

## **Master of Sciences in Health and Social Care Research at the University of Sheffield**

### **Project: 405**

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The grant of the SFEFS Foundation enabled me to study at the University of Sheffield (UK) for the last two years and to graduate with a MSc in Health and Social Care Research. As this course is a distance learning program, I could continue working at part-time on nutritional studies in critically ill children at the Paediatric Intensive Care Unit of the University Hospital of Lausanne (CHUV).

During this course, numerous skills in quantitative and qualitative research are developed like designing tools for data collection, data analysis, critical appraisal of the literature, etc. The main advantage of this course is the possibility to make most of the assessments in our field of interest, for instance, it was possible to conduct two systematic reviews on nutrition in critically ill children.

The first review aimed to determine if resting energy expenditure in critically ill children can be estimated using predictive equations instead of measured by indirect calorimetry. Indirect calorimetry is the most accurate method to determine energy expenditure but requires financial and staff resources. In daily practice, predictive equations would be a useful tool, but a controversy remains about their accuracy in critically ill children. A rigorous research strategy provided 13 studies that compared the values of estimated and measured energy expenditure in critically ill children. 14 different predictive equations were tested in 595 ventilated critically ill children with medical and surgical diagnoses. In conclusion, predictive equations are not accurate and should not be used in critically ill children, except for the equation of Schofield that leads to contradictory results. These findings were presented at national and international congresses of nutrition and intensive care.

The second review constituted one section of my final dissertation. Considering the lack of evidence about nutritional recommendations in critically ill children, the primary aim was to examine energy and nitrogen balances in this population in order to assess the adequacy of nutritional support. 24 studies, 22 published studies and 2 unpublished studies, involving 1665 critically ill children, were included. The main result was that one week after admission in paediatric intensive care unit was required to achieve caloric goal. For proteins, the results demonstrated that nitrogen equilibrium was achieved with an amount of protein that ranged from 1.4 to 2.8 g/kg/d. The results could not be pooled because of the heterogeneity among studies, but one of the most important findings was that approximately 50% of included studies were assessed as having a bad methodology. The main reason was that energy and protein requirements were estimated using equations and not determined by an accurate measurement of energy expenditure and urinary nitrogen loss.

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