

GRADUATE AND POSTDOCTORAL STUDIES

MCGILL UNIVERSITY



FINAL ORAL EXAMINATION
FOR THE DEGREE OF
DOCTOR OF PHILOSOPHY

OF

MATILDA ESSANDOH LAAR
SCHOOL OF DIETETICS AND HUMAN NUTRITION

15th July, 2015

9:00 AM

CINE Board room, Room 102
McGill University, Macdonald Campus

TITLE: Improving the capacity of community health workers to identify and mitigate low weight-for-length in young children in Ghana.

COMMITTEE:

Dr. Jim Fyles, Natural Resource Sciences (**Pro-Dean**)

Dr. L Wykes, School of Dietetics and Human Nutrition (**Chair**)

Dr. GS Marquis, School of Dietetics and Human Nutrition (**Supervisor**)

Dr. H Melgar-Quinonez, School of Dietetics and Human Nutrition (**Internal Examiner**)

Dr. K Gray-Donald, School of Dietetics and Human Nutrition (**Internal Member**)

Dr. H Monardes, Department of Animal Science (**External Member**)

Dr Josephine Nalbantoglu, Dean of Graduate and Postdoctoral Studies
Members of the Faculty and Graduate Students
are invited to attend

ABSTRACT

The Ghana Health Service's (GHS) outreach program has expanded its reach to remote rural communities through monthly growth monitoring and promotion (GMP) community-based clinics. Even though the wasting (< -2 weight-for-length z-score [WLZ]) prevalence rate is higher than underweight in infancy, only weight is measured; no provision exists to measure length in the GHS GMP outreach service. The inadequate nutrition knowledge and poor counseling skills of community health workers (CHW) and the lack of counseling aids and tools further impede the prevention and management of wasting. The aim of this study was to determine if increasing the capacity of CHW, by providing them with appropriate tools and nutrition knowledge to identify low WLZ and offer effective nutrition counseling would affect the prevalence of wasting in children less than 2 years of age. Using a cross-sectional survey of households with young children in the Upper Manya Krobo district, an algorithm was developed based on individual- and household-level predictors of low WLZ. We used a cluster-randomized intervention carried out in rural GMP outreach services to compare three treatments: (i) control group, use of the mandated standard-of-care (SOC) weight measurements, weight-for-age z-score (WAZ) chart and the GHS counseling cards; (ii) algorithm group, use of a newly-developed algorithm and SOC; and (iii) length group, measurement of length, use of WLZ chart and SOC. Thirty clusters of community-based GMP clinics were randomly assigned to the three treatment groups ($n=10$ per group). Using two cross-sectional surveys at baseline ($n=661$) and one year later ($n=666$), we tested differences in prevalence of low WLZ in children 0 to 24 months. At both rounds of survey, children's anthropometric and dietary data, caregivers' young child feeding and child care practices, and household assets, demographics, and food security were assessed. Community- and child-level analyses were by intention-to-treat, adjusting for clustering effect, child age, sex, diet, and health factors. The diagnostic accuracy of the algorithm was examined. Child health workers were directly observed during GMP sessions and mothers were interviewed to document the quality of the intervention implementation (number of GMP sessions held, proportion of mothers receiving individual counseling, and mothers' recall of nutrition messages). Reliability studies examined length measurements collected at two anthropometry standardization sessions conducted six months apart. Case observations and interviews with CHW examined their ability to measure length and their experiences with using length as part of outreach GMP sessions. The results show that the algorithm was unable to accurately discriminate between children with low WLZ and those with higher WLZ. The indicator $WAZ < -1$ alone was moderately accurate in identifying low WLZ in children. The intervention had no effect on prevalence of low WLZ at the community level ($p = 0.67$) or low wasting status at the individual level ($p = 0.48$). However, a significantly higher number of scheduled GMP sessions was held in the algorithm and length groups compared to control (mean difference: 2.7; 95% CI: 0.01 to 5.40, and 2.93; 95% CI: 0.55 to 5.31,

respectively). A higher proportion of caregivers were provided with individual counseling in the algorithm and control group compared to length (mean difference: 0.24; 95% CI: 0.17 to 0.31, and 0.23; 95% CI: 0.15 to 0.31, respectively). Length measurements taken by CHW and those taken by the experienced anthropometrist at GMP sessions were of moderate agreement ($\kappa = 0.53$, $p < 0.0001$). The present study gives rise to further investigations on using locally relevant predictors and WAZ to identify children with low WLZ. Regular assessment of undernutrition rates is important to understand the current situation at regional and district levels. The reliability of length measurements taken during GMP sessions may be susceptible to errors due to overburdened CHW and understaffed and crowded GMP clinics. Pre- and in-service training for CHW are important for improving and maintaining reliable length measurements. In future, there is a need to evaluate rural GMP programs in Ghana to identify bottlenecks and how these can be addressed to improve program effectiveness.

PUBLICATIONS

Laar, A., Manu, A., Laar, M., El-Adas, A., Amenyah, R., Atuahene, K., ... & Quakyi, I. (2015). Coping strategies of HIV-affected households in Ghana. *BMC public health*, 15(1), 166.

Laar, A., El-Adas, A., Amenyah, R. N., Atuahene, K., Asare, E., Tenkorang, E. Y., ... & Quakyi, I. (2014). Food and nutrition assistance to HIV-infected and affected populations in Ghana: a situational analysis and stakeholder views. *African Geographical Review*, pp. 1-14.

Laar, A., Fiaveh, D., Laar, M. E., Boatemaa, S., Abugri, J., El-Adas, A., Amenyah, R., Atuahene, K., Adjei, A. and Quakyi, I. (2014). Profiles of HIV-Affected Households in Ghana. *Health*, 6, 2004-2013. doi:10.4236/health.2014.615235.

Laar M. E., Laar, A. K. (2012). Infant feeding modality and health of mothers infected with human immunodeficiency virus in sub-Saharan Africa—a systematic literature review. *Journal of AIDS and HIV Research* Vol. 4(1), pp. 1-7.

Laar A. K., Mohammed A A, Essandoh-Bondzie M. (2006). Diet: A Cornerstone to Diabetes Management. *Ghana Health Digest*, volume 6 issue 2 September 2006 pp 25.

PRESENTATIONS AND PUBLISHED ABSTRACTS

Matilda E. Laar & Grace S. Marquis (2014, July). The role of health

volunteers in outreach health services of a rural district in Ghana. Paper presented at biennial meeting of the VIth African Nutrition Epidemiological Conference (ANEC), Accra, Ghana.

Matilda E. Laar, Grace S. Marquis, Anna Lartey, Kathryn Gray-Donald (2014, July). Improving the capacity of community nurses to identify and mitigate wasting: developing an algorithm. Poster presented at biennial meeting of the VIth African Nutrition Epidemiological Conference (ANEC), Accra, Ghana.

Matilda E. Laar, Grace S. Marquis, Anna Lartey, Kathryn Gray-Donald (2015, Mar-Apr). Growth Monitoring and Promotion in Rural Ghana: Lack of Motivation or Tools? Paper presented at the annual Experimental Biology Conference (EB), Boston, USA

Matilda E. Laar, Grace S. Marquis, Anna Lartey, Kathryn Gray-Donald (2015, Mar-Apr). Growth Monitoring and Promotion in Rural Ghana: Lack of Motivation or Tools? Poster presented for Emerging Leaders in Nutrition Science Award (Finalist) at the Experimental Biology Conference (EB), Boston, USA.

EMPLOYMENT AND RESEARCH EXPERIENCE

Preceptor, International Community Nutrition Rotation for Dietetic Interns, University of Ghana's Nutrition Research and Training Center, Ghana (2012)

Senior Public Health Nutritionist, Hennepin County Supplementary Nutrition program for Women, Infants and Children program, -WIC, MN, USA (2009 - 2011)

Graduate Research Assistant, Division of Epidemiology, University of Minnesota, MN, USA (2007 - 2009)

Intern, World Health Organization (Headquarters), Geneva, Switzerland (2008)

National Service Personnel (Nutritionist) Ports Medical Center, Tema, Ghana (2007)

UNIVERSITY EDUCATION

PhD, Human Nutrition, McGill University, Canada, 2011-present
MPH, Public Health Nutrition, University of Minnesota, USA, 2010
BSc, Nutrition and Food Science, University of Ghana, Ghana, 2005