1. Introduction

Children hospitalized with severe acute malnutrition (SAM) experience high mortality rates, with many recent studies reporting rates above 20% (1–5). According to a recent systematic review, the World Health Organization (WHO) guidelines have reduced mortality, but mortality remains high due to the presence of severe co-morbid conditions, lack of resources and different treatment practices (6). Children with SAM experience a high burden of infection due to their defective immune system (7). Among the immune changes in SAM, atrophy of the thymus gland has been reported (8–11). Moreover, a small thymus has been reported to predict mortality in well nourished children (12,13). In malnourished children, studies correlating thymus size to function have yielded contradicting results depending on the tests used (7). This thesis was supposed to provide an opportunity to assess the thymus function using T cell receptor excision circles (TRECs) in this population. In addition, describing correlates of thymus size in this population would help identify those whose immunity is more severely affected. Fortunately, the thymus atrophy experienced by children with SAM is reversible, but it lags behind nutritional recovery (11). Despite this information, nutritional programs continue to use only anthropometric recovery as the criteria for discharge from care. The reported high risk of post-discharge mortality among malnourished children (3,14,15) warrants further evaluation of their immunity. It is therefore important to investigate the recovery of the thymus gland and determine predictors of its recovery during nutritional rehabilitation. Finally, inpatient mortality has remained high in low income countries despite interventions. This calls for studies to identify predictors of mortality in this population so that those at highest risk should be targeted.

The main objective of this thesis is to evaluate the thymus gland size at admission, thymus gland recovery during nutritional rehabilitation and predictors of hospital mortality among children with severe acute malnutrition.

Specific objectives

1. To describe the correlates of thymus size at admission and determine the correlation between thymus size and TRECs among children admitted with SAM.
2. To determine predictors of thymus gland recovery during nutritional rehabilitation of children admitted with SAM.
3. To determine the predictors of inpatient mortality among children admitted with SAM.