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Medical Management Practices for Hospitalized Children with Acute Diarrhea in Gaza City

Ibrahim O. Lubbad,[*1]

Ashraf Y. EL-Jedi

[1] AL-Nassr Pediatric Hospital, Gaza Strip, Palestine

Corresponding author:
e-mail address: Ibrahim.lubbad@hotmail.com

Abstract

Diarrheal Disease among children remains a major constituent of morbidity in Gaza City. The way to ensure the quality of hospital care, produced to those patients, is to comply with the evidence-based guidelines. This cross-sectional study was conducted to describe the commitment of the pediatricians in Gaza City to the WHO guidelines in the management practices of Acute Diarrhea among children less than 5 years. During the peak of Diarrheal Disease (May to August 2016), a designed retrieval sheet was used to identify the pediatricians' actual practices, where 301 of the cases' records were retrieved from the pediatric hospitals. Documenting most of the danger signs of Acute Diarrhea (3 and 4 compatible signs), specified by the guidelines, had a very low percentage (18.9%). Documenting most of the dehydration signs (2 and 3 correct signs) had a percentage of 47.5%. For classification of dehydration, only 27% of the classification practices were correct. The percentage of medical records with a correct indication of Intravenous fluids and Oral Rehydration Solution were 16.3% and 65.4%, respectively. The percentages of using of drugs were: 24.3% for zinc, 65.1% for antiemetics, 59.1% for antimicrobials, while the least was for antidiarrheal (5.6%). The only statistically significant relationship was found between the cases' gender and the prescription of antidiarrheal (P-value = 0.007). As there was no guideline to be complied with in Gaza City, the researcher highlighted the importance of adoption and application of the WHO Diarrheal Disease management guidelines, as well as the need to audit and regular feedback.

Keywords:
Acute Diarrhea, Gaza City, Hospitalized Children, Medical Practices, Pediatricians.

1. Introduction:

Diarrhea is one of the leading causes of childhood morbidity and mortality. In developing countries, around 2.5 billion episodes and 1.5 million deaths annually in children under the age of five. This accounts for 21% of all the deaths in these countries, and the number has remained unacceptably high (Mengistie, *et al*. 2012). Many times this number has long term complications like dehydration, malnutrition, growth retardation, and immune impairment (WHO, 2015).

In the Palestinian territories, the Diarrheal Disease (DD) constitutes a real health problem where its average percentage is more than 11% of all diseases among children under age of five. It represents a large load (PCBS, 2015).

To ensure a high quality of hospital care produced for those patients, international and local case management guidelines of the DD have been set for more than two decades. However, adherence to these guidelines has become a challenge . The related studies have shown a wide variation of care (Hoekstra, 2001). In Palestine, up to date, such matter has not been studied yet. Accordingly, this study was conducted to identify the physicians' management of Acute Diarrhea (AD) in Gaza City (GC) pediatric hospitals, and to assess their clinical practices' adherence to the World Health Organization (WHO) guidelines. This study is expected to be very important for different stakeholders as it provides baseline information on the medical management practices of the AD in GC. In addition, it will regulate the medical practices of the DD and accelerate the defaults correction and which in turn it might help in the promotion of efficient and effective healthcare delivery.

2. Methodology

The design of this study is a cross-sectional descriptive one. Adopting this design, the study relied on a hospital-based retrospective review of the records of cases aged less than five years admitted with the AD.

In 2016, during the peak of DD; May to August (MOH, 2014), the study was conducted at the two general pediatric hospitals providing health care for children with DD in GC: Al-Nasser pediatric hospital and Al-Durra pediatric hospital.

1676 cases were the total number of eligible medical records of AD cases admitted to the two hospitals. As it was calculated by Equation of Stephen Sampson (Annex 1), a sample of 301 medical records was selected randomly and proportionately to the number of AD cases admitted to each hospital and each month of the study period. Hence, the needed number of records was completed and reviewed to identify the actual documented practices.

Eligibility criteria included medical records for AD cases aged less than five years, cases admitted during the study period (1st May to 30th August), cases admitted to one of the two GC pediatric hospitals, and cases with no specialized co-morbidities (eg: cardiology, urology, oncology, etc.).

The researcher designed a retrieval sheet form to review the medical management of AD. This sheet included the patient's demographic data, medical history taking, assessment of dehydration, classification of dehydration, and case management. The audit criteria were adopted from the developed criteria of the fourth revision of the WHO manual for the treatment of diarrhea; the manual for physicians and other senior health workers, Geneva (WHO, 2005). The WHO, through these guidelines, emphasized on the comprehensive use of ORS (Oral Rehydration Solutions) and Zinc as a spine of the disease treatment, in addition to restricting antibiotics use and other unhelpful medications such as; Antiemetic and Antidiarrheal (WHO, 2005).

To achieve the goal of the study, the researcher used the Statistical Package for Social Science (SPSS 20) program for data entry and analysis.

Ethical considerations included an official approval letter to conduct the study from Helsinki committee. Another administrative approval was obtained from the Human Resources Development Directorate General in the Ministry of Health (MOH) to facilitate study conducting. Confidentiality was maintained; the medical records eligible for the study were given a unique study identification to ensure that the patients' names or file numbers were not utilized during analysis.

3. Findings

3.1 Demographic characteristics of cases admitted to GC pediatric hospitals

To identify the GC pediatricians' actual practices, the researcher reviewed 153 AD cases' records from AL-Nasser Pediatric hospital and 148 from Al-Durra Pediatric hospital to constitute the required calculated sample. The cases' weights were classified into four groups: 2.5-5 Kg (13.3%), 5.1.-10 Kg (65.8%), 10.1- 15 Kg (19.6%), and 15.1- 19 Kg (1.3%), where the mean of the weights was 8.26 ± SD 2.77 Kg. Also ages were classified into six groups: Less than 6 months (37.2%), 6 to less than 12 months (35.2%), 12 to Less than 18 months (10.3%), 18 to Less than 24 months (7%), 24 to Less than 30 months (3.3%), and 30 months or more (7%) with mean of ages 11.66 ± SD 10.57 months. To our knowledge, male gender was dominant with a rate of 59.80%.

3.2 History of cases admitted to GC pediatric hospitals:

The researcher retrieved the medical history of the AD cases which contributed in describing to what extent the physicians recognized the danger signs of dehydration [Table 1]. The history was illustrated as followings:

For diarrhea frequency, 200 out of the 301 AD cases (66.4%) had a history of 1-3 times of diarrhea/day, 15.6% (47 cases) had more than 3 times of diarrhea/day, while the others were with no information. For the presence of bloody diarrhea, 35.9% (108 cases) had no bloody diarrhea, while the rest had no information. For the presence of vomiting, most of the cases (89.5%) were with a history of vomiting classified to two groups: cases with 1-3 times of vomiting/day (63.5%), and more than 3 times of vomiting/day (11%), while more than a quarter of cases had no information. Also, they were classified according to the intensity of vomiting into cases vomited everything (25.6%), cases didn't (14%), and the majority were with no information. The last sign illustrated was convulsion; only 2.3% of the cases (7 cases) were with a history of convulsion, 23.6% (71 cases) were without, and 74.1% were with no information [Table 1].

Table 1 *History of cases admitted to GC pediatric hospitals*

Variable		Frequency	Percentage
Presence of Diarrhea		301	100%
Diarrhea Frequency/Day	1-3 Times	200	66.4%
	More than 3 Times	47	15.6%
	No Information	54	18%
Bloody Diarrhea	No	108	35.9%
	No Information	193	64.1%
Presence of Vomiting	Yes	269	89.4%
	No	28	9.3%
	No Information	4	1.3%
Vomiting Frequency/Day	1-3 Times	191	63.4%
	More than 3 Times	33	11%
	No Information	77	25.6%
Vomiting Everything (Intensity)	Yes	77	25.6%
	No	42	14.0%
	No Information	182	60.4%
Convulsion	Yes	7	2.3%
	No	71	23.6%
	No Information	223	74.1%

3.3 General examination of cases admitted to GC pediatric hospitals

General examinations of AD cases admitted to GC pediatric hospitals were retrieved [Table 2]. The retrieve focused on the presence of sunken eyes, skin pinch, level of consciousness, and ability to drink/ breastfeed. These examinations have an important role in describing physicians' recognition regarding the assessment of dehydration. The previous examinations were illustrated as followings:

For sunken eyes, 166 out of the 301 AD cases (55.1%) had sunken eyes, while other 95(31.6%) were with no information. Only 17.3% (52 cases) were documented for skin pinch; 5% (15 cases) documented as Immediate/(1-2 Sec), 6% (18 cases) were Slow/Prolonged/ >2sec, while the rest were with no information. For the Level of consciousness, 46.1% of the cases were documented for consciousness level; 17.6% of cases were had altered

consciousness and 38.5% were alert, while 43.9% of cases were with no information. Finally, the ability to drink/breastfed was only documented for a quarter of the cases (25.3%) divided into 14.3% able to drink/breastfeed and 11% didn't. The highest percentage of cases (74.8%) were with no mentioned information regarding the level of consciousness [Table 2].

Table 2 *General examination of cases admitted to GC pediatric hospital*

Variable		Frequency	Percent
Presence of Sunken Eyes	No Information	95	31.6%
	No	40	13.3%
	Yes	166	55.1%
Skin Pinch Documented	No	249	82.7%
	Yes	52	17.3%
Duration of Skin Pinch	No Information	19	06.3%
	Immediate/(1-2 Sec)	15	5.0%
	Slow/Prolonged/ >2sec	18	6.0%
Total of the Documented Skin Pinch		52	17.3%
Level of Consciousness	No Information	132	43.9%
	Altered Consciousness	53	17.6%
	Alert	116	38.5%
Ability to Drink/ Breastfed	No Information	225	74.7%
	No	33	11.0%
	Yes	43	14.3%
Total		301	100.0%

3.4 Classification of dehydration

Degrees of dehydration proposed by WHO are: no dehydration, some dehydration, and severe dehydration. The study result indicated that classification of 27.2% (82/301) of the total retrieved files was compatible with the guidelines, the majority (58.5%, 176/301) were absolutely unclassified, and the rest (14.3%, 43/301) were classified incompatibly. The incompatible classifications included mild dehydration, moderate dehydration, and mild to moderate dehydration.

3.5 Co-morbid conditions specified by admitting clinician

Thirty –nine (13%) out of the 301 AD cases files were specified by admitting physicians as co-morbid conditions. These co-morbid diseases are: 88% for Anemia, 5% for Upper Respiratory Tract Infection (URTI), 3% for Fever for Investigation (FFI), 2% for Bronchiolitis, and 2% for Pneumonia.

4.6 Physicians' actual documentation regarded fluid giving

The WHO recommended Oral Rehydration Salts (ORS) as a principal fluid for all types of DD as well as dehydration. Intravenous (IV) fluids are supposed to be given only for cases with uncontrolled vomiting and severely dehydrated cases. These recommended fluids were Ringer Lactate (RL) and Normal Saline. As seen in Figure 1, multiple fluids and combinations were used for AD management. They included Pediatric Dextrose saline (PDS), ORS, Normal Saline, and RL. According to the physician's documentation, half of the AD cases were managed using ORS and PDS, nearly one third using PDS, while the least (0.7%) was managed only using ORS. Compared with the WHO, the researcher classified the fluids choices. It was found that most of the cases (83.7%) were managed using incompatible fluids.

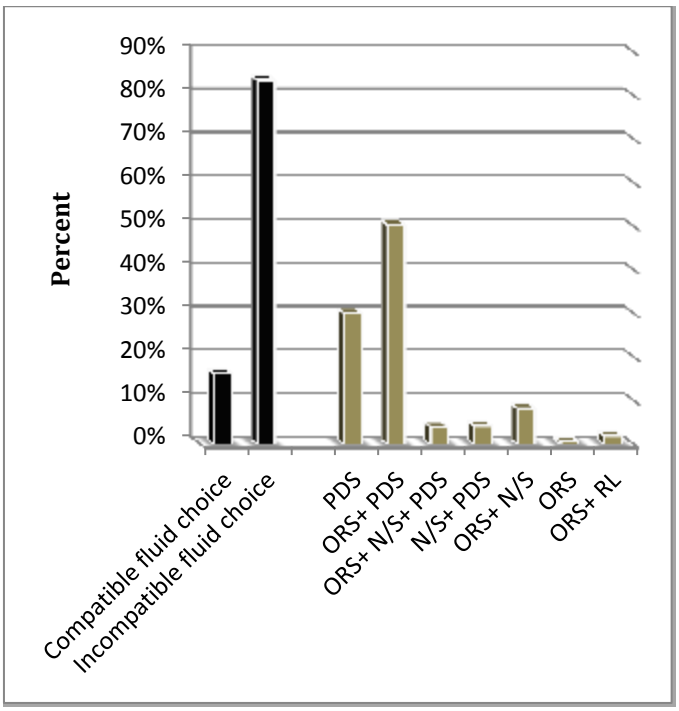

Figure 1 *Type and compatibility of the given fluid*

3.7 Physicians' documented actual practices regarding drugs use

According to Figure 2, only less than a quarter of the pediatricians prescribed zinc sulfate, which was recommended for all cases of the AD by the WHO guidelines. Interfering with WHO guidelines, Antimicrobials, antiemetic, and antidiarrheal were prescribed. For using of Antibiotics, the percentages of using Ampicillin was the highest (30.2%) in addition to combining it with other Antibiotics (10.7%). For Antiemetic, 65.1% of the cases had received either Metoclopromide (63.8%), or Metoclopromide combined with Promethazine (1.3%). Moving regarding Antidiarrheal, which is only Furamix syrup, it had the least percentage which constituted 5.6%.

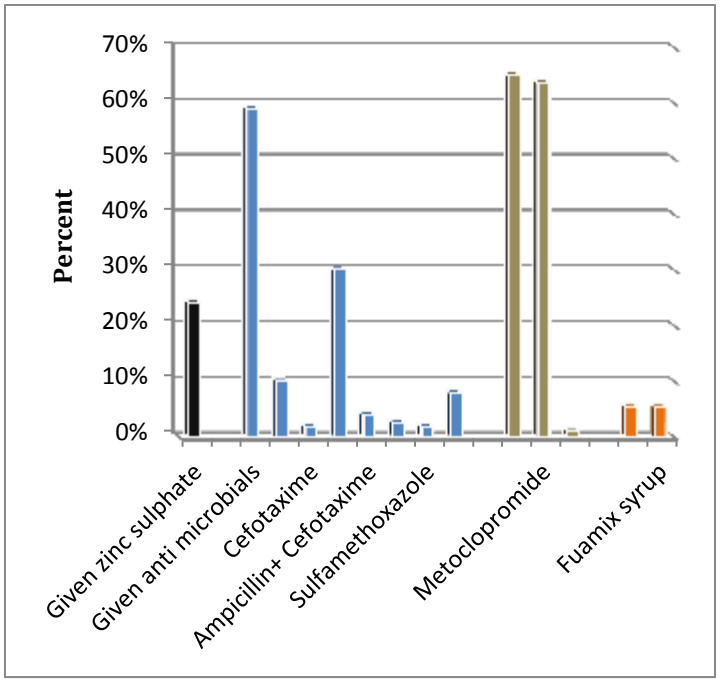

Figure 2 *Physicians' documented actual practices regarded drugs use*

3.8 The relationship between demographic variables and selected study variables:

Chi-square test was used to examine the relationship between the main demographic characteristics of the study population (hospital name, sex, weight, and ages of the cases with AD), and selected study variables including: compatibility of classifying of dehydration and rehydration therapy with the WHO guidelines, as well as, the prescription of zinc, antimicrobials, antiemetic, and antidiarrheal. The Only relationship (statistically significant) was found between the sex of AD cases and the prescription of antidiarrheal, where the P-value was 0.007. [Table 3].

Table 3 *The relationship between demographic variables and selected study variables*

Variable		Correct Classification of Dehydration			Chi-^{2} value	Compatible Rehydration Therapy with the Guidelines		Chi-^{2} value	Prescription of Zinc Sulfate		Chi-^{2} value	Prescription of Antibiotic		Chi-^{2} value	Prescription of Antidiarrheal		Chi-^{2} value	Prescription of Antiemetic		Chi-^{2} value
		Yes	No	NA		Yes	No		Yes	No		Yes	No		Yes	No		Yes	No	
Hospital Name	AL-Nassr Pediatric Hospital	52	22	79	7.68	37	116	14.26	5	148	74.58	46	107	108.82	0	153	18.62	90	63	5.42
	AL-Durra Pediatric Hospital	30	21	97		12	136		68	80		132	16		17	131		106	42	
Sex	Male	53	27	100	1.60	24	156	2.85	42	138	0.2	105	75	0.11	10	170	0.007	116	64	0.089
	Female	29	16	76		25	96		31	90		73	48		7	114		80	41	
Weight	2.5-5 KG	4	11	25	16.44	5	35	1.52	9	31	0.1	24	16	1.95	0	40	3.58	30	10	2.23
	5.1-10KG	59	24	115		35	163		49	149		118	80		12	186		126	72	
	10.1-15KG	19	6	34		9	50		14	45		35	24		5	54		37	22	
	15.1-19	0	2	2		0	4		1	3		1	3		0	4		3	1	
Age (months)	Less than 6	24	20	68	9.51	16	96	3.49	32	80	9.09	71	41	5.52	7	105	2.56	80	32	5.26
	6- Less than12	34	12	60		18	88		19	87		60	46		6	100		62	44	
	12- Less than 18	10	6	15		5	26		11	20		19	12		2	29		22	9	
	18- Less than 24	6	1	14		2	19		7	14		14	7		0	21		13	8	
	24- Less than 30	1	1	8		2	8		2	8		6	4		0	10		7	3	
	30 and more	7	3	11		6	15		2	19		8	13		2	19		12	9	

4. Discussion

As long as this is the first study auditing medical management practices of the DD in the Palestinian territories, it represents a baseline information to help in developing the health strategies needed to decrease the burden of DD as well as it's mortality.

The demographic characteristics of the AD cases showed that the incidence of the DD decreased with age. Also, the highest share of the study sample cases were males (59.8%) and lived in GC (62.8%). In this study, the characteristics of AD cases shared Weru's study (2013), Stephen's study (2015), and Menkir's study (2014) in the idea of the majority of children admitted with AD were males and less than 24 months in Garissa Provincial Hospital in Kenya, Juba teaching hospital in Sudan, and Dil Chora Referral Hospital in Ethiopia, respectively.

A high percentage of medical files with no information mentioned regarding most of the previous signs (signs of dehydration) represented poor documentation and lack of awareness of the importance of identifying the danger signs of dehydration and other signs. That is why it is supposed to raise awareness as well as provide regular audit and feedback.

Table 2 revealed that the common sign assessed was the level of consciousness (56.1%) and the least assessed sign was skin pinch at (17.3%), while a study conducted in South Sudan (2015) found that the common sign assessed was for sunken eyes (75.12%) and the least assessed sign was ability to drink/breastfed at 34.32% (Stephen, 2015). In addition to that, a study conducted by Weru in Kenya (2013) was congruent with ours in the most

assessed sign which was the level of consciousness (48.1%), nevertheless, the least assessed sign (20.8%) was the ability to drink (Weru, 2013).

In South Sudan, 75.68% of the patients were correctly classified according to WHO guideline (Stephen, 2015). This was much higher than our findings and Weru's ones through which he found that about 31.1% of patients were correctly classified according to the WHO (Weru, 2013). Also, the result in Bahrain was better than ours, where only 3% of the cases weren't classified (Ismaeel et al., 2007).

The researcher found that 39 patients in Gaza study had an associated co-morbidity with anemia, as the most common co-morbid condition at 88%. On the other hand, this finding is different from what was found in the studies done in South Sudan and Kenya, where malaria was the most common co-morbid condition at 73.77% in Juba Teaching Hospital (Stephen, 2015) and 54% in Garrisa Provincial Hospital (Weru, 2013), respectively. This finding could be due to the siege and the bad economic circumstances in the Gaza study, while in the other studies could be due to the fact that Sudan and Kenya are in the endemic zone of malaria.

In South Sudan study, the most commonly used fluid for hydration was IV fluids at 55% and ORS at 34% (Stephen, 2015). The choice of hydration fluid was correct according to WHO guideline among 61.73% of patients (Stephen, 2015). In a study conducted in Kenya, the commonly used fluid for rehydration was ORS (59.6%) followed by Ringers Lactate (38.2%). The choice of rehydration was consistent with the protocols in 61.6% of patients treated with ORS and in 29.5% of patients treated with Ringers lactate solution (Weru, 2013). A third study, conducted in Lebanon, found that ORS were prescribed by 49% of pediatricians (Alameddine et al., 2010). In India, the commitment to the guidelines regarding the use of ORS was varied; a study revealed that in spite of the availability of ORS, only 3.5% of the practitioners in Bihar (India) offered them (Mohanan et al., 2015). However, another study done in India (Utter Pradesh) showed that their use was 77.3% in the treatment of the DD (Walker et al., 2016). Botswana was more in line with the guidelines; the ORS were prescribed in 87% of the diarrhea cases (Boonstra et al., 2005). The semi-identical and the height percentages were showed in Georgia (89.3%) and Bahrain (90%). (Kherkheulidze et al., 2011; Ismaeel et al., 2007).

Accordingly, it seems that in spite of high percentage of incompatible fluid choices, the total percentage of cases managed in GC pediatric hospitals for AD using ORS (65.4%) was higher than those in South Sudan (Stephen, 2015), Kenya (Weru, 2013), Lebanon, (Alameddine et al., 2010), and Bihar in India (Mohanan et al., 2015).

In regard to antibiotic/Antimicrobials prescription, antibiotics were prescribed for 76 of 255 (30%) cases during management of AD in a study conducted in Botswana (Boonstra et al., 2005). Vecchio in Italy found that the use of antibiotics was 9.2% (Vecchio et al., 2014), while in Georgia, the use of antimicrobial drugs were 45%.8. More than 26% of pediatricians in Lebanon preferred to treat acute gastroenteritis with antimicrobial agents (Alameddine et al., 2010). The worst finding, in regard to the use of Antibiotics/ Antimicrobials, was found in Uttar Pradesh (India) at 61.9% (Walker et al., 2016), while the best was in Bahrain where they were prescribed only to 2% of the patients (Ismaeel et al., 2007).

In the GC study, most of the AD cases in Al-Durra hospital received Ampicillin. This antibiotic is used as a prophylactic antibiotic for all AD cases to prevent nosocomial infection, as Al-Durra hospital's physicians justified. Despite having a diagnosis of the AD, 12% of patients with the co-morbidities may have an indication for antibiotic use. These included those who diagnosed with URTI, FFI, Bronchiolitis, and Pneumonia.

In the literature review, the erroneous prescription of antiemetic agents to treat AD was identified as follows; 77% in Lebanon (Alameddine et al., 2010), 12% in Bahrain (Ismaeel et al., 2007), and 35% in Georgia (Kherkheulidze et al., 2011). The researchers think that high prescription of the antiemetics in these studies, as well as ours, may be owed to meet the family's request of the rapid elimination of the recurrent vomiting. The wrong ideas regarding the drug use should be corrected, and thus, guidelines will be more committed to.

In the GC study, the practices of zinc prescription were the poorest in comparison with the studies done in South Sudan (Stephen, 2015), Kenya (Weru, 2013), and Utter Pradesh (Walker et al., 2016) where 97%, 92%, and %29.9 of patients were prescribed zinc sulfate, respectively. In our study, the researchers believed that low commitment to the prescription of zinc may be owed to its high cost in addition to its unpreferable taste. This can be solved by the provision of free, and flavored zinc supplements for the DD cases.

In the management of the DD, the WHO guidelines emphasized on the restriction of using antidiarrheals. In GC study, the use of antidiarrheal was worse than what was found in Italy (Vecchio et al., 2014), where the percentage was 0.6% in Vecchio study. At the same time, it was much better than the findings in Georgia (Kherkheulidze et al., 2011) and Utter Pradesh (Walker et al., 2016); 27% and 17.5%, respectively.

4. Conclusions

There was poor documentation of the general clinical signs of the AD by the clinicians and inappropriate use of the medications recommended by the WHO guidelines. Regular on-the-job training with audit and regular feedback should be given.

5. Recommendations

1. Adoption and application of universal guidelines such as the WHO in the management of the DD.

2. The importance of the availability of copies of the WHO AD treatment manual among health practitioners.

3. Improving knowledge and practices among GC physicians regarding the WHO AD management guidelines.

4. Regular on-the-job training with audit and regular feedback should be given.

5. The importance of improving documentation which reflects the actual practices of the health practitioners.

6. The importance of the appropriate use of IV fluids.

7. Avoiding inappropriate use of antidiarrheal, antiemetic and antibiotics which are inconsistent with the WHO guidelines.

8. The comprehensive use of ORS and zinc sulfate which are recommended for all cases of the AD by the WHO guidelines.

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