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Assessment of Malnutrition among Under-Five Children in Umuahia North Local Government Area Abia State, Nigeria

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Abstract *— Background:* Malnutrition, the intake of an insufficient or surplus amount of nutrients is a significant public health burden with greater concern among children under five years.

Objectives: This study assessed the prevalence of malnutrition among under-five children in Umuahia North L.G.A, Abia State, Nigeria.

Methods: A cross-sectional descriptive design was used for the study. A multistage sampling technique was used to select 268 respondents for the study. Data on socio-economic and demographic characteristics of the under five children were taken. Anthropometric characteristics of the children were determined using validated questionnaires and standard procedures. The SPSS version 25.0 was used to analyze the data. Data obtained were described using frequency and percentage.

Result: The study showed that 52.6% of the children were females and had 1-2 siblings. About 65.3% of their mothers were between the ages of 20 to 29years and 57.1% had tertiary education. About 29.1% and 25.7% of the mothers were traders and housewives respectively. A quarter of the mothers (45.1%) earned less than 30,000 naira per month. More than half (56.3%) of the fathers were within the age range of 41 to 50 years, 98.9% were married, while 63.4% acquired tertiary education. About 42.2% of the fathers were self-employed and 36.6% earned between 31,000 to 50,000 naira per month. More than half (72.8%) of the households had 3 to 6 persons, few households (34.7%) had borehole as their major source of drinking water. About 89.9% of the households used water system, 60.8% of households allowed their children to feed themselves, 63.4% had healthy facility around their household, 38.1% lived in a two-bedroom flat. About 22.8% of the children had oedema, 30.2% had experienced anorexia, while 32.1% had apathy and 28.4% had lethargy. For Anthropometric characteristics of the children, 10.8% were underweight and 7.8% were overweight. About 17.2% of the children were stunted and 8.2% tall. About 9.4% were wasted, while 2.2% and 2.6% were overweight and obese respectively. Body mass index for age showed 9.4% were thin. About 14.9% were malnourished using their mid upper arm circumference.

Conclusion: This study observed the nutritional status of the children were moderately fair. Socioeconomic and demographic factors played a vital role in the nutritional status of children. There is need to strengthen the nutritional status of children in food insecure households.

Keywords *— Malnutrition; Assessment; Under-five children; Umuahia North L.G.A; Abia State; Nigeria.*

1. Introduction

Malnutrition is a condition that results from eating a diet in which nutrients are not enough or are too much such that it causes health problems. It refers to undernutrition where there are not enough calories, protein or micronutrients; or however, it also includes over nutrition when there is too much. Malnutrition is a category of diseases that includes undernutrition and overnutrition. Undernutrition is a lack of nutrients, which can result in stunted growth, wasting, and underweight. A surplus of nutrients causes overnutrition, which can result in obesity (UNICEF, 2020). Undernutrition manifests in four broad forms: wasting, stunting, underweight, and micronutrient deficiencies (WHO, 2020). Wasting is defined as low weight-for-height. It often indicates recent and severe weight loss, although it can also persist for a long time. It usually occurs when a person has not had food of adequate quality and quantity and/or they have had frequent or prolonged illnesses. Wasting in children is associated with a higher risk of death if not treated properly. Stunting is defined as low height-for-age. It is the result of chronic or recurrent undernutrition, usually associated with poverty, poor maternal health and nutrition, frequent illness and/or inappropriate feeding and care in early life. Stunting prevents children from reaching their physical and cognitive potential. Underweight is defined as low weight-for-age. A child who is underweight may be stunted, wasted or both (WHO, 2020). Malnutrition is a significant global public health burden with greater concern among children under five years (Simonyan *et al*., 2020). Approximately 45% of deaths among children under 5 years of age can be attributed to undernutrition

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(WHO, 2019). Childhood undernutrition may result in long-term effects that are irreversible, including impaired physical growth and cognitive development (Biesalski, 2016). The prevalence of undernutrition in the world is highest among children under five. In 2020, 149.2 million children under five years of age were too short for their age (stunting), 45.2 million were too thin for their height (wasting) and 38.9 million were too heavy for their height (overweight). It is estimated that Nigeria had the second highest burden of wasting (a form of acute malnutrition) worldwide with 3.4 million children under 5 years affected (UNICEF, 2020). Malnutrition is frequently part of a vicious cycle that includes poverty and disease; these three factors are interlinked in such a way that each contributes to the presence and permanence of the others. Socioeconomic, political changes, standard of living, environmental conditions, food, housing and health care have all be linked as determinants of malnutrition (Aruna, and Sudha, 2015). A child's fundamental right to a higher level of physical and mental health development worldwide is boosted with access to good nutrition (Amalia, 2020). Every day, Nigeria loses about 2,300 children below 5 years of age (UNICEF, 2019). One of the responsibilities of any government is to provide the basic needs of her citizens especially the vulnerable ones. In Nigeria this is not so, as there is an obvious disparity in resources and opportunities within citizens of the country and those in dire need of food, shelter and education are the very people that lack it. Unfortunately, a sizable portion of children suffer from inadequate food intake induced undernutrition resulting from poverty and ignorance. There have been several efforts by the Nigerian Government to improve on the nutritional status of children through her policies and programs. Therefore the push of this study was to assess the socioeconomic and nutritional status of children under-five years in Umuahia North L.G.A. The study will help to make important beneficence by contributing to the existing literature particularly on nutrition among under-five children in Abia State and Nigeria.

2. Materials and Methods

2.1 Study Design

A cross-sectional survey method was adopted for this research.

2.2 Population of the Study

The population of the study comprised of under-five years children in Umuahia North L.G.A, Abia State.

2.3 Study Area

Umuahia North Local Government Area is an urban Local Government Area in Abia State. The L.G.A has a population of 223,134 according to 2006 Nigerian Population Commission (NPC, 2006). It is a railway town and one of the oldest towns in Abia State. Umuahia North LGA is located at the center of Abia State and bounded on the East by Bende L.G.A, on the West by Ihite Obowo Local Government Area of Imo State and on the Southern axis by Umuahia South Local Government Area. The L.G.A has a low-lying terrain that is good for agriculture. It occupies a land mass of 14.464.0 square kilometers. Majority of the inhabitants are farmers, civil servants, teachers, business men and craftsmen.

3. Sampling and Sampling Techniques

3.1 Sample Size Calculation

The sample size was calculated using the Cochran's formula:

$$n = \frac{Z^2\ P\ (1-P)}{X^2}$$

Where:

Z = acceptable margin of error (1.96 at 95% confidence interval)

P = the estimated prevalence of underweight among under-five in Nigeria according to National Demographic Health Survey (NDHS, 2018) is 19.9%

X = margin error (5%)

(1-P) = percentage of children that are not stunted

$$n = \frac{1.96^2 X\ 0.199\,(1-0.199)}{5^2}$$

$$n = \frac{3.8416\ X\ 0.199\,(1-0.199)}{0.0025}$$

$$n = \frac{0.7644784\,(0.801)}{0.0025}$$

$$n = \frac{0.612347\,1984}{0.0025}$$

n = 244.93 =244

To calculate for drop out (10% of 244):

=24.4

Therefore,

24.4 + 244 = 268.4

Therefore, the sample size was taken as 268.

3.2 Sampling Procedure

The sample size was selected using a multi-stage sampling procedure. The first stage involved the random selection of communities in Umuahia North. The list of all the villages in Umuahia North L.G.A was gotten from the local government area. A simple random sampling method was used to select 6 villages out of the 33 Villages in Umuahia North L.G.A. The 6 Villages selected were, Umukabia, Ahiakwu-Umuagwa, Umuda-Isingwu, Nkwoegwu, Umuekwule and Ofeme. Furthermore, systematic random sampling technique was used to select sample households from the selected villages. Forty-five households were selected from each village. Households without under five children were systematically replaced

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with households who had children less than five years. A total of 268 children representing the sample size were used in this study.

3.3 Informed Consent and Ethical Clearance

Prior to the survey, a preliminary visit was made to the Head of various communities with a letter of introduction. Ethical approval was obtained from Federal Medical Centre, Umuahia, Abia State. The purpose and objective of the study was communicated and clearly explained to the participants and their consent was obtained before the commencement of the study.

3.4 Data Collection

A structured and validated questionnaire was used to collect data on characteristics of the children, background and socioeconomic data of parents, determinants of malnutrition, and clinical signs of malnutrition and Anthropometric measurement of the children.

3.5 Weight Measurement

The weights of the children under two years were measured using an infant weighing scale. The weights of the children from 2-5years were measured using a properly calibrated, high quality balance bathroom scale. The children were asked to stand motionless on the centre of the platform of the scale barefooted with minimal clothing until measurement was obtained. Weight was recorded to the nearest 0.1 kilogram (Oguizu and Okafor, 2019).

3.6 Height Measurement

The heights of the respondents were measured using a stadiometer with the respondents standing erect on a flat platform with shoes removed and looking straight ahead with hands on both sides. The movable head plate was then lowered into the crown of the head and was accurately read to the nearest 0.1cm (Oguizu and Okafor, 2019).

3.7 Length Measurement

For measurement of recumbent length, the wooden length board was used. The children were laid on the board, with their head positioned firmly against the fixed headboard and eyes looking vertically. Their knees were extended by firm pressure and their feet flexed at right angles to the lower legs. Recumbent lengths were read and recorded to the nearest 0.1 cm (Oguizu and Okafor, 2019).

3.8 Mid Upper Arm Circumference (MUAC)

The Mid Upper Arm Circumference of the children was measured was using the Shakir's tape. The tape was gently placed around the mid upper arm of the children without compressing their tissue. The respondent's left hand was bent to the elbow at a 90-degree angle, with the upper arm held parallel to the side of the body. The tape was placed at the midpoint between the top of the shoulder and the tip of the elbow (olecranon process and the acronium) and measurement was taken to the nearest 0.1cm (Alberti *et al.*, 2010).

3.9 Statistical Analysis

Data entry and analysis was done using statistical package for service solution version 25.0. Descriptive statistics was used to determine the background information, socio-economic characteristics and determinants of malnutrition of the respondents. WHO anthropometry software was used to categorize the prevalence of wasting, stunting, underweight and BMI-for-age of the respondents.

4. Results

Table 1 shows the characteristic of the children studied. More than half (52.6%) of the children studied were females, while 47.4% were males. About 61.2% of the children had 1 to 2 siblings, 35.4% had 3 to 4 siblings, while 35.4% had more than 5 siblings in their home. Majority (64.1%) of the children had birth interval less than two years. Less than one third (25.7%) of the children were within the age range of 36 to 45months, 21.6% were within the age range of 26 to 35months, while 17.9% were within the age range of 46 to 59 months.

Table 1: Characteristics of the children studied

Variables	Frequency	Percentage
Gender		
Male	127	47.4
Female	141	52.6
Total	**268**	**100**
Number of siblings		
1-2 persons	164	61.2
3-4 persons	95	35.4
Greater than 5 persons	9	3.4
Total	**268**	**100**
Birth interval		
Less than 2years	172	64.1
3-4years	91	34.0
5-6years	5	1.9
Total	**268**	**100**
Age (months)		
6-15	36	13.4
16-25	57	21.3
26-35	58	21.6
36-45	69	26.8
46-59	48	17.9
Total	**268**	**100**

Table 2 shows the socioeconomic characteristics of mothers' studied. Majority (65.3%) of the mothers were

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between the age of 20 to 29years, less than a third (19.4%) were between the ages of 30 to 39years, while about 13.1% were between the ages of 40 to 49years, very few (2.2%) of the respondents were less than 20years. Majority (98.1%) of the mothers were Christians, Very few (1.5%) were traditional worshippers. More than half (57.1%) of the mothers had tertiary education, some (34.3%) acquired secondary education, while 6.3% had no primary education and 2.2% attended primary education. The result reveals that 29.1% of the mothers were traders, 27.2% civil servants and 25.7% housewife, while 11.2% of the mothers were teachers and 6.7% farmers. About a quarter (45.1%) of the mothers earned less than 30,000 naira per month, 35.4% earned 31,000 to 50,000 naira, while 6.3% earned 81,000 to 100, 000 naira.

Table 2: Socioeconomic characteristics of the mothers'

Variables	Frequency	Percentage
Age range (years)		
Less than 20	6	2.2
20-29	175	65.3
30-39	52	19.4
40-49	35	13.1
Total	**268**	**100**
Marital status		
Married	261	97.4
Single	3	1.1
Separated	1	0.4
Widowed	3	1.1
Total	**268**	**100**
Religion		
Christianity	263	98.1
Traditional	4	1.5
Others	1	0.4
Total	**268**	**100**
Level of education		
No formal education	17	6.3
Primary education	6	2.2
Secondary education	92	34.3
Tertiary education	153	57.1
Total	**268**	**100**
Occupation		
Housewife	69	25.7
Farmer	18	6.7
Civil servant	73	27.2
Trader	78	29.1
Teacher	30	11.2
Total	**268**	**100**
Monthly income		
Less than ₦30,000	121	45.1
₦31,000 - ₦50,000	95	35.4
₦51,000 - ₦80,000	35	13.1
₦81,000 - ₦100,000	17	6.3
Total	**268**	**100**

Table 3 shows the socioeconomic characteristics of the fathers'. More than half (56.3%) of the fathers were within the age range of 41 to 50years, 39.9% were within the ages of 31 to 40 years, only 0.7% were less than 25years. Majority (98.9%) of the fathers were married, only 1.1% of them were separated. Majority (98.9%) of them were Christians. About 63.4% of the fathers acquired tertiary education, 31.0% attended secondary school, and 3.7% had no formal education. About a quarter (42.2%) of the fathers were self-employed, 29.5% civil servants, and 10.1% were artisans. One third of the fathers (36.6%) earned 31,000 to 50,000 naira per month, while 13.1% earned 81,000 to 100,000 naira per month.

Table 3: Socioeconomic characteristics of the fathers'

Variables	Frequency	Percentage
Age range (years)		
Less than 25	2	0.7
26-30	5	1.9
31-40	107	39.9
41-50	151	56.3
51-60	3	1.1
Total	**268**	**100**
Marital status		
Married	265	98.9
Separated	3	1.1
Total	**268**	**100**
Religion of father		
Christianity	265	98.9
Traditional	2	0.7
Others	1	0.4
Total	**268**	**100**
Level of education		
No formal education	10	3.7
Primary education	5	1.9
Secondary education	83	31.0
Tertiary education	170	63.4
Total	**268**	**100**
Occupation		
Self-employed	113	42.2
Farmer	14	5.2
Civil servant	79	29.5
Trader	33	12.3
Teacher	2	0.7
Artisan	27	10.1
Total	**268**	**100**
Monthly income of father		
Less than ₦30,000	48	17.9
₦31,000 - ₦50,000	98	36.6
₦51,000 - ₦80,000	87	32.5
₦81,000 - ₦100,000	35	13.1
Total	**268**	**100**

Table 4 shows the determinants of malnutrition among respondents. Majority (72.8%) of the children had 3 to 6 persons living in their household, 27.2% had 7 to 10 persons in their household. About 34.1% of the respondents used borehole as their source of drinking water, 29.1% used sachet water, while 12.7% and 9.0% used bottled water and well water respectively. Only 1.9% and 1.1% used river and spring respectively as their source of drinking water. Majority (89.9%) of the respondents used water system for defecation, some (8.2%) used pit latrine,

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while 1.5% and 0.4% used nearby bush and bucket respectively. More than half (60.8%) of the children fed themselves. About 19.8% of the children skipped meals, while 80.2% of them did not skip meals. About 63.4% of the respondents had a health facility around their households, while one third (36.6%) did not have a healthy facility near them. About 38.1% of the respondents lived in 2 bedroom flat, 12.7% lived in duplex and 11.2% lived in 3 bed room flat, while 7.5% lived in a one room self-contain.

Table 4: Determinants of malnutrition in the children

Variables	Frequency	Percentage
Household size		
1-2 persons	0	0
3-6 persons	195	72.8
7-10 persons	73	27.2
Total	**268**	**100**
Source of drinking water		
Well water	24	9.0
Spring water	3	1.1
Tap water	31	11.6
River	5	1.9
Bottled water	34	12.7
Sachet water	78	29.1
Borehole	93	34.7
Total	**268**	**100**
Type of toilet		
Water system	241	89.9
Pit latrine	22	8.2
Nearby bush	4	1.5
Bucket	1	0.4
Total	**268**	**100**
Allow child feed themselves		
Yes	105	39.2
No	163	60.8
Total	**268**	**100**
Skip meals		
Yes	53	19.8
No	215	80.2
Total	**268**	**100**
Health facility		
Yes	98	36.6
No	170	63.4
Total	**268**	**100**
Type of house		
Family house	22	8.2
Hut	3	1.1
Duplex	34	12.7
2-bedroom flat	102	38.1
3 bed room flat	30	11.2
Bungalow	57	21.3
Self-contained room	20	7.5
Total	**268**	**100**

Figure1 shows the clinical manifestation of malnutrition. About 22.8% of the respondents had oedema present. One third of the children (30.2%) had experienced anorexia. More than half of the children (66.4%) did not experience weight loss, while 33.6% were found to have lost weight. Most (67.9%) of the respondents were free from apathy, while 32.1% had experienced apathy. Majority (71.6%) of the children had no lethargy, while 28.4% had experienced it.

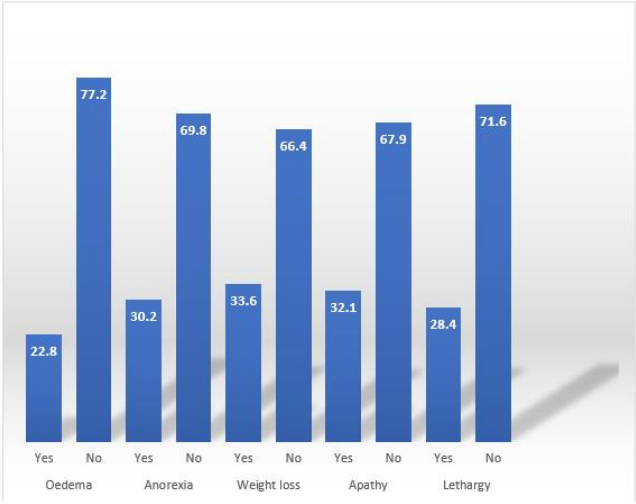

Fig.1: Clinical manifestation of malnutrition in the children

Table 5 shows the anthropometric characteristics of the children. The result shows that 10.8% of the respondents were underweight, while 7.8% were overweight. For Stunting, 17.2% were stunted, while 8.2% were tall. For Wasting, the result showed that about 9.4% were wasted, while 2.6% were obese and 2.2% were overweight. The body mass index for age (BMI-for-Age) showed that about 9.4% were thin, while 2.6% and 2.2% were obese and overweight respectively. The Mid upper arm circumference revealed that 14.9% of the children were malnourished.

Table 5: Anthropometric characteristics of the children

Variables	Frequency	Percentage
Underweight		
Underweight	29	10.8
Normal	218	81.4
Overweight	21	7.8
Total	**268**	**100**
Stunting		
Stunted	46	17.2
Normal	200	74.6
Tall	22	8.2
Total	**268**	**100**
Wasting		
Wasted	25	9.4
Normal	230	85.8
Overweight	6	2.2
Obese	7	2.6
Total	**268**	**100**
BMI-for-age		
Thinness	25	9.4
Normal	230	85.8

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Overweight	6	2.2
Obese	7	2.6
Total	**268**	**100**
MUAC		
Malnourished	40	14.9
Normal	228	85.1
Total	**268**	**100**

5. Discussion

The high population of under five female participants obtained in this study is consistent with the report of Oguizu and Nnadede. (2016) who recorded a high percentage of females. Young mothers between the ages of 20 to 29 had the highest number of children under five years in the study; most women were most likely to get married and start bearing children in their early twenties. Binod, Ankush and Suman. (2022) reported a similar report in their study. More than half of the mothers had tertiary education. The result was in line with Makanda and Olufemi (2020). The higher the mothers level of education, the greater her chances of being able to care and provide for her children. Education attainment has a strong effect on nutrition. Most of the mothers' had something doing in terms of occupation even though majority of them earned less than the minimum wage of 30,000 Naira per month.

The alarming situation is that the 30,000 Naira earned by some of these women is insufficient to meet the basic need of food for healthy living. The inflation rate in Nigeria is alarming and most households can no longer feed themselves. More than half of the fathers were within the age range of 41 to 50 years. This is so because in the Eastern part of Nigeria where this study was carried out, it is expected that a man should be financially comfortable and have something doing before he starts a family hence the reason for middle aged fathers having under five children. Majority of the fathers were Christians this may be attributed to the region the research was done, majority of the Eastern Nigerians are Christians.

Majority of the fathers were educated. Educated household heads are more likely to have access to improved financial resources and better job opportunities, which are expected to translate to improved nutrition for the household (Pankomera *et al*., 2009). Majority of the fathers were self-employed. Parental occupation is a critical factor in determining the causes of undernutrition among children. Most fathers earned within the minimum wage in Nigeria which is poor when compared to the wages of other countries. Occupation and income plays a vital role in the management and upbringing of the family. Low income is one of the factors that cause food insecurity and insufficiency to meet dietary requirements in households. Higher income therefore implies increased purchasing power (de Onis *et al*., 2003). Most households in the study had 3 to 6 persons. The higher the number of family members in the household, the more financial burden on the household to provide optimum nutritious food to all the family members and children. According to Umesh *et al*. (2020) households with five or more members and households with three or more children were statistically associated with severe acute malnutrition. Some children used borehole as their source of drinking water, while a few others had inadequate sources of drinking water. This agrees with the report of Makanda and Olufemi. (2020), were more than half of the household used borehole as their source of drinking water.

A clean water system is one means of preventing diseases. Majority of the children used water closet as their means of faecal disposal; Few children used poor toilet facilities like bucket system and nearby bushes. The availability of toilet facility is directly linked with child's hygiene and nutrition. Sanitation and hygiene behaviors, therefore, are essential factors to improve the nutritional status of children. Ghimire *et al*. (2020) reported that toilet facility at household showed a significant association with severe acute malnutrition in children. More than half of the mothers allowed their children to feed themselves, because when fed by others, they refused to eat. Up to half of the children lived in a 2 bedroom flat. The conditions within our homes have a great implication on our health. Unsafe and overcrowded housing causes increase in the risk of infections and illness, which influences nutritional status (Federal Ministry of Health, 2013). A few of the children presented with oedema, anorexia, weight loss, apathy and lethargy; this may be as a result of chronic and ongoing malnutrition and ill health among the respondents, which results from inadequate intake of balanced meals by the respondents. Inadequate income of the parents can lead to lack of provision of adequate and healthy foods for consumption. A few of the children in the study area were underweight. This could be due to the fact that no child in the study area skipped meals, they ate on demand and were well fed and taken care of by their parents; this result contradicts Henry *et al*. (2007).

A few of the children studied were stunted and less than one tenth were tall. From our findings it believed that stunted children would come from food insecure households, while tall children would come from food secured households. Baker. (2013) drew similar inferences. A few of the children were wasted which could be as a result of inadequate nutrition over a short period of time. The BMI-for-age showed that few of the children were thin (low body mass index-for-age). Thinness can result in delayed maturation, deficiencies in muscular strength and work capacity, and reduced bone density later in life. More than one tenth of the children were malnourished. The anthropometric results obtained in this study is similar to that reported by Oguizu and Okafor (2019). The low prevalence of stunting, wasting and underweight identified in this study is a relatively fair development as the children in the study area will benefit if an intervention is staged. Poverty, lack of access to food and inadequate intake of

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nutritious meals continue to place households and children at risk of malnutrition.

6. Discussion

Findings from this study observed that the nutritional status of the children were moderately fair. Socioeconomic and demographic factors played a vital role in the nutritional status of children. Good nutrition is the basic need for children to thrive, grow, learn, play and participate actively. Access of every child to sufficient food is the responsibility of parents. Malnutrition steals dreams from young children and hang their future in the balance. There is need to strengthen the nutritional status of children in food insecure households by promoting access to food and various sources of nutrition. Nutrition programs in Nigeria should be focused to serve the poorest and disadvantaged households.

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