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"AN ASSOCIATIONAL STUDY OF ACUTE MALNUTRITION OF UNDERWEIGHT CHILDREN'S SUFFERING FROM STUNTING , WASTING AND LOW NUTRITIONAL DIET"

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ABSTRACT

Child malnutrition constitutes a serious threat to child survival and development in the DRC. The Demographic and Health Survey (DHS) from 2013/14 provides data on the prevalence of malnutrition in children below five years in 2013 in the DRC. According to the survey, 43% of the children suffered from stunting, 8% from wasting and 23% from underweight. Under five years children of the households with family size of greater than 5 were seen associated with severe acute malnutrition of the children (OR = 2.267, 95% CI 1.235 – 4.161). The illiteracy rate was 98 (90.7%) among mothers of the cases and 71 (65.7%) among the mothers of controls similarly, 93 (86.1%) among the fathers of the cases and 76 (70.4%) among the controls. Under five years children whose mother is illiterate were significantly associated with severe acute malnutrition of the children (OR = 8.25, 95% CI 2.923 – 23.287); similarly under five years children whose father is illiterate were also seen associated with severe acute malnutrition of the children (OR = 2.7, 95% CI 1.307 – 5.578). Majority of the mothers, 102 (94.4%) of the cases and 105 (97.4%) of the controls, were housewives with no occupation. Anthropometric measurement of the children was measured based on the WHO standardized procedures. Weight and recumbent length/ height was taken according to WHO standardized techniques.

KEYWORDS: Child malnutrition, stunting, survey, underweight, illiterate, housewife, occupation.

1. INTRODUCTION

Some parts of the world have experienced a significant drop in the percentage and numbers of children with malnutrition. According to UNICEF, Asia has experienced a significant decrease in malnutrition and the most pronounced decline occurred in the East Asia and Pacific region (**1**). There was

also a notable decline in the percentage and number of children with stunting in South Asia, although this regions till has the largest number of children with stunting in the world (**2**). In Western and Central Africa the percentage declined from 45% to 36%. (**4)** As to underweight, there was a decline in Eastern and Southern Africa from 28% to 18% and in Western and Central Africa from 30% to 23%. The numbers of children who suffered stunting and underweight in sub-Saharan Africa increased during this period. Whereas South-East Asia and the Pacific have been successful in reducing the proportion of children who suffered from wasting, South Asia has not (**5)**.

1.1. CHILD MALNUTRITION

Child malnutrition constitutes a serious threat to child survival and development in the DRC. The Demographic and Health Survey (DHS) from 2013/14 provides data on the prevalence of malnutrition in children below five years in 2013 in the DRC. According to the survey, 43% of the children suffered from stunting, 8% from wasting and 23% from underweight (**6**). Under nutrition can cause damage to the brain and thereby affect cognitive and educational development (**7)**. Child malnutrition has been associated with failure of school enrolment at due time (**8)**. It can have implications for school achievement, and stunting at an early age has been found to be a predictor of poor cognitive performance and achieved school grades (**9)**. Linear growth relates to employment and growth restrictions at two years have been reported to reduce the likelihood of employment in formal sector jobs (**10)**. Nutrition is a predictor of income, and improved nutrition during childhood has been associated with better earnings (**11**). Growth failure during early childhood may have implications for an adults' mental health and has been related to depression and increased suicidal ideation (**12)**.

1.2. DIET AND MALNUTRITION

Diet is considered as an immediate determinant of nutritional status. The term is commonly defined as the food that a person eats every day. There are two major ways of describing a diet (**13)**. It can be portrayed with regards to chemical composition which is typically described in terms of nutrient content, or it can be described as food and food groups. An account of diet as specific compounds or groups of compounds allows for making direct links to human biology. Epidemiological studies that contain measurements of total nutrient intake provide data that can be used to test hypotheses on how intake of a specific nutrient is associated with the risk of developing a disease. The use of food items to represent a

diet also provides useful information that can underpin epidemiological studies. The relationship between different food items is complex and reciprocal and it can therefore be problematic to use food items to represent a diet. (**14**)

2. METHODOLOGY

2.1. Data collection procedures and measurement of variables

Anthropometric measurement of the children was measured based on the WHO standardized procedures. Weight and recumbent length/ height was taken according to WHO standardized techniques. Undressed or with minimal dressed children was weighed to the nearest 0.1 kg using 25 kilogram (kg) portable Salter spring scales, recumbent length/height was measured to the nearest 0.1 cm. Validation of instruments, and measurements and random auditing were done on a daily basis. Trained nurses were taken the anthropometric measurements in the houses of the selected children during day time. Data on exposure variables were collected by face to face interview using structured questionnaire. Household wealth was assessed by constructing an index using principal components analysis. The first component, which explains most of the variance in the observed set of variables, is expected to reflect an unobserved dimension, and in the given model 'wealth'. The variables included in our factor analysis were the following: (1) number of livestock present in the household (cow, goat, sheep, chicken, and horse) (2) ownership and size of farm land (3) housing material for roof, walls and floor; and (4) type of toilet. The first component explained 49% of the variance. The regression scores from the first component were used to create an index that was divided into five equal categories and then grouped as the highest, medium, and lowest wealth index categories.

All the study samples were selected randomly to be included in the study. After consulting the health extension workers of each selected, the households who have children less than five years were reached, then anthropometric measurements of the children was taken to categorize the child as a case or control. Then using simple random sampling the children was included in the study until the desired sample size. Proportional allocation of the number of cases to participate in the study from different area of district was considered and the controls were selected from the same area and age interval.

2.2. Collection of Samples and Storage:

The study was conducted in Centre for **B**iotechnology Studies, A.P.S. University, Rewa (M.P.) using community based age matched case control study. The cases were children with (Severe Acute Malnutrition) SAM (WHZ-score < -3SD) and the controls were children without malnutrition (WHZ-score > -1SD) who

were matched with similar age interval with the case (3 months). Matching was 1:1 individual and interval matching.

RESULTS

A total of 108 cases and 108 controls, which were matched with their respective age intervals were analyzed, with the response rate of 100%. The mean weight of cases and controls were 4.84 kg and 7.12 kg, with standard deviation of 1.67 and 2.19 respectively. The average weight for height percentile was 62.0 and 91.74 among the cases and the controls respectively.

Table 1: shows Parental status for socio demographic characteristics associated with malnutrition:

Variables		Control			COR (95% CI)	P value
Case	Mother Illiterate		Male	Female	5.33 (2.23 – 12.755) 1.00	0.001
		Yes	62	32		
		No	6	8		
	Parental illiteracy		Male	Female	2.7 (1.307 – 5.578) 1.00	0.007
		Yes	66	27		
		No	10	5		
	Maternal Autonomy		Male	Female	2.545 (1.267 – 5.113) 1.00	0.009
		Yes	64	28		
		No	11	5		
	Family size		>5	≤5	2.27 (1.235 – 4.16) 1.00	0.008
		>5	38	34		
		≤5	15	21		

Table 2: Bivarate analysis of child characteristics using discordant pairs of cases and controls, among under five years year children (n = 108 pairs).

Variables		Control			COR(95% CI)	P value
Case	Sex of the child		Male	Female	1.706(0.937 – 3.104)	0.08
		Male	32	29	1.00	
		Female	17	30		
	Diarrhea 2 weeks preceding the survey		Yes	No	5.4(1.997 – 13.541)	0.001
		Yes	3	27	1.00	
		No	5	73		
	Fever 2 weeks preceding the survey		Yes	No	3.2(1.090 – 8.254)	0.023
		Yes	3	16	1.00	
		No	5	84		

Table 3: Bivariate analysis of selected child caring practices with SAM using discordant pairs of cases and controls, (n = 108 pairs).

Variables		Control			**COR(95% CI)**	**P value**
Case	Frequency of breast feeding in a day		4-7 times	≥8 times	**2.58 (1.187 – 4.59)**	0.005
		4-7 times	27	31	**1.00**	
		≥8 times	12	21		
	Frequency of complementary feeding		≤2 times	3-5 times	3.5(1.94 – 11.24)	0.0001
		≤2 times	8	28		
		3-5 times	8	64	1.00	
	Take to health institution when the child is sick within 24 hours		No	Yes	2.643(1.429 – 4.88)	0.002
		No	10	37	1.00	
		Yes	14	47		
	Change pattern of feeding for sick child		Yes	No	1.00	0.034
		Yes	23	40	1.379 (1.041 – 2.90)	
		No	29	16		
	Frequency of washing		Daily	Third day	1.00	0.022
		Daily	29	3	0.091(0.012– 0.704)	

		Third day	33	43		

CONCLUSION

The average maternal age of the cases and controls were 32.7 and 31.0 years respectively. Among the surveyed 216 mothers, 37 (34.3%) of the mothers of cases and 23 (21.3%) of the mothers of the controls were in the age group above 35 years. It was seen that there is significant difference among cases and controls in relation to the maternal age (OR = 2.0, 95% CI 1.053 – 3.799). Under five years children of the households with family size of greater than 5 were seen associated with severe acute malnutrition of the children (OR = 2.267, 95% CI 1.235 – 4.161). The illiteracy rate was 98 (90.7%) among mothers of the cases and 71 (65.7%) among the mothers of controls similarly, 93 (86.1%) among the fathers of the cases and 76 (70.4%) among the controls. Under five years children whose mother is illiterate were significantly associated with severe acute malnutrition of the children (OR = 8.25, 95% CI 2.923 – 23.287); similarly under five years children whose father is illiterate were also seen associated with severe acute malnutrition of the children (OR = 2.7, 95% CI 1.307 – 5.578). Majority of the mothers, 102 (94.4%) of the cases and 105 (97.4%) of the controls, were housewives with no occupation. The main paternal occupation is farming in both the cases and controls (95.2% and 97.2% respectively). There was no significant difference on the child severe acute malnutrition in cases and controls in relation to the maternal and paternal occupation (P value >0.05). Concerning the morbidity status of the children, 28(25.9%) of the cases and 10(9.2%) of the controls had diarrhea 2 weeks before the survey likewise 17(15.7%) of the cases and 12(11.1%) of the controls had fever 2 weeks preceding the survey. There was significant association between severe acute malnutrition and the morbidity status by diarrhea (OR = 5.4, 95% CI 1.997 – 13.54) and fever (OR = 3.2, 95% CI 1.090 – 8.254). Children whose mothers do not take to the health institution within 24 hours of the onset of the symptom were associated with severe acute malnutrition of the child (OR = 2.643, 95%CI 1.429 – 4.888). Washing practice were practiced by all of the mothers of the cases and controls, 89 (82.4%) of the cases and 99 (91.7%) of the controls had practiced once daily while the remaining 8.3% of the cases and 17.6% of the controls were practiced every third day. There was significant difference in frequency of washing practice among cases and controls (OR = 0.091, 95% CI 0.012 – 0.704). The number of children ever born by a mother was variable among the cases and the control. Fifty percent of the mothers of controls and 66.7% of mothers of cases had given birth of more than three children.

REFERENCES

1. **Amthor Rachel E, Stephanie M Cole, Mark J Manary (2012)** the use of home-based therapy with ready-to-use therapeutic food to treat malnutrition in rural area during a food crisis. Journal *of the America Dietetics Association*. 2009;109:464-467 221.

2. **Bary Carly (2012)** Regression Analysis: Using stepwise regression to explain plan energy usage. http://blog.minitab.com/blog/real-world-quality-improvement/using-minitab-stepwise-regression-to-explain-plant-energy-usage

3. **Belachew T and H Nekatibed (2007**) Assessment of outpatient therap[eutic programmes for severe acute malnutrition in the regions of Ethopia. *East African Medical Journal*, Vol 84, No 12.

4. **Bennett and Marie (2009)** Understanding childhood malnutrition in Maya villages region of Guatemala. A syndemic perspective. University of Connecticut, 2009, 320 Pages 3360686

5. **Black ER, Allen LH, Bhutta ZA, et al (2008)** maternal and child under nutrition: Global and regional Exposure and health consequences. Lancet 2008; 371.

6. **Black ER, Cesar G Victora, Susan P Walker, 2013** Zulfigar A Bhutta, Mercede DeOnis, Majid Ezzati, Sally Grantham-McGregor, Joanne Katz, Reynaldo Martorell, Ricardo Uauy, and Maternal and Child Nutrition study Group (2013). *Lancet* 2013; 382:427-51. www.thelancet.com volume 382, August 3, 2013

7. **Collins S (2004)** Community-based therapeutic care. Community-based therapeutic care. A new paradigm for selective feeding in nutritional crisis. *Humanitarian practice network paper number* 48, 2004

8. **Collins S (2006)** Treating malnutrition seriously. *Achieves of diseases in children* 2006; 92(5):453-61

9. **Collins S, Dent N, Binns P, Bahwere P, Sadler K, Hallam A (2011)** Management of severe acute malnutrition in children. Lancet 2006; 368(9551):1992-2000

10. **Collins S, Nicky D., Paul B., Paluku B., Kate S., and Alistair H (2006)** Management of Severe Acute Malnutrition in Children. *Lancet* 2006; 368; 1992-2000. September 26, 2006 DOI: 10.1016/S0140 - 6736(06)69443-9

11. **Collins S, Sadler K (2002)** Outpatients care for severely malnourished children in emergency relief programmes. A retrospective cohort study. *Lancet* 2002; 360(9348): 1824-30

12. Collins S, Sadler K, Dent N, Khara T, Guerrero S, et al. (2005) Key issues in the success of community-based management of severe malnutrition. Food Nutr Bull 27: S49-S82.

13. **Collins S. 2001**, Changing the way we address malnutrition severe malnutrition during famine. *Lancet* 2001; 358(9280): 498-501

14. **Collins S. Sadler K. Dent N. Khara T, Guerro S, Myatt M, Saboya M. Walsh S.2006** Key issues in success of community-based management of severe malnutrition. *Food and Nutrition Bulletin* 2006; 27 (3 suppl); S49-82 223.

15. **Collins S., and Kate Sadler K., (2002)** Outpatients care for severely malnourished children in emergency relief programmes: a retrospective cohort study. Lancet 2002:360:1824-30, volume 360.

16. **Cotterill P (2009)** Interviewing women: issues of friendship, Vulnerability and power. Women Studies International Forum.15/5-6 September-December 1992): 593-606.

17. **Creswell J.W (2009**) research design: qualitative quantitative and mixed methods approaches, *SAGE*, London.

18. **Creswell J.W. and Plano Clark V.L (2007)** designing and conducting mixed method. Thousand Oaks, CA: *SAGE*. London

19. **Danielle K Matilsky, Kenneth Maleta, Tony Casteleman, and Mark Manary (2009)** Supplementation feeding with fortified spreads results in higher recovery rates than a corn blend in moderately wasted children. *The Journal of Nutrition*, 139:773-778.

20. **Darton-Hill Ian and Mickey Chaopra (2007**) in Mark Lawrence and Tony Worsley (2007) public health nutrition; principles and practice. *Open University press*. First edition.

21. **Deen J. Acqueline L., Mathias Funk, Victor C Guevara, Haroon Saloojee, James Y Doe, Ayo Palmer and Martin W Weber (2003)** Implementation of WHO Guidelines on the management of severe malnutrition in hospitals in Africa. *Bulletin of the World Health Organisation*, 2003; 81(4).

22. **Defourny Isabelle, Andrea Minetti, Geza Harczi, Stephane Doyon, Susan Stepherd, Milton Tectonidis, Jean-Herve Bradol, Micael Golden (2009**). A large-scale distribution of milk-based fortified Spread: evidence for a new approach in regions' with high burn of acute malnutrition. *PLoS* one volume 4 issue 5.

23. **Delisle F Helen (2008)** poverty – a double burden of malnutrition in mothers and the intergenerational impact. New York Academic of sciences

24. **Dopson S, Fitgerald L, Ferlie E, Gabbay J, Locock L (2002)** No magic targets! Changing Clinical Practice to become more evidence based. Health care management Review 2002, 27(3):35-47.

25. **Draper A and Swift J.A (2010)** Qualitative research in nutrition and dietetics - data collection issues. Journal of Human Nutrition and Dietetics, 24:pp-3-12 224

26. **Eticha K (2007)** Prevalence and Determinants of Child Malnutrition: Western Ethiopia, Gimbi District, Oromia Regional State. Addis ababa university [master thesis.

27. **Farhana Sultana (2007)** Reflexivity, Positionality and participatory ethics. Negotiating fieldwork dilemmas in international research. ACME Editorial. 225.

28. **Funnel Sue C. and Patricia Rogers (2011)** Purposeful programme Theory. Effective use of theories of change and logic model. *Jossey Bass*

29. **Guerrero Saul, Mark Myatt, Steven Collins (2013**) Determinants of coverage in community-based therapeutic care programmes: towards a joint quantitative and qualitative Analysis. *Blackwell*, London

30. **Hendrickse RG (2015)** 50 years of myth and mystery. Do aflotoxins provide a clue? P.H Van Tiel-lezing. Institute of Tropical medicine. Rotterdam Leiden, floris publication. Dordrecht

31. **Kathleen St Louise and Angela Calabrese Barton (2012)** Tales from Science Education Crypt: A critical Reflection of positionality, subjectivity and reflexivity in research. Qualitative Social Research, Vol. No 3 (2002)

32. **Kauffman Carol A, PG Jones and M.J Kluger (1986**) fever and malnutrition: endogenous pyrogen/interleukin-1 in malnourished patients Am J Clin nutr. 44:449-452

33. **Kerac Marko, James Bunn, Andrew Seal, Marriam Thindwa,** Andrew Tomkins, Kate Saddler, Paluku Bahwere and Steve Collins (2009) Probiotics and prrebiotics for severe acute malnutrition (PRONUT study): a double-blind Efficacy randomised controlled trial in Malawi. *The Lancet* Volume 374, 2009; 374:136-44.

34. **Kirtisudha M, Praveen K, Srikanta B, Kiran R, Aneja S (2012**) Risk Factors for Severe Acute Malnutrition in Children below 5 year of Age in India: A Case- Control Study. Indian J Pediatrics 81: 762-765.

35. **Kruger and Vorster (2007**) poverty, malnutrition and underdevelopment and cardiovascular diseases: A South African perspective. Cardiovascular J Africa 2007 Sept-Oct; 18(5)'321-4

36. **Leone Lillian (2008**) realistic evaluation of an illicit drug deterrence programme: Analysis of a case study. Evaluation 2008 14:9

37. **Linneman Zachary, Danielle Matilsky, MacDonald Ndekha, Micah J Manary, Ken Maleta and Mark J Manary (2017**) a large operational study of home-based therapy with ready-to-use therapeutic food in childhood malnutrition in Malawi. *Maternal and child nutrition.* Vol 3; pp206-215

38. **Marchal Bruno, McDamien Dezo, Guy Kegels (2010**) Turning around an ailing district Hopsital: A realist evaluation of strategic Changes at Ho Municipal Hospita (Ghana). BMC Public health 2010, 10:787

39. **Michael J Gibney, barrie M. margetts, John M**. Kearney and Lenore Arab. Public health nutrition. The nutrition society textbook series, 2004

40. **Mwangome M, Fegan G, Mbunya R, Prentice A, Berkley J (2018**) Reliability and accuracy of Anthropometry performed by community health workers among infants under age 6 months in rural Kenya. *Trop Med Int Health.* Feb 26.