ABSTRACT
With an increasing cost of living in Canada, more people are considered food insecure, and this can have a detrimental impact on Canadian University students (Dahal et al., 2023). Food insecurity is the state of being without reliable access to affordable and nutritious food. University students face greater food insecurity than the general population due to financial constraints and accessibility (Sing, 2022). This study sought to explore student’s knowledge, need, and use of food initiatives on campus (aimed at mitigating food insecurity) through the use of a questionnaire. The questionnaire determined that 61% of students are not always able to access affordable and nutritious food. Regarding food insecurity, students said that they never (39%), seldom (21%), sometimes (30%), often (9%), and always (1%) experience it. The University of Lethbridge has three food initiatives in place to combat food insecurity: the food bank, the food pantries, and the fresh food box. 27% of students in this study use the three mentioned food initiatives, breaking down into 9% using the food bank, 14% using the food pantry, and 4% using the fresh food box. This research could be used to help inform the University of Lethbridge’s levels of food insecurity in the student population as well as which food initiatives to implement based on students’ self-identified needs.

KEY WORDS: Student food insecurity, food initiatives, food bank, food pantries, hunger

1 | INTRODUCTION
Food insecurity is the state of being without reliable access to affordable and nutritious food. This problem affects a large portion of the Canadian population, affecting roughly 11% of Canadians in 2018 (Caron & Plunkett-Latimer, 2022). It is important to mention that this problem is only getting worse, data from the Canadian Income Survey indicated that the national average has risen from 11% in 2018, to 16% in 2021, and 18% in 2022 (Statistics Canada, 2023).

It is believed that food insecurity results from growing economic inequality, placing considerable financial stress on people with lower incomes. (Weaver et al., 2019). Another cause of food insecurity are “food deserts” which (as defined by the United States Department of Agriculture (USDA)) are an “urban area where at least 33% of its residents are located more than a mile away from a venue offering nutritious food” as well as a place where it is difficult to buy affordable and nutritious food. The University of Lethbridge is 3.3 kilometers (2 miles) away from the nearest venue offering nutritious food (Safeway™). The university doesn’t have anywhere on campus where students can buy groceries, only pre-made snacks and fast food. Being that the University of Lethbridge’s campus is considered a food desert, and with the addition of financial constraints, many students are impacted by food insecurity (Dhillon et al., 2019).

Food insecurity is especially prevalent among university students. Ahmadi et al (2020) reported that 23% of students at the University of Guelph experience food insecurity. Blundell et al. (2019) reported that 40% of participating students at Memorial University experience food insecurity. Carry et al. (2019) reported that 38.5% of students at The University of British Columbia experience food insecurity. Entz et al. (2017) reported that 35.3% of participating students at the University of Manitoba experience food insecurity.

The Canadian household national average in 2022 was 18%, but as of 2021, the Canadian University national average was 40% (Sing, 2022). To address this problem, many universities have food initiatives (including food banks and delivery services), which generally seek to provide healthy food
to students at a low cost. At the University of Lethbridge, the Food for Thought (FFT) committee has the goal of decreasing food insecurity by supporting projects related to sustainable accessibility of healthy food. This is a vital initiative, as current research at the University of Lethbridge found that 1 in 5 students on the campus are impacted by food insecurity and 7.5% experience it often or all the time (Food for Thought, n.d.).

Given the extent of this issue at the University of Lethbridge, this study aimed to examine current rates of food insecurity as reported by our sample in the student population. The study aims to answer the main research question of “What rate of students on the University of Lethbridge Campus experience food insecurity?” A hypothesis is that the University of Lethbridge’s food insecurity levels will be higher than the national average of 18%. This study also examined food initiatives that are or could be implemented on campus to alleviate this issue, as well as the student’s pre-existing knowledge of them.

2 | METHODS

2.1 Participants

The study had 141 participants enrolled in a University of Lethbridge Psychology course and recruited via the university’s SONA™ system. When using the SONA™ system, participants select the study based on the title and the description, their personal and contact information is kept completely confidential. The researcher does not have access to the student’s personal or contact information, and participants are identified by a numeric string if they choose to participate in a study. Students who participated received a 1% credit for their respective Psychology courses. The study consisted of 22 “male” participants (15.61%), 112 “female” participants (79.43%), and 7 responders who made up the “prefer not to say”, and “other” categories (4.96%). Ethics approval was received from the University of Alberta Research Ethics Board 2. Pro00124049.

2.2 Procedures

The participants completed a confidential online survey. The survey had 37 questions, 6 regarding food insecurity and 29 relating to food initiatives in four main categories (1) Demographics, (2) Food Insecurity, (3) Current Food Initiatives, (4) Potential Food Initiatives, plus one open-ended comment box. For each food initiative, students were asked about their knowledge, need, and use. The two demographic questions in the study were gender, and whether or not they were enrolled in the University food plan. The food plan is a plan students can choose to pay when they enroll which gives them access to food vendors around campus. They are 8-month contracts payable at the start of the academic year costing anywhere from $700 to $4,990 (University of Lethbridge (n.d.)). The participants accessed the consent form, the recruitment, form as well as the questionnaire (Appendix A1, A2, and A3).

The question in the survey that was used to measure our food insecurity levels was “In the last few months, have you been worried about running out of food?” The answers to the question ranged from “never” to “always” If they answered “never”, they were considered food secure, and if they answered “seldom” and “sometimes” they were considered moderately food insecure, and if they answered “often” and “always” they were considered severely food insecure. (See Appendix 3 for the questionnaire). These classifications of food insecurity level were based on the Household Food Security Survey Module (HFSSM) and the US (Statistics Canada, 2012). One question was chosen as the only decider of food insecurity for a simpler approach to gathering basic insights without delving into complex scoring systems.

The questionnaire (See Appendix 3) asked students about six factors that are/could be contributing to their food insecurity, 1) In the last few months, have you been worried about running out of food? 2) In the last few months, have you been worried about not eating a balanced and nutritional diet? 3) In the last few months, have you been worried about how to get somewhere where you can purchase food? 4) In the last few months, have you made plans on ways to have enough money to buy food? 5) In the last few months, have you made plans on ways to get the nutrition you need? and 6) Do you plan for how you will get access to inexpensive and nutritious food? The answer options were “Never” “Seldom” “Sometimes” “Often” and “Always”. Student’s answers showed concerns about nutrition (question 2 and question 5), location (question 3), finances (question 4), and other circumstances, (question 1). As this is self-reported there are varying degrees of subjectivity in the results. E.g. A student could run out of money and answer “Always” to question 1 and answer “Never” to question 4.

2.3 Statistical Analysis

The statistical analysis performed in the study involved calculating percentiles to understand the prevalence and distribution of food insecurity among the participants, as well as their knowledge, needs, and use of various food initiatives on the University of Lethbridge campus. Percentiles were chosen as they provided a standardized way to read the data found.
Table 1. Food Insecurity Questions

<table>
<thead>
<tr>
<th>Food Insecurity Level (Q3)</th>
<th>Never</th>
<th>Seldom</th>
<th>Sometimes</th>
<th>Often</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nutrition (Q4)</td>
<td>39%</td>
<td>21%</td>
<td>30%</td>
<td>9%</td>
<td>1%</td>
</tr>
<tr>
<td>Location (Q5)</td>
<td>9%</td>
<td>12%</td>
<td>27%</td>
<td>37%</td>
<td>15%</td>
</tr>
<tr>
<td>Financial Circumstances (Q6)</td>
<td>56%</td>
<td>19%</td>
<td>15%</td>
<td>7%</td>
<td>2%</td>
</tr>
<tr>
<td>Planning for Nutrition (Q7)</td>
<td>25%</td>
<td>13%</td>
<td>27%</td>
<td>32%</td>
<td>9%</td>
</tr>
<tr>
<td>Planning for Inexpensive Food (Q8)</td>
<td>11%</td>
<td>18%</td>
<td>38%</td>
<td>49%</td>
<td>7%</td>
</tr>
</tbody>
</table>

2.4 Demographic Analysis

Information was collected about the participants regarding their gender, as well as their enrolment in the University food plan. The enrolment in the food plan (n=13) can also be used as a control variable. Since these individuals have access to food, it serves to delineate the impact of the food plan on food insecurity levels and help ascertain if the food plan effectively mitigates food insecurity. The dependent variable was the participant’s food insecurity level.

3 RESULTS

3.1 Gender-Based Analysis

Using a gender-based analysis, female-identifying participants (n=112) answered: Never (n=44) 39.29%, Seldom (n=22) 19.64%, Sometimes (n=36) 32.14%, Often (n=8) 7.12%, and Always (n=2) 1.79%. Male-identifying participants (n=22) answered Never (n=10) 45.45%, Seldom (n=4) 18.18%, Sometimes (n=4) 18.18%, and Often (n=4) 18.18%.

3.2 Food Insecurity

The responses to the question regarding food insecurity were put on a 5-point Likert scale. The question was, “In the last few months, have you been worried about running out of food?” The answers were: Never (n=55) 39%, Seldom (n=29) 21%, Sometimes (n=43) 30%, Often (n=12) 9%, and Always (n=2) 2% (Figure 1). 51% of students are moderately food insecure, and 10% are severely food insecure. When excluding the participants on the food plan (as they have access to food,) reduced our participant level to 128. The answers were Never (n=53) 41%, Seldom (n=22) 17%, Sometimes (n=39) 30%, Often (n=12) 9%, Always (n=2) 2%. 47% of students are moderately food insecure, and 10% are severely food insecure (Figure 2).

When examining the population with the food plan (n=13) they answered, Never (n=3) 23%, Seldom (n=6) 46%, and Sometimes (n=4) 31%. (Figure 3). Answers to the questionnaire showed that student’s greatest concerns about their food, are its nutrition (n=20) 15%, and financial circumstances (n=15) 11%. These answers also showed that respondents were least concerned about their proximity to food providers (n=3) 2%.

3.3 Current and Potential Food Initiatives

Following the section on food insecurity, the questionnaire asked about students’ knowledge, need, and use of services currently in place (food bank, pantry, fresh food box) as well as those not in place.

For current food initiatives, students responded that they were most familiar with the food bank (46%), and the least familiar with the food co-op (11%). Students responded that
they need the food bank the least (17%), that they utilize the food pantries the most (14%), that they have the least knowledge of the fresh food box (4%). For potential food initiatives based on students’ needs and use, students stated they would need an on-campus grocery store the most (n=75) 56% and that they would use the farmers’ market the most (n=125) (93%) (Table 2).

4 | DISCUSSION

This study revealed a notable prevalence of food insecurity among the University of Lethbridge student population. The results of the survey indicated that 61% of respondents perceived themselves as food insecure, exceeding the national average of 18% and the Canadian University student average of 40% (Olauson et al., 2017). Food insecurity was found by those who answered “seldom”, “sometimes” “often” and “always” and excluded those who answered “never”. If we only included those who answered “Sometimes”, “Often”, and “Always”, the food insecurity level in this sample would be 40%. Those who answered “seldom” and “sometimes” equated to being “moderately food insecure”, and those who answered “often” and “always” equated to being “severely food insecurity”. This was modified from the U.S. Household Food Security Survey Module (U.S. Household Food Security Survey Module, (n.d.).

One aspect of the study was concerned with the impact that food plan enrollment had on student food insecurity. It is important to note that of the 13 people on the food plan, no one stated that they were “always” worried about running out of food, meaning that the food may mitigate severe food insecurity, but it does not mitigate moderate student food insecurity.

As previously stated, students exhibited varying degrees of awareness regarding existing and potential food initiatives at the University of Lethbridge. Students expressed less knowledge about potential initiatives, such as the campus garden, cooking club, and grocery store. The study highlighted favourable initiatives that students would want to see on campus such as the grocery store and a farmers’ market. However, it is important to note that due to the seasonal nature of farmers’ markets, it may not mitigate food insecurity consistently. However, initiatives such as the farmers’ market offer intangible benefits, fostering psychological and physical health, as documented in research highlighting higher levels of perceived well-being (Chalmin-Pui et al., 2021).

When evaluating students’ needs, it was evident that nutrition and financial constraints were their primary concerns, while accessibility and proximity to food services appeared less critical. This could be attributed to the availability of public transit near the University, possibly mitigating concerns about the institution being a food desert.

Students who are food insecure often use strategies such as applying for the food bank and using food pantries; however, studies indicate that people may be reluctant to use food banks, due to feelings of embarrassment and shame (Middleton et al., 2018). This study had a high level of female responders, a study by Matheson & McIntyre (2013) found that female respondents have been shown to have other people besides themselves to care for, as well as a lower household...
income than male respondents, which can result in female-identifying participants being more food insecure. None of our male-identifying participants stated that they were always hungry, which although this was confidential may be false, as feelings of embarrassment and shame can impact reporting as well as differences in lifestyle (Matheson & McIntyre., 2013).

Addressing student food insecurity is paramount for postsecondary institutions, representing a critical barrier to academic success and overall well-being (Hughes et al., 2011). The outcomes of this research can support the Food for Thought committee at the University of Lethbridge in designing preferred food services. This study also will contribute to the general knowledge surrounding Canadian University student food insecurity. Recognizing food insecurity as emblematic of broader fundamental societal inequalities, it is in the best interest of universities to provide accessibility to mitigate these barriers, aiming for a more equitable and promising future.

### Table 2. Knowledge, Need and Use of Services

<table>
<thead>
<tr>
<th>Service</th>
<th>Knowledge</th>
<th>Need</th>
<th>Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food Bank</td>
<td>46%</td>
<td>17%</td>
<td>9%</td>
</tr>
<tr>
<td>Food Pantries</td>
<td>40%</td>
<td>25%</td>
<td>14%</td>
</tr>
<tr>
<td>Fresh Food Box</td>
<td>24%</td>
<td>49%</td>
<td>4%</td>
</tr>
<tr>
<td>Farmers’ Market</td>
<td>18%</td>
<td>51%</td>
<td>93%</td>
</tr>
<tr>
<td>Garden</td>
<td>42%</td>
<td>39%</td>
<td>56%</td>
</tr>
<tr>
<td>Food Delivery Service</td>
<td>21%</td>
<td>36%</td>
<td>51%</td>
</tr>
<tr>
<td>Food Co-op</td>
<td>11%</td>
<td>45%</td>
<td>54%</td>
</tr>
<tr>
<td>Cooking Lessons</td>
<td>29%</td>
<td>47%</td>
<td>88%</td>
</tr>
<tr>
<td>Campus Grocery Store</td>
<td>26%</td>
<td>56%</td>
<td>69%</td>
</tr>
</tbody>
</table>

**Limitations**

This study had limitations, including a skewed sample with fewer male participants and a small sample size. However, these findings are in line with other data suggesting a higher tendency among women to report food insecurity, consistent with global trends where 32% of women and 28% of men experience moderate or severe food insecurity (FAO., 2022). Moreover, despite these limitations, this research aligns with studies conducted in larger university populations, such as a 2017 study from the University of Manitoba, which indicated that 12% of students face severe food insecurity.

One of the primary limitations of this study revolves around the use of self-reported measures to gauge food insecurity among the University of Lethbridge student population as well as the fact that This study was only available to students through the SONA system who were enrolled in psychology courses for course credit. The identification of food insecurity was reliant on participants’ responses to the questionnaire based on their frequency of encountering food insecurity, as indicated by the responses 'seldom,' 'sometimes,' 'often,' and 'always.' The self-reporting method should be considered within the context of potential subjectivity in responses.

The selection of survey question three “In the last few months, have you been worried about running out of food?” as the sole indicator for measuring food insecurity, is also a limitation. As previously stated, this simpler approach was chosen to provide a foundational understanding of the problem. While the survey question addresses concerns about running out of food, it does not entirely represent the myriad factors associated with food insecurity, particularly its deeper implications related to accessibility, affordability, and nutritional aspects. Also, all answers other than “never” were used to calculate the 61% food insecure as by definition all of those groups are not food secure. Future research could expand more upon this. This question was used based on the U.S. Department of Agriculture's HFSSM question “(I/We) worried whether (my/our) food would run out before (I/we) got money to buy more.” Was that often true, sometimes true, or never true for (you/your household) in the last 12 months?” (U.S Household Food Security Survey Module, (n.d.)).

5 | CONCLUSIONS

Future research should explore the correlation between food insecurity and the utilization of food initiatives. Understanding the investment associated with these initiatives will be crucial.

**ACKNOWLEDGEMENTS**

The author would like to thank Dr. Jennifer Mather at the University of Lethbridge who helped the synthesis of the research question.

**CONFLICTS OF INTEREST**

The author declares no conflict of interest.
FUNDING

This research received no specific grant funding from any agency in the public, commercial, or not-for-profit sectors.

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*How to cite this article:*