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Thesis abstract

The potential of online food ordering systems to increase healthy food purchasing behaviours

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Background and aims

Poor dietary behaviours, resulting in the over-consumption of energy, saturated fat, sugar and sodium, are a leading cause of global disease burden. Given dietary behaviours established in childhood track through to adulthood, childhood is considered a critical period for the establishment of healthy dietary behaviours. School food services, such as canteens or cafeterias, are recommended settings to improve child diet, due to their wide reach, frequent use by students and the regulatory and policy context in which they operate. Despite this, historically, research in these settings has identified purchasing behaviours which are not aligned with dietary guidelines. Online food ordering systems that enable users to pre-order and pay for menu items online are increasingly common, including within the school setting. These systems can support the direct delivery of interventions that encourage the purchase of healthier foods at a critical behavioural decision (i.e. the point of purchase). Despite this, little is known about the feasibility, acceptability and efficacy of using online food ordering systems to deliver interventions to encourage healthier food purchases. Therefore, the broad aim of this thesis was to investigate the potential of online food ordering systems to deliver public health nutrition interventions to increase healthy food purchasing. Specifically, this thesis will address evidence gaps relating to the acceptability and efficacy of an intervention embedded within an online food ordering system to increase healthy food purchasing from primary school online canteens. The thesis objectives are:

- To assess the nutritional quality of foods purchased by students from primary school canteens in one region of Australia (Chapter 2)
- To systematically review the literature to describe the association between digital health intervention engagement (a factor hypothesised to influence intervention effectiveness) and dietary intake (Chapter 3)
- To assess the uptake of online canteen lunch ordering systems in primary schools and the acceptability of strategies that could be implemented within such systems to encourage healthy food and beverage purchases by students (Chapter 4)
- To develop (Chapter 5) and evaluate the efficacy (Chapter 6) of an intervention implemented in an online canteen lunch ordering system in reducing the energy, saturated fat, sugar, and sodium content of primary school student lunch orders

- To systematically review and synthesise current evidence for the effectiveness of interventions implemented within real-world online food ordering systems to encourage healthy food and beverage purchases (Chapter 7)
- To provide a summary of thesis findings and the implications for future policy, practice and research (Chapter 8).

Results

To address the first thesis aim, a cross-sectional study was undertaken with 18 government primary school canteens in the Hunter region of New South Wales, Australia. The study found that 76% (n = 1,871/2,475) of lunch items purchased from school canteens were classified as "less healthy" according to the state healthy canteen policy of the time, with the most common items purchased being "sugar sweetened ice-blocks and slushies." The findings indicated that there is considerable scope to improve the nutritional quality of student purchases from primary school canteens.

To address the second thesis aim, a systematic review was undertaken to describe the association between user engagement and the effectiveness of digital health interventions targeting dietary intake. The review identified just seven studies that had assessed an association between digital health intervention engagement and dietary intake. Overall, the review found mixed evidence of any association between user engagement and dietary intake, with the majority of findings reported as "inconclusive" for measures of usage (e.g. logins, time spent using the intervention, activities completed) and subjective experience (e.g. interest) respectively.

To address the third aim, a telephone survey was conducted in 2014 with 123 school Principals in one region of NSW, Australia. The study found that 8% of schools were using an online canteen and that 38% were likely to do so in the future. Overall, the majority of Principals agreed it would be acceptable to implement the suggested strategies to encourage healthy food purchasing in online canteens (>70%), particularly strategies that involved the provision nutrition information (93%) and labelling (92%).

To address the fourth thesis aim, a cluster randomised controlled trial of ten primary schools (and 2,714 students) found that an intervention (including menu labelling, placement, prompting and availability) implemented in an online canteen decreased the energy (between group difference: –567 kJ), saturated fat (between group difference: –2.37 g) and sodium content (between group difference: –151 mg) of primary school student lunch orders (P < 0.001 respectively), without any adverse impact on canteen revenue. There were no significant differences found for sugar (between group difference: 1.16 g; P = 0.17).

Finally, a systematic review of eleven studies (six RCTs; two cross-over RCTs; two cluster RCTs; one CCT) found that interventions delivered within real-world online food ordering systems (including meal delivery apps, meal subscription services, online supermarkets and online canteens and cafeterias) to encourage healthy food choices were effective in reducing the energy (standardised mean difference (SMD): –0.34, P = 0.01), fat (SMD: –0.83, P = 0.04), saturated fat (SMD: –0.71, P = 0.02) and sodium content (SMD: –0.43, P = 0.01) of online food purchases.

Conclusion

This thesis provides evidence for the acceptability and efficacy of using real-world online food ordering systems to increase healthy food purchases. Such interventions may be particularly relevant for public health practitioners, educators, retailers, researchers and policy makers seeking to improve digital food environments and public health nutrition. This thesis concludes by providing recommendations to support decision making regarding using online food ordering systems to deliver interventions to encourage healthier food purchases at scale.

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