**To Bleed or Not to Bleed: Period Poverty in an Age of Data Journalism**

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In an era of acceptance and understanding, it is time to crush the taboo around menstrual health. It is estimated that as many as 1.9 billion individuals experience menstruation every month – so why are we so uncomfortable with period talk? A longstanding history of stigmatization surrounds this natural, biological process, and women and others who menstruate continue to face a devastatingly low amount of support when it comes to managing and understanding their period. This avoidance coupled with expenses associated with menstrual and reproductive healthcare has placed women and others in a highly inequitable position. The term ‘period poverty’ has been used to describe the decreased accessibility or affordability to menstrual products, reproductive and sexual health resources, necessary facilities (e.g., toilets), pain management medications, and safe and sanitary product disposal (Rodriguez, 2021;Vardapetyan, 2021). The implications of period poverty are multi-faceted, and menstrual inequity places an increased economic vulnerability on women and others who menstruate.

Despite the significance menstrual inequity has on the wellbeing of many, efforts targeting period poverty are largely initiated by not-for-profit organizations. Charities such as PERIOD. and The Period Purse are amongst many organizations working to provide access to resources related to menstrual health. These charities push to destigmatize menstruation by educating individuals on the ‘period process’ while imploring institutions and governments to provide access to free products. These goals are supported by data these organizations collect via survey questionnaires; however, concerns surrounding potential sample bias and other methodology issues questions the reliability of these reports (Lee, Toory & Harrison, 2024). Beyond these concerns, not-for-profit efforts have served as the foundation for tearing down taboo. Unfortunately, resistance exists towards dismantling stigmatized beliefs related to menses, and this lack of understanding continues to perpetuate global rates of period poverty.

In the face of this prejudice, peer-review literature has begun to emerge in the past two decades, with most studies using survey-based methods to gather opinions and experiences individuals have had with menstrual inequity and the menses process. Although this has contributed to efforts at quantifying the impact of period poverty, the data is limited and not readily accessible to policy makers and community members. As such, menstrual wellbeing continues to be a global public health concern that affects the physical, socioeconomic, and mental health of women and others (Sacca et al., 2023; Michel et al., 2022).

Given the preliminary state of peer-review data and the current approach to knowledge translation, we propose a central long-form data journal story that operates on a virtual platform. Technology and virtual reporting formats are some of the most popular and accessible ways to access information in the current digital climate, and using data journalism as a communication tool may serve as the catalyst to ultimately targeting period poverty. The goal of this journal story is three-fold: to increase accessibility to information; to operate as a resource for government legislation and healthcare efforts; and to serve as a global reservoir for data to be collected through the use of website questionnaires. As such, the following proposal aims to 1) review socioeconomic barriers to accessing sanitary products, 2) discuss factors of wellbeing that are impacted by menstrual inequity, 3) assess existing period poverty knowledge translation tools, and 4) discuss an approach to creating an interactive long-form journal article with the goal to increase education, inspire future policies and legislation, and to systematically collect data with the purpose of informing future peer-review research and intervention strategies.

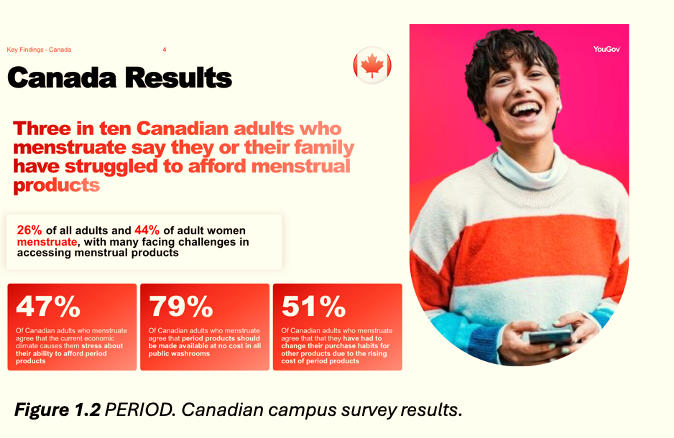
Period Poverty Economics and Implications

**Financial Stress**

A pie chart with text and numbers

Description automatically generated Financial strain serves as the basis of period poverty, and affects menstruating individuals living within both low and high income countries (Sacca et al., 2023). In Canada, 17% of individuals who menstruate have experienced period poverty in their lifetime (Environics Research Canada, 2023). This statistic increases to 25% for Canadians who have an annual income below $40,000. Shockingly, lifetime costs of sanitary products alone can range from $3,000 to $5,000 USD (Montano, 2018; Dave et al., 2022), and these rates continue to grow with the rise of inflation and higher cost-of-living circumstances. Important to note is that personal costs vary depending on an individual’s menstrual cycle (i.e., length, flow, and discomfort), product choice or preference, and additional costs including necessary medical intervention. In light of these factors, balancing other costs of living while managing ‘menses finances’ leads to trade-offs and, ultimately, a struggle to access basic needs.

Given the unaffordable nature of sanitary supplies and associated period products (e.g., pain medications, period underwear, etc.), individuals are often left having to choose between paying for menstrual supplies and other essentials. Environics Canada (2023) reports that one in five Canadians believe they will be unable to afford sanitary supplies in the upcoming year, with inflation serving as an additive concern to accessing basic menstrual resources. Similarly, a survey administered by Plan International Canada (2022) outlined that in a sample of 1000 menstruating Canadians, 21% have struggled to access products for themselves or family members, and 25% have had to ration or extend the use of their menstrual products longer than is medically suggested. Importantly, period poverty and financial vulnerability disproportionately affects traditionally underrepresented or marginalized groups, including women, individuals who are experiencing homelessness or who are in precarious living circumstances, BIPOC individuals, the LGBTQ+ community, and youth receiving government-funded support and living facilities (Barrington et al., 2021; Rossouw & Ross, 2021; National Advisory Council on Poverty, 2023). Costs of products and access to healthcare also differ across geographic domains. In fact, tampons in rural communities are sold at a skyrocketing $16 to $45 per box (Rushowy, 2021).

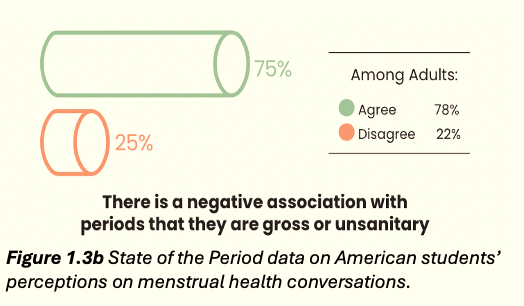
 In an effort to quantify student experiences across North America, PERIOD. and YouGov (a public opinion and data organization) conducted surveys on Canadian and U.S. university and college campuses to better understand period poverty at an institution level. Results from Canadian campuses indicated that three in ten menstruating adults have previously struggled to afford products. Similarly, 37% of American students reported a history of being unable to access essential sanitary supplies. Important to note however is that this data is based on smaller sample sizes, and may not be representative of all student experiences.

**Health-Related Concerns**

With the rise of inflation and cost of living, attempts to reduce product use present various risk factors for hygiene and physical health. In a questionnaire study by Lukindo and colleagues (2022), 65% of Nova Scotian participants reported being unable to purchase products due to financial restrictions. When asked about efforts to access sanitary products, a stark 37% of respondents reported having to use toilet paper and rags as alternatives, and an additional 22% have previously had to wash and reuse soiled sanitary products (Lukindo et al., 2022). These reports are unfortunately common, where competing costs of living lead to women and other individuals having to engage in using unsanitary or risky alternatives, such as old blankets and rags, newspapers and paper products, and even animal products such as bird feathers (Dave et al., 2022). Another physical health concern relates to the prolonged use of products, where using items like such as tampons, menstrual cups and sanitary napkins or pads for long periods of time poses a higher risk of contracting infections such as bacterial vaginosis, yeast infections or urinary tract infections (Jaafar, Ismael & Azzeri, 2023; Berger et al., 2019).

Beyond financial and physical health vulnerability, the indirect effects of period poverty on mental wellbeing are often underappreciated. A recent Plan International Canada survey outlined that over 50% of women ages 14 to 55-years-old reported missing activities or social events due to period-related symptoms and/or concerns about having access to necessary materials or resources. Barriers to social engagement are further supported by Lukindo and colleagues (2022), who reported that 40% of menstruating individuals have missed school, social engagements, and recreational activities while on their periods due to a lack of resources or access to sanitary products. Interestingly, data from this sample indicated that half of respondents were later able to prevent future social isolation once access to products became free within their institution. In addition to increased social isolation, cross-sectional sample studies suggest higher levels of depression, low mood and anxiety in women and others facing period poverty (Cardoso, Hamidaddin & Gupta, 2021; Jaafar, Ismael & Azzeri, 2023; Gouvernet et al., 2023; Gallo et al., 2023).

**Taboo and Stigmatization**

A diagram of a graph

Description automatically generated with medium confidenceA long history of stigmatization has facilitated an unsafe environment for women and others who menstruate to have discussions surrounding their menstrual health concerns. In a partnership with the menstrual product company Always, the not-for-profit organization known as PERIOD. conducted a self-report survey asking individuals to share their personal perspectives and beliefs surrounding menstruation and period poverty. Within this Canadian sample, 25% of teenagers and emerging adults reported having an ‘inadequate’ level of knowledge about how to manage their periods, as well as the biological process behind the menstrual cycle (Always, 2020).

From an education perspective, a lack of knowledge surrounding correct hygienic practices and how to manage menses symptoms can be damaging and isolating. Unfortunately, outdated perceptions of periods, including ones that insinuate menses are ‘harmful’ or ‘contagious’ to others, are alive and well (Rapp & Kilpatrick, 2020; Jaafar, Ismael & Azzeri, 2023). In a survey study assessing beliefs in residents of the United States, 58% of women reported being ashamed of their period, and 51% of men reported beliefs that it is improper to discuss menstruation in the workplace (Jaafar, Ismael & Azzeri, 2023). Similarly, Enviro Canada reports that 25% of Canadians perceive periods to be “dirty” and “unclean”, and 22% prefer that menstruation not be discussed in public settings. In fact, 22% of respondents preferred to have sanitary supplies hidden from view (Environics Research Canada, 2023). These belief systems are prejudiced and misguided, resulting in individuals feeling high levels of shamefulness and the need to manage menstruation in secrecy (Hennegan et al., 2019). As a result, higher instances of physical health complications are common, and menstruating individuals are prevented from achieving optimal care (Das et al., 2015; Babbar, 2022).

Current Knowledge Translation

With the steady rise of period poverty has come various, positive efforts to address factors that contribute to menstrual inequity on a global scale. In 2020, Scotland became the first country to officially pass legislation mandating menstrual products to be free and accessible for all consumers (Rodrigues, 2021). New Zealand, Kenya and Botswana are also amongst several countries to fund free products in public schools, and certain universities across France and North America have installed free menstrual product dispensers for post-secondary students.

Canada has also recently participated in advocating for menstrual equity by implementing programs and policies with the purpose of alleviating financial burden associated with sanitary products. As of 2015, the Goods and Service Tax (better known as the ‘pink tax’) was removed from store-bought sanitary products (Government of Canada, 2015), and in 2021 free menstrual products were provided to students in First Nations schools and reserves across the country from the Canadian federal government (George, 2022). More recently in 2023, a grant of $25 million was applied to initiate the Menstrual Equity Fund for various not-for-profit Canadian charities and organizations to increase period product accessibility (National Union of Public and General Employees, 2022; Canadian Press, 2023). Despite these positive efforts period poverty continues to persist, and a push for an increase in peer-review research is necessary to optimize the success of current interventions (Patel et al., 2022; Rossouw & Ross, 2021; Harrison et al., 2022; Wyckof 2023).

In terms of data visualizations, a quick Google engine search brings you to an interactive tool created by Kalmus (2020) on *Public Tableau*, where data collected in 2018 on poverty, unemployment, and access to health insurance across each American state is visually outlined. Figure 2.1 is an example of specific data visualizations on the Kalmus (2020) Tableau, where the user is able to scroll over a map of the United States and see state-specific information related to the estimated population of women and girls, as well as how many of these individuals do not have access to health insurance, how many are unemployed, and how many experience poverty. Figures 2.2 and 2.3 underscore additional data that contributes to period poverty in the United States. More specifically, the bar chart in Figure 2.2 outlines the number of period equity laws in both 2018 and 2019, with the red bars representing how many states eliminated tax on period products. The green, pink and purple bars represent the number of correctional facilities, schools and shelters that have made attempts to increase accessibility to period products in their institutions. An integrated link titled ‘What about the Impact of COVID-19’ takes the user to an image of another map of the United States, where unemployment trends across each individual state can be tracked from 2018 to 2020. To see trends in data, the user is required to use a sliding bar to change from year to year. For more information, a link to the Period Poverty Tableau is included below figures 2.2 and 2.3.

This Tableau piece contains various engaging elements, with interactive components creating a visualization that is informative and aesthetically strong. The choice of colour generally contrasts well for visual purposes and is not overwhelming or hard to visually perceive. Having the option to jump between pages to learn more about specific factors (e.g., data in 2018 related to unemployment, health insurance, and poverty) as well as recent considerations (e.g., the impact of COVID-19 on period poverty and unemployment) adds to the overall organization of the visualization and leaves space for a more fulsome story. In addition to the visual aesthetics and use of multi-links, the choice to use a map and bar graphs for data presentation purposes was relatively strong. Given that much of the data reported is discrete data, the use of a bar graph allows for a clear comparison of values. Percentiles are easily mapped to their associated ‘State’, and using a map for nominal data (e.g., which states provide affordable products for correctional facilities, schools, and shelters) allows for a creative visualization rather than using a grouping method (i.e., grouping participating states under each institution).

One general drawback to the Tableau is in reference to the type of data collected (which may be representative of the scarcity of data collected on the topic or the methodology used for surveying participants). Menstruating individuals who do not identify as women are not explicitly included. Additionally, this data focuses almost exclusively on unemployment rates rather than other variables that directly relate to period poverty variables (e.g., how many individuals are unable to afford sanitary products). The colours used on the map in Figure 2.2 lack contrast from the black background, making it less apparent which states participate in product accessibility initiatives. It is also rather unclear *what* the bar graph and map are conveying with respect to the data collected for correctional facilities, schools, and shelters; some extrapolation from the first bar (i.e., eliminated period tax) and the title of the bar chart (i.e., ‘Number of Period Equity Laws in U.S. States’) is required for interpretation. The colour gradient used on the COVID-19 unemployment map (see Figure 2.3) is also very similar across all states, making it less apparent which states have seen substantial change in unemployment from 2018 to 2020. Instead, hovering over each state to see specific percentages of estimated unemployment is required to fully grasp any trends. Finally, the data presented is specific to the United States. As such, the creation of a data visualization tool that outlines the *global* impact of period poverty is instrumental to future menstrual equity efforts. To the author’s current knowledge, no global database, study or interface exists where period poverty statistics, legislation, and other intersecting factors are presented for multiple countries.

**Figure 2.1** Public Tableau Interactive Visualization of Period Poverty in the United States.

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Description automatically generatedFigures 2.2 & 2.3** Public Tableau Period Equity Law Data and Unemployment Across 2018-2020

<https://public.tableau.com/app/profile/niki.kalmus4294/viz/PERIOD_POVERTY_All_Updates_AUG3_15965554096230/Introduction>

Creating a Long-Form Feature Story

In light of the current state of peer-review research and efforts of data collection made by not-for-profit agencies, the goal of this proposal is to combine efforts via one long-form virtual feature story. Data-driven journalism is an effective tool for marrying storytelling and data dissemination, and the use of a central story with interactive features may serve as a foundation for targeting menstrual inequity at large.

A three-component ‘workflow’ was proposed by Lorenz (2010) in an effort to place data visualization at the core of a successful journal story. These steps largely include identifying and integrating data; applying visualization methods to understand said data; and using storytelling to explain visualizations. Given the current state of period poverty literature, a ‘flipped’ approach to the Lorenz (2010) workflow has been followed, where story composition is first used to support the foundation of data visualization initiatives.

**Story Composition**

Much of the long-form story will incorporate the themes outlined throughout this proposal, including current literature and data that has previously been collected. One of the core goals of this proposal is to destigmatize menstrual health, and a large section will be dedicated to explaining the process of menstruation, as well as demystifying common misperceptions and taboos associated with periods. Direct and indirect implications of period poverty will also be outlined in detail. In the spirit of long-form storytelling, a goal of this section is to include personal anecdotes or anonymous accounts of how these implications have affected individuals who menstruate. These anecdotes are considered an important compliment to the data, and are meant to engage the reader further. These anecdotes will be collected through an open-response item that will be included in the website questionnaire, which will be explained further below. Mixed media methods, such as a short video or infographic will also be included. The purpose of these media formats is to also increase accessibility and improve general engagement and understanding. The journal story will include a translation feature, where a user is able to change the language information is written in. Toggle bars will also be included in order for readers to increase visual elements including text size and interface brightness. A read-along-text function will also be supplied to individuals who require verbalized information.

**Visualization of the Data**

Period poverty data largely falls into three categories: poverty statistics, beliefs and perspectives, and ‘implication’ data. To start, in keeping with the Kalmus (2020) Public Tableau, a map will be used to outline rates (or lack thereof) of period poverty across the globe. These rates will encompass how many individuals who menstruate are impacted by period poverty, and will be observed by the user hovering over a country on a visual representation of a globe. This globe will spin with a user mouse (i.e., left to right), and clicking a target country will lead the visualization to zoom into the geographic area of interest. For example, if an individual were curious about period poverty rates in Ontario, they would move the globe to Canada, and press on the country outline. If data permits, future updates to this visualization can include specific geographical locations within countries to understand inter-country period poverty levels. The data itself will be viewed in a ‘pop up’ window that appears on the side of the map so as to not obstruct the visualization but also increase font size and viewer accessibility.

To effectively visualize data collected from various organizations and peer-review studies on beliefs and perspectives related to period poverty and menstruation, interactive bar graphs will be accessible via a hyperlink embedded within the journal story. This hyperlink will open to a separate window that will allow viewers to click on their country of interest. Important to note on these visualizations is where data has been collected and, if necessary, having separate bar graphs associated with the researchers or organization who collected the displayed results. Colour choice will be considered as well, where colours such as green and red will be avoided due to potential negative or positive connotations associated with these colours, as well as increasing accessibility for colour blind individuals.

Finally, to visualize the ‘implications’ of period poverty (e.g., physical health risks such as infection rates, social isolation rates, etc.) icons associated with each sub-topic (e.g., a stethoscope for ‘physical health implications’) will be located at the top of the subsection. When hovering a mouse over these icons, a pie chart or bar graph will appear below to outline any data collected on the sub-topic. Data will be amalgamated for the purposes of simplifying each visualization, and the use of a pie chart or bar graph will be determined based on the number of variables measured for each sub-topic. When appropriate, major testimonial quotes related to the sub-topic (e.g., an anecdote related to the effect of period poverty on the speaker’s mental wellbeing) will be included in bold font on the side of the visualization for added effect.

**Localizing, Retrieving and Integration of the Data**

In an effort to contribute to the current and future understanding of period poverty, a questionnaire survey will be included as an additional feature at the end of the larger long-form story, and will be offered to any user who interacts with the site. Interested individuals will have to fill out a screener and consent form to participate in data collection. The goal of this added questionnaire is to ultimately create a reservoir of data speaking to global experiences with period poverty, beliefs surrounding menstruation and period hygiene, and perspectives on addressing period poverty in areas where individuals reside. This questionnaire will conclude with an open-ended item, where participants will have the option to write any personal anecdotes about their experiences with any period poverty. Participants will be asked to maintain anonymity when writing these experiences, and additional efforts will be made to anonymize information if necessary. All other data remains anonymous and no identifying information will be collected. This data will be housed on the website server and will be monitored and managed by the research team. The data will be available upon request, where researchers, government and not-for-profit organizations can use results for dissemination and investigative purposes.

To conclude, the purpose of this interactive, virtual data journal story is to ultimately increase conversations surrounding menstrual health and period poverty. Through the use of data journalism, it is our hope that education stimulates important conversations to both inform perceptions of menstrual health as well as current legislation and policies actively working to intervene against period poverty. In an era where social media and technology are the major contributors to informing our understanding, this project aims to take advantage of these platforms and expose what has long been considered a taboo. After all, everybody bleeds.

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