good morning/Afternoon! My name is _____. I am working with the research team of the Department of Pharmaceutics and Social pharmacy, School of Pharmacy, Addis Ababa University. And the department approved it with reference number ERB/SOP/35/35/10/2018.

I would like to ask you a few questions regarding the management of medicines by HEWs. The interview would take 30-40 minutes of your time. The findings will be helpful for the communities to get the right medicine for the right disease and, to minimize challenges for the HEWs. You are going to participate only if you are voluntary, you can refuse to answer the question if you are not interested. Also it is possible to withdraw from the study at any time. If you refuse to participate also there is no any risk/harm happening to you for the future. All of your answers will remain confidential. I will not ask your name and it will not appear on the interview guide. All the information you will give me analyzed together with other participant's information. The data you will provide is very helpful to give important comments that will help to strengthen and improve the study. The information obtained in this study will be used only for research purposes. But your honest participation will contribute a lot to generate information to come up with important findings.

If you have any problems, you can contact me.

1. Haregewoin Kassa

Mobile +251921457680

Email: hareg.kassa3@gmail,com,

1. Others

Do I have your permission to continue?

Yes ____

No ____

Interviewer: Name_____ Signature: _____ Date: _____

Annex II-Interview guiding questions for Health Extension Workers

Part one: Socio-demographic characteristic of respondents

1. Sex Male ☐ Female ☐

2. Age: _____

3. Your present position: _____

4. Date of interview: _____

5. Venue: _____

6. Years of working experience in present position: _____

Part two: Questions regarding research topic

1. How do you get medicines? Where? How often?
2. How do you see the distribution of medicines to the Health post?
3. How do you store medicines or vaccines at the health post?
4. What kind of challenges you have faced while you are trying to collect and distribute medicines to consumers?
5. How do you see the courses (trainings) you took prior to work? Do you think that it was enough to collect, store and distribute medicines to communities?
   Is there on job trainings regarding with medicine management?
   Who is the supposed to give you trainings? How often?
6. When you distribute medicines what kind of information will you give?
7. In your setting which disease is more prevalent? And how do you treat it?

Thank you for your cooperation!

Annex III- Interview guiding questions for Pharmacy professionals**.**

Part one: Socio-demographic characteristic of respondents

1. Sex Male ☐ Female ☐

2. Age: _____

3. Your present position: _____

4. Date of interview: _____

5. Venue: _____

6. Years of working experience in present position: _____

Part two: Questions regarding research topic

1. How do you distribute medicines to the health post? Which format, when..?
2. Do you think that the health post is convenient to manage medicines or vaccines? Including rooms, shelf, refrigerator and others?
3. How HEWS control inventories of each item? Including expiry items?
4. How do you explain about medicine management training of HEWs?
   Do you think that the training is enough?
5. How do you evaluate the HEWs activities in treating and giving medications to patients?
6. How do you see medicine or vaccine storage management at the health post?
7. How do you supervise (evaluate) health extension workers?

Thank you for your cooperation!

Annex IV-Questions for Focus Group Discussion

1. Do you work together with HEWs? How?
2. Do they label and tell you how to take medications correctly? For example what does three times a day means?
3. What are the cases you will be referred to HC?
4. How do you store medicines at your home?
5. How do HEWs check whether you are taking medications or not?
6. Do you think that HEWs solve medicine related problems?
7. Have you get appropriate medicine related services at the health post.

Pharmaceutical Supply Chain Management System & service implementation(PSCMS)key performance indicators reporting template for Health Facilities of Amhara Region				
Name of Health center Zone Woreda No of HP				
Reporting period from To				
S.N	Activities	Unit	Result	Result
	1.Logistic Management Information System			
1	Dispensing unites which reported their IFRR Timely based on schedule during the reporting period (Every two months)			
2	Health post which report their HPMRR timely based on schedule during the reporting period(Every two months)			
3	Health facility RRF reports that are submitted on time to WoHO/ZHD /RHB/PFSA by the facility within the reporting period [Every two month]			
4	Health facility complete and accurate RRF reported that are submitted on time to WoHO/ZHD/RHB/PFSA by the facility within the reporting period			
	2.Inventory management and storage condition			
5	Item [lines] requested on RRF of program and RDF Pharmaceuticals every two month			
6	Item [lines] receive correctly by program and RDF Pharmaceuticals RRF request every two month			
7	The average duration of time between facilities place order to PFSA and when the product delivery to a facility every two month			
8	Selected list of pharmaceuticals applicable for the HF at the time of review month [every two month]			
9	Selected list of pharmaceutical applicable from the applicable at time of review period [every two month			

10	Total number of item counted in the reporting period [every two month]			
11	Count from the total item counted [every two month]			
12	Cost of stock available for the HF during the period of one year [Annually]			
13	Total cost of item expired /damage during the time same year [annually]			
14	Dose the HF conduct annual inventory [annually]			
15	Forecasted item demand in birr [annually]			
16	Actual consumed item demand in birr of the same year[annually]			
17	Dose the HF implemented 80% of acceptable storage guideline [annually]			
	3 Pharmacy serves			
18	Dose the HF have functional DTC [biannually]			
19	HF which established system to report adverse drug reaction [ADR] [every two month]			
20	HF which provide medication use health education at list 4 times [every two month]			
21	HF which have specific facility drug list categorized by VEN [Annually]			
22	Dose the HF have standard prescription [Biannually]			

(Amharic Version)

አዲስ አበባ ዩኒቨርስቲ

ጤና ሳይንስ ኮሌጅ

የፋርማሲ ትምህርት ቤት

የፋርማሲውቲክስና የሶሻል ፋርማሲ ዲፓርትመንት

የቃለ መጠይቅ ፎርም

መግቢያ

እኔ ሃረገዎይን ካሳ በድህረ ምረቃ የሁለተኛ ዓመት የፋርምሲ ተማሪ ስሆን የመመረቂያ ፅሁፌን በጤና ኤክሰቴንሽን ባለሙያዎች የመድሃኒት አያያዝ ላይ እየሰራሁ እገኛለሁ;;የመድሃኒት አቅርቦትና አያያዝ በማህበረሰቡ ጤና ላይ አሰተዋጽአ እንዳለው ይታዎቃል የእኔም ፅሁፍ በዚህ ላይ ያተኮረ ሲሆን የዚህ ጥናት ውጤትም ሊቀረፉ የሚችሉ ችግሮች ለይቶ በማውጣት በጤና ኬላ ውስጥ የተሻለ የመድሃኒት አቅርቦት እና አያያዝ እንዲጎለብት ያደርጋል፡፡በተጨማሪም የጥናቱ ውጤት ለዞኑም ሆነ ለወረዳው እንደመረጃ ያገለግል ዘንድ የሚሰጥ መሆኑን መግለጽ እወዳለሁ፡- ስለሆነም ይህንን አርዕስት በተመለከተ መረጃ ለመሰብሰብ ይጠቅም ዘንድ ከታች የሚገኘውን ቃለመጠይቅ አዘጋጅቻለሁ፡፡

በጥናቱ ላይ መሳተፍ ሙሉ ለሙሉ የእርስዎን ፈቃደኝነት የሚፈልግ ሲሆን ከእርስዎ የሚገኘው መረጃ በሚስጢር የሚያዝ ይሆናል፡፡ መረጃ በሚሰበሰብበትም ጊዜ የእርስዎን ስምም ሆነ እርስዎን በምልክት ሊለዩ የሚችሉ ነገሮች አይካተቱም፡፡ የሚሰበሰበውን መረጃ ሙሉ በሙሉ ለመመዝገብ ያመች ዘንድ በቃለ መጠይቁ ጊዜ ድምፅ የመቅጃ መሳሪያ መጠቀም መጠቀም እችል ዘንድ በትህትና እጠይቃለሁ፡፡

ይህንን ፅሁፍ በተመለከተ ትክክል ወይም የተሳሳተ የሚባል መልስ የለም፡፡ ነገር ግን የእርስዎ ሀቀኛ የሆነ መልስ ለፅሁፉ እውነተኛነት እና በስኬት መጠናቀቅ ትልቅ ሚና ስላለው እነዲተባበሩኝ በትህትና እጠይቃለው፡፡ በቃለ መጠይቁ ጊዜ ግልፅ ያልሆነልዎት ጥያቄ ካለ እንዲብራራልዎት የመጠየቅ መብት አለዎት ፡፡ ቃለ መጠይቁ ከ 30-40 ደቂቃ የሚፈጅ

ሲሆን በመረጡት ቦታ ሊካሄድ ይችላል፡፡እንዲሁም በቃለ መጠይቁ ጊዜ እረፍት ወስዶ መመለስ ይቻላል።

በመቀጠልም እርስዎ ፍቃደኛ ከሆኑ መጀመር እንችላለን፡፡ አዎ/አይደለም

ነ-ለጤና ኤክስቴንሽን ባለሙያወች የተዘጋጁ ጥያቄዎች

ክፍል 1:

1. ፆታ ☐ ወንድ ☐ ሴት

2 . ስም

3 .አድራሻ ፡- ሰልክ ቁጥር_____

4. እድሜ: _____

5. የትምህርት ደረጃ _____

6. አሁን ያሉበት የስራ መደብ: _____

7. የስራ ዓመት ልምድ (አሁን ባሉበት ቦታ): _____

8.የቃለ መጠይቅ ቀን: _____

9. ቦታ: _____

ክፍል 2: ጥናቱን የተመለከቱ ጥያቄዎች

1.መድሃኒቶችን ከጤና ጣቢያ በምን መልኩ ትወስዳላችሁ?

በየስንት ጊዜው ትጠይቃላችሁ?መጠኑን የሚያሰላውስ ማን ነው?

2.በተፈለገው መጠን አይነትና ጊዜ መድሀኒቶችን ከጢና ጣቢያ የማግኘቱ ሁኔታ ምን ይመስላል?

3.የክትባት ና ሌሎቺ መድሃኒቶችን በጤና ኬላ ውሰጥ ዕንዴት ታሰቀምጣላቸሁ?

ፍሪጅ ውስጥ ወይም ሸልፍ ላይ በምን መልኩ ታስቀምጣላችሁ?

4.በምትሰሩበት ጤና ኬላ ውስጥ መድሀኒቶች በአግባቡ ተይዘው ለተጠቃሚው ለማደል ሰትሞክሩ እንቅፋት የሆኑባችሁ ነገሮችን እንዴት ትገልጿቸዋላችሁ?

5.የዎሰዳችሁት ስልጠና መድሃኒትን በአግባቡ ይዞ ለተጠቃሚ ለማደል የሚያሰችል በቂ እውቀትን ያስጨብጣል ብላችሁ ታስባላችሁ?እንዴት?

6. ወደ ስራ ከገባችሁ በኋላ ስልጠና ወሰዳችሁ ታውቃላችሁ?በየሰንት ጊዜው?

ስልጠናውን የሚሰጣችሁ አካል ማን ነው?

7.በምትረከቡበት ጊዜ የመድሀኒቱን ደህንነት እንዴት ታረጋግጣላችሁ?

መድሀኒት በወቅቱ ካላገኛችሁ ምን ታደርጋላችሁ?

በጤና ኬላችሁ ውስጥ የመጠቀሚያ ጊዜአቸው ያለፉ እና የተቃረቡ መድሀኒቶችን እንዴት ትቆጣጠራላችሁ?

8.ጸረተዋህሰያ(የሳንባ ምች)፤ጸረ ሳንባነቀርሳ፤የወሊድመቆጣጠሪያ እና የክትባት መድሀኒቶችን ለተጠቃሚ በምታድሉበት ወቅት ምን ምን መረጃወችን ትሰጣላችሁ?

በተጨማሪም የማይቋረጡ መድሃኒቶችን ሳያቋርጡ መውሰዳቸውን እንዴት ትከታተላላችሁ?በየ ሰንት ጊዜው?

9. በጤና ኬላው በስፋት የሚስተዋለው የበሽታ አይነትና የህክምና አሰጣጡስ ምን ይመሰላል?

II- ለፋርማሲ ባለሙያዎች የተዘጋጁ ጥያቄዎች

ክፍል 1:

1. ፆታ ☐ ወንድ ☐ ሴት

2 ስም

3 አድራሻ ፡- ሰልክ ቁጥር_____

3. እድሜ: _____

4. የትምህርት ደረጃ _____

5. አሁን ያሉበት የስራ መደብ: _____

6. የስራ ዓመት ልምድ (አሁን ባሉበት ቦታ): _____

7.የቃለ መጠይቅ ቀን: _____

8. ቦታ: _____

ክፍል 2: ጥናቱን የተመለከቱ ጥያቄዎች

1 መድሀኒቶችን ለጤና ኬላወች በምን መልኩ ታሰራጫላችሁ?

በምን ቅጽ?በየ ስንት ጊዜው?ምን ያህል?

2 መድሀኒት በተፈለገው መጠን፤አይነት እና ጊዜ ለጤና ኬላዎች በምታድሉበት ወቅት ያጋጠሟችሁን ችግሮች እንዴት ትገልጿቸዋላችሁ?

3 ዬክትባትና ሌሎች መድሀኒቶችን አቀማመጥ በጤና ኬላ ውስጥ እንዴት ትገልጹታላችሁ?

4 በመድሀኒት አያያዝ ዙሪያ ስልጠናቸው ምን ይመስላል?በናንተ በኩል ያለው ድጋፍ ምን ይመስላል?

5 የጤና ኤክሰቴንሽን ባለሙያወች በጤና ኬላ ውሰጥ ህክምና የማድረጉንና መድሀኒት የመስጠቱን ሁኔታ እንዴት ትገልጹታላችሁ?

6 የጤና ኤክሰቴንሽን ባለሙያወች በጤና ኬላ ውሰጥ መድሀኒቶችን ሲያስቀምጡና ሲያሰራጩ የሚያጋጥሟቸውን ችግሮች እንዴት ትገልጹታላችሁ?

III-ከማህበረሰቡ ለተመረጡ የቡድን ተኮር ተወያዮች የተዘጋጁ ጥያቄዎች

1. የጤና ኤክሰቴንሽን ባለሙያወች በአቅራቢያችሁ መኖር በመድሀኒት ስርጭት ዙሪያ ያላቸውን ሚና እንዴት ትገልጹታላችሁ?

2. ከጤና ኬላ ምን ምን መድሃኒቶችን ታገኛላችሁ?ስለ መድሀኒቱ ምን ምን መረጃወችን ይሰጧችኋል?

3. የጤና ኤክሰቴንሽን ባለሙያወች መቋረጥ የሌለባቸው መድሀኒቶችን ተጠቃሚውን የሚከታተሉበትን መንገድ እንዴት ታዩታላችሁ?