Evaluating a national level programme to improve eating behaviors at institutes of higher learning : Design and preliminary results

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1. Introduction

- Eating out is increasingly common in urban Asia
- Improving quality of out-of-home cooked food is challenging
- Healthier Dining Programme (HDP), a national level programme in Singapore, was introduced to institutes of higher learning (IHL) to improve
  - Availability and accessibility of healthier food and beverages by environmental interventions including subsidies for healthier ingredients
  - Food-related knowledge and attitudes via educational posters
- Data on the effectiveness of a combination of environmental and educational interventions in changing dietary behaviours in Asian settings are limited

Study aims:

To evaluate effects of the HDP on changes in:

i. Out-of-home food behaviours and dietary quality
ii. Consumers' and food vendors' food-related attitudes

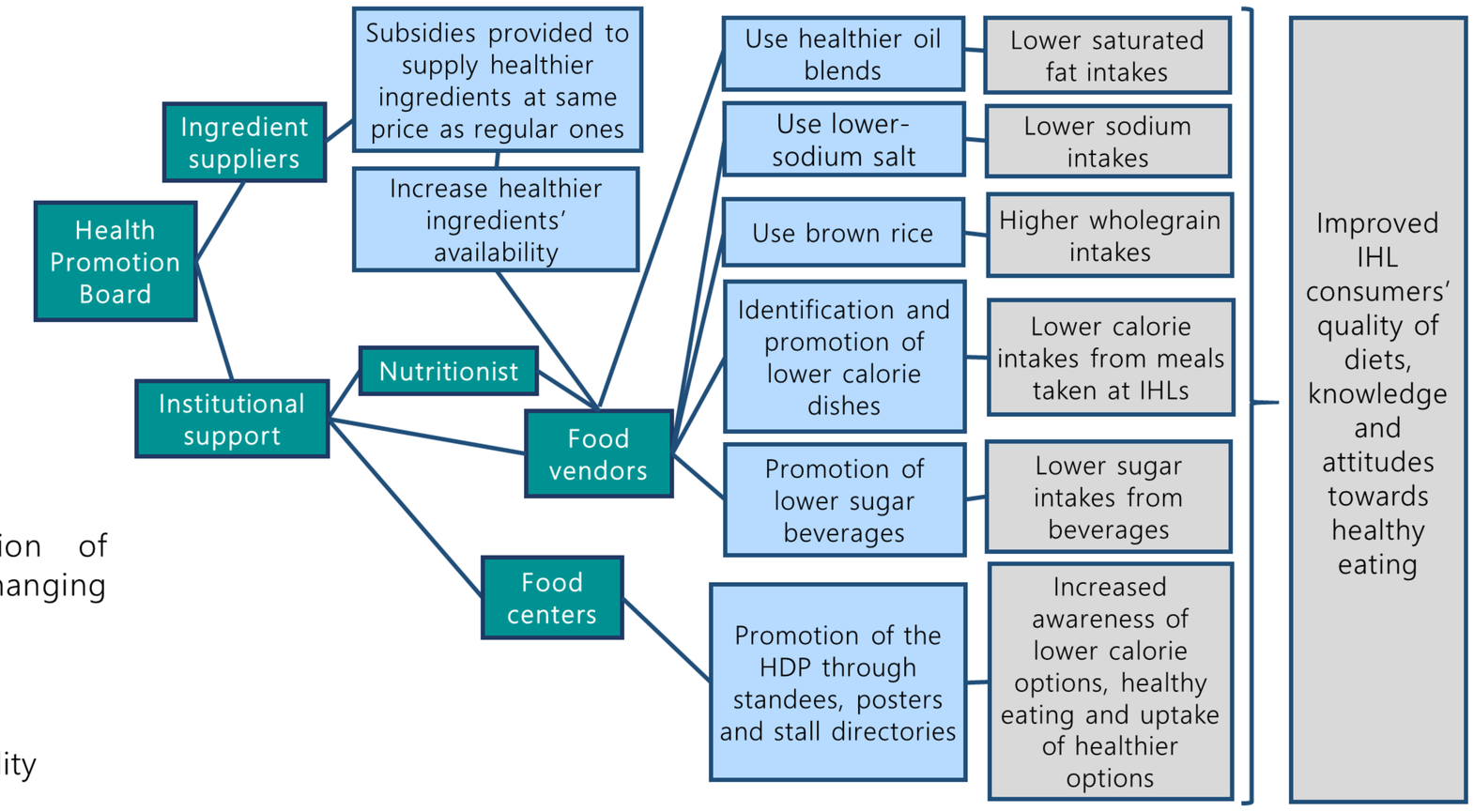

Figure 1: Theory of change for the HDP implemented in National University of Singapore main campus

2.1 Outcome evaluation

Project CHEW (Choosing Healthier Eating options at Work and school)

- Cluster randomized trial conducted on National University of Singapore main campus (Oct 2014-April 2015):
  - 2 intervention arms (4 canteens and 2 food courts) across one campus
  - 408 consumers (aged ≥18) interviewed
  - Pre-intervention and post-intervention data
    - ✓ 7-day out-of-home food diaries
    - ✓ short food frequency questionnaires (FFQ)
    - ✓ 4-point Likert scale questions assessing food-related attitudes
  - Intervention duration: 2.5 months
  - Primary outcome:

    Difference in proportion of consumers who had at least one healthier out-of-home foods per week between the two study arms
  - Definition of out-of-home meals:

    Foods sold/prepared out-of-home sources which have the potential to be affected by the HDP through the food vendors
  - Definition of healthier out-of-home meals:
    - ✓ Prepared with healthier oil blends
    - ✓ Lower in calories (≤500kcal) meals
    - ✓ Prepared with brown rice
    - ✓ Prepared with lower sodium salt

Table 1: Post-intervention demographics for consumer participants (n =283)*

	Control (n=137)	Intervention (n=146)
Female	54%	54%
Age (years), *mean (SD)*	28.7 (10.8)	29.3 (11.7)
BMI, *mean (SD)*	21.8 (3.2)	22.1 (3.8)
Students	53%	53%
Ethnicity:		
Chinese	78%	80%
Indian	14%	6%
Malay	4%	6%
Others	4%	8%
Education attainment:		
Tertiary education and below	51%	66%
University or higher	49%	34%

*Only participants who submitted the post-intervention questionnaire (which contains short FFQ and food-related attitudinal questions) were included

2.2 Process evaluation

- 76 food vendors interviewed pre- and post-intervention
- Training observations, monthly plate counts and environmental audits were conducted
- Fidelity, dose delivered, dose received, reach, cost and context of the implementation to be assessed

3. Findings and Discussion

- Preliminary results suggest that participants in the intervention arm were 2.68 times more likely to have at least 1 healthier meal per week as compared to those in the control arm (84% intervention arm, 65% control arm, adjusted OR: 2.68 95% CI: 1.37 to 5.26)
- Use of healthier oil blend and lower sodium salt prepared meals were important contributors to this result
- Whilst saturated and polyunsaturated fat intake in the 2 arms were comparable, participants in the intervention arm had lower total fat (1.46 gram per 1000kcal) and monounsaturated fatty acid intake (0.62 gram per 1000kcal) from out-of-home meals as compared to the control arm

Table 2: Preliminary results of dietary intake from out-of-home foods from 7-day food diaries (n =247)

	Unadjusted			Adjusted*		
Dietary intake from out of home foods	OR	p-value	95% CI	OR	p-value	95% CI
Proportion of participants who had at least#:						
1 healthier meal	2.79	*<0.001*	1.59 to 4.88	2.68	*0.004*	1.37 to 5.26
1 healthier oil blend prepared meal	3.24	*<0.001*	1.95 to 5.38	3.16	*<0.001*	1.83 to 5.47
1 lower calorie meal	1.13	0.62	0.69 to 1.87	1.21	0.42	0.76 to 1.94
1 brown rice prepared meal	1.43	0.32	0.71 to 2.89	1.44	0.39	0.63 to 3.31
1 lower sodium salt prepared meal	4.36	*0.003*	1.64 to 11.58	5.90	*0.003*	1.82 to 19.14

*Adjusted for baseline proportion, education and post-intervention total energy intake from out of home foods
#Analyzed using separate generalized estimating equations (GEE) logistic regression models

4. Implications

- We recommend the use of healthier oil blends with higher unsaturated fatty acids content in future HDP implementations and to encourage food vendors who were already using healthier oils (e.g. soy bean oil) to continue and not switch to blends
- Stronger food vendor engagement and support for using healthier ingredients and serving ≤500 calorie meals are key to increase healthier options' availability

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