Research Article

Impact of a Capacity-Building Intervention on Food Marketing Features in Recreation Facilities

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ABSTRACT

Objective: To explore the impact of a capacity-building intervention (CBI) to support implementing provincial nutrition guidelines on food marketing in recreation facilities (RFs).

Design: Randomized controlled trial within a natural experiment: food marketing in RFs from 3 guideline provinces randomly assigned to intervention (GL+CBI) or comparison (GL-ONLY) was compared with facilities in 1 province without guidelines (NO-GL). Food marketing was assessed by the Food and Beverage Marketing Assessment Tool for Settings.

Setting: Canadian provinces with/without voluntary nutrition guidelines for RFs.

Participants: 51 RFs.

Intervention: 18-month CBI.

Main Outcome Measures: Change in Food and Beverage Marketing Assessment Tool for Settings scores and marketing features between baseline and follow-up across groups.

Analysis: Kruskal–Wallis with *post hoc* Mann–Whitney U tests.

Results: No significant differences in food marketing features between baseline and follow-up across groups except for a change in food marketing frequency ($P = .045$). The increase in frequency in NO-GL (median, 6.0; interquartile range, −2.0 to 8.5) was significantly greater than changes in the GL+CBI ($P = .033$) and GL-ONLY sites ($P = .049$).

Conclusions and Implications: Capacity-building was not associated with improved food marketing features potentially because of nonmandated nutrition guidelines, low priority for change, and vague or narrow facility goals and guidelines. Nutrition guidelines with specific unhealthy food marketing restrictions should be mandated and supported.

Key Words: food marketing, recreation and sports facilities, capacity building, children, policy (*J Nutr Educ Behav.* 2020;000:1–9.)

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INTRODUCTION

The food industry has historically been a commercial partner in professional and recreational sports.[1] Professional sports sponsorship and athlete endorsement of food products have been used by food companies to reach and influence consumers broadly.[2] In addition, consumers may be exposed to food products and companies through food marketing in their local community recreation and sports facilities. Previous research in municipally operated recreation and sports facilities in Canada counted a median of 29 food marketing occasions per site, of which half were for unhealthy products (eg, sugar-sweetened beverages, confectionery,

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deep-fried foods), or brands and retailers generally regarded as unhealthy (eg, pizza, burger, donut retailers).[3] Research from Australia has found that food and beverage companies that sell predominantly unhealthy products also often sponsor youth sports.[4,5] Kelly et al[5] estimated that children aged 5−14 years participating in organized sports in Australian sports clubs may be exposed to up to 63,662 person-hours of food and beverage sponsorship per week.

The presence of unhealthy food marketing, messages, and promotions that increase the appeal of energy-dense, low-nutrient foods and beverages in settings intended to promote health and wellbeing (eg, recreation facilities [RFs]) is contradictory to their aims and may contribute to *health halos* by associating unhealthy products with physical activity.[2,6] The potential for recreation and sports facilities and leagues to regularly expose hundreds of thousands of users, including children,[5,7,8] to unhealthy food marketing should be an impetus for action, as recommended by the World Health Organization.[8] Experts in health promotion, nutrition, physical activity and sports management from government, academia, and nongovernment agencies have identified restricting unhealthy food and beverage sports sponsorship as an important and feasible intervention to promote children's health in community sports centers.[9]

In Canada, 3 provinces (British Columbia [BC], Alberta, and Nova Scotia) have developed voluntary provincial nutrition guidelines for RFs. Voluntary nutrition guidelines for RFs provide a nutrient profiling system to classify foods and beverages as healthy and less healthy to inform RFs of what items are recommended to be sold or provided to visitors of their facility. Evidence indicates that voluntary provincial nutrition guidelines may be poorly adopted and implemented because of concerns over the potential for reduced profitability, desires to maintain current cultural norms, and beliefs that patrons will continue to purchase unhealthy foods even when healthy options are available.[10] However, evidence also suggests that healthy food marketing could support the success (and profitability) of providing healthy food in RFs by increasing consumer awareness of healthy options and nudging consumers to healthier choices.[11] To this end, this study aimed to explore the impact of a capacity-building intervention (CBI) to support recreation facility managers' and foodservice operators' abilities to implement provincial nutrition guidelines in RFs on food marketing features.

METHODS

Study Design

The Eat, Play, Live (EPL) trial was a randomized controlled trial embedded within a natural experiment. The study enrolled RFs in 3 provinces with voluntary provincial nutrition guidelines for the recreation sector (BC, Alberta, and Nova Scotia) and 1 province without such guidelines (Ontario). The EPL trial first evaluated whether voluntary provincial nutrition guidelines were associated with healthier food environments, including food marketing, in RFs. The results of this evaluation are published elsewhere with a description of the 3 provincial nutrition guidelines.[3] Next, the EPL trial evaluated the added value of capacity building in enhancing a recreation facility's ability to implement provincial nutrition guidelines. The current study explored the impact of a CBI on food marketing features, comparing RFs within guideline provinces randomly assigned to a capacity-building group or a comparison group, and RFs within the province with no nutrition guidelines. This exploratory study aimed to support the confirmatory trial with primary outcomes[12] and inform future research hypotheses.[13] Full details and primary study outcomes of the confirmatory EPL trial are reported elsewhere.[12]

Participants and Recruitment

Local parks and recreation associations emailed study invitation letters once to all of their members in each province. Researchers followed up with 286 facilities that indicated an interest in participating and were located within a day's travel of the host institution in each province. Approximately half of these facilities (n = 145) returned phone calls/emails, but only 75 of these were eligible to participate (ie, provided food services through concessions or vending machines, provided year-round sports programming, and had not made changes to their food environment since 2010 but were willing and able to do so). Of the eligible facilities, 49 facilities agreed to participate (65% of those who returned calls and were eligible). Only 26 eligible facilities declined the invitation, citing insufficient staff capacity in most cases (n = 11). The Institutional Review Boards at the University of Victoria, the University of British Columbia, the University of Alberta, the University of Waterloo, and Dalhousie University provided approval for the EPL trial.

Procedures

Facilities within guideline provinces were randomized to a CBI (GL+CBI) or a guideline only (GL-ONLY) comparison group. A third party randomly assigned the facilities in guideline provinces to the CBI (GL+CBI; n = 17) or guidelines only comparison (GL-ONLY; n = 15) group after baseline audits were completed. All Ontario facilities were automatically assigned to the *no guidelines* comparison (NO-GL) group (n = 17). Two facilities (1 in the GL+CBI group and 1 in the GL-ONLY group) were made up of 2 separate buildings each. Consistent with previous research, each building was treated as an individual measurement site for food marketing resulting in a total of 51 sites (GL+CBI, n = 18 sites; GL-ONLY, n = 16 sites; NO-GL, n = 17 sites).[3] Over the next 18 months, GL+CBI facilities participated in the CBI, whereas GL-ONLY and NO-GL facilities were asked to continue with their usual practices.

The CBI was based on pilot studies that found that CBIs are successful at improving food environments in RFs in BC.[14,15] Briefly, the CBI was guided by the broader socioecological framework, used a whole setting approach to change practices in the recreational facilities and it evolved from Robinson et al[16] and Orlandi et al[17] linking system approach. Specifically, the CBI included a 1-time

training workshop, on-demand support from a provincial coordinator, monthly check-ins, 3 teleconferences with all GL+CBI facilities in each province, facilitated goal-setting, and implementation-planning activities, electronic tools and resources, and a $1,000 CAD grant. A framework of municipal food environments in recreation, developed from previous research,[18] guided the possible areas for action for the GL+CBI facilities action plans. Consistent with a socio-ecological approach, it was recommended that GL+CBI facilities include goals across functions of the recreation facility (eg, food services, programming, events), targeting different levels (eg, individual visitors, sports teams, facility policies).

A provincial coordinator provided tailored support to each facility depending on their self-identified needs and goals, which may or may not have encompassed food marketing. However, according to facility action plans collected during the CBI, the majority of GL+CBI sites (16 of 18) had at least 1 goal that strove to improve food marketing features within their facilities. Food marketing goals set by GL+CBI sites included: marketing healthy choices in concessions and/or vending machines, increasing general healthy food promotion, restricting sports sponsorship to healthier food or beverage retailers, and/or incorporating food marketing requirements or restrictions into a new or existing policy. Additional details of the CBI have been previously reported.[12]

All 51 sites were assessed at baseline (T1; from November 2015 to May 2016) and follow-up (T2; from August to December 2017). Because of the permanent or temporary closing of concessions (n = 5) and sports areas (n = 1) in some sites, all areas in all sites could not be reassessed at T2. Therefore, some sites were excluded from some analyses.

Instruments and Measures

The Food and Beverage Marketing Assessment Tool for Settings (FoodMATS) (interrater reliability (κ) = 0.88 −1.00; $P < .001$; intraclass correlation = 0.97, $P < .001$ established during pilot testing) was used to assess food marketing in all facilities.[19] The FoodMATS tool collects information on the frequency of food marketing occasions, repeated marketing of the same product, brand, or retailer, use of child-targeted and sports-related marketing techniques, and size of promotions. The FoodMATS identifies 37 marketing indicators (eg, marketing on vending machines, or scoreboards) to be assessed by raters, with space for raters to add additional unlisted marketing items if present in the facility.[19]

Raters classified whether food marketing occasions were child-targeted, sports-related, and their size (eg, small occasions were less than an 8.5 × 11-in letter piece of paper) based on a priori definitions. After data collection, all food and beverage products, brands, and retailers were classified as *Most Healthy*, *Less Healthy*, or *Least Healthy* by a registered dietitian, confirmed independently by a second registered dietitian. Products were ranked according to their classification in provincial nutrition guidelines[20–22] using several simplifying assumptions because it was not feasible to collect nutrient information for all products (see previous study[19]). Brands were ranked as per the product rankings for the product, the brand most closely represented. For example, Coca-Cola was ranked as per the original Coca-Cola product, whereas Dasani was ranked as per its original plain water product. Retailers were classified by rankings of relative food retailer healthfulness informed previous research by Minaker et al[23] assessing the food environment according to various food retailer types. See Table 1 for definitions of *Least Healthy* products, brands, and retailers. Full analysis details are published elsewhere.[19]

Based on the FoodMATS scoring scheme, composite scores were generated for facility areas (food [where the concession was located], sport [where physical activity and sports were played], and other [any non-food and non-sport areas, including the outside parking lot]) and for the total facility (all areas). Individual food marketing features included the frequency and repetition of food marketing occasions, and the proportions of *Least Healthy*, child-directed, sports-related, and large food marketing occasions) (Table 1). These features are combined to create the FoodMATS score[19] as they contribute to the exposure and power of food marketing and its impact on children's dietary preferences and behaviors.[24] The FoodMATS scoring scheme has been previously validated where higher FoodMATS scores represent less favorable food marketing environments (*lowest possible score* = 0, meaning no food marketing exists; the highest possible score is undetermined because scores continue to increase with additional food marketing occasions).[19]

Data Analysis

Statistical analyses were made using SPSS software (version 23, SPSS Inc., Chicago, IL; 2018) with $P < .05$ indicating statistical significance. Because of the exploratory nature of this study by evaluating secondary outcomes of a trial, it was not necessary to account for the familywise error rate to adjust for multiplicity.[13,25] The intervention conditions (GL+CBI, GL-ONLY, and NO-GL) were the independent variables, whereas the dependent variables were FoodMATS scores per area (food, sports, other) and all areas (food + sports + other) and individual food marketing features (see outcomes of interest in Table 1). Because of unequal covariances, Wilcoxon Signed Rank tests were used to test within-group differences in changes in FoodMATS scores and each food marketing features between T1 and T2, separately. Kruskal–Wallis tests were used to test between-group differences (GL+CBI vs GL-ONLY vs NO-GLs) in changes in FoodMATS scores and individual food marketing features between T1 and T2, separately, with Mann–Whitney U *post hoc* tests. Effect sizes for Wilcoxon Signed Rank tests and Mann–Whitney U *post hoc* test were calculated as $r = z/\sqrt{n}$, interpreted as a small effect (r = .1), medium effect (r = .3), large effect (r = .5).[26] Kruskal–Wallis with *post hoc* Mann–Whitney U tests were also used to test if there were significant differences in FoodMATS scores and individual food marketing features between intervention groups at T1.

RESULTS

Food marketing feature outcome measures at T1 and T2 are summarized

Table 1. Measures Evaluated by the FoodMATS Over Time

Measure	Outcome of Interest (Δ[a])	Definition of Measure
FoodMATS score	Number of points (units)	A composite score calculated from the exposure (frequency, repetition) and power (healthfulness, child-targeting, sports-related, size) of food marketing documented in a facility area and all areas.[16]
Frequency	Count of food or beverage marketing occasions	One marketing occasion was counted as any commercial advertising, promotion, or messaging of food or beverage products, brands, or retailers intended to increase the "recognition, appeal and/or consumption"[21] (p. 9) of the products, brands, or retailers. Includes all food marketing, regardless of healthfulness.
Repetition	Count of repeated products/brands/retailers	A product, brand, or retailer was counted as repeated if it was marketed three or more times across all areas.
Unhealthfulness	*Least Healthy* products, brands, retailers marketing occasions (%)	*Least Healthy* products/brands were processed, energy-dense, nutrient-poor items with high levels of fat, sugar, or salt, informed by provincial nutrition guidelines.[20–22] *Least Healthy* retailers were pizza, burger, taco, fried chicken, Asian, and ice cream outlets, and pubs/lounges/alcohol stores.
Child-targeted techniques	Child-targeted marketing occasions (%)	A child-targeted technique included evidence of animated or fictional characters, taste appeals, humor, action-adventure, fantasy, fun (shapes, colors), competitions, giveaways, cartoonish font, or used a child actor for advertising a food or beverage product/brand that would appeal to children.[16]
Sports-related techniques	Sports-related marketing occasions (%)	A sports-related technique included any reference to physical activity, exercise, sport, game, recreation, performance, or competition.
Size	Large marketing occasions (%)	Large marketing occasions inside the facility were those that included more than three 8.5 × 11-in pieces of paper. Large marketing occasions outside the facility were those that included more than 10 pieces of paper.

FoodMATS indicates Food and beverage Marketing Assessment Tool for Settings.
[a]Change calculated as T2 (follow-up assessment) value minus T1 (baseline assessment) value.

in Table 2 for all areas, food areas, and sports areas according to the intervention condition. There were no statistically significant differences at T1 in food marketing in all areas between the groups, except for NO-GL sites having more *Least Healthy* food marketing occasions than the GL-ONLY sites ($P = .008$) and a greater proportion of *Least Healthy* food marketing occasions than both other groups ($P < .001$).

At T2, across all condition types, the median number of food marketing occasions per recreation facility was 26 (interquartile range [IQR], 13.5–44.5). Approximately half of food marketing occasions were for *Least Healthy* food or beverage products, brands, or retailers (median, 47.6%; IQR, 28.5%–66.5%) and were large (median, 45.8%; IQR, 33.3%–62.4%). The proportions of child-targeted (median, 4.7%; IQR, 0.0%–8.9%) and sports-related (median, 3.0%; IQR, 0.0%–7.5%) food marketing occasions were low. The median FoodMATS score for all areas across all groups was 43.2 (IQR, 19.7–72.5).

Within-Group Change in Food Marketing Environments

There was a significant increase in the frequency of food marketing occasions (6.0; IQR, −2.0 to 8.5; $r = -.525$; $P = .036$) and FoodMATS scores (indicating a poorer food marketing environment) for all areas (7.1 points; IQR, −4.5 to 16.6; $r = -.517$; $P = .039$) within NO-GL sites. In Food Areas, FoodMATS subscores significantly decreased by 5 points (indicating an improved food marketing environment) in GL-ONLY sites from T1 to T2 ($r = -.599$; $P = .047$) (Table 3). There were no other statistically significant differences within groups for any condition in all areas, food areas, or sports areas between T1 and T2.

Between-Group Change in Food Marketing Environments

There were no significant differences in the change in food marketing environments between T1 and T2 across groups (Table 3), except for a significant difference in the change in frequency of food marketing occasions in all areas ($P = .045$). *Post hoc* Mann–Whitney tests revealed that the change in frequency of food marketing in all areas in NO-GL sites (6.0; IQR, −2.0 to 8.5) was significantly greater than the change in frequency in GL+CBI sites (0.0; IQR, −10.0 to 4.0; $r = .384$; $P = .033$) and GL-ONLY sites (0.0; IQR, −2.0 to 3.0; $r = .356$; $P = .049$); there was no difference in between GL+CBI and GL-ONLY sites ($r = .168$; $P = .367$).

Table 2. Descriptive Food and Beverage Marketing Outcomes Over Time by Facility Condition and Facility Area

	GL+CBI				GL-Only				NO-GL			
	T1		T2		T1		T2		T1		T2	
Outcomes	**Median**	**IQR**	**Median**	**IQR**	**Median**	**IQR**	**Median**	**IQR**	**Median**	**IQR**	**Median**	**IQR**
All areas[a,b]	n = 15				n = 15				n = 16			
Score,[e] points	58.3	2.8–73.70	53.9	8.1–107.60	32.6	4.1–68.8	30.3	4.4–58.3	43.6	31.8–71.3	50.5	34.8–80.1
Frequency, n	37.0	4.0–47.00	32.0	8.0–55.00	24.0	3.0–40.0	24.0	3.0–34.0	29.0	20.0–42.8	31.5	23.0–51.3
Repetition, n	3.0	0.0–5.00	2.0	0.0–5.00	1.0	0.0–2.0	1.0	0.0–3.0	2.0	1.0–3.0	2.0	1.0–3.8
Unhealthfulness, n (%)	14.0 (42.9)	2.0–19.00 (25.3–51.4)	10.0 (33.3)	2.0–23.00 (18.8–50.0)	11.0 (41.8)	1.0–17.0 (7.7–57.5)	10.0 (38.3)	0.0–20.0 (0.0–55.6)	20.0 (75.4)[f]	13.8–33.8 (66.9–81.4)	23.0 (77.3)	15.5–35.8 (29.9–85.2)
Child-targeted, n (%)	2.0 (2.8)	0.0–4.00 (0.0–12.0)	1.0 (2.8)	0.0–2.00 (0.0–57.7)	0.0 (0.0)	0.0–3.0 (0.0–22.7)	0.0 (0.0)	0.0–3.0 (0.0–23.1)	0 (0.0)	0.0–1.0 (0.0–2.3)	0.0 (0.0)	0.0–2.0 (0.0–5.3)
Sports-related, n (%)	2.0 (5.7)	0.0–11.00 (0.0–18.8)	1.0 (6.1)	0.0–4.00 (0.0–12.5)	0.0 (0.0)	0.0–3.0 (0.0–7.7)	0.0 (0.0)	0.0–3.0 (0.0–6.5)	1.0 (4.3)	0.0–1.8 (0.0–7.3)	1.0 (1.9)	0.0–1.0 (0.0–5.4)
Large size, n (%)	7.0 (33.3)	2.0–32.00 (18.9–62.4)	10.0 (53.3)	3.0–38.00 (33.5–66.7)	8.0 (50.0)	2.0–15.0 (33.3–66.7)	7.0 (53.8)	2.0–17.0 (31.8–77.8)	10.5 (50.0)	4.3–20.3 (43.7–61.6)	12.0 (51.0)	6.0–20.8 (38.7–68.1)
Food Area[c]	n = 10				n = 11				n = 16			
Score,[e] points	14.2	9.3–42.20	22.5	12.1–72.70	20.7	14.1–40.2	13.2	8.8–30.6	13.4	8.8–23.6	15.1	12.3–22.8
Frequency, n	14.0	8.8–32.80	18.5	6.8–32.00	17.0	13.0–28.0	14.0	9.0–23.0	12.0	7.3–18.0	14.0	9.0–17.8
Unhealthfulness, n (%)	6.5 (34.5)	3.0–12.75 (16.7–54.5)	6.5 (39.6)	2.0–11.50 (25.5–57.0)	9.0 (46.7)	5.0–11.0 (38.5–69.0)	7 (40.0)	4.0–7.0 (21.7–53.8)	8.5 (38.3)	5.3–12.8 (2.6–55.9)	9.0 (42.8)	7.25–14.0 (23.6–62.0)
Child-targeted, n (%)	0.0 (0.0)	0.0–1.50 (0.0–21.9)	0.0 (0.0)	0.75–5.25 (0.0–10.7)	0.0 (0.0)	0.0–1.0 (0.0–33.3)	0.0 (0.0)	0.0–1.0 (0.0–71.4)	0.0 (0.0)	0.0–1.0 (0.0–100.0)	0.0 (0.0)	0.0–0.0 (0.0–0.0)
Sports-related, n (%)	0.0 (0.0)	0.0–0.50 (0.0–4.5)	0.0 (0.0)	0.0–0.50 (0.0–4.5)	0.0 (0.0)	0.0–1.0 (0.0–33.3)	0.0 (0.0)	0.0–3.0 (0.0–50.0)	0.0 (0.0)	0.0–0.8 (0.0–18.8)	0.0 (0.0)	0.0–0.0 (0.0–0.0)
Large size, n (%)	1.0 (4.1)	0.0–3.25 (0.0–014.7)	2.5 (16.5)	0.75–9.75 (2.0–30.0)	0.0 (0.0	0.0–3.0 (0.0–30.0)	0.0 (0.0)	0.0–3.0 (0.0–17.6)	0.0 (0.0)	0.0–2.0 (0.0–15.8)	1.0	0.0–1.8 (0.0. 10.0)
Sport Area[d]	n = 16				n = 15				n = 17			
Score,[e] points	13.2	0.0–36.50	8.8	0.0–34.80	0.4	0.0–18.0	7.3	0.0–19.1	9.5	4.2–21.3	14.6	4.0–23.9
Frequency, n	6.0	0.0–17.30	5.5	0.0–8.50	2.0	0.0–10.0	3.0	0.0–13.0	5.0	2.0–12.5	8.0	2.5–12
Unhealthfulness, n (%)	3.0 (16.5)	0.0–8.50 (0.0–33.6)	2.5 (27.6)	0.0–9.25 (0.0–35.6)	1.0 (3.4)	0.0–4.0 (0.0–26.7)	1.0 (5.0)	0.0–6.0 (0.0–34.8)	2.0 (12.5)	1.0–8.0 (4.4–33.3)	4.0 (14.3)	1.0–7.0 (2.2–32.7)
Child-targeted, n (%)	0.0 (0.0)	0.0–1.00 (0.0–43.8)	0.0 (0.0)	0.0–0.00 (0.0–0.0)	0.0 (0.0)	0.0–1.0 (0.0–20.0)	0.0 (0.0)	0.0–0.0 (0.0–0.0)	0.0 (0.0)	0.0–0.0 (0.0–0.0)	0.0 (0.0)	0.0–0.0 (0.0–0.0)
Sports-related, n (%)	0.0 (0.0)	0.0–5.75 (0.0–50.0)	0.0 (0.0)	0.0, 2.00 (0.0–93.2)	0.0 (0.0)	0.0–1.0 (0.0–40.0)	0.0 (0.0)	0.0–1.0 (0.0–16.7)	0.0 (0.0)	0.0–1.0 (0.0–100.0)	0.0 (0.0)	0.0–0.5 (0.0–33.3)
Large size, n (%)	3.5 (36.7)	0.0–13.5 (0.0–71.0)	2.0 (29.1)	0.0–16.0 (0.0–60.4)	0.0 (0.0	0.0–10 (0.0–62.5)	3.0 (17.6)	0.0–9.0 (0.0–50.0)	5.0 (41.7)	2.0–9.0 (21.6–67.5)	7.0 (40.0)	1.5–10.5 (20.0–63.6)

CBI indicates capacity-building intervention; GL, guideline; IQR, interquartile range (25th percentile–75th percentile); NO, no guidelines; T1, baseline assessment; T2, follow-up assessment.

[a]All areas: food area + sports area + other area; [b]For all area analyses, 5 sites were excluded (3 because of missing food area audits; 1 because of missing sports area audit; 1 because of missing food area audit and an error in sports area audit at baseline); [c]For food area analyses, 5 sites were excluded because of missing food area audits data at follow-up and another 9 sites were excluded because they did not have a concession at baseline or follow-up; [d]3 sites were excluded from sports area analyses (1 because of missing Sports Area audit, 1 because of an error in sports area audit at baseline, and 1 did not have a sports area to audit)[3]; [e]FoodMATS scores can range from 0 to infinity (high scores are worse); [f]$P < .05$ for Kruskal–Wallis, with *post hoc* Mann–Whitney U tests assessing differences between groups at T1.

Note: GL+CBI—facilities in provinces with voluntary nutrition guidelines randomly assigned to a CBI. GL-ONLY—facilities in provinces with voluntary nutrition guidelines randomly assigned to a comparison group. NO-GL—facilities in a province with no voluntary nutrition guidelines.

Table 3. Change in FoodMATS Outcomes Over Time Within and Between GL+CBI−GL-ONLY−and NO-GL Sites

	All Areas[a,b]				**Food Area(s)[c]**				**Sport Area(s)[d]**			
n (missing) Outcomes	**GL+CBI 15 (3) Median[e] (IQR)**	**GL-ONLY 15 (1) Median (IQR)**	**NO-GL 16 (1) Median (IQR)**	**χ^2 (2)−*P* value[f]**	**GL+CBI 10 (8) Median (IQR)**	**GL-ONLY 11 (5) Median (IQR)**	**NO-GL 16 (1) Median (IQR)**	**χ^2 (2); *P* value[f]**	**GL+CBI 16 (2) Median (IQR)**	**GL-ONLY 15 (1) Median (IQR)**	**NO-GL 17 (0) Median (IQR)**	**χ^2 (2); *P* value[f]**
FoodMATS Score,[g] points	−1.0 (−9.7 to 8.95)	0.00 (−9.7 to 6.9)	7.1 (−4.5 to 16.6)[i]	4.269; *P* = .118	6.4 (−2.5 to 30.1)	−5.0 (−9.6 to 1.4)[i]	2.5 (−3.0 to 8.4)	5.991; *P* = .050	0.0 (−8.4 to 1.2)	0.0 (−3.0 to 0.0)	0.0 (−1.9 to 7.6)	2.430; *P* = .313
Frequency, n	0.0 (−10.0 to 4.0)[A]	0.0 (−2.0 to 3.0)[A]	6.0 (−2.0 to 8.5)[i,b]	6.213; *P* = .045	1.5 (4.50−10.0)	−2.0 (−7.0 to 2.0)	1.5 (−1.8 to 5.0)	3.351; *P* = .187	0.0 (−5.3 to 1.5)	0.0 (−1.0 to 0.0)	0.0 (−0.5 to 4.0)	1.547; *P* = .461
Repetition,[h] n	0.0 (−2.0 to 4.00)	0.0 (−1.0 to 1.0)	0.0 (−0.8 to 1.0)	3.318; *P* = .190	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Unhealthfulness, %	−9.5 (−22.3 to 4.8)	0.0 (−4.6 to 4.0)	0.0 (−10.0 to 6.5)	1.988; *P* = .370	3.0 (−16.1 to 19.1)	−8.0 (−20.1 to 1.7)	−2.1 (−12.6 to 8.3)	1.388; *P* = .500	0.0 (−8.3 to 6.7)	0.0 (0.0 to 4.0)	0.0 (−9.7 to 7.0)	0.335; *P* = .846
Child-targeted, %	0.0 (−5.7 to 3.0)	0.0 (0.0 to 0.0)	0.0 (0.0 to 3.7)	1.966; *P* = .374	0.0 (−12.5 to 7.6)	0.0 (−20.0 to 38.1)	0.0 (−75.0 to 0.0)	0.974; *P* = .614	0.0 (0.0 to 0.0)	0.0 (0.0 to 0.0)	0.0 (0.0 to 0.0)	3.662; *P* = .163
Sports-related, %	−1.3 (−10.4 to 2.3)	0.0 (−4.5 to 0.0)	−0.9 (−4.4 to 1.2)	0.255; *P* = .880	0.0 (0.0 to 0.0)	0.00 (0.0 to 6.7)	0.0 (0.0 to 0.0)	3.741; *P* = .154	0.0 (0.0 to 25.0)	0.0 (−6.7 to 0.0)	0.0 (−66.7 to 0.0)	2.259; *P* = .323
Large size, %	0.0 (−0.0 to 14.33)	0.0 (−3.6 to 0.0)	0.0 (−1.2 to 5.1)	2.702; *P* = .259	7.0 (0.0 to 19.5)	0.0 (−7.0 to 0.0)	0.0 (−1.0 to 5.0)	5.641; *P* = .060	0.0 (−17.8 to 2.8)	0.0 (−6.7 to 2.7)	0.0 (−15.0 to 6.4)	0.620; *P* = .734

CBI indicates capacity-building intervention; GL, guideline; IQR, interquartile range (25th percentile−75th percentile); n/a, not available; NO, no guidelines; T1, baseline assessment; T2, follow-up assessment.

[a]All areas: food area + sports area + other area; [b]For all area analyses, 5 sites were excluded (3 because of missing food area audits; 1 because of missing sports area audit; 1 because of missing food area audit and an error in sports area audit at baseline); [c]For food area analyses, 5 sites were excluded because of missing food area audits data at follow-up and another 9 sites were excluded because they did not have a concession at baseline or follow-up; [d]3 sites were excluded from Sports Area analyses (1 because of missing Sports Area audit, 1 because of an error in Sports Area audit at baseline, and 1 did not have a Sports Area to audit[3]); [e]Median difference post-intervention minus preintervention; [f]*P* value from Kruskal−Wallis nonparametric test between groups; [g]FoodMATS scores can range from 0 to infinity (higher scores are worse); [h]Repetition is only measured at the facility level (not by area); [i]$P < .05$ from *post hoc* Mann−Whitney tests with uppercase superscripts indicating statistically significant differences between groups (ie, groups with the same uppercase superscript (eg, A) are not statistically different from one another but are statistically significant from a group with a different uppercase superscript (eg, B)].

Note: GL+CBI—facilities in provinces with voluntary nutrition guidelines randomly assigned to a capacity-building intervention. GL-ONLY—facilities in provinces with voluntary nutrition guidelines randomly assigned to a comparison group. NO-GL—facilities in a province with no voluntary nutrition guidelines.

DISCUSSION

This study found that unhealthy food marketing exists in RFs, and persisted in RFs that participated in an 18-month CBI to improve food environments. Overall, this study did not find that capacity building improved food marketing features in RFs. These null findings are in contrast to a previous study that evaluated the impact of a CBI on food availability and healthfulness of concessions in the same set of RFs: GL+CBI facilities significantly reduced their proportion of unhealthy snacks in vending machines and improved their overall quality of the food environment in concessions at the end of the 18-month CBI compared with the GL-ONLY and NO-GL groups.[12] It may be more difficult and/or less of a priority for GL+CBI facilities to change food marketing features than other aspects of their food environments (eg, food availability).

Facility action plans were created and updated by each GL+CBI during the CBI. Upon review of these action plans, it was found that although almost all GL+CBI sites set food marketing goals, they were minor components of the site's overall improvement plans. At the end of the intervention period, many GL+CBI sites stated that they had not achieved their marketing goals, with less than one-third of sites succeeded in changing food marketing in concessions and vending machines as they had originally planned. All sites that aimed to increase general healthy food promotion and restrict unhealthy food sponsorship stated that they made progress toward their goal but had not fully achieved their goal at study end. Moreover, only 2 of 5 sites that aimed to implement a food policy that addressed food marketing had made progress in this respect.

Notably, most food marketing goals were vague (eg, *market healthy choices* without specific actions) and/or narrow in scope (eg, identified 1 or 2 marketing strategies to implement such as labeling healthy choices for consumers). Specificity and comprehensiveness are components often evaluated in school wellness policies[27,28] and may support

action planning because ambiguity makes it difficult to implement policy requirements.[27] The ambiguous food marketing goals of GL+CBI sites is consistent with the minimal detail provided on food marketing in provincial nutrition guidelines.[3] Lucarelli et al[27] recommended that policy direction for schools be supplemented with procedure manuals specifying practice-based recommendations to support policy implementation. Policymakers should detail ideal food marketing practices within provincial nutrition guidelines for RFs and provide sufficient resources to support the implementation of these recommendations.

The narrowness of food marketing goals may also explain why GL+CBI sites did not appear to improve their food marketing environments. In many cases, the planned food marketing intervention targeted a single socioecological level, which was usually at the individual level. As previously described, labeling products by healthfulness on menus or in vending machines was a common strategy site identified to promote healthy options to consumers. Although such labeling systems can be effective,[29–31] the FoodMATS only counted menu labeling as 1 food marketing occasion, therefore having a small impact on FoodMATS scores and marketing features. Because the FoodMATS is designed to measure food marketing in whole settings,[19] null to minor changes to the FoodMATS score after implementing a single change (eg, labeling the menu) suggests that simply adding healthy food promotion and not removing unhealthy food marketing may be insufficient to change food marketing environments for consumers overall. Previous research has suggested that having both healthy and unhealthy options available in RFs[32] and schools[33,34] may not support healthy eating in children. In the same vein, having healthy and unhealthy food marketing presented simultaneously may be contradictory. When competing with unhealthy food marketing, healthy food marketing may fail to influence dietary attitudes positively or behavior as intended.

Furthermore, solely focus on intervening on food marketing at the consumer level (which may be akin to simply providing nutrition education) ignores other influences across the recreation facility[18] and the socioecological model.[35] In addition to individual consumer influences, interpersonal factors (eg, coaches, teams), institutional factors (eg, food services providers, sports leagues, children's programming), community factors (eg, corporate sponsors, other RFs, provincial sport associations), and policy influences (eg, provincial nutrition guidelines, municipal policies) collectively influence individual behavior.[35] These levels offer opportunities for food marketing interventions that could complement individual-level interventions, such as healthy fundraising for sports teams or programs, healthy sponsorships of leagues, associations, or facility, or municipal contracts that restrict unhealthy food branding in facilities.

However, the complexity of these higher-level factors, including the number of decision-makers involved (eg, recreation facility managers, foodservice operators, sports leagues, municipalities), may have made it difficult for RFs to align healthy food marketing interventions across multiple levels of the socioecological model, or make progress within the defined time and resources of the EPL trial.

Recreation facilities are often profit-driven,[36] and food is seen as a source of revenue.[37] Therefore, marketing decisions may be influenced by a desire to maintain or increase profits. Moreover, as some food marketing features, such as vending machine branding, may be dictated by lengthy contracts; for some, food marketing features in RFs may not be changed until the contract renewal date arose (which may not have occurred during the 18 month intervention period for some sites).

The impact of capacity-building efforts, such as the resources and training provided in this study, could have been improved if the nutrition guidelines for RFs were mandatory rather than voluntary. In the case of this study, the additive value of the capacity building to support voluntary nutrition guidelines may be limited if the obstacles that RFs had to overcome to create healthy food environments were too complex or challenging.

The 18-month CBI provided several opportunities for RFs to access resources and support; however, the findings highlight the difficulty in changing food environments in real life. Several gaps in the literature still exist regarding how to generate and evaluate effective food environment interventions.[38] Efforts to improve complex food environments may be enhanced through multilevel, multicomponent interventions that include all levels of the socioecological model; however, the methods of implementing and evaluating these types of trials are still developing.[39]

Limitations

The study findings are limited by the sample size, which was calculated to detect a medium to large change in proportionate healthy food availability but may be underpowered to detect an observable change in food marketing environments.[3] Furthermore, there is a risk of false positives (type I error) because of the multiple exploratory analyses run; therefore, the results must be interpreted with caution and should be used to inform future research hypotheses.[13] There is a risk of self-selection bias because there may have been greater participation among facilities more interested in creating healthy food environments. Because a convenience sample was recruited, the generalizability of findings is unclear.

IMPLICATIONS FOR RESEARCH AND PRACTICE

This study highlights challenges related to changing food marketing features in RFs. The high prevalence of unhealthy food marketing occasions in Canadian RFs observed in this study represents an opportunity to align food messages in RFs with their health-promoting intent. However, the vague and narrow food marketing goals set by GL+CBI sites may suggest that improving food marketing was more difficult than anticipated. The change may be further challenged by the limited guidance on food marketing in voluntary provincial nutrition guidelines, the fact that there may be many parties involved in making decisions on

food marketing, and the time required to plan and implement changes. Policymakers should consider mandating nutrition guidelines for RFs, communicate explicit and effective strategies to improve food marketing environments, provide support for implementation, and encourage recreation facility decision-makers to include specific food marketing stipulations in facility food policies or foodservice operator contracts. More research is needed to clarify how to address unhealthy food marketing in RFs and identify effective capacity-building strategies to improve food marketing environments. The profit-making side of food marketing or sponsorship cannot be ignored but should be weighed against the long-term costs of perpetuating food marketing environments in recreation that are inconsistent with healthy eating.

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