

Gwarzo GD

CC –BY

Mothers' awareness and use of zinc in under-five children with diarrhoea in North-Western Nigeria

DOI:<http://dx.doi.org/10.4314/njp.v45i2.2>

Accepted: 3rd May 2018

Gwarzo GD (✉)
Department of Paediatrics,
Bayero University Kano, Nigeria

Abstract: *Background:* Zinc supplementation is recommended in the treatment of diarrhoea. It reduces the severity, duration and recurrence of diarrhoea. Mothers' knowledge and usage of zinc are important.

Objectives: This study assessed mothers' knowledge and use of zinc in children with diarrhoea. *Materials and Method:* The study was descriptive cross sectional of mothers who brought their children to a tertiary health centre in Kano, Nigeria. Mothers were selected consecutively from the Outpatient Clinic. Data were collected using questionnaire, and analysed.

Results: Among the 212 mothers selected 55.7% were aware of zinc in the treatment of diarrhoea and 51.9% gave zinc to their children. Health facilities were the sources of information in 55.9% of them. Urban residency and mother's education were associated higher rate of zinc utilization. *Conclusion:* Awareness and use of zinc among the mothers were modest. Maternal education and awareness campaigns are needed to improve its knowledge and usage.

Keywords: Zinc, diarrhoea, children, knowledge and practice, Nigeria.

Introduction

Zinc deficiency is common among children in developing countries.^{1,2} Diarrhoea, which worsens zinc deficiency is still common among children in these regions.^{3,4} Conversely, zinc deficiency may exacerbate the passage of unusually loose or watery stools, through various mechanisms and may contribute to undernutrition in these children.⁵⁻⁷

Studies have shown that zinc supplementation (10-20mg daily for 10-14 days) in children with diarrhoea reduced the duration by up to 24%,^{8,9} stool volume by 30%,¹⁰ and the incidence of diarrhoea in children by 15% to 18%.^{9,11} The benefits of zinc were observed in both acute and persistent diarrhoea.² Because of these benefits, the World Health Organization (WHO) and United Nations Children's Fund (UNICEF) recommend the use of oral zinc and ORS in management of diarrhoea in children.^{7,10}

Awareness of the inclusion of zinc in the management of childhood diarrhoea among health care providers has been high in some countries¹² and low in others.^{13,14} In a study in Nigeria, only two-thirds of healthcare workers were aware of zinc supplementation, 35% of them prescribed zinc when managing childhood diarrhoea and 10% of these do so for every case of childhood diarrhoea.¹⁵ But success in reducing diarrhoeal morbidity and mortality by administering zinc to children with diarrhoea depends on the knowledge and acceptance of

zinc by the parents/caregivers of these children. In Nigeria, researches on the awareness and use of zinc among mothers of children with diarrhoeal diseases are lacking. In order to assess the success of zinc supplementation in diarrhoeal diseases, and to find ways of promoting it, a study on the awareness and usage of zinc in children with diarrhoea is needed. This study evaluated the knowledge and use of zinc in mothers of children with diarrhoea brought to a tertiary hospital for care.

Materials and methods

The study was descriptive cross sectional conducted at the Outpatient Clinic of Murtala Mohammed Specialist hospital Kano, Nigeria. Consecutive mothers who brought their under-five children to the clinic for care were selected. Visitors who had been staying in the area for less than 10 days were excluded from the study. Investigator administered questionnaire was administered to the selected mothers between September and December 2016. The children were examined thoroughly and those who needed hospitalization were immediately sent to Emergency Paediatrics Unit (EPU). Information relating to biodata, diarrhoea and use of oral Zinc was obtained. The primary outcome indices were the percentage of caregivers who were aware that zinc is an appropriate treatment for diarrhoeal disease, and the percentage of mothers/caregivers who actually administered

zinc to their children who had diarrhoea.

All information obtained was recorded in the questionnaire, and confidentiality of the participants was kept. The data obtained were entered into Excel Spreadsheet and analysed using Excel and SPSS statistical software. Tables and charts were used to present the data. Ethical clearance for the research was obtained from the hospital Research Ethics Committee, and each participant gave an informed consent for the study.

Results

A total of 212 eligible mothers who brought their children for care were interviewed. The demographic data of the mothers is shown in Table 1. Majority of the mothers are unskilled self-employed, and resided in the urban areas.

Table 1: Mother's demographic variables

Variable	Frequency	Percentage
<i>Mother's Educational Level</i>		
Illiterate or primary school	111	52.4
Secondary school	84	39.6
Tertiary school	17	8.0
<i>Mother's Employment status</i>		
Unemployed	94	44.3
Employed	118	55.7
<i>Place of Residence</i>		
Urban	160	75.5
Rural	52	24.5

As shown in Table 2, only a little over half of 212 mothers who participated in the study were aware of Zinc as part of treatment of diarrhoea in children, while the remaining 44.3% never heard of it before. Close to half of the mothers surveyed did not know the use of Zinc in children, and 48.1% had never given zinc to their children with diarrhoea. Among 118 mothers who knew about zinc, 110 (93.2%) of them gave zinc to their children.

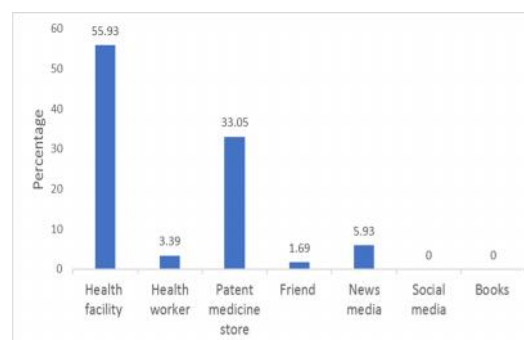
Out of 110 mothers who gave Zinc to their children, 107 (97.3%) of them were because of diarrhoea. As shown in Table 2, majority (70.9%) of children accepted Zinc easily as reported by 110 mothers who gave Zinc.

Health facility and Patent Medicine store were the main sources of information about zinc. More than half (55.9%) of 118 mothers knew about zinc from health facilities while one-third (33.1%) of them from Patent Medicine stores. Other sources of information about zinc included news media (5.9%), health worker outside health facility (3.4%) and friends (1.7%). None of them got the information from books or social media. These are shown in Figure 1.

Table 2: Knowledge and administration of Zinc by the mothers

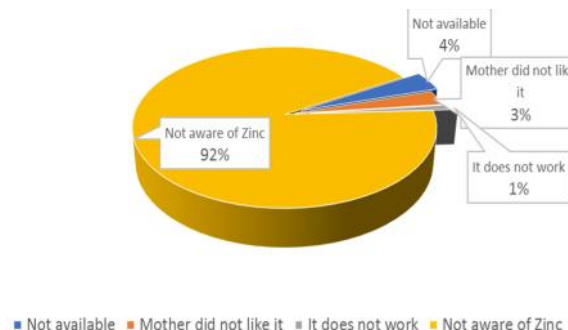
Variable	Frequency	Percentage
<i>Ever aware of Zinc supplementation in treatment of diarrhoea</i>		
Yes	118	55.7
No	94	44.3
<i>Knowledge of use of Zinc</i>		
Did not know	100	47.2
As part of treatment of diarrhoea	112	52.8
<i>Ever given Zinc to your child</i>		
Yes	110	51.9
No	102	48.1
<i>Reason for giving Zinc to your child</i>		
Diarrhoea	107	97.3
Vomiting	1	0.9
Other	2	1.8
<i>Acceptance of Zinc by the child</i>		
Refused/Force fed	6	5.5
Drank with difficulty	26	23.6
Drank easily	78	70.9

Fig 1: Sources of information about Zinc in 118 mothers.



Reasons given by 102 mothers who never gave Zinc to their children with diarrhoea were variable. Ninety-two percent of them did not give zinc to their children because they were not aware of it. Other reasons included zinc not available (4%), mother did not like zinc (3%) and mother believed zinc was not effective (1%). This is presented in Figure 2.

Fig 2: Reasons for not giving Zinc by 102 mothers



Mother's educational level up to secondary school and beyond, and residing in urban areas were significantly (p values 0.01 and 0.00 respectively) associated with administration of zinc to their children with diarrhoea. Other variables such as mother's employment, father's education, use of ORS, and presence of fever were not

significantly associated with the administration of zinc to these children as shown in Table 3.

Table 3: Relationship between zinc administration and some demographic variables

Variable	Administered Zinc		X ²	p value
	Yes	No		
<i>Mothers' education</i>				
None /less than secondary school	49	62	5.6	0.01
Secondary school or more	61	40		
<i>Mothers' employment status</i>				
Employed	68	50	3.5	0.06
Unemployed	42	52		
<i>Fathers' education</i>				
None /less than secondary school	30	38	2.4	0.12
Secondary school or more	80	64		
<i>Place of residence</i>				
Urban*	94	66	12.3	0.00
Rural#	16	36		
<i>Number of under-fives in the family</i>				
1-3	98	83	2.5	0.11
More than 3	12	19		
<i>Use of ORS[¶]</i>				
Yes	107	96	1.3	0.32
No	3	6		
<i>Presence of vomiting</i>				
Yes	22	29	2.1	0.15
No	88	73		
<i>Axillary temperature</i>				
Below 37.5 °C	38	41	0.7	0.40
37.5 °C or above	72	61		

* Metropolitan Local Government Areas (LGAs): Dala, Fagge, Gwale, Kumbotso, Municipal, Nassarawa, Tarauni and Ungogo LGAs. # All the remaining 36 LGAs. ¶ORS is Oral Rehydration Salt.

Discussion

Only 55.7% of the caregivers surveyed in this study ever aware of zinc supplementation, and just over half of them knew zinc is used as part of treatment of diarrhoea. This is in contrast to the lower level of awareness of 32% found by Ogunrunde et al in 2012 in North-Western Nigeria.¹⁶ Higher awareness level in the present study may be due to increase awareness of use of zinc over the years, and difference in study population with Kano state being more urban than states included in the previous study. Moreover, the educational level differed since 85.1% of female respondents in the previous study had no formal education. Higher awareness rate (66.7%) of zinc supplementation in diarrhoea was found in a study conducted in 2010 among health workers in Benin city Nigeria.¹⁵ It is not surprising that health workers used in Benin study, some of whom had training workshop on zinc, knew more about zinc supplementation than mothers.

Majority of the caregivers learnt about zinc from either health facilities or from patent medicine stores. This suggest that caregivers commonly take their children with diarrhoeal diseases to health facilities or patent medicine store (PMS) locally called "chemist." It also

means that health workers and PMS attendants are aware of zinc in treatment diarrhoea in children. This is supported by Benin-City study where health workers studied learnt about zinc from their colleagues (50.5%) or from training workshops (39.6%).^[15] With a significant number of mothers in the present study getting information about zinc in PMS, efforts aimed at increasing awareness and use of zinc should include PMS attendants since zinc formulations used for diarrhoea is a non-prescription drug.

Only 5.9% of them learnt about zinc from news media and none from social media. Since people in this area commonly utilise electronic media to get information (and news), adequate and sustain electronic media campaign could be an important tool in educating caregivers on the important of zinc in the treatment of diarrhoea. Similarly, social media can be utilized since it is increasingly being used by people to get information.

Almost all (93.2%) mothers who knew about zinc also administered it, at least once, to their children. Moreover, 97.3% of them administered it to children with diarrhoea. Similarly, 84.3% of caregivers in a study in the same zone earlier knew zinc is used in the treatment of diarrhoea.^[16] The overwhelming majority (92.0%) of the caregivers who did not give zinc was because they did not know about it. This underscores the importance of enlightening people in this area, using effective methods available, about the use of zinc in diarrhoea. The more caregivers know about zinc the more they use it in the management of diarrhoeal disease in children.

Majority (70.9%) of the children easily accepted zinc when offered by the mothers. They drank it easily probably due to palatability of zinc tablets being used.

The proportion of mothers who gave zinc to their children with diarrhoea was significantly higher in those whose level of education of at least secondary school. An educated mother is more likely to take her sick child to health facility for care, and more likely to adhere to the prescribed treatment than less educated one. This further illustrates the importance of girl child education since today's girls are the future mothers.

The place of residence had significant association with the use of zinc in children with diarrhoea. Higher proportion of mothers who lived in urban areas gave zinc than those in rural areas. This may be due to easier access to health facilities in urban than in rural areas of Kano state. There are more health facilities and PMSs, and more health workers in the urban than in the rural areas. Significant number of mothers got their knowledge about zinc from health facilities and PMSs. Furthermore, women in the urban areas are more educated than their counterparts in rural areas.

There is no significant difference in father's educational status (p=0.1) and mother's employment (p=0.06) status between those who gave zinc and those who did not give. In the study area, dispersible oral zinc tablets are given free to all children taken to health facility with diarrhoea. Therefore, the child will get oral zinc as far as he/she taken to a health facility for treatment irrespec-

tive of the father's educational status. Similarly, the child will receive oral zinc in the health facility irrespective of the mother's employment status.

There is no significant difference in the usage of zinc between the mothers who gave ORS to their children with diarrhoea and those who did not. This is surprising because in the current treatment of diarrhoea in children both ORS and zinc are given simultaneously. Therefore, it is expected that those who gave ORS are also more likely to administer zinc. This finding could be as a result of higher palatability of zinc compare to ORS solution. The children may have been refusing ORS solution and therefore the mothers no longer administer it. On the other hand, some mothers still believe in giving 'drugs' (tablets of syrups) rather than ORS solution to children with diarrhoea. These mothers probably gave zinc (but not ORS solution) because it is a tablet which is considered a 'drug'.

Administration of zinc to children with diarrhoea by the mothers was not associated with presence of vomiting or fever (axillary temperature 37.5 °C and above) in the children. In the presence of vomiting or fever, other

medications are usually given to these young children to treat common illnesses such as malaria. In this situation, zinc may wrongly be omitted even though there is diarrhoea.

Conclusions

In the study population, the awareness and use of zinc by mothers of children with diarrhoea were moderate. Mothers' education and residence in urban areas were associated with high rate of oral zinc administration to children with diarrhoea. Public enlightenment through electronic and social media may improve the acceptance and usage of zinc in the study population. Girl child education may have a long term positive impact on the use of zinc in this population.

Conflict of Interest: None

Funding: None

References

- Brown, K., Peerson, J. Allen, L. Effect of zinc supplementation on children's growth: a meta-analysis of intervention trials. *Bibl. Nutr. Dieta.* 1998;54:76-83.
- Black RE. Zinc Deficiency, Infectious Disease and Mortality in the Developing World. *J Nutr* 2003; 133:1485S-1489S.
- Murray C, Lopez A. The global burden of disease. A Comprehensive assessment of mortality and disability from diseases, injuries, and risk factors in 1990 and projected to 2020. Cambridge, MA: Harvard School of Public Health; 1996; 990.
- World Health Organization. Complementary feeding of young children in developing countries: a review of current scientific knowledge. Document ref. WHO/NUT/98.1. Geneva: World Health Organization; 1998.
- Koo SI, Turk DE. Effect of zinc deficiency on the ultrastructures of the pancreatic aciner cell and intestinal epithelium in rat. *J Nutr* 1977;107:896-908.
- Roy SK, Tomkins AM. Impact of experimental zinc deficiency on growth, morbidity and ultrastructural development of intestinal tissue. *Bangladesh J Nutr* 1989;2:1-7.
- World Health Organization. The treatment of diarrhoea. A manual for physicians and other senior health workers. WHO 2005.
- Bhutta ZA, Bird SM, Black RE, Brown KH, Gardner JM, Hidayat A, et al. Therapeutic effects of oral zinc in acute and persistent diarrhea in children in developing countries: pooled analysis of randomized controlled trials. *Am J Clin Nutr* 2000;72:1516- 22.
- Baqui AH, Black RE, El Arifeen S, Yunus M, Chakraborty J, Ahmed S, et al. Effect of zinc supplementation started during diarrhoea on morbidity and mortality in Bangladeshi children: community randomised trial. *BMJ* 2002;325:1-6. (DOI: 10.1136/bmj.325.7372.1059.)
- World Health Organization. Diarrhoeal disease Fact sheet N°330. WHO. April 2013. (<http://www.who.int/mediacentre/factsheets/fs330/en/>)
- Bhutta ZA, Black RE, Brown KH, Gardner JM, Gore S, Hidayat A, et al. Prevention of diarrhea and pneumonia by zinc supplementation in children in developing countries: pooled analysis of randomized controlled trials. Zinc Investigators' Collaborative Group. *J Pediatr* 1999;135:689- 97.
- Larson CP, Saha UR, Nazral H. Impact monitoring of the national scale up of zinc treatment for childhood diarrhoea in Bangladesh: Repeat Ecologic Surveys. *PLoS Med J.* 2009;6 :e100175. <http://dx.doi.org/10.1371/journal.pmed.1000175>.
- Fisher-Walker CL, Fontaine O, Young MW, et al. Zinc and low osmolarity oral rehydration salts for diarrhoea: a renewed call to action. *Bull. World Health Organization*, 2009; 87: 780-86. <http://dx.doi.org/10.2471/BLT.08.058990>.
- Hoekstra JA. Acute gastroenteritis in industrialised countries: compliance with guidelines for treatment. *J Paediatr Gastroenterol Nutr* 2001;33:531-5

15. Omuemu VO, Ofuani IJ, Kubeyinje IC. Knowledge and use of zinc supplementation in the management of childhood diarrhoea among health care workers in public primary health facilities in Benin-city, Nigeria. *Glob J Health Sci* 2012;4:68-76.
16. Ogunrinde OG, Raji T, Owolabi OA, Anigo KM. Knowledge, Attitude and Practice of Home Management of Childhood Diarrhoea among Caregivers of Under-5 Children with Diarrhoeal Disease in Northwestern Nigeria. *J Trop Pediatr* 2012; 58:143-46.