

Chronic disease risk after brain injury: a retrospective review of Australian paediatric patient weight outcomes

Mark Anderson¹, Suzie Harte¹, Karen Barlow^{1,2}

¹ Acquired Brain Injury in Children Research Group, Child Health Research Centre, Faculty of Medicine, The University of Queensland, South Brisbane, QLD, Australia

² Queensland Paediatric Rehabilitation Service, Queensland Children's Hospital, South Brisbane, QLD, Australia

Background

Optimal nutrition following acquired brain injury (ABI) is critically important to ensure ideal neurological and physical healing and most favourable long-term outcomes. Despite ABI affecting 1-3% of Australian children, the literature and management guidelines for nutritional support of these children is limited^{1,2}.

This study aimed to explore nutrition-related health outcomes for children followed through the state-wide Queensland Paediatric Rehabilitation Service

Methods

- Chart review of convenience sample to collect demographic, anthropometric, injury and medical data (n=104);
- Chi² analysis of change in proportion of weight categories from 0-6, 6-12 and >12 months following injury;
- Sub-group analysis to consider prevalence of significant weight trajectories (Δ BMI z-score >0.67 over any 12-month period) (n=67);
- Categorisation of weight as 'healthy nutrition' (BMI 5-85%ile) or 'malnutrition' (BMI <5%ile or >85%ile) for binomial logistic regression analysis to evaluate factors influencing aberrant weight change.

Results

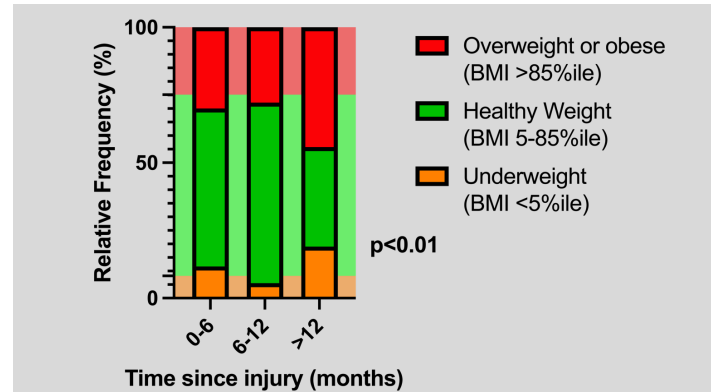
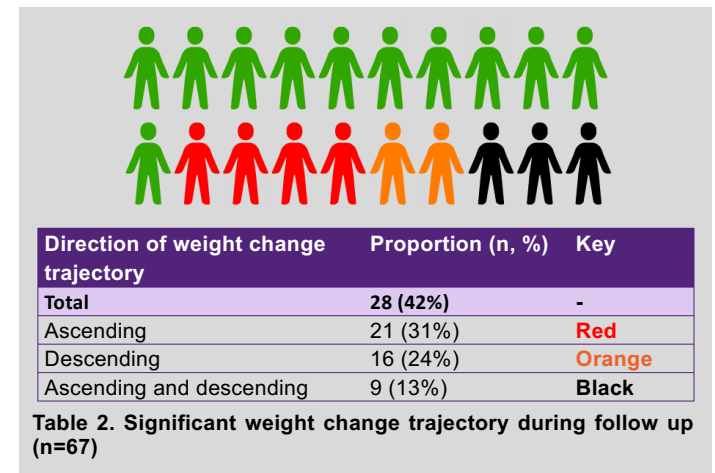


Figure 2. Weight categories of children following ABI (n=104). Background shading represents BMI of Australian children from National Healthy Survey data.

- Significant increase in proportion of both underweight (12% to 19%) and overweight/obese (30% to 44%) children from 0-6 months to more than 12 months after injury (**Figure 2**);
- Age at injury and female sex identified as significant risk factors for aberrant weight change during follow up (**Table 1**);
- 42% had significant weight change trajectories after injury (**Table 2**).

Conclusions

- Increased prevalence of **both underweight and overweight/obesity** in children after brain injury, when compared to age and gender population-matched data;
- Aberrant weight change **sustained** over time post-ABI;
- Health service research exploring comprehensive long-term nutrition programs to improve nutrition and decrease risk of future weight related chronic disease are needed.



Future Directions

- Weight change **measured more frequently** in practice;
- Significant weight change used as a **red flag** for referral and investigation;
- Co-design principles to design and implement rehabilitation strategies.

Children with ABI are at significant risk of malnutrition following injury, so weight change is an important red flag for follow up

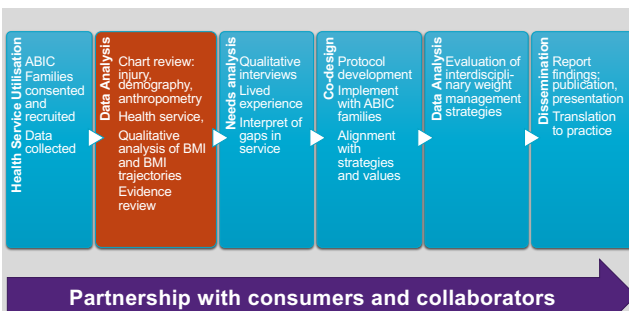


Figure 1. Methods

Covariates	Odds ratio [95% CI]	p-value
GAC	1.005 [0.975, 1.044]	0.713
Age at Injury	3.024 [1.423, 12.680]	0.017
Female Sex	1.158 [1.045, 1.406]	0.013
Days of Hospital Admission	0.998 [0.929, 1.017]	0.883

Table 1. Factors influencing nutrition status following injury (n=67)

References

1. Pozzato, I., et al., *Epidemiology of hospitalised traumatic brain injury in the state of New South Wales, Australia: a population-based study*. Aust N Z J Public Health, 2019. **43**(4): p. 382-388.
2. Jourdan, C., et al., *Weight gain after childhood traumatic brain injury: a matter of concern*. Dev Med Child Neurol, 2012. **54**(7): p. 624-628.

Keywords

Paediatric neurology, behaviour, nutrition, physical activity, quality of life, rehabilitation

✉ mark.anderson@uq.edu.au

🌐 uq.edu.au

👤 Mark Anderson

Acknowledgements

Children and families attending the Queensland Paediatric Rehabilitation Service.

