ADDIS ABABA UNIVERSITY
COLLEGE OF HEALTH SCIENCE
SCHOOL OF ALLIED HEALTH SCIENCE
DEPARTMENT OF NURSING AND MIDWIFERY

FACTORS AFFECTING USE OF ZINC SUPPLEMENTATION IN MANAGEMENT OF CHILDHOOD DIARRHEA AMONG HEALTH WORKERS AT PRIMARY HEALTH CARE UNIT, IN SELECTED WOREDAS OF BALE ZONE, SOUTH EAST, ETHIOPA, 2015

INVESTIGATOR: DADEI BEKELE (B.SC.)

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ADVISOR: **ATO BERHANU DESSALEGN (MPH)**

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Internal examiner:

_____ _____ _____ ____/____/____

Full name Rank Signature Date

Advisor:

Ato Berhanu Dessalegn(MPH)_____ _____ _

Full name Rank Signature Date

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List of Acronyms and Abbreviations

AAU Addis Ababa University

BSCN BSC Nurse

CHOs Community Health Officers

CHWs Community Health Workers

DHS Demographic and Health Survey

H/C Health Center

HEWs Health Extension Workers

HO Health Officer

H/P Health Post

IMNCI Integrated Management of Newborn and Childhood Illness

MDG Millennium Development Goal

ORS Oral Rehydration Salt

PHCU Primary Health Care Unit

SSA Sub-Saharan Africa

WHO World Health Organization

Zn Zinc

Abstract

Back ground: - Zinc is the most ubiquitous of all trace elements. Adequate zinc intake is critical for health. The awareness of the inclusion of zinc in the management of childhood diarrhea among health care providers has been reported to be high in some developing countries. Despite this growing awareness, its use in diarrhea treatment in many of these countries has lagged behind. The use of zinc to treat diarrhea has the potential to avert up to an estimated 400,000 deaths annually and has been recommended for treatment of children with diarrhea in developing countries by UNICEF and WHO.

Objective: - To assess factors affecting use of zinc supplementation in management of childhood diarrhea among health workers at primary health care unit, in selected woredas of Bale zone, South East Ethiopia, 2015.

Method: -A Cross-sectional study design was conducted on a total of 283health care providers working at PHCU during the study period, the study subjects were proportionally allocated for each woredas and a pretested semi-structured questionnaire was used for data collection and it was analyzed by SPSS16th version.

Result: The response rate was 97% and 200 (73%) of participants were not taken training on management of childhood diarrhea in the last six months and about 159(58%) of them had adequate knowledge on Zn supplementation and among 203 (74.3%) of them who treated child with diarrhea in the last 6month, 134 (66%) of them included Zn in their management of childhood diarrhea and those who have training, adequate knowledge, and information on Zn in diarrheal treatment are positively associated with Zn supplementation practice.

Conclusion and Recommendation: The study has revealed a gap in the knowledge, attitude and practice with respect to zinc supplementation in the management of childhood diarrhea and also it showed that there was a limited distribution of zinc at PHCUs at the study area. Training/sensitization activities of health workers on the use of new zinc treatment for diarrhea management should be done and as well availability of commodities should be ensured by the stakeholders.

Key words: Zinc supplementation, childhood diarrheal disease, knowledge, attitude.

1. INTRODUCTION

1.1 **Back-ground of study**

Zinc is the most ubiquitous of all trace elements involved in human metabolism and facilitates in catalytic, structural and cellular regulatory functions, of several enzymes. In its structural role, it facilitates folding of proteins into three-dimensional configurations stimulating growth in utero, childhood and adolescence [1].

Adequate zinc intake is critical for health and its deficiency affects cells of the immune system. It causes a reduction in the number of B lymphocytes and T lymphocytes through increased apoptosis and also reduces their functional capacity. The functions of the macrophage, another key immunological cell that engulfs and destroys bacteria, are also compromised. Thus, in the case of diarrhea, multiple functions of zinc may help to maintain the integrity of the gut mucosa to reduce or prevent fluid loss. Notably, these responses can occur within 48 hours, much more rapidly than the direct effects of zinc on cellular development [2].Diarrhea can lead to zinc deficiency, and the resulting zinc deficiency can lead to a vicious cycle of worsening duration and severity of diarrhea [3].

In 2004, the World Health Organization (WHO) and the United Nations Children's Fund (UNICEF) issued a joint statement regarding the clinical management of acute diarrhea. This statement recommended the use of zinc treatment, as well as oral rehydration solution (ORS), as a two-pronged approach to treatment of acute diarrhea in children [4].

Zinc deficiency is widespread among children in developing countries and occurs in most part of Latin America, Africa, the Middle East, and South Asia. By giving zinc as soon as diarrhea starts, the duration and severity of the episode as well as the risk of dehydration will be reduced. By continuing zinc supplementation for 10 to 14 days, the zinc lost during diarrhea is fully replaced and the risk of the child having new episodes of diarrhea in the following 2 to 3 months is reduced [5].

It is alarming that although the use of zinc for treatment of diarrhea was introduced in Kenya in 2006, only less than 1 % of children with diarrhea were given zinc supplements[6].

The Integrated Management of Childhood Illness (IMCI) guidelines advise use of ORT, along with continued feeding, and zinc for appropriate diarrhea case management [7] though zinc has yet to be introduced at scale in most resource limited countries [8].Improving private provider knowledge and treatment of childhood diarrhea so that providers recommend pediatric zinc along with ORS as the first line treatment for uncomplicated diarrhea in under-five children [9].

The awareness of the inclusion of zinc in the management of childhood diarrhea among health care providers has been reported to be high in some developing countries. Despite this growing awareness, its use in diarrhea treatment in many of these countries has lagged behind. Addition of zinc to current case management of acute diarrhea has also been reported to lead to reduction in the use of antibiotics and increase in the rate of use of ORS [10]. Health professionals prescribe first-line anti-diarrheal drugs that are prohibited by WHO and the American Academy of Pediatrics which recommends not using them with young children [11].

To meet the challenges of prevention of diarrhea related morbidity and mortality in children,an effective public health program is needed which should include supply of safe drinking water, zinc supplementation, prevention / early correction of dehydration [12]. The possible mechanism for the beneficial effect of Zinc treatment on the duration of diarrhea included the following: - improved absorption of water and electrolytes by the intestine, faster regeneration of gut epithelium, increased levels of enterocyte brush border enzymes, and an enhanced immune response leading to increased clearance of the pathogen(s) responsible for diarrhea from the intestine [13].

In zinc supplementation areas, children had a 51% lower risk of non-injury deaths compared to those in areas where zinc was not available [14, 15].

Zinc supplementation seems even more necessary for malnourished children, as they already have a zinc deficiency, which predisposes them to diarrhea and worsens it [16]. Children aged less than five years (under-five children) and those exposed to zinc-deficient diets will benefit from either daily supplementation of zinc or a 10 to 14-day course of zinc treatment for an episode of acute diarrhea [17].

1.2 Statement of the problem

Every year approximately 1.7 million children die as a result of diarrhea and dehydration [18].

Diarrhea is one of the leading causes of death among children under five years. [19].Diarrheal diseases are a leading cause of childhood morbidity and mortality in developing countries, and an important cause of malnutrition. On average, children below 3 years of age in developing countries experience three episodes of diarrhea each year [14]. In Kenya, more than 122,000children die each year. About 11,000 or 9 percent of these deaths are from diarrhea. Zinc was not available over the country until August 2012; caregivers had to seek treatment directly from a trained medical professional, such as a doctor or nurse, to access zinc. Diarrhea with severe zinc deficiency had been observed in children in developing countries [20].Diarrhea was most common among children age 6-23 months (23-25%) and about 11.3% of children under age five were reported to have had diarrhea in Oromia regional state [21]. The WHO has estimated the global annual burden of mortality attributable to zinc deficiency to be 750,000 deaths [22].Zinc deficiency is highly prevalent in children in devel-oping countries [23] and zinc coverage remains comparably low, given the fact that the majority of caregivers seek diarrhea treatment advice from a provider and trust their local providers, a key element of the strategy was to reach providers with information about zinc and its effectiveness in both treating children and preventing future bouts of diarrhea [24].

Using zinc to treat diarrhea has the potential to avert up to an estimated 400,000 deaths annually in Pakistan and has been recommended for treatment of children with diarrhea in developing countries [25]. Despite the availability of these interventions; there have been no declines to diarrhea incidence as many children are not using the interventions [26]. As a result, diarrhea disease continues to be a serious threat to children in many countries in SSA [27, 28].

The symptomatic treatment or prevention of dehydration is not rapidly effective against diarrhea; the prescriptions are sometimes inadequate and there is a lack of consultation because of a lack of training and supervision of health workers.

Solutions like improving training and supervision should fight against this suboptimal medical practice. To respond to sub-optimal care and practices CHWs and health professionals must be trained and supervised in the prescription of ORS and zinc [29].

According to Care-Seeking and Management of Common Childhood Illnesses in Tanzania – Results from the 2010 Demographic and Health Survey, extremely few children (1%) were reported to have received Zinc for diarrhea treatment [30]. Studies have shown that zinc treatment results in a 25 percent reduction in duration of acute diarrhea and a 40 percent reduction in treatment failure or death in persistent diarrhea [31]. Zinc is an important micronutrient for the overall health and development of infants and young children. But among children in the poorest countries, zinc deficiency is widespread and can result in higher rates of infectious diseases, including diarrhea. During diarrheal episodes, zinc is further depleted, replacing this critical nutrient is an important way to help children recover from diarrhea and stay healthy [32].Since zinc is proven as it is an effective remedy for diarrheal management in children but care providers are not strictly adhered to its utilization in diarrheal management in Ethiopia and in the study area. Therefore, the purpose of this study is to address the gap of health care workers in the utilization of zinc supplementation in management of childhood diarrhea at primary health care units in the study area.

1.3 Significance of the study

Diarrhea disease remains a leading cause of morbidity and mortality in developing countries. Despite the effectiveness of Zn for diarrheal treatment, health workers were not seen while supplementing zinc for diarrheal management. Therefore, this study has determined the gap of health workers on current management of diarrhea in under five children at primary health care units. Moreover, the study result will provide an evidence for policy makers to act upon accordingly, in order to alleviate communities health problem, and it will serves as a guide for the researcher to use it as a baseline because to the best of my knowledge, there was no research done in the study area, beyond this it will be used at woreda health facility level to reduce child morbidity and mortality, to achieve MDG IV. Furthermore this research will contribute for development of both knowledge and skill of child health nursing and promote professional career. From the finding professionals will understand the gap exists on use of zinc supplementation in management of childhood diarrhea and they will teach the community.

2. Literature review

2.1 Over view of zinc supplementation

Supplementation with zinc sulfate (2 mg per day for 10–14 days) reduces the incidence of diarrhea for 2–3 months. It helps reduce mortality rates among children with persistent diarrheal illness. Administration of zinc sulfate supplements to children suffering from persistent diarrhea is recommended by the WHO [32].Zinc plays a part in the maintenance of epithelial and tissue integrity through promoting cell growth and suppressing apoptosis and through its underap-preciated role as an antioxidant, protecting against free radical damage during inflammatory responses [33].Diarrheal diseases are a leading cause of childhood morbidity and mortality in developing countries, and an important cause of malnutrition. On average, children below 3 years of age in developing countries experience three episodes of diarrhea each year [13]. Zinc has been proven to significantly reduce morbidity and mortality from diarrhea in young children [34, 35] and was incorporated in the diarrhea management guidelines since 2005[36].

2.2 Factors which affect use of zinc supplementation among health workers.

As zinc is a relatively new treatment for diarrhea management, there is limited research related to knowledge, attitude and practice of prescription-behavior of providers.

A Surveillance which was conducted on Antibiotic-Prescribing Practices of Primary Care Prescribers for Acute Diarrhea in New Delhi, India, explained that there was an evidence of the irrational use of drugs/ antibiotics for acute diarrhea in primary care settings for ambulatory patients in both the public and private sectors rather than using zinc supplementation. WHO guidelines [6, 8] and Indian guidelines [9, 10] for the treatment of acute diarrhea clearly mention that antimicrobials should not be used routinely, because most episodes of acute diarrhea are caused by virus, not bacteria.

The study also revealed that over all Doctors of the public sectors were prescribing practices of antimicrobial seemed to be more related to agreement with social expectations rather than their knowledge and guidelines [37].

A cross-sectional prescription analysis on Adherence to treatment guidelines for acute diarrhea in children up-to-12 years in Ujjain, India showed that 6(six)

prescriptions out of 843 adhered to the recommended treatment of ORS along with zinc for the treatment of acute diarrhea in children and antibiotics were prescribed to 71% and most prescriptions were from pediatricians, i.e. from doctors with less than 10 years of practice (either after graduation or post-graduation). It also revealed that ORS with zinc was prescribed in 22% of case, but these prescriptions contained other drugs like antibiotics & anti-emetics, and it also indicated that the pattern of prescriptions for acute diarrhea varies by practitioner's qualifications, i.e. for post graduate, Allopathic graduate and others 26%, 37% and 2% respectively. The distribution of ORS and zinc prescriptions for acute diarrhea showed that ORS with zinc and zinc only prescription 22% and 0.53% respectively [38].

Based on a pilot study in New Delhi, India, which was carried out on the addition of zinc to the current case management package of diarrhea in a primary health care setting, the village-based workers and private practitioners were a common source of diarrhea treatment, but they use zinc in approximately for half of the episodes [39].

A longitudinal survey which was conducted to Assess the impact of training community health workers in the Bolama Region, Guinea-Bissau, indicated that, in the first moment the item ORS was rarely prescribed (4%)-when recommended, but after training this rate increased to 80%. Forty percent of the children were not prescribed the correct treatment when they presented with signs indicating its need [40].

According to the research conducted on assessment for the introduction of zinc in the treatment of diarrhea in Madagascar, the health workers were trained for IMCI before they assigned to the facility after graduation, in order to solve the challenge for introduction of zinc supplementation for diarrhea ,but the assessment team were found that the application of the standards of IMCI inconsistently applied in the sites visited , and it was found that cotrimoxazole was used for treating simple diarrhea[41].

The study carried out on introducing improved treatment of childhood diarrhea with zinc and ORT, in Tanzania stated that there were an improved knowledge and practice among providers in prescribing of zinc for childhood diarrhea, that was the prescription patterns were rose from zero at baseline (before training) to 34% (after

training) was given to the providers, reflected a significance difference between their practices and those of untrained [42].

Prospective interventional study conducted on Impact of Training Workshop on Knowledge and Attitude for 'Zinc and Its Role in Management of Diarrhea' among Peripheral Health Workers of Primary Health Centre of A Tribal Area in Thane District of Maharashtra showed that about 81.8% health workers had receiving training for their jobs ,the rest 18.2 %workers did not receive any training for their jobs, the percentage of participants giving correct answer whether they had heard of zinc role in diarrheal management were 2.3% before training was given and the respondents were assessed for their knowledge for post training, and their results were 42% of the respondents correctly knew the role of zinc during diarrhea ,47% of the respondents correctly knew the functions of zinc during diarrhea ,75% of the participants correctly knew the dosage of zinc tablets in children between 2—6 months of age, 64% of the participants correctly knew the dosage of Zinc tablets in children between 6months to 5 years of age and 83% of the participants correctly knew the total number of days for which Zinc tablets are to be administered to children during diarrheal episode. There were also changes in attitude among respondents, i.e. 94% of participants felt that Zinc was appropriate treatments for management of diarrhea and 89% of participants were ready to use Zinc if their child falls ill with Diarrhea[43].

A cross sectional study which was carried out in Nigeria on Knowledge and Use of Zinc Supplementation in the Management of Childhood Diarrhea among Health Care Workers in Public Primary Health Facilities showed that 66.1%of them aware of zinc supplementation and their major sources of information were from colleagues (50.5%) and training workshop (39.6%).About 70.4% of the male health care workers were aware of zinc compared with 65.2% of the female health care workers. Specific knowledge of zinc supplementation with respect to management of acute diarrhea by health care workers was showed that about 50.5% and 32.4% of them knew that persistent and acute diarrhea in children, respectively can be treated with zinc. Benefits of zinc mentioned by them included reducing severity of diarrhea (57.7%), reducing duration of diarrhea (34.2%) and preventing future episodes of diarrhea (16.2%). The highest proportion of them (66.7%) knew the correct dosage

and duration of administering zinc supplements during a diarrhea episode. Majority of the respondents 86.5% mentioned that zinc supplementation was safe for use in children while 4.5% said it was not safe. Nine %(9.0%) of them had no idea about the safety of zinc supplementation in children. All those who reported that zinc was not safe for use in children thought so because it causes vomiting. Forty-percent (39.6%) of the health care workers had received training on zinc supplementation in management of childhood diarrhea while the rest had not. Thirty-five % (35.1%) of the health care workers prescribe zinc when managing childhood diarrhea. A higher proportion of the female health care workers (38.1%) prescribed zinc more than the male health care workers (21.1%).The Community Health Officers-CHOs (62.5%) prescribed zinc more than the other categories of health workers. Those who had received training on zinc supplementation (56.8%) prescribed zinc more than those who had no training (20.9%).Of the 39 health care workers who prescribed zinc, 10.3% always prescribed it for every case of childhood diarrhea while the rest 89.7% did so occasionally. Forty-nine % (48.7%) of those who prescribe zinc did so for the correct duration and 84.6% prescribe the correct dose. Majority 97.4% of those who prescribed zinc prescribe it in addition to ORS while 2.6% health worker prescribed antibiotics in addition to ORS and zinc for diarrhea management. Ninty-five % (94.9%) of those who prescribed zinc counseled mothers/caregivers on the proper way to administer zinc and 43.6% paid follow-up visits to monitor the children. Forty-two % (41.9%) of the 31 PHC facilities in Benin-City had zinc tablets in stock at the time of the survey(10).According to Zinc Supplementation in Public health indicated Zinc supplementation as adjunct therapy in diarrhea has been shown to be efficacious with a potential to reduce morbidity and mortality especially among populations with a high burden of zinc deficiency. The effective scaling up of zinc treatment to benefit an entire population is a challenge that requires creating demand by caregivers and convincing health providers of the benefits of zinc. The cooperation of local governments and healthcare policy makers is essential [44]

2.3 Conceptual framework

The study was used a conceptual frame work, which was developed after referring different literatures. The detail of conceptual framework was displayed as follow and the arrows in the diagram show the relationship between dependent and independent variables were interrelated to one another.

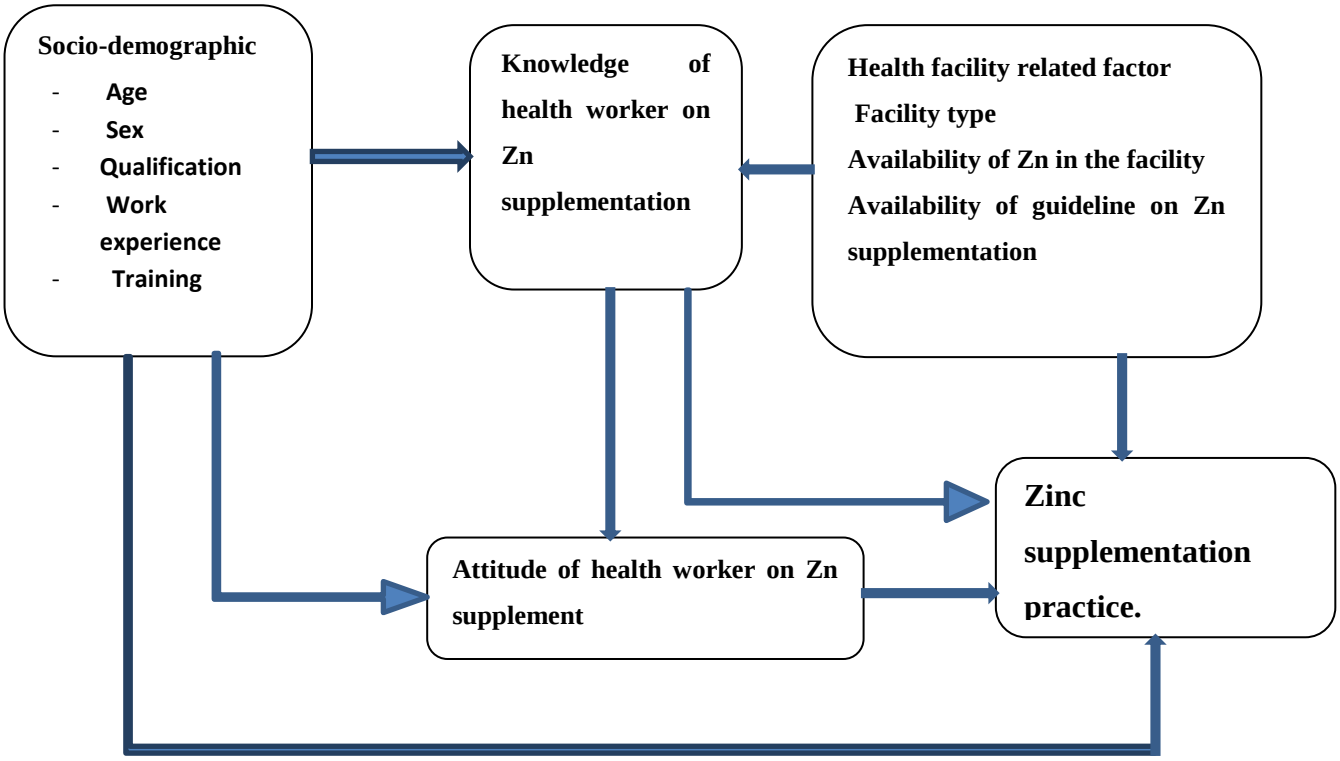

Figure 1 :conceptual framework showing the factors affecting use of zinc supplementation among health worker in diarrheal management among children developed by principal investigator.

3. OBJECTIVE OF THE STUDY

3.1 General objective

- To assess factors affecting zinc supplementation practice in management of childhood diarrhea among health workers at primary health care unit in selected woredas of Bale zone, south east Ethiopia, 2015.

3.2 Specific objectives:-

- ✓ To assess the knowledge of health workers on zinc supplementation practice in case of diarrheal management in children.
- ✓ To describe the attitude of health workers towards zinc supplementation practice in case of diarrheal management in children.
- ✓ To determine the practice of health workers on zinc supplementation practice in case of diarrheal management in children.
- ✓ To assess the cost perception of zinc among health workers.
- ✓ To assess the availability of zinc in facility/store/ during study period.

4. METHODOLOGY

4.1 Study Area

The study was conducted in selected woredas of Bale zone primary health care units, Oromia Regional State, south East Ethiopia. Since Bale zone is one of oromia zone with highest prevalence of diarrheal disease. It is one of 18 Oromia Regional States, with an area of 67.329.6 km^2 and the zonal administrative town, Robe is located at 430 km from Addis Ababa. Bale zone is bounded on the south by Guji zone, on the west by the west Arsi Zone, on the north by Arsi, on the northeast by west Hararghe and East Hararghe, and on the east by the Somali Regional state.

According to census of 2007, the total population of Bale zone is 1,418,864. The temperature ranges from 3.5-32°c. Bale zone has four governmental hospitals which are Goba referral Hospital, Robe district Hospital, Ginnir general Hospital and Dello-mana district hospital. The zone has no private hospital and health center. In the zone there are 43 and 92 health centers and health posts, respectively. The total number of health care providers in the zone are 774(seven hundreds seventy four). The study was conducted in all health facilities of the selected woredas in the zone.

4.2 Study period

The study was conducted from November, 13, 2014 – December 20, 2014.

4.3 Study Design

Institutional based cross-sectional study design was conducted.

4.4 Source Population

Health workers who were assigned and working in primary health care units in Bale zone.

4.5 Study Population

Health workers who were working in primary health care units, in selected woredas of Bale zone during the stated study period and who were volunteer to participate in the study.

4.6 Inclusion and Exclusion Criteria

4.6.1 Inclusive

All health workers (GP, HO, BSCN, diploma nurse either clinical or public nurse and HEWs).Health workers who were working at primary health care units and available during the study period.

4.6.2 Exclusive Criteria

Health workers who were not available on date of data collection due to different reasons and health workers who had experience of less than 6months.

4.7 Sample Size Determination

The overall sample size was determined using single population

Proportion formula: $n = (Z\alpha/2)^2 \times p\ (1-p)/d^2$.

Where n= sample size required for the study

Z= standard normal distribution (Z=1.96) with 95% confidence interval and α =0.05

P=prevalence/ population proportion (p=0.5)

d= margin of error (d=0.05)

= 1.96(1.96) (0.5(1-0.5))/0.05(0.05) = 384.16 => n i =384. Since the study population is less than 10,000 s, (774). To determine the exact sample size, correction formula was used. Calculated as follows: n f = n i X N/n i + N, Where n i = calculated sample size , n f = exact sample size, N= source population

= (384x774)/ (384+774) =297216/1158=256.66.

= 257 +10% none response rate = 257+25.7=283.

4.8 Sampling Procedure

Six woredas were selected by lottery method from18woredas of Bale zone randomly. A proportionate to sample size was employed for the selected woredas. All health workers in selected woredas who were going to be included in the study were taken from the respective woredas health office human resource officer, and then the selection of 283 study participants were performed. According to the data obtained from the woredas health office, Goba ,Robe ,Goro ,Gasera,Agarfa, and Dinsho ,the numbers of health workers were 200,250,80,58,50,and 48 respectively and ,since the sample was proportionally allocated so that the respondents for , Goba ,Robe ,Goro,Gasera,Agarfa, and Dinsho were become82,103,33,24,21,and 20 respectively. In the selected woredas' all health facilities were included, and the respondents was determined by systematic random sampling technique, the k^{th} value for the sample size were every 2 from the list of health workers for all health facility in the selected woredas.

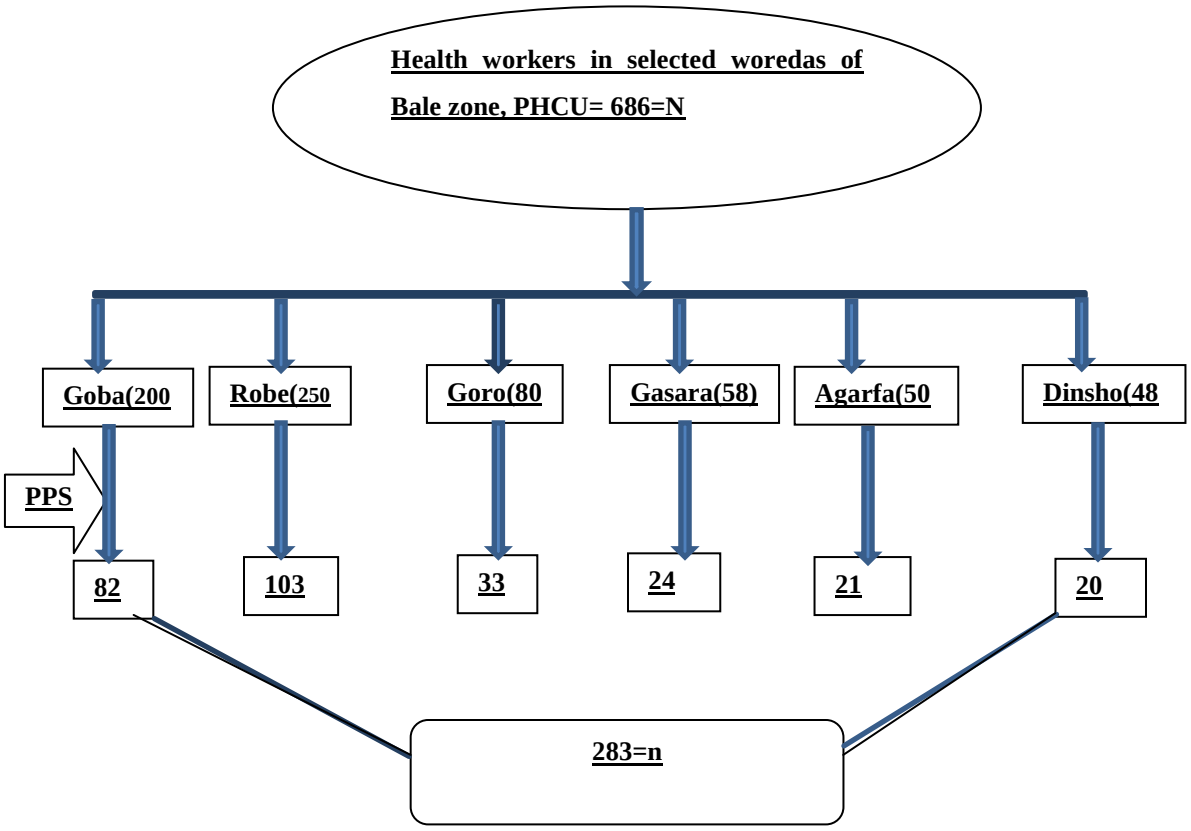

Figure 2: Schematic representation of sampling method.

4.9 Data collection Tools

An English version Semi-Structured questionnaire was adapted and contextualized by reviewing different literatures (10, 36, 37, and 42) and pretest was done to check its validity in 10% health workers of non study area. It includes four main parts about health worker‘s socio demographics, knowledge, attitude and practice of health workers towards zinc supplementation in diarrheal management at primary health care units.

4.10 Method of Data Collection

Data were collected by self-administered questionnaires. Data were collected by six diploma nurses and the data collection process was supervised by the principal investigator. Before the date of actual data collection ,orientation was given for data collectors for one day about the data collection and how to handle the data and the content of the instrument. Questionnaires were filled by health workers in their respective work place.

4.11 Variable

4.11.1 Dependent

- Zinc supplementation practice.

4.11.2 Independent

- Socio demographic characteristics of Health workers’
- Knowledge of health workers.
- Attitude of health workers’.
- Health facility related factors.

4.12 Operational Definition of Terms

Health workers:-according to this study, it included General practitioners, HO, BSCN, Diploma nurse (clinical or public) and HEWs.

Primary health care unit:-it included district hospitals, H/Cs and H/Ps.

Knowledge:-According to this study, those respondents who answered knowledge questions above the mean have adequate knowledge and those who answered below the mean have inadequate knowledge. To determine the knowledge level of the health workers 16 questions were asked. The mean score (10.3) was used to classify

the health care workers' level of knowledge into adequate knowledge and inadequate knowledge about Zn in treatment of childhood diarrhea.

Attitude: - To determine the attitude towards zinc supplementation practice 8 questions were asked. The mean score (4) was used to classify the health care workers' attitude into good attitude and poor attitude towards Zn in treatment of childhood diarrhea.

Zinc supplementation practice:-prescribing zinc alone or in combination for children in diarrheal cases.

4.13 Pretest

The questionnaire was pre- tested to avoid any confusion during the actual data collection period. The principal investigator was checked (10%) health workers response one week prior to the actual data collection period in Dodola hospital and Adaba health center. This is helpful for the investigator to screen out vague questions and modify some of the question item as soon as possible.

4.14 Data Processing and Analysis

The collected data were, coded, entered and cleaned into computer using Epinfoversion3.1 and exported into SPSS16th version for analysis. The univariate analysis such as percentage and frequency distribution of different characteristics of the questionnaire was analyzed. Bivariate analysis was used to see the association of independent with the dependent variable. Multivariate Logistic regression model was employed to control confounding variables, variables included in the model were restricted to those significantly related to zinc supplementation at the bivariate level and some of the statistical test like, odds' ratio (crude & adjusted) were used to measure their association and even though limited studies done on this area, some of the results was compared with results of other studies available.

4.15 Ethical Consideration

Letter of ethical approval was obtained before the beginning of data collection from departmental review board of Nursing and Midwifery, College of Health Science, Addis Ababa University. Permission letter was provided to zonal health office, and in turn to the selected hospital, health centers and health posts for proceeding data collection. After that participants were well oriented about the purpose and procedure of data collection, and that confidentiality and privacy was ensured. It is also cleared that participation was fully based on the willingness of participants using written consent; name and address of the interviewee were not recorded in the questionnaire.

4.16 Dissemination of Results

The findings of this study will be communicated through Addis Ababa University Health Sciences College, Health Sciences College library, Bale zone's health office, Oromia regional state health bureau, and attempts should also be made to publicize on national and international peer reviewed journals if possible.

5. Results

5.1. Socio-demographic Distribution of health workers at PHCU in selected woredas of Bale Zone South East Ethiopia

A total of 274 out of 283 health care workers participated in the study making the response rate of 97% of which 138(50.4%) were males and the rest 136 (49.6%) were females. About 193(70.4%) were in age group of 20-29. Concerning their qualification diploma nurses comprise 145(52.9%) and the least number were GPs which was 11(4.0%). Regarding place of work about 136 (49.6%), 93 (33.9%), 45 (16.4%) were working at health Centers, Hospitals and Health posts respectively. Two hundred (73%) study participants were not taken training on management of childhood diarrhea in the last six months (Table 1).

Table 1 Socio Demographic distribution of the study subjects s at PHCUs in selected woredas of Bale zones, south east Ethiopia2015

Variables	N=274	Categories	No	%
Sex		Male	138	50.4
		Female	136	49.6
Age		20-29	193	70.4
		30-39	60	21.9
		40-49	14	5.1
		50-59	7	2.6
Current profession				
		HEW	45	16.4
		Diploma nurse	145	52.9
		BSc nurses	35	12.8
		Health officers	38	13.9
		GP	11	4.0
Work experience				
		less than 5 years	140	51.1
		5-10years	102	37.2
		11 and above	32	11.7
Place of work		HOSPITAL	93	33.9
		H/C	136	49.6
		H/P	45	16.4
Training on management of childhood diarrhea in the last six months				
		YES	74	27.0
		NO	200	73.0

5.2. Awareness and Knowledge of the study subjects on Zinc as management for Childhood Diarrhea

About 244 (89.1%) of health workers heard about Zn in treatment of childhood diarrhea. The major sources of information was mass media (Radio and TV) which was 123(36.4%) followed by from the Co-workers which was 70(20.7%) (Figure 1)

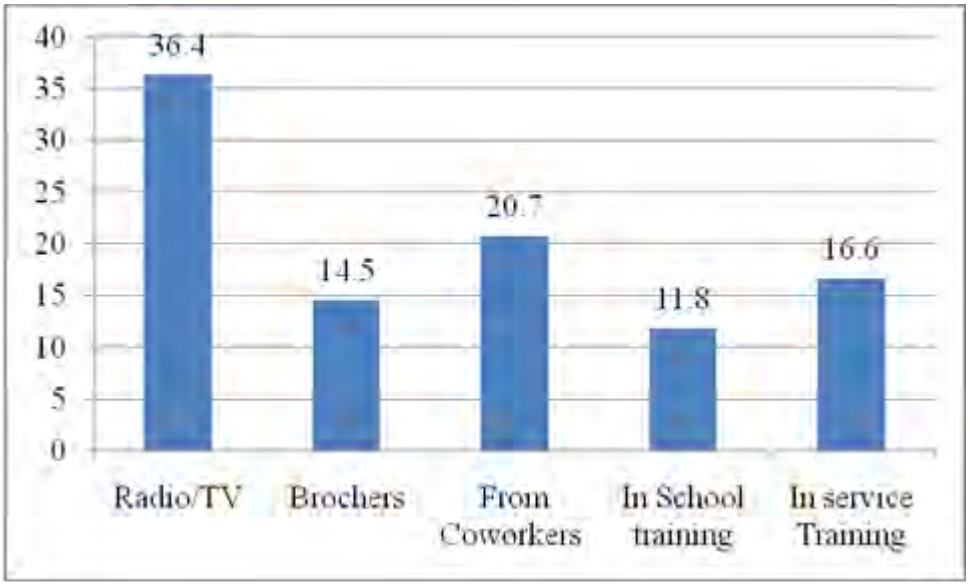

Figure3: Percentage distribution of Sources of information about zinc in the management of childhood diarrhea among study subjects at PHCUs in selected woredas of Bale Zone, South East Ethiopia, 2015.

About 75(27.4%) of the study participants mentioned that zinc can be used for the management of persistent diarrhea and bloody diarrhea in childhood while 126(46%) mentioned that Zinc can't be used. About 143(52.2%) of them reported that Zinc stops diarrhea quickly or soon and 202(73.7%) were aware that Zinc lessens the severity of diarrhea. One hundred fifty one (55.1%) said Zinc protects the child from getting another episode of diarrhea soon while 123(44.9%) were not.

Concerning the dose of zinc for childhood diarrhea management for a child less than six months and six months and above, 132(48.2%), and 128(46.7%) were reported the correct doses respectively. About 127(46.4%) of them were not knew the correct doses of Zinc for childhood diarrhea management of Childs while 15(5.5%), and

19(6.9%) mentioned the incorrect doses of Zinc for childhood diarrhea management of less than six months and above six months respectively.

Concerning the duration and frequency of Zn for childhood diarrhea management, 149 (54.4%), and 116 (42.3%) reported the correct duration of Zinc for the management of childhood diarrhea respectively. About 19 (6.9%) and 31(11.3%) of them reported the incorrect duration and frequency respectively, while 106(38.7%) and 127(46.4%) not knew the correct duration and frequency of Zinc for childhood diarrhea management respectively.

Table 2 Distribution of the study subjects on knowledge of Zinc as management for childhood diarrhea at PHCUs in selected woredas of Bale Zone, South East Ethiopia.2015

Knowledge Variables	Response category	N	%
Have you heard about Zn in treatment of childhood diarrhea	Yes	244	89.1
	No	30	10.9
	I don't know	20	7.3
Can we give Zn for child with persistent diarrhea?	Yes	75	27.4
	No	126	46.0
	I don't know	73	26.6
Can you prescribe Zn for child with bloody diarrhea?	Yes	75	27.4
	No	126	46.0
	Don't know	73	26.6
Dose of Zn for child less than six months	Correct doses	132	48.2
	Incorrect doses	15	5.5
	I don't know	127	46.4
Dose Zn for child six months and above	Correct doses	128	46.7
	Incorrect doses	19	6.9
	I don't know	127	46.4
Duration of Zn Treatment for children with childhood diarrhea	Correct duration	149	54.4
	Incorrect duration	19	6.9
	I don't know	106	38.7
Frequency Zn per day for children with childhood diarrhea	correct frequency	116	42.3
	Incorrect frequency	31	11.3
	I don't know	127	46.4
Zinc& ORS can be given at same time for child with diarrhea?	Yes	191	69.7
	No	36	13.1
	I don't know	47	17.2
Can zinc have any side effects?	Yes	77	28.1
	No	197	71.9
Can zinc be given with others medicines?	Yes	199	72.6

	No	75	27.4
Zinc supplementation is the fourth rule in home management of diarrhea	Yes	117	42.7
	No	157	57.3
Zinc stops diarrhea quickly or soon.	Yes	143	52.2
	No	131	47.8
Zinc lessens the severity of diarrhea.	Yes	202	73.7
	No	72	26.3
Zinc protects the child from getting another episode of diarrhea soon	Yes	151	55.1
	No	123	44.9
Zinc improves the appetite of the child.	Yes	174	63.5
	No	100	36.5
Zinc is necessary if diarrhea is mild.	Yes	171	62.4
	No	103	37.6

To determine the knowledge level of the health workers 16 question were asked concerning the importance's of zinc on treating childhood diarrhea, its doses, duration of treatment, frequency of treatment per day, whether Zn has side effect or not, Zn used for home management of childhood diarrhea, and whether Zn will be given in combination with ORS or Not and others question were asked.

The mean score (10.3) was used to classify the health care workers' level of knowledge into adequate knowledge about Zn in treatment of childhood diarrhea or not. Accordingly about 159(58%) of health care workers have adequate knowledge while the rest not (Table 3).

Table 3: Knowledge of the study subjects on Zn as treatment of Childhood diarrhea at PHCUs in selected woredasof Bale Zone, southeast Ethiopia, 2015

knowledge classification	N	%
Adequate knowledge	159	58.0
inadequate knowledge	115	42.0
Total	274	100.0

5.3Attitudes of study subjects towards zinc Supplementations in Managements of Childhood diarrhea

About 149(54.4%) of health workers were reported that Zinc tablets should be promoted for diarrheal management instead of anti-diarrheal and unnecessary antibiotics while, 125(45.6%) were not. However, about 212(77.4%) were ready to use zinc for diarrheal management of childhood diarrhea. Regarding inclusion of zinc as essential drug list in their facility 157(57.3%) of them were considered zinc as essential drug list while 117(42.7%) were not considered as essential drug list in their facilities. About 196(71.5%) said that Zinc is good as alternative home remedies for diarrhea management while 78(28.5%) were not considered Zn as alternative home remedies (Table 4).

Table 4: Attitude of the study subjects towards zinc supplementation practice in management of childhood diarrhea at PHCUs in selected woredas of Bale Zone South East Ethiopia 2015

Variables	Responses	N	%
Zinc is the appropriate treatment of diarrhea in Under Five children's?	YES	228	83.2
	NO	46	16.8
Zinc tablets should be promoted for diarrheal mgt instead of anti-diarrheal and unnecessary antibiotics?	YES	149	54.4
	NO	125	45.6
Are you ready to use zinc if child comes to you with diarrheal disease?	YES	212	77.4
	NO	62	22.6
Is zinc treatments are too expensive?	YES	66	24.1
	NO	208	75.9
If zinc is supplemented once it can help to prevent sickness in the coming months.	YES	136	49.6
	NO	138	50.4
Is Zinc considered as an essential drug list in your facility?	YES	157	57.3
	NO	117	42.7
Zinc is difficult to administer?	YES	67	24.5
	NO	207	75.5
Zinc is good as alternative home remedies for diarrhea	YES	196	71.5
	NO	78	28.5

To determine the attitude towards zinc supplementation practice 8 questions were asked. The mean score (4) was used to classify the health care workers' attitude into good attitude and poor attitude towards Zn in treatment of childhood diarrhea.

In general about 147(53.6%) of health workers were had A Good attitude whereas the rest, 127(46.4%) had poor attitude toward Zn as treatment of Childhood diarrhea.

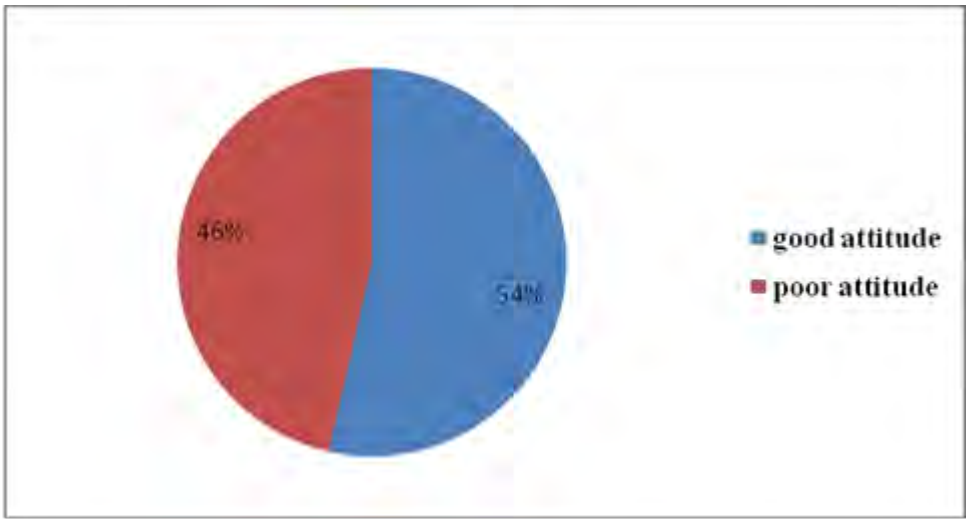

Figure 4: Attitudes of study subjects on Zn as treatment of Childhood diarrhea at PHCUs in selected woredas of Bale Zone, southeast Ethiopia, 2015

5.4. Zinc supplementation practice

About 203(74.1%) of health workers at PHCUs treated child with diarrhea in last six months. Of these about 26(12.8%), 82(40.4%), 101(49.8%) 117(57.6%) were treated the child with zinc alone, antibiotics with zinc, ORS with zinc and ORS alone respectively.

One hundred thirty four (66.0%) of the health workers used zinc as treatment of childhood diarrhea in last six months in combination with other treatment or zinc alone whereas 69(34%) not used zinc in management of childhood diarrhea.

Table 5: Zinc supplementation practice among the study subjects at PHCUs in selected woredas of Bale Zone, South East Ethiopia, 2015

Variables	Responses	N	%
In last six months, have you treated child with diarrhea?	Yes	203	74.1
	No	71	25.9
If yes, have you ever used zinc in treatment of childhood diarrhea?	Yes	134	66.0
	No	69	34.0

5.5. Perception on availability and affordability of zinc for childhood diarrhea management among the study subjects.

To identify the availability and affordability of zinc in management of childhood diarrhea four questions were asked, those health care providers who were working at PHCU, whether zinc was stocked in the facility, drug vendors nearby stocked zinc or not, care givers failed to get zinc after their prescription or not, and the consumers could afford the cost of zinc or not.

About 81(29.6 %) of the participants were reported that zinc were stocked in their facility, 148 (54.0 %) of them said that it was not stocked, and the rest of them reported that we don't know whether it was stocked or not. One hundred three (37.6 %) of the respondents mentioned that, the consumers can afford the cost of zinc for management of childhood diarrhea and 89 (32.5 %) of them said that the consumers couldn't afford and the others reported that we don't know whether they afford or not (Table 6).

Table 6: Perception on availability and affordability of zinc among the study subjects at PHCUs in selected woredas of Bale Zone South East Ethiopia 2015

Variables	Responses	N	%
Is there a zinc stock in the facility you are working	YES	81	29.6
	NO	148	54.0
	I DONT KNOW	45	16.4
	Total	274	100.0
Is drug venders nearby always have zinc for sale?	YES	43	15.7
	NO	130	47.4
	I DONT KNOW	101	36.9
	Total	274	100.0
Did the family ever failed to get Zn after prescription?	YES	66	24.1
	NO	125	45.6
	I DONT KNOW	83	30.3
	Total	274	100.0
Do you perceive that the community can afford the cost of Zinc?	YES	103	37.6
	NO	89	32.5
	I DONT KNOW	82	29.9
	Total	274	100.0

Table 7: Factors associated with zinc supplementation practice in diarrheal management among the study subjects at PHCUs in selected woredas of Bale zone south east Ethiopia 2015, OR=odds Ratio, p= p-Value, CI=Confidence Interval

Variables		Unadjusted OR(95%CI)	P	adjusted OR(95%CI)	P
Training	Yes	**2.1(1.03-4.08)**	**0.04**	**2.5(1.001-6.41)**	**0.049**
	No	1		1	
Experience	<5 years	1.7(0.7-3.9)	0.25	0.8(0.25-2.46)	0.675
	5-10yeras	0.9(0.4-2.3)	0.89	0.4(0.11-1.47)	0.168
	>11 years	1		1	
Knowledge	Adequate	**5.7(3.0-10.8)**	**0.000**	**2.6(1.15-5.84)**	**0.022**
	Inadequate	1		1	
Attitudes	Good	**2.5(1.3-4.5)**	**0.003**	0.9(0.42-2.03)	0.835
	Poor	1		1	
Information about zinc	Yes	**15.2(4.9-46.5)**	**0.000**	**8.5(1.83-39.08)**	**0.006**
	No	1		1	
Qualification	Certificate	0.8(0.35-1.90)	0.649	3.4(0.73-16.17)	0.118
	Diploma	1.7(0.90-3.36)	0.098	1.9(0.84-4.54)	0.120
	Degree	1	1	1	
Community afford	Yes	**7.1(3.22-15.55)**	**0.000**	**4.7(1.94-11.60)**	**0.001**
	No	3.5(1.68-7.23)	0.001	2.6(1.05-6.54)	0.039
	I don't know	1		1	

5.6 Factors associated with zinc supplementation practice in diarrheal management among the study subjects.

5.6.1. Binary logistic regression

To identify factors affecting Zn supplementation practice binary logistic regression was used. Accordingly, trained health care workers on management of child hood diarrhea prescribe zinc in treatment more likely compared to those who didn't take training (COR=2.1(95%CI: 1.03-4.08; P=0.04).

Being having adequate knowledge about zinc in management of childhood diarrhea was positively associated with prescribing zinc compared to being having inadequate knowledge about zinc (COR=5.7(95%CI: 3.00-10.80; P=0.000).

Those health care workers who had Good attitude toward the supplementations of zinc in management of childhood diarrhea was positively associated with prescribing zinc compared to those who had poor attitude (COR=2.5(95%CI:1.3-4.5; P=0.003).

Those health care workers who had Information about zinc in management of childhood diarrhea were more likely to prescribe zinc compared to those who hadn't information (COR=15.2(95%CI: 4.9-46.5; P=0.000).

Regarding the perception of health care workers on whether the community afford or not the cost of Zinc, those who reported the community can afford were more likely to prescribe zinc compared to those who don't know whether the community afford or not (COR=7.1, 95%CI=3.22-15.55; P=0.000).

5. 6.2. Multiple logistic regressions

To identify factors affecting Zn supplementation practice a multivariable logistic regression was used. Accordingly, trained health care workers on management of child hood diarrhea prescribe zinc in treatment more likely compared to those who didn't taken training (AOR=2.5(95%CI: 1.001-6.41; P=0.049).

Being having adequate knowledge about zinc in management of childhood diarrhea was positively associated with prescribing zinc compared to being having inadequate knowledge about zinc (AOR=2.6(95%CI: 1.15-5.84; P=0.022).

Those health care workers who had Information about zinc in management of childhood diarrhea were more likely to prescribe zinc compared to those who hadn't information (AOR=8.5(95%CI: 1.83-39.08; P=0.006).

Regarding the perception of health care workers on whether the community afford or not the cost of Zinc, those who reported the community can afford were more likely to prescribe zinc compared to those who don't know whether the community afford or not (AOR=4.7, 95%CI=1.94-11.60; P=0.001).

6. Discussion

Zinc has been proven to significantly reduce morbidity and mortality from diarrhea in young children [34, 35] and was incorporated in the diarrhea management guidelines since 2005[36]. The awareness of the inclusion of zinc in the management of childhood diarrhea among health care providers has been reported to be high in some developing countries. Despite this growing awareness, its use in diarrhea treatment in many of these countries has lagged behind [10] so, this study tried to assess factors affecting practices of zinc supplementation among health workers in PHCU of Bale Zone.

This study found that about 89.1% of health workers were heard about Zn in treatment of childhood diarrhea. This finding is higher than the finding from study carried out in Nigeria on health care workers which showed that 66.1%of them aware of zinc supplementation [10]. A prospective study from Thane District of Maharashtra showed that about 2.3% health workers heard of zinc role in diarrheal management [43] which is incomparable with finding from our study. This information difference might be due to the role of mass media in promoting or advertising the role of zinc in management of diarrhea in our country, Ethiopia.

The study from Uganda also reported that 86% of providers heard of zinc as treatment for diarrhea [47], which was consistent with finding from this study.

Different studies revealed that the main sources of information were, TV/radio, continuing medical education sessions, medical or drug representatives, training of work shop and co-workers[10, 47,]. Similarly, mass media, co-workers and in service training were the main sources of information in current study.

This study found that more male health workers had heard about Zinc than female health care workers which is consistent with finding from Nigeria which reported that about 70.4% of the male health care workers were aware of zinc compared with 65.2% of the female health care workers [10]

This study found that about 27.4% of health workers knew that zinc supplementation for child with persistent diarrhea. This finding is lower than finding from Nigeria

which reported 50.2% of health care workers knew persistent diarrhea can be treated by zinc [10]

This study also tried to assess the knowledge level of health workers regarding the correct doses, frequency and duration of zinc in management of childhood diarrhea and about 48.2%, 54.4%, 42.3% were knew correct doses, duration and frequency of zinc for child less than six months respectively. While about 46.7%, 54.4% were knew correct doses and duration of zinc in treatments of child diarrhea for age of six months and above. About 46.4% of health workers knew the correct doses of zinc regardless of age of the child. This finding is lower than the finding from Benin City of Nigeria which reported a high proportion of Health care workers (66.7%) were knew the correct doses of zinc for child with diarrhea [10]. This difference might be due to that majority of health workers in this study were not received training on management of childhood diarrhea.

Another study from jigawa state, Nigeria reported that 60% HCW were not knew the correct doses of Zn and 63% of them not knew the correct duration of zinc treatments for under five children.[46] In this study about 8% of PHCWs were not known the correct doses of zinc and 6.9% were not known correct duration of the treatment. This gap might be due to lack of information in former study.

About 54.4% of health workers were reported that Zinc tablets should be promoted for diarrheal management instead of anti-diarrheal and unnecessary antibiotics. This finding is in consistent with the finding from Lahore city of Pakistan which reported that 42.1% of GPs had Belief in the role of Micro-nutrient in management of acute water diarrhea [45].

This study found that, Out of 203, who were treated childhood diarrhea in the last six months, 134 (66.0%) of health worker were practiced zinc supplementation in management of childhood diarrhea. This finding is higher that the finding from Nigeria which revealed that about 35.1% of the health care workers prescribes zinc when managing childhood diarrhea [10], a study from Uganda reported that 28% of providers were reported that they gave zinc in addition with other drugs for childhood diarrheal management [47]. This might be due to awareness difference about zinc, magnitudes of diarrhea and availability of zinc.

In current study no significant difference in prescribing zinc by sex while higher proportion of the female health care workers (38.1%) prescribed zinc more than the male health care workers (21.1%) in Benin-City of Nigeria [10].

In this study about 34.0% of health workers were not practiced zinc alone or in combination with other drugs in child hood diarrhea management, this finding was lower than the cross-sectional prescription analysis on Adherence to treatment guidelines for acute diarrhea in children up-to-12 years in Ujjain, India reported that about 71% of doctors were prescribe antibiotics without zinc inclusion in their management of childhood diarrhea, this practice gap might be due to that Doctors of the public sectors were prescribing antimicrobial more related to agreement with social expectations rather than their knowledge and guidelines [37].

Study from Madagascar among trained health workers on IMCI was found the inconsistent uses of IMCI standard and uses of cotrimoxazole for treating simple diarrhea rather than using Zinc [41]. While in current study those trained on childhood diarrhea management were more likely to use zinc in treatment of childhood diarrhea. This difference might be due to the role of mass media in advertising the role of zinc in management of diarrhea and brochure distribution at different PHCU by stakeholders in our cases.

This study found that knowledgeable health workers were more likely to prescribe zinc combination treatments in management of childhood diarrhea. However, The study from Lahore city of Pakistan revealed that majority of the GPs were not practicing zinc supplementation according to their knowledge due to lack of awareness on ORS plus zinc alone can manage diarrhea.[45]. The current study also in line with study from Tanzania that reported an improved knowledge and practice among providers in prescribing zinc for childhood diarrhea after training was given to them on zinc [42].

In this study about 81(29.6%), 148(54.0%) and 45(16.4%) of the study subjects reported that zinc were stocked in the facility they are working in, not stocked in the facility and they did not know whether it stocked or not respectively. Similarly they reported that about 43(15.7%), 130(47.4%) and101 (36.9%) of them reported that drug vendors nearby always had zinc for sales, had not zinc for sales and they did not know whether drug vendors nearby had zinc for sales respectively. This might show

that there was limited distribution of zinc in health facilities and poor attitude of health workers on zinc and they did not consider as an essential drugs. In this study about 89(29.9%) of the study subjects were perceived that the community cannot afford the cost of zinc in management of childhood diarrhea, this might be contributed for low utilization of zinc in diarrheal management among health workers in the study area.

7. CONCLUSION AND RECOMMENDATION

Conclusion

- The study has revealed a gap in the knowledge, attitude and practice with respect to zinc supplementation in the management of childhood diarrhea at the study area.
- Health workers who had received training on management of childhood diarrhea, adequate knowledge about zinc, and had awareness about zinc were more practice Zn supplementation in the management of childhood diarrhea
- This study demonstrated that health workers were not strictly adhered to standard treatment guidelines for management of diarrhea in children under 5 years at PHCU in Bale Zone, south east, ETHIOPIA.
- The study also revealed that there was a shortage of zinc distribution and a misperception about cost of zinc in diarrhea management among study subject at PHCUs in the study area

Recommendation

For Woreda and Zone health bureau

- Training/sensitization activities for health workers on the use of new ORS and adjunct zinc treatment for diarrhea management should be done.

For RHB/FMOH

- Making the drug available throughout the PHCUs all the time
- There is an urgent need to revitalize, maintain and enhance the skill of health care workers in managing children with diarrhea through periodic re-fresher and update courses.

For health care provider:-They should be adhered to National Guide line for treatment of childhood diarrhea at PHCUs as much as possible.

For NGOs

- Support the facilities with Supplies and logistics distributions

- Conduct regular Supportive supervision in facilities to ensure availability of commodities.

For researchers:-This study may be further extended to study the actual change produced in the community after the health workers' implementation of Zinc related interventions.

8. Strength and limitation

Strength

- The study tried to include different professionals working at PHCUs.
- This study assessed the knowledge attitude and practice for Zinc related intervention.
- It also assessed the availability of commodities at PHCUs.
- It will be used as a baseline information for others

Limitation

- The potential for recall bias exists in this study since data were based on self- reported information.
- However, it may have increased the risk of over-reporting good practices. Generally, self-reported practices have lower validity than other more objective measurements
- In addition, being a cross-sectional study, a causal relationship between specific variables and use of zinc supplementation cannot be inferred
- Lack of adequate literatures on the study problems.

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Annexes

Annex I: Information and Consent Sheet

Information sheet and consent form is prepared for health workers who are participated in research project, a cross-sectional study to identify factors affecting health workers on zinc supplementation in diarrheal management at primary health care unit, in selected woredas of bale zone, south east, Ethiopia, 2014.

Name of Principal investigator: Dadei Bekele

Name of the organization: Addis Ababa University, College of Health Sciences, Department of Nursing and Midwifery.

Name of the Sponsor: Addis Ababa University

This information sheet and consent form is prepared to explain the study you are being asked to join. Please listen carefully and ask any questions about the study before you agree to join. You may ask questions at any time after joining the study. The investigator is final year MSN graduate student from the department of nursing, college of health science, Addis Ababa University, and one advisor from Addis Ababa University.

Purpose of Research Project: - I am hopeful that this research will contribute for reducing mortality and morbidity of child by identifying the factors that affect use of zinc supplementation in management of childhood diarrhea among health care workers at primary health care units.

Procedure

To assess factors affecting health workers on use of zinc supplementation in case of diarrheal management in children ≤ 5 years at primary health care unit in selected woredas of bale zone. You are invited to take part in this project. If you are willing to participate in this project, you need to understand and tick ―yes‖ the agreement form. Then after, you will receive the questionnaire from the data collector to give your response. You do not need to write your name on the questionnaire and all your responses and the results obtained will be kept confidentially by using coding system whereby no one will have access to your response.

Risk/ Discomfort:-By participating in this research project, you may feel that it has some discomfort especially on wasting time about 30 minutes. We hope you will participate in the study for the sake of the benefit of the research result. There is no risk in participating in this research project.

Benefits: If you participate in this research project, there may not be direct benefit to you but your participation is likely to help us in assessing the practice of health workers on use of zinc supplementation for diarrheal management in under five children at primary health care units. Ultimately, this will help us to identify the gap and take the appropriate intervention by the authorized stakeholder.

Incentives:-You will not be provided any incentive or payment to take part in this project.

Confidentiality:-The information collect from this research project will be kept confidential and information about you that will be collected by this study will be stored in a file, without your name, but a code number assigned to it. In addition, it will not be revealed to anyone except the principal investigator and will be kept locked with key.

Right to refuse or withdraw: You have full right to refuse from participating in this research. You can choose not to respond to some or all questions if you do not want to give your response. You have also the full right to withdraw from this study at any time you wish, without losing any of your right.

Persons to contact:

If you have any question to ask, please contact

DadeiBekele. Tel: +251-911-06-4891, Email = Dadeibekele@gmail.com

Annex II: Questionnaire

Addis Ababa University

College of Health Science

Department of Nursing and Midwifery

Consent form: - This questionnaire is prepared to assess the factors affecting health workers on zinc supplementation in diarrheal management at primary health care unit, in selected woredas of bale zone, south east, Ethiopia, 2014.The assessment is made for the partial fulfillment of Master's Degree in Nursing. The results of the study will be used as base line information to design appropriate intervention strategies to increase health workers capacity in diarrheal management in under five children at primary health care units. The questionnaire contains both closed and open ended questions and will be provided in self-administered form. You are therefore kindly requested to provide genuine answers to the questions. The information you provide is confidential and is used only for the purpose of this study. If you have any question, don't hesitate to ask the data collector. Your cooperation and participation until the completion of the questionnaire is very necessary for the successful completion of the assessment. We therefore ask your genuine willingness. However, you have the right to turn down if you are not voluntary to participate fill -No' in the box below.

If you are voluntary Yes ☐ No ☐

Thank you in advance for your cooperation

Data collectors sign: _____

I. Socio demographic data of health workers

All questionnaires are completed anonymously. We would appreciate if you answer all the questions and answer as honestly as possible. Please circle on the letter you select that best answers the question. Kindly make only one Selection unless otherwise instructed.

S/n	Questions	Response
101	What is your sex?	1. Male 2. Female
102	How old are you?	_____
103	What is the highest level of education you have completed?	1. HEWs 2. Diploma nurse (clinical/public). 3. BSCN. 4. HO. 5. GP.
104	How long have you been working in experience?	_____
105	Now, where are you working in?	1- Hospital, 2- H/C, 3- H/P

Section 2.Knowledge of health workers about zinc supplementation in management of childhood diarrhea.

S/N	Questions	Responses	Skip
201	Have you heard about zinc in the treatment of diarrhea?	1. yes 2. No, go to question →	203
202	If yes for question No-201, what are your sources of information about zinc in diarrheal treatment?	1. Radio/TV. 2.Newspaper/magazines, books, journals. 3. From co workers 4. In school training	
203	Can you give zinc for child with persistent diarrhea?	1. Yes, go to question → 2. No. 9. I don't know	205.
204	Can you prescribe zinc for child who has blood in the stools?	1. Yes. 2. No. 9. I don't know	
205	What is the dose of zinc for children less than 6month	_____in mg.	

	of age?		
206	What is the dose of zinc for children 6month and older?	_____in mg.	
207	How many times / how frequent/ a day should zinc be administered to a child with diarrhea?	_____times 9. I don't know	
208	How many days should zinc be administered to a child with diarrhea?	_____complete days. 9.I Don't know	
209	Can you give zinc and ORS at the same time for child with diarrhea?	1. Yes, go to question → 212 2. No 9. I don't know	
210	Can zinc have any bad side effects?	1. Yes. 2. No, go to question → 214	
211	Can zinc be given with others medicines?	1. Yes 2. No	
212	Do you know that, zinc supplementation is the fourth rule in home management of diarrhea?	1. Yes 2. no	
213	Zinc stops diarrhea quickly or soon.	1. Yes 2. no	
214	Zinc worsens the severity of diarrhea.	1. Yes 2. no	
215	Zinc protects the child from getting another episode of diarrhea soon	1. Yes 2. no	
216	Zinc improves the appetite of the child.	1. Yes 2. No	
217	Zinc is not necessary if diarrhea is mild.	1. Yes 2. No	

ATTITUDE QUESTIONS.

II. The following statements refer to the attitude of health workers towards zinc supplementation in management of childhood diarrhea. “The Attitude of health workers towards zinc supplementation in management of childhood diarrhea," as you sees it. The two columns provide spaces for the following responses: - YES, NO

Please put right mark (√) the response which must closely reflects your feelings. There is no right or wrong answers.

The attitude of health workers towards zinc supplementation in management of childhood diarrhea.		Response	
		Yes	No
301	Do you agree that, Zinc is the appropriate treatment of diarrhea in under five children’s?		
302	Do you agree that, Zinc tablets should be promoted for diarrheal mgt instead of anti-diarrheal and unnecessary antibiotics?		
303	. Are you ready to use zinc if child comes to you with diarrheal disease?		
304	Do you agree that, zinc treatments are too expensive?		
305	Do you agree that, once zinc is supplemented for childhood diarrhea it can help to prevent sickness in the coming months?		
306	Do you agree that, Zinc considered as an essential drug list in your facility?		
307	Do you agree that, Zinc is difficult to administer in childhood diarrhea?		
308	Do you agree that, Zinc is good as alternative home remedies for diarrhea?		

Zinc supplementation practice in management of childhood diarrhea among health workers.

s/n	Questions	Response	Skip
401	In last six months, have you treated child with diarrhea?	1. Yes 2. No,go to question	→501
402	If yes, with what did you treat the child?		
	a. zinc alone	1. Yes 2. no	
	b. ORS with zinc	1. Yes 2. no	
	c. ORS alone	1. Yes 2. no	
	d. antibiotics alone	1. Yes 2. no	
	e. ORS and antibiotics	1. Yes 2. no	
	f. antibiotics and zinc	1. Yes 2. No	
403	If you didn't used Zinc alone or Zinc with other drugs to treat diarrhea, what was your reason? Hint: if your response to question number 402 is 'NO' for a, b,& f.		

Questions regarding perception on availability and affordability of zinc among health workers for treatment of diarrhea in Under five children

s/n	Questions	response	Skip
501	Is there a zinc stock in the facility you are working?	1. Yes 2. No 9 I don'tknow	
502	Is drug venders nearby always have zinc for sale?	1. Yes 2. No 9. I don't know	
503	Did the family ever failed to get Zn after prescription?	1. Yes 2. No 9. I don't know	
504	Do you perceive that the community can afford the cost of Zinc?	1. Yes 2. No 9. I don't know	

Declaration

I the undersigned declare that this is my original work and has not been presented in this or any other University and all source of materials used for the thesis have been fully acknowledged.

Name of principal investigator: Dadei Bekele

Signature: _____

Date: _____

Place: Addis Ababa University College of Health Science School of Allied Health Science Department of Nursing and Midwifery

This proposal has been submitted for approval to:

Advisor: Berhanu Desselagn (MPH)

Signature: _____

Date: _____