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# BMJ Paediatrics Open

## Barriers to utilization and sources of oral rehydration salt and zinc in managing diarrhoea among under-five children in Oyo State, Nigeria: A clarion call

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4 **2 among under-five children in Oyo State, Nigeria: A clarion call**

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6 **3 \*Adeniyi Francis Fagbamigbe<sup>1,2</sup>, Joseph Juma<sup>2</sup>, John Kariuki<sup>2</sup>**  
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8 **4**

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10 <sup>1</sup>Department of Epidemiology and Medical Statistics, Faculty of Public Health, College of Medicine, University of  
11 Ibadan, Ibadan, Nigeria

12 <sup>2</sup>Department of Epidemiology & Biostatistics, School of Public Health, Mount Kenya University, Nairobi, Kenya

13 \*Correspondence: [franstel74@yahoo.com](mailto:franstel74@yahoo.com), +2348061348165, ORCID: 0000-0001-9184-8258  
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16 **10 Keywords:** barriers to utilization, diarrhoea, Nigeria, unavailability, unaffordability, under-five  
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20 **12 Word counts: 598**

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9 17 Despite its effectiveness, Oral Rehydration Salt (ORS) and Zinc use for managing diarrhoea  
10 18 among under-five children (U5C) is low in Nigeria. We assessed the barriers to utilization and sources  
11 19 of ORS/Zinc in Oyo State, Nigeria. Cross-sectional mixed-method design was adopted. Of the 1154  
12 20 mothers in the quantitative study, only 71 (6.2%) reported recent U5C diarrhoea, of which 41 used  
13 21 ORS/Zinc. Eleven of these 41 obtained ORS/Zinc from private chemist/PMS, 6 each from  
14 22 government hospital and health centre. Topmost barriers to utilization of ORS/Zinc are  
15 23 unavailability, unaffordability and poor awareness. Stakeholders should intensify efforts to sensitize  
16 24 women, improve availability and affordability.

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18 25 **Keywords:** barriers to utilization, diarrhoea, Nigeria, unavailability, unaffordability  
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2 28 Nigeria ranks top among the countries with the highest burden of diarrhoea in sub-Saharan Africa.  
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4 29 Compared with a global average of 70.6, the mortality attributed to diarrhoea in Nigeria among under-  
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6 30 five children (U5C) as of 2016 is 327.3 respectively per 100,000 cases of diarrhoea<sup>1</sup>. Whereas, the  
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8 31 World Health Organization (WHO) and UNICEF recommended that a child having the symptoms of  
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10 32 diarrhoea must be given Oral Rehydration Therapy (ORT) and Paediatric Zinc Sulphate Dispersible  
11  
12 33 Tablets (Zinc) within 24 hours of such notice<sup>2,3</sup>. The Oral Rehydration Salt (ORS) is the commonest  
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14 34 ORT. Literature is replete with factors associated with ORS/zinc use in managing diarrhoea among  
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16 35 U5C<sup>4</sup>. However, there is still a paucity of data on barriers to utilization of ORS/zinc in managing  
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18 36 diarrhoea among U5C. We aimed to identify the barriers to the utilization of ORS and zinc in  
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20 37 managing diarrhoea among U5C in Oyo State, Nigeria and to also assess the outlets/facilities where  
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22 38 these commodities were obtained.

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24 39 A cross-sectional mixed-method population-based study was conducted using both quantitative and  
25  
26 40 qualitative methods in the Oyo State of Nigeria using a case study approach whereby stakeholders  
27  
28 41 were actively engaged. A total of 1,154 mothers/guardians selected using three-stage cluster sampling  
29  
30 42 procedure participated in the quantitative arm while purposively sampled one government senior  
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32 43 personnel, two paediatricians had KIIs and two FGDs with 9 mothers/guardians each.

33  
34 44 Oly 71(6.2%) reported recent diarrhoea episodes among their children. A total of 41(57.7%) of these  
35  
36 45 71 mothers used ORS/Zinc. The utilization varied by respondents' characteristics. Among the 24  
37  
38 46 discussants in the FGDS, the main barrier is unavailability, unaffordability, poor awareness and  
39  
40 47 spousal approval. Similar patterns were found in the quantitative arm (Table 1). The key informants  
41  
42 48 at the ministry of health stated that ORS/Zinc was available free of charge in public hospitals. This  
43  
44 49 was alluded to by key informants at hospitals. Some FGD participants didn't know where ORS/Zinc  
45  
46 50 can be obtained. Of the 41 with recent U5C diarrhoea in the quantitative study, 11 obtained the  
47  
48 51 commodity from private chemist/PMS, 6 each government hospital and government health centre  
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50 52 (Table 2).

53 Table 1: Reasons for not using ORS/Zinc

Reasons	*Used recently (n=41)	*Didn't use recently (n=30)	*All (n=71)
Unavailability	25	22	47
unaffordability	36	20	56
Unawareness	0	6	6
Spousal approval	0	16	16

Others	0	2	2
None	0	2	1
<b>Total</b>	<b>41</b>	<b>30</b>	<b>71</b>

\*multiple responses

Table 2: Distribution of places where ORS/Zinc were obtained

Place	n
Government Hospital	6
Government Health Center	6
Public Mobile Clinic	2
Other Public Sector	1
Private Hospital, Clinic	11
Pharmacy	7
Private Chemist/PMS	5
Itinerant Drug Seller	1
Others	2
Any	41
None	30
<b>Total</b>	<b>71</b>

The commonest stated barriers to the use of ORS and or Zinc in the management of diarrhoea were availability, affordability and awareness. These are corroborated by existing literature<sup>3,5,6</sup>. ORS and/or Zinc were obtained at hospitals, chemists, pharmacies and markets. To improve the use of ORS/Zinc, sensitization of women who have poor access to health facilities through radio jingles and programs and distribution of free ORS and Zinc should be intensified<sup>5,6</sup>. There is need to design behaviour change components to enhance awareness, elimination and management of diarrhoea. Finally, there are needs for the management of hospitals to ensure that ORS/Zinc stock-outs in public hospitals are eliminated.

### **Patient and public involvement**

Patients were not directly involved in the design of the study. Rather pediatricians and policymakers at the Oyo State Ministry of health contributed to the data collection instruments and the sampling.

### **Ethics statements**

Ethical approval was obtained from the Oyo State Ministry of Health with approval number AD/13/479/1696 with written informed consent obtained from all participants.

## 72 References

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## 88 Footnotes

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90 No funding received

### 91 Conflict of interest

92 The authors declared no conflict of interest

### 93 Author contributions

94 AFF contributed to conception and study design and conducted the statistical analysis and  
95 interpretation of results and the drafting of the manuscripts. AFF, JJ and JK reviewed the statistical  
96 analysis and revised the manuscript draft. All authors read and approved the final manuscript.

### 97 Acknowledgements



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99 children, the pediatricians, the staff of Ministry of health of Oyo State Nigeria as well as the staff  
100 and students of Mount Kenya University, Nairobi.

101 **Availability of data and materials**

102 The data that support the findings of the current study are available on request to the authors  
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13 <sup>3</sup>Health Data Science, Populational and Behavioural Science, School of Medicine, University of St Andrews, St Andrews,  
14 UK

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Nigeria has the highest burden of diarrhoea in sub-Saharan Africa. Compared with a global average of 70.6, the mortality attributed to diarrhoea in Nigeria among under-five children (U5C) in 2016 is 327.3/100,000 diarrhoea cases<sup>1</sup>. World Health Organization (WHO) and UNICEF recommended that any child with diarrhoea symptoms must be given Oral Rehydration Therapy (ORT) and Paediatric Zinc Sulphate Dispersible Tablets (Zinc) within 24 hours<sup>2,3</sup>. The Oral Rehydration Solution (ORS) is the commonest ORT. ORS utilization is low in Nigeria<sup>4</sup>. Literature is replete with factors associated with ORS/zinc use in managing diarrhoea among U5C<sup>4</sup>. However, there is paucity of data on barriers to utilization of ORS/zinc in managing diarrhoea among U5C. We identified the barriers to utilization of ORS/zinc in managing diarrhoea among U5C in Oyo State, Nigeria and to also assess the outlets/facilities where these commodities were obtained.

A cross-sectional mixed-method population-based study was conducted using both quantitative and qualitative methods in Oyo State of Nigeria using a case study approach whereby health programmers, and paediatricians were actively engaged in the study planning and implementation. A total of 1,154 mothers/guardians selected using three-stage cluster sampling (wards/communities/households) participated in the quantitative arm while purposively sampled one government senior personnel, two paediatricians had key informant interviews (KIIs) and two focus group discussions (FGDs) among 9 mothers/guardians each in the qualitative study.

Only 71(6.2%) reported recent diarrhoea episodes among their children. A total of 41(57.7%) of these 71 mothers used ORS/Zinc, lower than 34% across Nigeria<sup>4</sup>. The utilization varied by respondents' characteristics. Among FGDs' participants, main barriers are unavailability, unaffordability, poor awareness and spousal approval. Similar patterns were found in the quantitative arm (Table 1). All the key informants stated that ORS/Zinc was available free of charge in public hospitals, contrary to unavailability reported by FGD participants. Some mothers/guardians didn't know where ORS/Zinc can be obtained. Of the 41 with recent U5C diarrhoea who used ORS/zinc in the quantitative study, 11 obtained the commodity from private chemists, 6 each government hospitals and government health centres (Table 2).

Table 1: Reasons for not using ORS/Zinc

Reasons	*Used recently (n=41)	*Didn't use recently (n=30)	*All (n=71)
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<b>Total</b>	<b>71</b>

The commonest stated barriers to the use of ORS/Zinc in the management of diarrhoea were availability, affordability and awareness. These are corroborated by existing literature<sup>3,5,6</sup>. ORS/Zinc were obtained at hospitals, chemists, pharmacies and markets. To improve the use of ORS/Zinc, sensitization of mothers/guardians who have poor access to health facilities through radio jingles and programs and distribution of free ORS/Zinc should be intensified<sup>5,6</sup>. There is need to design community-level behaviour change components to enhance awareness, elimination and management of diarrhoea. There are needs for hospital management to ensure that ORS/Zinc stock-outs in public hospitals are eliminated. Finally, further research is necessary to validate key informants' claim that the commodities are available free of charge, as it contradicts the mothers/guardians' stand.

### Patient and public involvement

Patients were not directly involved in the study design. Rather pediatricians and health programmers contributed to the data collection instruments and sampling.

### Ethics statements

73 Ethical approval was obtained from Oyo State Ministry of Health (AD/ 13/479/1696) with written  
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## 97 Author contributions



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98 AFF conceived and designed and conducted the statistical analysis and results interpretation. AFF,  
99 JJ and JK reviewed the statistical analysis and revised the manuscript . All authors read and  
100 approved the final manuscript.

101 **Acknowledgements**

102 I acknowledge the study participants: mothers/guardians, under-five children, pediatricians, staff of  
103 Ministry of health of Oyo State Nigeria and staff and students of Mount Kenya University, Nairobi.

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8  
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11 Ibadan, Ibadan, Nigeria

12 <sup>2</sup>Department of Epidemiology & Biostatistics, School of Public Health, Mount Kenya University, Nairobi, Kenya

13 <sup>3</sup>Health Data Science, Populational and Behavioural Science, School of Medicine, University of St Andrews, St Andrews,  
14 UK

15 \*Correspondence: [franstel74@yahoo.com](mailto:franstel74@yahoo.com), +2348061348165, ORCID: 0000-0001-9184-8258  
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2 16 **Barriers to utilization of oral rehydration solution and zinc in managing diarrhoea among**  
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4 17 **under-five children in Oyo State, Nigeria**

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6 18 **Abstract**  
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9 19 Despite its effectiveness, Oral Rehydration Solution (ORS) and Zinc use for managing  
10 20 diarrhoea among under-five children (U5C) is low in Nigeria. We assessed the barriers to utilization  
11 21 and sources of ORS/Zinc in Oyo State, Nigeria. Cross-sectional mixed-method design was adopted.  
12 22 Of the 1154 mothers in the quantitative study, only 71 (6.2%) reported recent U5C diarrhoea, of  
13 23 which 41 used ORS/Zinc. Eleven of these 41 obtained ORS/Zinc from private chemists, and 6 from  
14 24 government hospitals. Topmost barriers to utilization of ORS/Zinc are unavailability, unaffordability  
15 25 and poor awareness. Stakeholders should intensify efforts to sensitize women, improve the  
16 26 availability and affordability of oral rehydration solution and zinc therapy.

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18 27 **Keywords:** barriers to utilization, diarrhoea, Nigeria, unavailability, unaffordability  
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Nigeria has the highest burden of diarrhoea in sub-Saharan Africa. Compared with a global average of 70.6, the mortality attributed to diarrhoea in Nigeria among under-five children (U5C) in 2016 is 327.3/100,000 diarrhoea cases<sup>1</sup>. World Health Organization (WHO) and UNICEF recommended that any child with diarrhoea symptoms must be given Oral Rehydration Therapy (ORT) and Paediatric Zinc Sulphate Dispersible Tablets (Zinc) within 24 hours<sup>2,3</sup>. The Oral Rehydration Solution (ORS) is the commonest ORT. ORS utilization is low in Nigeria<sup>4</sup>. Literature is replete with factors associated with ORS/zinc use in managing diarrhoea among U5C<sup>4</sup>. However, there is paucity of data on barriers to utilization of ORS/zinc in managing diarrhoea among U5C. We identified the barriers to utilization of ORS/zinc in managing diarrhoea among U5C in Oyo State, Nigeria and to also assess the outlets/facilities where these commodities were obtained.

A cross-sectional mixed-method population-based study was conducted using both quantitative and qualitative methods in Oyo State of Nigeria using a case study approach whereby health programmers, and paediatricians were actively engaged in the study planning and implementation. A total of 1,154 mothers/guardians selected using three-stage cluster sampling (wards/communities/households) participated in the quantitative arm while purposively sampled one government senior personnel, two paediatricians had key informant interviews (KIIs) and two focus group discussions (FGDs) among 9 mothers/guardians each in the qualitative study.

Only 71(6.2%) reported recent diarrhoea episodes among their children. A total of 41(57.7%) of these 71 mothers used ORS/Zinc, lower than 34% across Nigeria<sup>4</sup>. The utilization varied by respondents' characteristics. Among FGDs' participants, main barriers are unavailability, unaffordability, poor awareness and spousal approval. Similar patterns were found in the quantitative arm (Table 1). All the key informants stated that ORS/Zinc was available free of charge in public hospitals, contrary to unavailability reported by FGD participants. Some mothers/guardians didn't know where ORS/Zinc can be obtained. Of the 41 with recent U5C diarrhoea who used ORS/zinc in the quantitative study, 11 obtained the commodity from private chemists, 6 each government hospitals and government health centres (Table 2).

Table 1: Reasons for not using ORS/Zinc

Reasons	*Used recently (n=41)	*Didn't use recently (n=30)	*All (n=71)
Unavailability	25	22	47
Unaffordability	36	20	56
Unawareness	0	6	6

Spousal approval	0	16	16
Others	0	2	2
None	0	2	1
Total	41	<b>30</b>	<b>71</b>

\*multiple responses

Table 2: Distribution of places where ORS/Zinc were obtained

Place	n
Government Hospital	6
Government Health Center	6
Public Mobile Clinic	2
Other Public Sector	1
Private Hospital, Clinic	11
Pharmacy	7
Private Chemist/PMS	5
Itinerant Drug Seller	1
Others	2
Any	41
None	30
Total	71

The commonest stated barriers to the use of ORS/Zinc in the management of diarrhoea were availability, affordability and awareness. These are corroborated by existing literature<sup>3,5,6</sup>. ORS/Zinc were obtained at hospitals, chemists, pharmacies and markets. To improve the use of ORS/Zinc, sensitization of mothers/guardians who have poor access to health facilities through radio jingles and programs and distribution of free ORS/Zinc should be intensified<sup>5,6</sup>. There is need to design community-level behaviour change components to enhance awareness, elimination and management of diarrhoea. There are needs for hospital management to ensure that ORS/Zinc stock-outs in public hospitals are eliminated. Finally, further research is necessary to validate key informants' claim that the commodities are available free of charge, as it contradicts the mothers/guardians' stand.

### **Patient and public involvement**

Patients were not directly involved in the study design. Rather pediatricians and health programmers contributed to the data collection instruments and sampling.

### **Ethics statements**

73 Ethical approval was obtained from Oyo State Ministry of Health (AD/ 13/479/1696) with written  
74 informed consent obtained from all participants.

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## 95 Conflict of interest

96 The authors declared no conflict of interest

## 97 Author contributions



1  
2 98 AFF conceived and designed and conducted the statistical analysis and results interpretation. AFF,  
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4 99 JJ and JK reviewed the statistical analysis and revised the manuscript . All authors read and  
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6 100 approved the final manuscript.

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14 104 **Availability of data and materials**

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16 105 The data that support the findings of the current study are available on request to the authors  
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