Is this too ugly for you? An Evaluation of Knowledge, Attitude and Practice in British Columbian Residents Regarding Ugly Produce and Food Waste

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ABSTRACT

Background: Globally 1.3 billion tonnes of food are wasted every year equating to approximately 750 billion US dollars (1). In Canada it has been estimated that $31 billion of food is wasted annually (2). This amount can easily be used to feed hundreds of thousands of undernourished people across the world. Food wastage can occur at every level of the food supply chain. The purpose of this study was to evaluate the food waste generated by residents of British Columbia, Canada. The study aimed to identify the general knowledge regarding food waste and ugly produce, the attitudes of the public towards food waste, and the general practices of waste disposal.

Methods: A self-administered electronic survey created on Survey Monkey Canada was distributed on various social media platforms over a two-week period in January 2020. The survey contained questions that resulted in a score for knowledge of food waste, attitude towards food waste and the waste reduction practices of British Columbian residents. Chi square and correlational analyses were performed using the statistical package NCSS.

Results: 96 respondents met the inclusion criteria and completed the survey. Many participants received a medium score for knowledge (N=67) and possessed a positive attitude (N=71) towards food waste. There was an even distribution between good and fair practice level (N=49 and N=46). There was no association between level of food waste knowledge and demographic categories except for age (p=0.025). Younger participants were less knowledgeable. Between practice and demographic variables, no statistically significant associations were found. The results for attitude were determined to be non-statistically significant for age, gender and experience working in the food industry while there was a statistically significant association between attitude and an individual's education level (p = 0.008). Those with higher levels of education had a more positive attitude. No correlation was determined between knowledge and practice indicating that there is no influence of knowledge on practice and vice versa. The study found that there is a positive correlation (p = 0.0004 and r = 0.3542) between attitude and practice indicating that these two variables influence each other.

Conclusion: This study demonstrated that the population in B.C. who responded to the survey has adequate knowledge, a positive attitude and moderate practice behaviours regarding food waste. Younger individuals were less knowledgeable about food waste and the more educated one is, the more positive their attitude towards food is. The study also indicated that positive attitudes translated into better practice. These results are only a starting point in determining the causes for food loss and waste in B.C as it reveals the need for more local initiatives to bring everyone to start adopting food waste reduction strategies.

Keywords: *food waste, ugly produce, environment, greenhouse gases, environmental health*

Introduction

Our world wastes 1.3 billion tonnes of food every year, which equals 750 billion US dollars (1). While in Canada it has been estimated that $31 billion of food is wasted annually (2). This amount can easily be used to feed hundreds of thousands of undernourished people across the world. Food waste is defined as food that is still fit for consumption but is consciously discarded. Food wastage can occur at every level of the food supply chain, from the farm to fork. However, the major contributor to food waste in Canada is households, contributing to 47% of Canada's total food waste while retail stores and restaurants only contribute 10% each (2). This amount of waste could, in part, be due to the misconception among Canadians that "ugly" produce is not as fresh and nutritious as produce that is nicely coloured and shaped resulting in individuals not wanting to purchase it. This ultimately leads the producers and retailers being more selective as people do not want to purchase ugly produce. The increasing amount of food entering our landfills leads to an increase in greenhouse gas (GHG) emissions that have a direct effect on global warming. To minimize this, Canada launched a "Love Food Hate Waste" campaign in 2018 which every province has been adapting to develop its plans to reduce food waste (3). This study involved the creation of a knowledge, attitude, and practice (KAP) survey to collect information on what is known, believed and done amongst British Columbian residents regarding food waste generation as a result of ugly produce, as Canada is encouraging more promotion in this sector.

LITERATURE REVIEW
Food Waste

Generally, food waste is a term used to describe any food, edible or non-edible, avoidable or unavoidable, that is discarded at any stage of the food supply chain (1, 2, 3). However, the focus of this paper is on food that is edible but is thrown away because it is no longer wanted at the retail and consumer level. While food wastage occurs along all stages within the food supply chain, higher volumes of food waste transpire in the downstream phases. This is most common in higher-income countries such as the United States (1). In Canada, consumers contribute an estimated 47% of food waste, and, of this 47%, 63% could have been avoided (2). In other words, each Canadian discards about 308 kg of food waste every year from households (4). This is typically due to oversupplying, over-preparing, cooking and eating habits of the consumers (1). Most food items that tend to be discarded are fresh fruits and vegetables, bread and dairy products (5). Food waste contributes to many environmental, economic, social and food security problems (6). In the upcoming years, the world would need to produce 70% more food than what is currently produced to feed the growing global population (4). An easier method of solving food insecurity is not by producing more, but to make more use of the food that people already have and are wasting. A recommended approach in this global issue is by introducing a food waste hierarchy like the recycling hierarchy (Figure 1). By minimizing food surplus and avoidable food waste at the top of the hierarchy, it is believed that the cost of food can decrease by 10-20% (2).
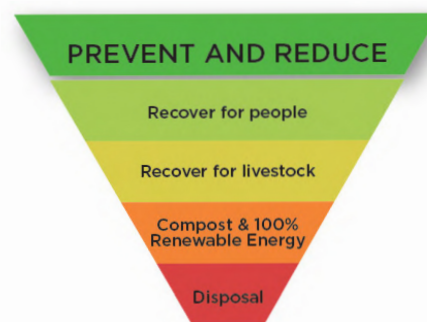
Figure 1. Food Waste Hierarchy (2)

Ugly Produce

Ugly produce (also known as imperfect, misshapen or suboptimal) is a term

used for fruits and vegetables that do not look appealing in colour, shape, and size (7, 8, 9, 10). People have developed a habit of purchasing perfect fruits and vegetables as they believe that imperfect ones are inferior in taste and nutritional properties (7). These expectations drive farmers to select more aesthetically appealing produce for sale and to discard produce that does not meet the criteria. Many international trade regulations also have product specifications in appearance, weight, shape, and size (8). These restrictive quality standards are responsible for large amounts of food wasted (7).

However, a person's perspective on the degree of imperfections may vary (7). For example, severely misshapen fruits and vegetables may signify a food safety risk, thus consumers tend to reject those items to protect themselves from perceived contaminants (7). Several studies have found that once an imperfect fruit or vegetable is priced less expensively than those that meet standards, a higher percentage of participants expressed the desire to purchase the cheaper flawed product than standard items (8, 9). This indicates that price fairness plays a factor in influencing a person's decision in selecting imperfect items. Recent studies investigated that authenticity positioning, a marketing strategy that focuses on increasing quality perceptions of suboptimal products, yields higher perceived quality of suboptimal produce by emphasizing the abnormal shapes, freshness, and healthiness of the product (10). This theory could change the course of action necessary to change consumers' habits regarding imperfect produce (10).

Organic Waste in BC's Landfills

Landfills are Canada's primary method of solid waste management. However, they account for 50% of food waste and 85% of GHG emissions in Canada (3). In the Metro Vancouver Region, there are two major landfills and six waste transfer stations (11). Historically, food and organic waste were never segregated from the main garbage stream. Residents of Metro Vancouver have full control over their household waste and the segregation of the different waste types fall under the behaviour of the individual. In British Columbia (B.C.), a household discards over 25% of uneaten or spoiled food, representing 40% of organic waste entering the landfills (12). After the introduction of the organic waste ban in Metro Vancouver, the reported organics waste that entered the landfills was a total of 27%, 21% of which was food waste indicating that households were not using the composting bins (13). The most recent municipal solid waste report in 2018 stated that the total compostable organics was 26%, 14% was food waste (14). A decreasing trend in food waste has been observed since 2015, but a significant amount of food waste could still be prevented from entering the garbage stream. As the population in B.C. continues to grow, there is a concern in waste management as the current landfills are reaching capacity limits (11). There is another concern that the landfill gas systems are not capable of recapturing the GHG emissions created by the increasing volume of garbage (11). Food waste is a large contributor to GHG emissions by weight and continual reduction of this waste would help with climate issues.

Green House Gas Emissions

The global temperature has been on a rise since the 1980s, with each passing year exceeding the previous temperature records as shown in Figure 2 (15).
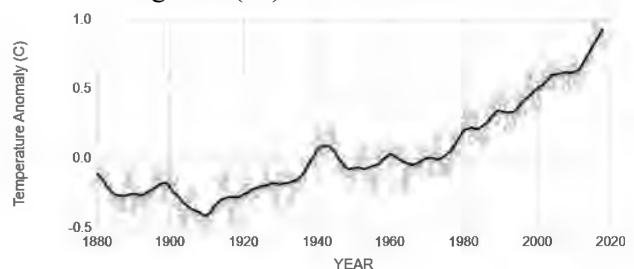
Figure 2. Global Mean Annual Land and Ocean Surface Temperature from 1880 to 2018 (15)

When carbon gases are released into the Earth's atmosphere, it traps and absorbs the radiation from the sun creating a layer of insulation on the Earth's surface (16). Increasing global temperature poses threatening issues such as rising sea levels, increased activity of disease spread through pests, and extreme weather events (17).

A large portion of the global GHG emissions is produced from food wastage in the food supply chain (18). When food is deposited into a landfill, it decomposes over time and releases methane and carbon dioxide — highly potent GHGs (19). The generation of methane is dominant throughout the whole landfill's life cycle and can be affected by the presence of water, pH, temperature and abundant sources of carbon (19). Studies have determined that alternative food disposal methods such as donation, conversion to animal feed, anaerobic digestion and composting produce lower GHG emissions compared to the traditional landfill methods (20). Higher energy-dense food types such as meat and dairy products typically produce higher GHG emissions than plant-based products and should be restricted from landfills (20).

In 2017, Canada produced 716 Mt CO_2 eq (metric tonnes of carbon dioxide equivalent), a net decrease of 15 Mt from 2005 emissions (21). Currently, B.C. is focusing its efforts towards reducing the amount of food waste entering the landfills to reduce its annual GHG emissions (11). Alternative methods that could capture GHGs and be converted as an energy source are being considered. These methods include centralized composting, non-thermal energy recovery, and incineration (22). If there is no improvement in the diversion of food waste, it is possible for global GHG emissions to increase by 160-260% in response to agricultural demands (18).

Consumer and Household Behaviours

Numerous studies have examined consumers' attitudes, values, knowledge, and behaviour towards food to explain how their choices have an impact on food waste (6, 8, 23, 24). Personal factors such as gender, age, household composition, income, and education contribute to a consumer's preferences regarding the purchase and consumption of unattractive foods (8). Households that use more criteria and rationale to identify food as waste were observed to throw food into organic waste (24). Larger households and households with children tend to produce lower amounts of household food waste (24), suggesting that budgeting and meal planning lowers waste generation. Overall research suggests that women, younger and less educated consumers, and those with higher household incomes tend to waste more food (8).

Individual responsibility and moral awareness heavily influence a person's choice of purchasing certain food. For example, a person who possesses a higher understanding of environmental sustainability and waste management tends to exhibit more environmentally friendly practices such as using biodegradable containers (6, 8) compared to a person who has an "out of mind, out of sight" attitude towards waste. One study determined that a participant who felt confident as a person, and who engages in environmental-related activities, shows regret if he/she fails at reducing household food waste, thus pushing themselves to maintain their personal values and beliefs towards food waste (23). Similarly, once a suboptimal food product is in the possession of a consumer, they are more cautious of letting the item go to waste and would consume it as soon as possible (9). It was also noted by Graham-Rowe that participants who felt that others who

approve of them reducing food waste were more likely to perform waste management (23).

The purchasing habits of consumers can be influenced by household management and price. Although it has not been researched extensively, some studies suggest that marketing attractions offer temptation and can alter purchase behaviour (6). Consumers noted that they tend to over-purchase food when they see a sale at the grocery store and throw out more food when they are unable to consume everything they brought (6). It is suggested that people who have disciplined purchasing behaviour (e.g. budgeting) generate lower food waste compared to people with a higher income (6). Consumers who are heavily engaged in household decisions are more likely to choose items that are more suboptimal than those who do not have a decisive role in a household (8).

Guidelines and Promotion

In response to the Paris Agreement on fighting climate change, Canada is putting its efforts in reducing the national amount of GHG emissions by focusing on food waste management (3). The provincial and local governments throughout Canada have started to develop plans on reducing food waste generation. An example of this is banning food and other biodegradable products from entering the landfills. In July 2018, a national initiative named "Love Food Hate Waste" was launched by the National Zero Waste Council of Canada (2). The goal of this initiative is to tackle food waste challenges by focusing on national, provincial and local policies; technology innovation; and behaviour changes (2). The strategy provides guidance that Canadians can utilize to prevent, recover, and recycle energy and nutrients from food waste (2).

RESEARCH QUESTIONS

The purpose of this study was to evaluate the food waste generation of the general public of British Columbia, Canada. The study aimed to identify the general knowledge level of food waste and ugly produce, the attitudes of the public towards food waste, and the general practices of waste disposal of British Columbian residents.

METHODS AND MATERIALS
Materials

For this study, the materials needed included a computer with Internet access, NCSS 2019 (25), Microsoft Excel 2019 (26), KAP survey about food waste, cover letter, and consent form.

Methods

The self-administered survey was conducted online via a BCIT license of SurveyMonkey (27), an online survey platform. The survey was open for 2 weeks from January 10, 2020 to January 24, 2020. The survey was distributed publicly on Facebook and Twitter through a personal account with hashtags: food waste, zero waste, Vancouver, BCIT, BC. The survey was also posted on Reddit under sub threads: environment, sustainability, ZeroWaste, Vancouver, BCIT, BC. Once the participants completed the survey, they had an option to participate in a prize draw.

Data collected by SurveyMonkey was used to generate descriptive graphs and tables (27). The data was entered onto a spreadsheet on MS Excel 2019 (26) and then inputted in NCSS 2019 for statistical analyses (25).

Inclusion and exclusion criteria

Participants of this survey were required to be a B.C. resident or have lived in B.C. for at least 12 months. This excluded anyone who lives in B.C. temporarily for school or work purposes. Since the survey was only offered in English, a knowledge of the English language was required.

Ethical Considerations

Ethics approval was granted by the BCIT Research and Ethics Board (REB) (28) prior to study commencement.

STATISTICAL ANALYSIS AND RESULTS
Data Description

Nominal and numerical data was collected from the survey. The questions for knowledge were scored based on correct answers while practice and attitude questions were scored by relevance.

For knowledge, twelve questions were asked about food waste knowledge and scored on 12. A score of 9/12 and above was s categorized as "High", a score of 5-8/12 was categorized as "Medium" and a score of 4/12 and below was categorized as "Low".

For practice, a 5-point Likert scale was used for each of the six questions pertaining to Practice, and numerical values of 1-5 were assigned to each agreement category for analysis purposes (29). An example of a Practice question is: "I do not separate food waste from the normal garbage stream"

The total practice score that could be acquired ranged from 1-30. A score of 20-30 was categorized as "Good", a score of 10-19 was categorized as "Fair" and a score of 9 and below indicated a "Poor" practice.

For attitude, a 5-point Likert scale was used for each of the six questions dedicated to Attitude, and numerical values of 1-5 were assigned for analysis purposes (29). An example of an Attitude question is: "I do not feel guilty when I throw away uneaten food".

The total attitude score that could be acquired ranged from 1 to 30. A score of 20-30 indicated a "Positive" attitude, a score of 10-19 indicates a "Neutral" attitude, and a score of 9 and below indicated a "Negative" attitude.

Descriptive statistics

Circle graphs were used to indicate the distribution of responses by participants. The distribution of knowledge, attitude and practice levels for each demographic group were displayed in tables. All descriptive statistics were performed using the export function on SurveyMonkey (27). Demographic categories that had a sample size smaller than 5 respondents were grouped together.

A total of 97 participants responded to the survey of which 96 had met the inclusion criteria and 93 provided complete demographic information. Among the participants, 35.4% (N=34) were male, 60.4% (N=58) were females, 3.1% (N=3) indicated that as others, while 1% (N=1) did not disclose their gender (Figure 3).
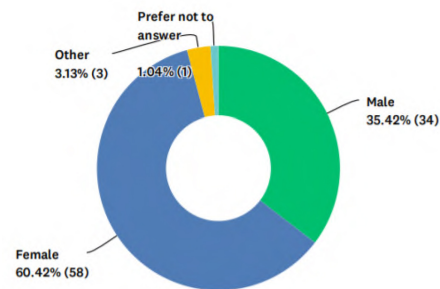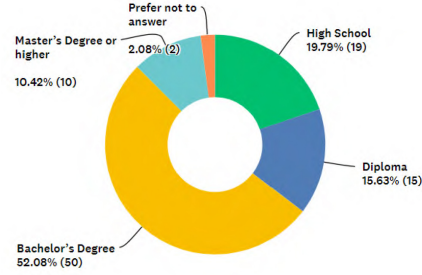

Figure 3. Gender (Male, Female, and Other) of all participants

Participants' ages ranged from younger than 18 to 64 years (Figure 4). The majority of participants were between 25-34 years of age (47%, N =45) while 31% (N=14) were 24 and younger, and 20% (N=19) were 35 and older. Approximately 2.08% (N=2) participants did not disclose their age.
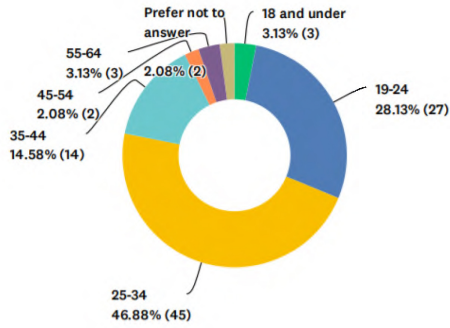
Figure 4. Age distribution of all participants

Figure 5. Education distribution of all participants

In terms of education, the majority (N=75) completed a post-secondary or higher education; in which 16% (N=15) completed a diploma, 52% (N=50) completed a bachelor's degree, 10% (N=10) completed a master's degree or higher degree (Figure 5). About 20% (N=19) participants were high school graduates. 2% (N=2) did not disclose their education.

Out of the total participants, 62.5% (N=60) replied that they have worked or are currently working in the food industry while 37.5% (N=36) replied that they have not (Figure 6).

Each participant was scored and categorized into different levels of knowledge, attitude and practice (Table 1). Many of the participants had a medium knowledge level in food waste (70%, N=67).74% (N=71) of the respondents had a positive attitude towards food waste while 26% (N=25) had a neutral view towards it. In terms of waste reduction practices, there was a similar number of respondents that had a good level (51%; N=49) compared to a fair level (48%; N=46).

Table 1. Number of participants of each knowledge, attitude and practice levels

Knowledge Levels	Number of Participants (N)	Attitude Levels	Number of Participants (N)	Practice Levels	Number of Participants (N)
High	23	Positive	71	Good	49
Medium	67	Neutral	25	Fair	46
Low	6	Negative	0	Poor	1

Inferential statistics

Chi-square tests were used to determine if an association exists between two categorical groups (30). This study assessed the association between knowledge levels and demographic variables; practice levels and demographic variables; and attitude levels and the demographic variables.

Regression and Correlation tests were used to analyze the strength of the relationship (31) between total knowledge scores and total practice scores; total knowledge scores and total

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attitude scores; total attitude scores and total practice scores.

The following table summarizes the hypotheses and results from the statistical analysis of the collected data. Out of 15 hypotheses, 12 were analyzed using Person's Chi Square Test and the remaining 3 were analyzed using Spearman Rank Correlation Analysis.

Table 2. Hypotheses and Results from Statistical Analyses of Collected Data

#	H_0 and H_a	Statistical Test	Result	Conclusion
1	H_0: There is no association between knowledge and age H_a: There is an association between knowledge and age	Pearson's Chi square	p = 0.02575	Reject H_0; conclude there is an association between knowledge levels of food waste and various age groups. Younger persons were more likely to have low knowledge. Possible alpha error.
2	H_0: There is no association between knowledge and gender H_a: There is an association between knowledge and gender	Pearson's Chi square	p = 0.46033	Do not reject H_0; conclude there is no association between knowledge levels of food waste and gender (female, male and others).
3	H_0: There is no association between knowledge and education H_a: There is an association between knowledge and education	Pearson's Chi square	p = 0.30304	Do not reject H_0; conclude there is no association between knowledge levels of food waste and education.
4	H_0: There is no association between knowledge and working in the food industry H_a: There is an association between knowledge and working in the food industry	Pearson's Chi square	p = 0.249153	Do not reject H_0; conclude there is no association between knowledge levels of food waste and experience working in the food industry.
5	H_0: There is no association between practice and age H_a: There is an association between practice and age	Pearson's Chi square	p = 0.46316	Do not reject H_0; there is no association between the waste reduction practices levels and various age groups.
6	H_0: There is no association between practice and gender H_a: There is an association between practice and gender	Pearson's Chi square	p = 0.15512	Do not reject H_0, conclude there is no association between waste reduction practice levels and gender (male, female, other).
7	H_0: There is no association between practice and education	Pearson's Chi square	p = 0.05686	Do not reject H_0, conclude there is no association between waste reduction practice levels

	H_a: There is an association between practice and education			and education. Potential beta error, therefore increasing sample size could minimize error.
8	H_0: There is no association between practice and working in the food industry H_a: There is an association between practice and working in the food industry	Pearson's Chi square	p = 0.430695	Do not reject H_0, conclude there is no association between waste reduction practice levels and experience working in the food industry.
9	H_0: There is no association between attitude and age H_a: There is an association between attitude and age	Pearson's Chi square	p = 0.48714	Do not reject H_0, conclude there is no association between attitude levels and various age groups.
10	H_0: There is no association between attitude and gender H_a: There is an association between attitude and gender	Pearson's Chi square	p = 0.43836	Do not reject H_0, conclude there is no association between attitude levels and gender.
11	H_0: There is no association between attitude and education H_a: There is an association between attitude and education	Pearson's Chi square	p = 0.00813	Reject H_0, conclude that there is an association between attitude levels and education when it comes to food waste. Individuals who have a bachelor's degree have a more positive attitude towards reducing food waste.
12	H_0: There is no association between attitude and working in the food industry H_a: There is an association between attitude and working in the food industry	Pearson's Chi square	p = 0.081620	Do not reject H_0, there is no association between attitude levels and experience working in the food industry. Potential beta error, therefore increasing sample size could minimize error.
13	H_0: There is no correlation between total knowledge scores and total practice scores H_a: There is a positive or negative correlation between total knowledge scores and total practice scores	Spearman Rank Correlation Analysis	p = 0.3509	Do not reject H_0, conclude that there is no correlation between knowledge and practice.
14	H_0: There is no correlation between total attitude scores and total knowledge scores	Spearman Rank Correlation Analysis	p = 0.1670	Do not reject H_0, conclude that there is no correlation between attitude and knowledge.

	H_a: There is a positive or negative correlation between total scores and total knowledge scores			
15	H_0: There is no correlation between total attitude scores and total practice scores H_a: There is a positive or negative correlation between total attitude scores and total practice scores	Spearman Rank Correlation Analysis	$p = 0.0004$ $r = 0.3542$	Reject H_0, conclude that there is a fair positive relationship between attitude and practice.

DISCUSSION

There is a statistically significant association between knowledge levels and age. However, it was found that there is no statistically significant association between knowledge and the other demographic variables (gender, education, and experience in food industry). Younger participants were more likely to score in the low knowledge category than the other age groups. It is possible that older individuals have more experience with food and new parents are more likely to spend more time learning about food safety. This indicates knowledge of food waste differs between each age group but could be equally as low or as high throughout the other demographic groups. Between practice and the demographic variables, no statistically significant associations were found. Results showed that an almost equal proportion of participants had a good or fair score for practice. One study determined that strength of the intention-behaviour relationship is moderated by whether a person has the opportunity and resources to carry out the behaviour (23). Hence, some participants may not have complete control over the behaviour of other members of the household that could be contributing to the waste amount. The same study also determined that an individual's motivation does not accord perfectly with their behaviour (23). The results for attitude were determined to be non-statistically significant for age, gender and experience working in the food industry while there was statistically significant

association in attitude depending on an individual's education level. From previous behavioural studies, it has been determined that an individual's attitude in their food-waste behaviours and their tendency to purchase and consume suboptimal produce is influenced by the level of education, thus a higher education equated to a better attitude towards this issue (8). Furthermore, statistically significant associations could have existed between attitude and age and work experience in the food industry if the sampling population size was larger.

No correlation was determined between knowledge and practice indicating that there is no influence of knowledge on practice and vice versa. This implies that confounding factors could influence an individual's waste management practices and food waste knowledge. The study found that there is a positive correlation between attitude and practice indicating that these two variables influence each other. These results agree with a past study that determined that a more positive attitude and greater level of perceived behavioural control produce more positive intention to reduce food waste (23).

Previous behavioural studies on food waste suggested that women, young and less educated consumers tend to waste more food (9). The survey scores showed that women, younger and less educated individuals had high waste reduction practices thus, this study disagrees with previous research. It is possible that the survey questions were not relevant enough for

this specific topic. Studies that examined an individual's understanding of environmental sustainability and waste management showed these individuals to exhibit more environmentally friendly practices (6, 9). This agrees with the results as the majority of the participants have positive attitude towards being environmentally friendly show better practice habits. Individuals who felt guilty for throwing food maintain a better practice, aligning with previous research on individuals' confidence (9, 23). The results of this study may not be externally valid as it only shows the general perception of B.C. residents who use social media platforms on a regular basis hence, the results of this study should only confidently be extrapolated to younger, predominantly female populations with bachelor's degrees.

LIMITATIONS

For this study, a self-administered survey was posted on various social media platforms. Participants were self-selected through their usage of social media during the research period. Most participants were females between 24 to 34 years of age. Thus, this is a potential bias as people around these ages may use social media more and hence do not show a complete representation of the population in B.C. In addition, it is difficult to control a participant's will to complete the survey. Individuals could select a random answer to just complete the survey quickly or if they did not understand the questions. Furthermore, participants can pause the survey and resume it at another time. All these confounding factors could have potentially skewed the results that were shown in this study. Apart from these, the study questions were created by the researcher based on knowledge of food waste, and on questions asked in other KAP surveys. The survey was not tested for validity nor reliability but every effort was made to ensure a high level of validity and reliability. Given the above, some of the findings may not reflect true knowledge,

attitudes and/or practices about food waste. Also, this study was limited by limited research funding and time.

In order to prevent these limitations from occurring, a larger sampling population would be needed in order to increase external validity. A longer response collection period and other survey dissemination methods can increase the sample size. In addition, a combination of survey methods will increase the internal validity. It will also increase the distribution of demographics of the sampling population as it is not just limited to people who use social media.

KNOWLEDGE TRANSLATION

The results from this study can be used to help make food waste reduction resources more accessible to the public. Although the results of this study indicate that initiatives and programs do not need to be targeted specifically to a demographic group, health education and promotion is extremely necessary to reduce food waste. Results of this study can be used as a generalization of public's perception of the current food waste initiatives as well as what the public needs in order to help them reduce food waste. The Love Food Hate Waste campaign created by the National Zero Waste Council is an important resource that provides every Canadian with the necessary information they need. However, it is not well known to many Canadians, so promotion is necessary. The provincial government can focus their resources in incorporating waste reduction programs into people's daily life by creating more policies on food waste to improve the public's current knowledge, attitudes and habits. They can also aid other non-profit organization programs to increase awareness for this national and international problem. The government can collaborate with experts from various industries to measure food waste as well as how to reduce it. It is also beneficial to hold workshops at local schools and community centers to produce more collective efforts. It is easier for an individual to

practice these waste reduction methods if everyone around them is doing so too.

FUTURE RESEARCH

Some ideas for future research projects are:

- Survey of how restaurants in British Columbia handle their food waste

- KAP survey of food waste in different professions in the food industry

- Survey to determine how an individual classify food as waste

- Food waste behaviours after the COVID-19 pandemic

CONCLUSIONS

This study revealed that the population in B.C. has an equal knowledge, attitude and practice on food waste with a positive association between attitude and practice. With the increasing concern for the environment, Canada has been reallocating their resources to prevent food waste from happening so that our national greenhouse gas emissions can be reduced. The significance of this study is that it reveals the need for more initiatives that will help everyone in B.C. to start adopting food waste reduction strategies.

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COMPETING INTEREST

The authors declare that they have no competing interests.

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