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Marta Keglević*

Josip Juraj Strossmayer University of Osijek
ORCID: <https://orcid.org/0009-0009-2645-6704>
e-mail: mkeglevic@ffos.hr

Hrvoje Lepeduš**

Josip Juraj Strossmayer University of Osijek
ORCID: <https://orcid.org/0000-0001-9329-7007>
e-mail: hlepedus@ffos.hr

Anita Dremel***

Josip Juraj Strossmayer University of Osijek
ORCID: <https://orcid.org/0000-0003-0526-8498>
e-mail: adremel@ffos.hr

**MENSTRUAL POVERTY IN THE CONTEXT OF
EDUCATION AND ENVIRONMENTAL SUSTAINABILITY**

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ENVIRONMENTAL SUSTAINABILITY

Keywords: menstruation, menstrual poverty, menstrual hygiene products, education, sustainability.

Often considered a universal symbol of femininity, menstruation marks a significant rite of passage in a girl's life. The menstrual experience varies and depends on geographical, cultural, and socioeconomic contexts, which influences perceptions and attitudes toward this phenomenon.

***Marta Keglević** – M.A. in sociology, external lecturer; scientific interests: sociology of gender and sexuality, menstrual poverty and shame, formation of behavioral patterns and norms, methodology of social research.

****Hrvoje Lepeduš** – full professor in social science; scientific interests: social ecology.

*****Anita Dremel** – Ph.D. in sociology, associate professor; scientific interest: sociology of gender, sociology of culture, qualitative methodology.

Menstrual poverty refers to the inability to ensure basic menstrual hygiene due to shame, lack of education, or financial resources. This article explores menstrual poverty in relation to two of its dimensions: education and environmental sustainability. A quantitative correlational study was conducted using an online survey. Menstruation and menstrual hygiene are important elements of upbringing and education, and their absence jeopardizes educational opportunities and equal chances. In addition, the environmental sustainability aspect of menstrual hygiene is often overlooked, even though the use of reusable products has numerous (economic and environmental) benefits. The main findings confirm the importance of education on menstrual hygiene and the neutral stance of respondents toward the environmental sustainability of menstrual products. Understanding the multidimensional nature of menstruation and menstrual poverty is essential for challenging existing taboos, promoting equity, and encouraging sustainable menstrual practices.

UBÓSTWO MENSTRUACYJNE W KONTEKŚCIE EDUKACJI I ZRÓWNOWAŻONEGO ROZWOJU ŚRODOWISKA

Słowa kluczowe: menstruacja, ubóstwo menstruacyjne, środki higieny menstruacyjnej, edukacja, zrównoważony rozwój.

Często uznawana za uniwersalny symbol kobiecości, menstruacja stanowi istotny moment przejścia w życiu dziewczynki. Doświadczenie menstruacji jest zróżnicowane i zależne od kontekstu geograficznego, kulturowego oraz społeczno-ekonomicznego, co wpływa na postrzeganie i postawy wobec tego zjawiska. Ubóstwo menstruacyjne oznacza niemożność zapewnienia podstawowej higieny menstruacyjnej z powodu wstydu, braku edukacji lub środków finansowych. Niniejsza praca podejmuje problem ubóstwa menstruacyjnego w odniesieniu do dwóch jego wymiarów: edukacyjnego oraz związanego ze zrównoważonym rozwojem środowiska. Badanie miało charakter ilościowy i korelacyjny i zostało przeprowadzone za pomocą ankiety internetowej. Menstruacja i higiena menstruacyjna są istotnymi elementami wychowania i edukacji, a ich brak zagraża możliwościom edukacyjnym oraz równości szans. Ponadto aspekt zrównoważenia środowiskowego higieny menstruacyjnej bywa często pomijany, mimo że stosowanie produktów wielokrotnego użytku niesie liczne korzyści ekonomiczne i ekologiczne. Główne wyniki potwierdzają znaczenie edukacji w zakresie higieny menstruacyjnej oraz neutralne podejście respondentów do kwestii zrównoważenia środowiskowego produktów menstruacyjnych. Zrozumienie wielowymiarowego charakteru

menstruacji i ubóstwa menstruacyjnego jest kluczowe dla przełamania istniejących tabu, promowania równości oraz wspierania zrównoważonych praktyk menstruacyjnych.

Introduction

In women's lives, the first menstruation – menarche – marks a new life phase and symbolizes health and femininity¹ (Bailey 1993). However, menstrual experiences vary across geographical location, historical period, culture, race, age, and sexual orientation; no two individuals have the same experience (Bailey 1993). Menstruation is a multidimensional, interdisciplinary subject that spans biological, social, and psychological sciences, as well as micro- and macro-levels of society. Menstruation, menstrual hygiene, and menstrual poverty are not confined to a single social group or sphere.

This paper focuses on two societal spheres of menstruation – education and environment. Menstruation and menstrual hygiene are indispensable elements of education and upbringing. Inadequate menstrual hygiene can lead to excessive school absenteeism and missed educational opportunities (Holmes et al. 2020). Academic programs can increase awareness of menstrual poverty and reusable hygiene products and reduce menstrual waste. Although many researchers have documented the multifaceted benefits of reusable menstrual hygiene products, environmental sustainability is often overlooked in menstrual hygiene practices (Weir 2015).

Sociological perspective of menstruation

Sociological theories and ideas provide the foundation for a sociological perspective of menstruation. The concept of social imagination – the capacity to shift from one perspective to another – introduced by C. W. Mills, along with his account of the social and historical meaning of such shifts (1959, p. 7) – calls for multidimensional research on menstrual poverty. In his work, Mills proposes “remote transformation,” which refers to broader systemic changes that indirectly shape individual experiences and behaviors. In the context of menstrual poverty, this notion can be interpreted as the influence of global sustainability and education efforts, which in turn drive societal change. Conversely, his idea of the “most

¹The terms *women*, *woman*, and *girl/s* in this text apply to all people who menstruate, regardless of gender identity. The authors acknowledge that not all women menstruate, and not all people who menstruate are women (Torchia 2021, Andersh et al. 2021).

intimate feature of human self” – which highlights private experiences shaped by societal structures and norms – can be applied to the ways menstrual experiences are formed by societal norms, institutions, and stigma. To understand the personal and the intimate, we must look beyond the individual to the institutions within which we live – institutions that form the social structure that shapes our consciousness (Mills 1959, p. 8).

As a symbol of womanhood, menstruation often entails negative stereotypes, discrimination, shame, and stigma (Bailey 1993), constraining girls’ social participation and self-actualization. It is therefore vital to consider a feminist perspective on the topic, noting that it is not a uniform perspective. According to Koeske (1983), research on the menstrual cycle and practices often adopts a biomedical point of view, and – contrary to common assumptions – such acknowledgment of biomedical influence is not *anti-feminist* (p. 2). A feminist perspective does not seek to minimize the biological and magnify the social and psychological influences; instead, it challenges the dichotomies of mind/body, cognition/emotion, and trait/content (Koeske 1983). The issue is not biology versus sociology per se, but the tacit interpretations and assumptions attached to such biological claims. Women’s reproductive biology has been used for gender-based oppression (Bailey 1993, p. 122). Women and women’s practices have been kept behind closed doors, under structural subordination, which has distorted, trivialized, minimized, and rendered the experience invisible; such interpretations are often cultivated through ideological differences between genders (Ritzer 1997, p. 335). It is vital to analyze the biological dimension to fully understand how menstruation affects women’s lives.

The goal of sociological imagination is to grasp the complexities of the world rather than remain a passive bystander; it is “the most fruitful form of this self-consciousness” (Mills 1959, p. 7). With a feminist perspective in mind, this paper intends to question and challenge the implicit assumptions of the biomedical framing of menstrual poverty and hygiene. Building on theoretical and empirical literature (Močibob 2021, CCEA 2021, Kelava 2022) in the context of education and the environment, the paper explores the personal struggles and realities of menstrual poverty, offering insights to inspire future researchers and policymakers to drive meaningful change. Methodologically, the study uses a static quantitative correlation with snowball sampling and a convenience participant sample (Pavić, Šundalić 2021). Inspired by previous studies, the survey questions were tailored to this study’s objectives. The survey explored sociodemographic characteristics, menstrual hygiene practices, and attitudes toward menstrual poverty; the detailed methodology is described below.

Literature Review

Definition of menstrual poverty

Menstrual or period poverty encompasses two related concepts: menstrual poverty and period dignity. Menstrual poverty refers to the inability to access clean menstrual hygiene products due to limited availability, increasing costs, or social stigma and shame (Andersh et al. 2021, PaRiter 2023). Closely associated with menstruation, period dignity refers to the accessibility and availability of menstrual hygiene products to meet menstruation care needs while dismantling surrounding taboos (CCEA 2021, p. 5; The Lancet Regional Health – Americas 2022). Menstrual poverty involves not only financial constraints but also the gender, educational, and environmental vulnerabilities experienced by women around the globe.

To maintain menstrual hygiene, women must be able to practice safe and clean menstrual care; otherwise, they risk reproductive and urinary tract infections (The Lancet Regional Health – Americas 2022, Hennegan et al. 2020, Weir 2015). Menstrual practices are activities undertaken to collect and remove menstrual blood from the body (Hennegan et al. 2020, p. 3). These practices may vary across menstrual cycles / the so-called *menstrual age*, by location, available resources, and needs. Menstrual hygiene products (MHPs) are central tools for maintaining menstrual practices. MHPs are used to collect menstrual blood and enable its safe disposal (Weir 2015, GIZ Sanitation for Millions 2020). They can be disposable (single-use) or reusable (i.e., disinfected after a menstrual cycle and reused) (Weir 2015). Disposable MHPs “dominate the market” in consumption and production, and their production “has progressively increased” in recent years (Cabrera, Garcia 2019, p. 4). There are several types of MHPs, but this paper focuses on a select few². Disposable menstrual pads, tampons, and menstrual disks³ are single-use, whereas menstrual cups, reusable menstrual pads, and menstrual underwear are reusable products (Sikirić Simčić 2021). In addition to MHPs, several conditions must be met for safe and clean menstrual hygiene. Hennegan et al. (2020) identify the following: access to running water, soap, a private toilet, toilet paper in the stall, and bins in the stall for safe disposal of menstrual waste. They also find that the possibility of washing hands before and after changing MHPs is necessary for women’s confidence and sense of cleanliness (Hennegan et al. 2020, p. 6).

²Due to spatial constraints, we will not go into detail of each menstrual hygiene product. For further explanation, please see Weir (2015), van Eijk and etc. (2019), or Borowski (2011).

³It is worth noting that there are some varieties that are reusable, but most are disposable (Scaccia 2019).

As previously noted, no two menstrual experiences or menstrual cycles are alike. Several criteria can influence the choice of MHPs, including availability, social norms, awareness, habit, or cost, and variations in menstrual flow (GIZ Sanitation for Millions 2020, Borowski 2011). Although this paper focuses on the influence of education and environmental sustainability on these criteria, one additional factor warrants specific attention because it is particularly prevalent: the cost of MHPs. Menstruation is commercialized, and menstrual poverty and capitalism have been described as two sides of the same coin (Haneman 2021). As with other consumer behaviors, product prices and income determine *menstrual* consumer behavior. The cost of MHPs can push many women into menstrual (economic) insecurity, which is especially detrimental for those with lower socioeconomic status. This economic burden affects their quality of life, health, and overall well-being; it can also force individuals to miss school or social events and to take vacation days from work because MHPs are unaffordable (Cabrera, Garcia 2019).

Closely connected to this issue is the “pink tax,” i.e., a value-added tax (VAT) for feminine products such as lotions, shampoos, shaving creams, razors, and menstrual hygiene products (Lahiri 2024). In April 2022, the European Union amended the VAT Directive to reduce VAT rates for MHPs. Annex III of the VAT Directive lists MHPs as goods eligible for a reduced rate of (at least) 5% (Council of the European Union 2022). In response, Germany (7%), Austria (10%), and Luxembourg (3%) joined other EU members that apply reduced VAT rates, including Poland, Czechia, Lithuania, France, Spain, and Cyprus. Ireland is the only EU member state that does not tax MHPs (Buchholz 2020). Croatia lowered the initial 25% VAT on MHPs to 13% in April of 2022, which is an important step in the right direction. However, media reports and statements by Croatian Minister of Finance Marko Primorac note that “reducing the VAT rate did not lead to lower prices but instead increased profit margins. In this context, we can say that this measure related to menstrual supplies has not been successful” (Iako je PDV... 2022). Research indicates that even when women consider other criteria – such as sustainability and health effects – the selected MHP must still be *cost-effective* (Borowski 2011). For many consumers, cost carries the greatest weight when deciding and purchasing MHPs (cited in Weir 2015).

Menstrual poverty in the context of education

Education is an indispensable element for our growth and development. Schools function as sites of secondary socialization, where individuals learn,

discern, and internalize social norms and values, and develop social identities (Giddens 2007). Merton's theory (1968) differentiates between two functions of education: manifest (planned and recognized) and latent (unplanned and unrecognized). In general, manifest functions transmit knowledge, while latent functions reproduce social norms and values. Although Merton's theory does not address menstruation, it provides a valuable foundation for analyzing how menstruation is treated (or overlooked) in the educational system. First, menstruation is largely absent from school curricula despite being a vital topic, given that many girls begin menstruating during their school years, often by age 14 (UNFPA 2022). A key manifest function of education should therefore be to provide accurate, practical knowledge about menstruation and menstrual hygiene, promoting health and awareness. Second, the marginalization of menstruation in education produces distinct latent functions. Its omission reinforces stigma, shame, and silence around menstruation.

Menstruation in education can also be examined through the lens of conflict theory, particularly through the concept of the hidden curriculum. Bowles and Gintis (1979) introduced the idea of the hidden curriculum to explain how education creates a compliant and alienated workforce. The concept has interested many contemporary scholars who explored the interconnectedness of education and social inequalities. As Dolenc, Doolan, and Žitko (2015) note, "what is accepted as legitimate knowledge is related to the political context" (p. 245).

This is directly relevant to menstruation because the hidden curriculum shapes how menstruation is addressed in education, and many educational settings do not view menstruation as *legitimate* knowledge. An emphasis on negative aspects of menstruation, promotion of secrecy and discretion around MHPs or menstrual practices, and segmenting the teaching about menstrual hygiene and poverty to girls and boys continually contribute to keeping menstruation "behind closed doors". From a feminist perspective, menstruation is both overlooked and exaggerated in educational settings. Under the pretext of protecting women's reproductive health, women were historically excluded from education (Bailey 1993); once women fought for their rightful place, their (menstrual) needs were ignored. Education adopts an androcentric approach in which men and their needs are universal, and disregarding women hinders educational opportunities and success (Bailey 1993).

In patriarchal societies, women are socially conditioned to develop an aversion to anything associated with femininity (Ritzer 1997). This conditioning extends to menstruation, where aversion is second nature

(for women). Women are expected to endorse these negative perceptions, hindering any possibility of self-exploration (Ritzer 1997). After all, if society fostered a more positive and open stance towards menstruation, some authors theorize that the perception of menstrual pain might decrease (Bailey 1993) and that women would reevaluate their views of it as a female burden (Johnston-Robledo, Chrisler 2011). Research has proved that knowledge before menarche can have a significant (positive) influence on maintaining menstrual health (Hennegan et al. 2020). Research conducted by Andersh et al. (2021) showed that 66% of teenagers avoid school during menstruation due to (menstrual) insecurity. *The Period Poverty: Survey Findings Report* (CCEA 2021) proposes a “toxic trio” of menstrual poverty: the cost of MHPs, lack of menstruation education, and imposed menstrual shame. Reforming educational programs is therefore the key to shattering menstrual stigma and poverty (CCEA 2021, p. 5). For many, providing free MHPs in institutions is considered the simplest first step in the right direction (The Lancet Regional Health-Americas 2022, Sikirić Simčić 2021, Kelava 2022).

Menstrual poverty in the context of environmental sustainability

Research on menstruation has primarily focused on social perceptions of menstruation, shame, and the choice among MHPs; few studies have addressed the sustainability of menstruation and neutral hygiene products (Weir 2015). The multifaceted benefits of reusable MHPs have been documented (Cabrera, Garcia 2019; Borowski 2011; Weir 2015; van Eijk et al. 2019), yet sustainability remains a negligible factor in MHP selection (Borowski 2011). Additionally, many people are unaware of the extent to which plastic components in MHPs enter the environment due to improper disposal methods (Greenpeace u Hrvatskoj 2019, Hennegan et al. 2020). Because single-use MHPs are made of materials that degrade slowly, research estimates their decomposition to be 500 years (London Assembly Environment Committee 2018). Single-use MHPs have an environmental footprint not only at the disposal stage but also through manufacturing, packaging and distribution. In comparison, due to their longevity and cost-effectiveness, reusable MHPs still have a smaller environmental footprint despite water and detergent use (Weir 2015).

On average, girls and women menstruate from ages 13 to 51, typically every 28 to 30 days, for 3 to 7 days per cycle. Over roughly 38 years, this amounts to approximately 456 menstrual periods, during which an individual may use more than 10 000 to 15 000 MHPs over their lifetime (The Lancet Regional Health – Americas 2022; Borowski 2011). Across the

menstrual years, a person generates 100 to 150 kg of MHP waste (Borowski 2011). While this may seem modest at the individual level, Cabrera and Garcia (2019) report that in 2017 the then-28 EU member states used 49 billion MHPs, generating an average waste of 590,000 tons. They further estimate that if only 20% of women switched to menstrual cups, annual menstrual waste could be reduced by 100,000 tons.

The financial burden of MHPs is particularly evident when considering the sustainability of these products, acting as a barrier (Weir 2015). On average, reusable MHPs require higher up-front spending than single-use MHPs, and therefore, women (of low socioeconomic status) will be less inclined to invest in “more expensive” hygiene products. Moreover, as previously noted in the Introduction, from a feminist perspective, the trivialization and ridicule of menstrual hygiene, and imposed menstrual shame have ingrained reluctance in women’s consciousness to care and invest in their menstrual hygiene among other things. They are discouraged from seeking, learning, using, or even testing a better⁴ product for their menstrual hygiene, compelling them to continue the cycle of keeping their menstruation (and health) “behind closed doors”. Some researchers note several other reasons for reservations (Cabrera, Garcia 2019; Sikirić Simčić 2021; Haneman 2021). Single-use MHP dominate the market and are readily available in drugstores or supermarkets. Reusables, by contrast, are often less accessible and may be available only online, due to their relative *personalization*. One of the ubiquitous arguments against reusables is the learning curve which deters women who are accustomed to more straightforward options (e.g. single-use pads and tampons). Additionally, reusables require greater privacy, running water, and soap – conditions that may not be available in some contexts, including schools, or that may be particularly difficult to meet for unhoused people or refugees (Sikirić Simčić 2021, p. 3).

Research Methodology

Research hypotheses

Research on the factors, prevalence, and consequences of menstrual poverty remains limited, although recent studies have begun to bridge this gap (see Močibob 2021, CCEA 2021, Kelava 2022). Accordingly, the aims and goals of the study described in this paper are to raise awareness of the importance of menstrual hygiene and of the issues associated with menstrual poverty.

⁴The goal of the paper is not to prescribe one and specific hygiene product, but to highlight the optimal products for various criteria of menstrual (consumer) behavior.

A static quantitative correlation study was conducted (Pavić and Šundalić 2021). This paper and research will test the following hypotheses:

- H.1. Higher education participants are more knowledgeable about menstrual poverty.
- H.2. Familiarity with menstrual poverty is positively correlated with educational equity regarding menstruation.
- H.2. Participants recognize that using reusable menstrual hygiene products is associated with living a *greener* life.

Descriptive statistics were reported and analyzed by response frequencies, arithmetic mean (M), median (Me), mode (Mod), and standard deviation (SD). The hypotheses were tested using correlation and simple analysis of variance (ANOVA). The 5-point Likert scale statements were divided into three constructs⁵: menstrual poverty, educational equity, and environmental sustainability.

Participants

Data were collected via an online survey, *Google Forms*, from February 23 to March 31, 2023. Recruitment used snowball sampling with a convenience sample. Survey questions were inspired by previous studies by Močibob (2021) and *Period Poverty: Survey Findings Report* (CCEA 2021), and were tailored to the goals and hypotheses of this paper. The survey explored three categories: the participants' sociodemographic characteristics, descriptive data on menstrual hygiene and habits, and attitudes toward menstrual poverty. Sociodemographic and descriptive items were formed as dichotomous, multiple-choice questions, and ranking scales, while attitude items used 5-point Likert scales. Statistical analyses were conducted using *IBM SPSS Statistics 26*.

The study included 468 individuals (N = 468) aged 18 to 35 who menstruate. By age group, most participants were 18-21 years old (32.1%), followed by 22-23 (22.6%), 31-35 (17.5%), 27-30 (13.7%), and 24-26 (13.7%). Of the participants, 41.7% were university students, 20.3% were high school students (aged 18 or older), and 33.5% were employed adults. Over half had completed tertiary education (52.4%). More than half (54.4%) rated their socioeconomic status as average. The age at menarche was 13 years (Mod = 13; SD = 1.840).

⁵A general theoretical concept that means to explain an array of other concepts. Constructs are not directly measurable, therefore require precise definition and operationalization (Pavić and Šundalić 2021, p. 54).

Results and Analysis

This study collected both quantitative and qualitative responses to provide a richer understanding of participants’ awareness of the effects of menstrual poverty. Adapting survey questions from relevant previous research allows for comparison and contextualization of the results for future researchers. The online survey examined various aspects of menstrual hygiene, including age at menarche, preferences in selecting MHPs, use of pain medication during menstruation, awareness of menstrual poverty, and monthly spending on MHPs.

Table 1

Descriptive statistics for the constructs of menstrual poverty, educational equity, and environmental sustainability ($N = 468$)

	Min	Max	M	Me	Mod	SD
Awareness of menstrual poverty	1.82	5	3.975	4	4	0.505
Educational equity regarding menstruation	1.81	4.19	3.046	3.063	2.94	0.354
Importance of sustainability regarding menstruation	1.38	4.85	3.273	3.231	3.38	0.704

Source: Authors’ own work.

Table 1 shows the values of the main constructs for which the (familiarity with) menstrual poverty has the highest descriptive indicators ($Me = 4$; $SD = 0.505$) meaning that most of the participants ($N = 468$) are familiar with the phenomena and have shown agreement with statements such as: “Menstrual poverty is one of the main social issues.” An analysis of statements categorized into the construct of sustainability indicates moderate agreement. These research participants somewhat agree and disagree with statements such as “I believe that long-term use of reusable menstrual products benefits the environment and reduces pollution.” and “I believe that reusable MHPs aren’t more sustainable than single-use MHPs,” respectively. Statements “Lessons on menstruation and menstrual hygiene were brief and concise,” and “Improving basic conditions for menstrual hygiene would reduce absences from school or work” were among the 16 statements included in the lowest-scored construct of educational equity ($Me = 3.063$; $SD = 0.3544$). The descriptives indicate belief of unjust presence – or lack thereof – of menstruation in education, and with lowest standard deviation similarity of responses among the participants.

Table 2

Descriptive statistics of familiarity, usage, and criteria for the choice of MHPs
($N = 468$)

	Min	Max	M	Me	Mod	SD
Familiar MHPs	1	8	4.276	5	5	1.27691
Number of MHPs used for menstrual hygiene	1	4	1.611	2	1	0.62978
Criteria for MHP choice	1	7	4.22	5	5	0.99774

Source: Authors' own work.

Online survey aggregated interesting data regarding menstrual hygiene, more specifically, participants' habits and preferences – as shown above (Table 2; Figure 1; Figure 2). Participants could choose from six MHP options: disposable pads, reusable pads, tampons, menstrual cups, menstrual discs, and “other” (open response). Table 2 and Figure 1 show that participants reported familiarity with up to eight products, although five was the most common number ($Mode = 5$). They also indicate that using only one product for menstrual hygiene was the most common practice ($Mode = 1$). Figure 1 visualizes the data in Table 2 and shows a clear preference for single-use MHPs (i.e. single-use menstrual pads and tampons). Figure 2 presents the criteria participants consider while choosing MHPs. Table 1 indicates that they select up to seven criteria, but five is the most common ($Max = 7$; $Mode = 5$). A sense of security and habit carried the most weight for the participants, while environmental concern – as other studies have already noted – was the least important criterion.

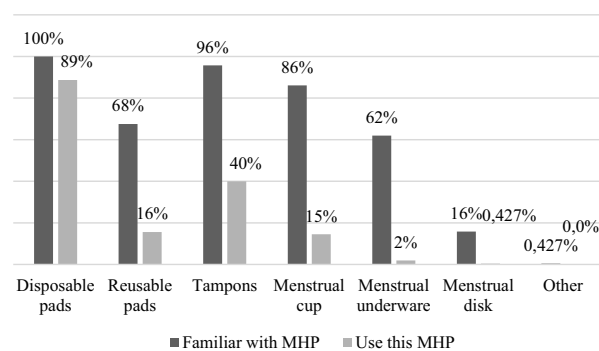


Figure 1. Familiarity and usage of menstrual hygiene products ($N = 468$).

Source: Authors' own work.

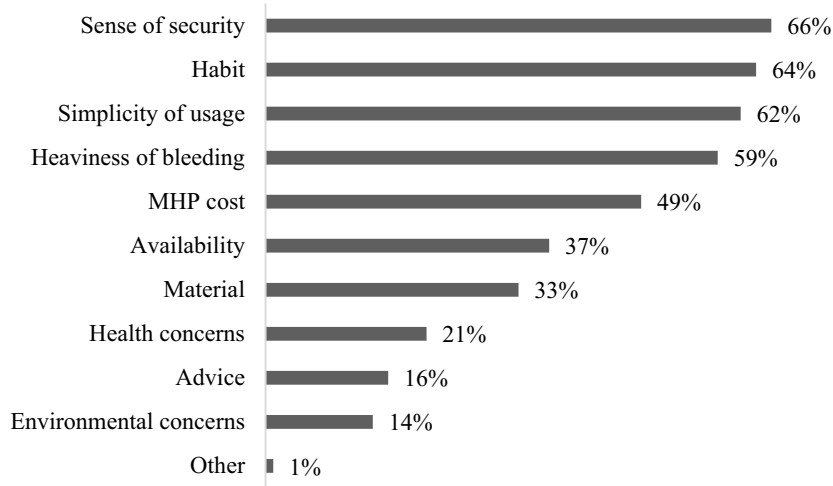


Figure 2. Criteria for the choice of menstrual hygiene products ($N = 468$).
 Source: Authors' own work.

H.1. Higher education participants are more knowledgeable about menstrual poverty

As stated above, more than half of the participants (52.4%) had completed a university- level education. One-way ANOVA was used to test this hypothesis, followed by a Games-Howell post hoc test due to group size and variance differences. As shown in Table 3, a statistically significant difference among levels of education was observed – the highest level of awareness is among the participants who had completed a level of tertiary education. Therefore, H.1. is accepted.

Table 3

One-way ANOVA analysis of menstrual poverty and the education level ($N = 468$)

Familiarity with menstrual poverty	Completed primary school		Completed high school		Completed tertiary education		$F(df)$
	M	SD	M	SD	M	SD	
	3.77	0.45	3.95	0.48	4.05	0.52	8.293(2)**

Legend: df – degrees of freedom; F – F ratio; ** $p < 0.01$; * $p < 0.05$.

Source: Authors' own work.

H.2. Familiarity with menstrual poverty positively correlates with educational equity regarding menstruation

Before testing this hypothesis, some descriptive information must be considered. Participants rated how frequently they had learned or heard of specific menstrual products in their surroundings on a 5-point scale (1 – *Never*, 2 – *Rarely*, 3 – *Sometimes*, 4 – *Often*, 5 – *Always*). Figure 3 distinctly indicates that disposable menstrual pads were the most prevalent, closely followed by tampons. Figure 4 visualizes sources of information on MHPs: family, peers, the school environment, and social media. With the exception of school, the sources had similar average scores: family was the most frequent source, whereas school was the least frequent. Notably, social media also emerged as a meaningful source of information about MHPs. Lastly, Figure 5 showcases the most frequent MHPs offered in educational institutions or workplaces. It is disappointing that more than 60% of the participants did not have free MHPs available. Among those who did report access, participants specified which products were offered; in total, 27% reported that free MHPs were available.

Further analysis revealed that within this subgroup, at least 15% had used free MHPs at least once. Hypothesis H.2. was tested using a Pearson correlation between the constructs of educational equity and menstrual poverty (see Table 1). As shown in Table 4, the correlation was positive and statistically significant: higher educational equity was associated with greater awareness of menstrual poverty. Therefore, H.2. is accepted.

Table 4

Pearson correlation for constructs of menstrual poverty and educational equity
($N = 468$)

	Educational equity regarding menstruation	Awareness of menstrual poverty
Educational equity regarding menstruation	Pearson Correlation	1
	Sig. (2-tailed)	0.253**
	N	468
Awareness of menstrual poverty	Pearson Correlation	0.253**
	Sig. (2-tailed)	0.000
	N	468

Legend: ** $p < 0.01$; * $p < 0.05$.

Source: Authors' own work.

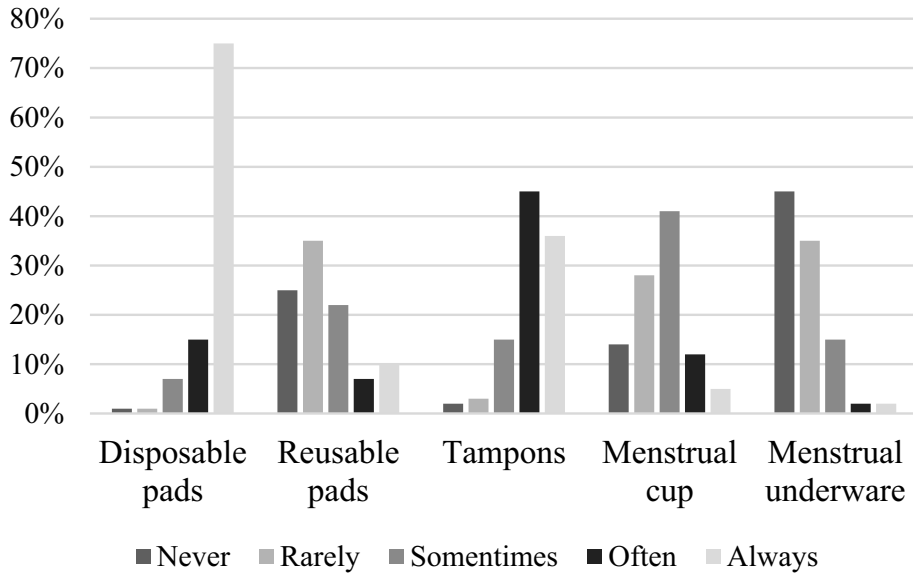


Figure 3. Menstrual hygiene products heard of in participants' surroundings ($N = 468$).
 Source: Authors' own work.

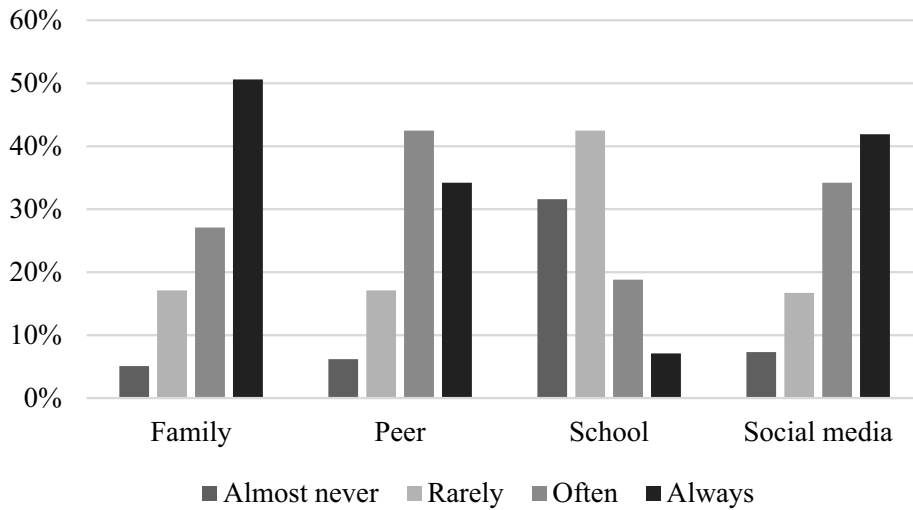


Figure 4. Source of information for menstrual hygiene products ($N = 468$).
 Source: Authors' own work.

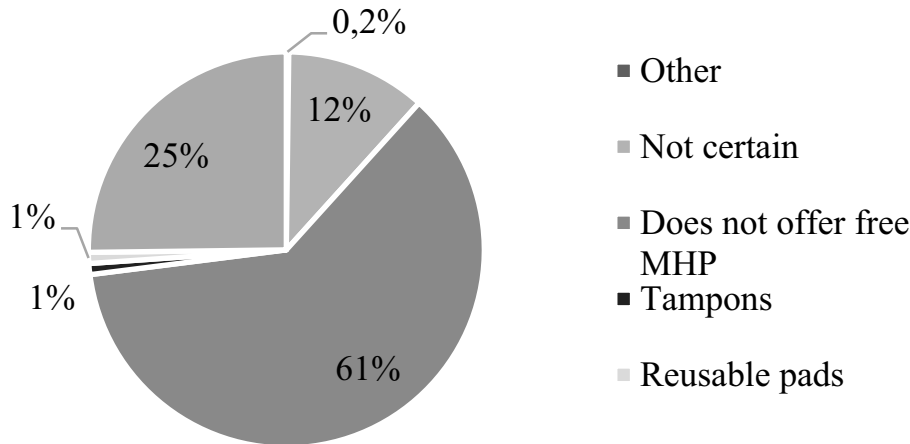


Figure 5. Most commonly offered free MHPs in education institutions or workplaces ($N = 468$).
 Source: Authors' own work.

H.3. Participants recognize that by using reusable menstrual hygiene products, they live a greener life

The importance of environmental sustainability was measured using 13 statements on a 5-point Likert scale, including: "I'm more likely to use MHPs with recycled packaging," as well as negatively phrased statements (that were recoded during statistical analysis): "I believe that reusable MHPs are no more sustainable than single-use MHPs." Table 5 shows a statistically significant positive correlation between the constructs of menstrual poverty and environmental sustainability.

Figure 6 presents participants' monthly expenses⁶ for MHPs. Overall, 31.2% of participants reported spending between €4 and €6 per month, and 30.1% reported spending between €2 and €4 per month. Further analysis provided interesting information: 67.7% of participants who reported spending less than €2 on menstrual hygiene products (13.7%) used menstrual cups⁷, underscoring the economic benefits of reusable MHPs. Figure 6 also proves to be a statistically significant correlation

⁶Note: The research was conducted in 2023, and due to the Croatia's inflation rate averaging 2.4% in 2024 (Croatia Inflation Rate n.d.), we cannot know what responses would be today.

⁷Menstrual cups has a lifespan of 10 years, which can significantly reduce the monthly expenses for menstrual hygiene (van Eijk et al. 2019).

for the participants who value sustainability for their menstrual hygiene (see Table 6). A negative correlation indicates that those who consider sustainability spend less, likely using reusable menstrual hygiene products⁸.

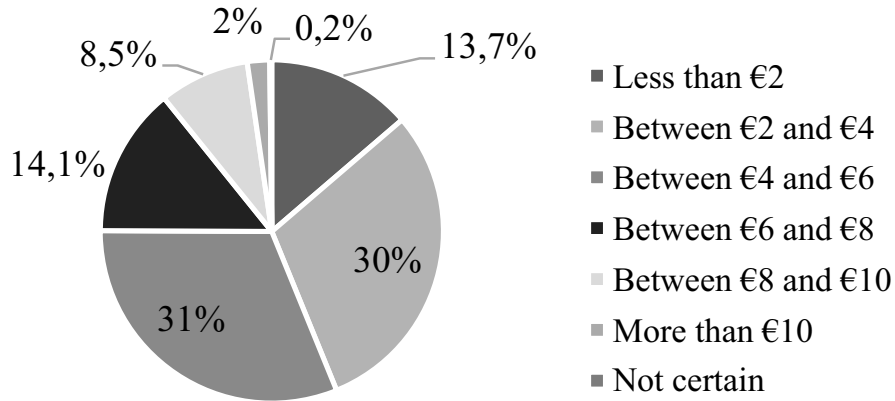


Figure 6. Monthly expenses on menstrual hygiene products ($N = 468$).
 Source: Authors' own work.

Table 5

Pearson correlation for constructs of menstrual poverty and environmental sustainability ($N = 468$)

		Importance of sustainability regarding menstruation	Awareness of menstrual poverty
Importance of sustainability regarding menstruation	Pearson Correlation	1	0.320**
	Sig. (2-tailed)		0.000
	N	468	468
Awareness of menstrual poverty	Pearson Correlation	0.320**	1
	Sig. (2-tailed)	0.000	
	N	468	468

Legend: ** $p < 0.01$; * $p < 0.05$.

Source: Authors' own work.

⁸Presumptions of the authors, not proven by statistical analysis.

Table 6

Pearson correlation for the construct of environmental sustainability and monthly spending on MHPs ($N = 468$)

		Importance of sustainability regarding menstruation	Monthly expenses on menstrual hygiene products
Importance of sustainability regarding menstruation	Pearson Correlation	1	-0.231**
	Sig. (2-tailed)		0.000
	N	468	468
Monthly expenses menstrual hygiene products	Pearson Correlation	-0.231**	1
	Sig. (2-tailed)	0.000	
	N	468	468

Legend: ** $p < 0.01$; * $p < 0.05$.

Source: Authors' own work.

Discussion and conclusion

As a marker of health, menstruation is perceived as a burden for women and general society. Shame, discrimination, taboos, and stigma surrounding menstruation permeate every aspect of life, including the private sphere – where menstrual hygiene has been kept “behind closed doors” – thereby trivializing menstrual experiences and education (Ritzer 1997). Menstrual poverty is a global phenomenon that affects women’s dignity, health, and social lives. It is not only about the financial means to obtain menstrual hygiene products (MHPs), but also about education and environmental sustainability of menstruation (the focus of this paper and study) (CCEA 2021; The Lancet Regional Health – Americas 2022). These dimensions form the “toxic trio” that women confront in everyday menstrual management: the cost of MHPs, the lack of or insufficient menstrual education, and imposed menstrual shame (CCEA 2021, p. 5). This study investigated perceptions, habits, and preferences related to menstrual health and menstrual poverty (regarding education and sustainability) using methods for quantitative correlational study and an online survey. The study included 468 participants aged 18 to 35, and both descriptive indicators and hypothesis testing data provided yielded informative findings (which can be beneficial for future researchers).

We must consider the limitations and strengths of the research. A correlational study such as this cannot confirm causal relationships. As the sample of participants was convenient, it is not representative of the population, and snowball sampling can lead to similar viewpoints among the participants. While efficient and quick, online surveys may result in a selective sample and limit generalization due to their activity during a specific time frame. However, the research poses many strengths.

As with many phenomena, awareness can influence behavior. Thus, it was vital to examine how awareness of menstrual poverty varies across various sociodemographic variables to depict this multidimensional phenomenon. H.1. indicated a statistically significant positive correlation between the higher education of participants and their awareness of menstrual poverty. Awareness of menstrual poverty benefits menstrual educational equity, as reflected in the test of H.2. Be that as it may, the descriptive indicators of the research were not as positive. Figures 3 and 4 showcased that the school environment is the least plausible source of menstrual education. Studies have confirmed that providing free MHPs in educational institutions is the *easiest* first step in combating menstrual poverty; however, 61% of participants in this study did not have that *luxury*. As to H.3., it was particularly interesting to demonstrate the statistically significant negative correlation between expense on MHPs and environmental sustainability, i.e., participants that reported lower expenses were more likely to give higher value to the sustainability of menstrual products. Albeit, sustainability is the least important criterion for choosing MHPs (Figure 2).

Overall, these results can serve as a basis for developing and establishing improved educational programs and raising awareness of environmental sustainability among the criteria for choice of MHPs. Additional research can be conducted on the interconnection of other social dimensions of menstrual poverty, as well as sociodemographic variables. Such studies can only contribute to combating menstrual poverty and stigma, and open a door to menstrual discourse. Menstruation is a symbol of health, not of a burden, and it deserves to be celebrated openly rather than being kept behind closed doors.

Literatura | References

- ANDERSH K., FRANCIS Z., MORAN M., QUARATO E. (2021), Period Poverty: A Risk Factor for People Who Menstruate in STEM, “Intersectional Science Policy”, 18(04), <https://doi.org/10.38126/jspg180401>.
- BAILEY C. A. (1993), Equality with Difference: On Androcentrism and Menstruation, “Teaching Sociology”, 21(2), p. 121-129, <https://doi.org/10.2307/1318632>.
- BOROWSKI A. (2011), Are American women turning to reusable and greener menstrual products due to health and environmental pollution concerns?, [Dissertation], <https://scholarworks.rit.edu/theses/544/>.
- BOWLES S., GINTIS H. (1976), Schooling in capitalist America: Educational reform and the contradictions of economic life, Basic Books, New York.
- BUCHHOLZ K. (2020), Infographic: Where the “Tampon Tax” is Highest and Lowest in Europe, Statista Daily Data, <https://www.statista.com/chart/18192/sales-tax-rates-on-feminine-hygiene-products-in-europe/#:~:text=In%20the%20past%2012%20months> [access: 29.07.2024].
- CABRERA A., GARCIA R. (2019), The Environmental and Economic Costs of Single-use Menstrual Products, Baby Nappies and Wet Wipes: Investigating the impact of these single-use items across Europe, Rezero – Fundació per a la Prevenció de Residus i el Consum Responsable, https://zerowasteurope.eu/wp-content/uploads/2019/12/bffp_single_use_menstrual_products_baby_nappies_and_wet_wipes.pdf.
- CCEA (2021), Period poverty: Survey Findings Report, Council for Curriculum, Examinations and Assessment, <https://ccea.org.uk/downloads/docs/ccea-asset/Resource/Period%20Poverty%20Survey%20Findings%20Report.pdf> [access: 10.07.2024].
- COUNCIL OF THE EUROPEAN UNION (2022), Council Directive (EU) 2022/542 of 5 April 2022 amending Directives 2006/112/EC and (EU) 2020/285 as regards rates of value added tax, <https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32022L0542&from=EN#d1e427-1-1> [access: 29.07.2024].
- CROATIA INFLATION RATE (n.d.), Tradingeconomics.com, <https://tradingeconomics.com/croatia/inflation-cpi> [access: 15.07.2024].
- DOLENEC, D., DOOLAN K., ŽITKO, M. (2015), Plus ça Change: Mapping Conversions in the Croatian Academic Field in the Early 1990s. In Universities and Elite Formation in Central, Eastern and South Eastern Europe,

edited by F. Bieber and H. Heppner, pp. 243-266, Berlin: Lit Verlag, https://www.researchgate.net/publication/273832309_Plus_ca_change_Mapping_Conversions_in_the_Croatian_Academic_Field_in_the_Early_1990s.

- GIZ SANITATION FOR MILLIONS (2020), Sanitation for Millions' Approach towards Menstrual Waste Management, Deutsche Gesellschaft Fuer Internationale Zusammenarbeit (GIZ) GmbH, pp. 1-9, <https://www.susana.org/en/knowledge-hub/resources-and-publications/library/details/3865\#> [access: 29.07.2024].
- GREENPEACE U HRVATSKOJ (2019), Otklon od jednokratnog – Vodič za provedbu Direktive o plastici za jednokratnu uporabu, Greenpeace. <https://www.greenpeace.org/croatia/otklon-od-jednokratnog/> [access: 10.07.2024].
- HANEMAN V. J. (2021), Menstrual Capitalism, Period Poverty, and the Role of the B Corporation, "Columbia Journal of Gender and Law", 41(1), pp. 133-145, <https://doi.org/10.52214/cjgl.v41i1.8827>.
- HENNEGAN J., NANSUBUGA A., AKULLO A., SMITH C., SCHWAB K. J. (2020), The Menstrual Practices Questionnaire (MPQ): development, elaboration, and implications for future research, "Global Health Action", 13(1), <https://doi.org/10.1080/16549716.2020.1829402>.
- HOLMES K., PARRY K. A., ARMOUR M. (2020), 3 out of 10 girls skip class because of painful periods. And most won't talk to their teacher about it, The Conversation, <https://theconversation.com/3-out-of-10-girls-skip-class-because-of-painful-periods-and-most-wont-talk-to-their-teacher-about-it-150286> [access: 29.07.2024].
- IAKO JE PDV na ove potrepštine smanjen – cijene nikad veće: "Puno je. Kad su dvije-tri žene u kući, bankrotiraš" (2022), Dnevnik.hr, <https://dnevnik.hr/vijesti/hrvatska/iako-je-pdv-na-uloske-i-tampone-smanjen-cijene-nikad-vece-puno-je-kad-su-dvije-tri-zene-u-kuci-bankrotiras---752997.html> [access: 29.07.2024].
- JOHNSTON-ROBLEDO I., CHRISLER J. C. (2011), The Menstrual Mark: Menstruation as Social Stigma, "Sex Roles", 68(1-2), pp. 9-18, <https://doi.org/10.1007/s11199-011-0052-z>.
- KELAVA M. (2022), O menstruaciji se napokon govori, H-Alter, <https://h-alter.org/ljudska-prava/o-menstruaciji-se-napokon-govori/> [access: 15.07.2024].
- KOESKE R. D. (1983), Lifting the Curse of Menstruation, "Women and Health", 8(2-3), pp. 1-16, https://doi.org/10.1300/j013v08n02_01.

- LAHIRI I. (2024), The “pink tax”: Why are women’s and men’s purchasing power so different?, Euronews, <https://www.euronews.com/business/2024/04/23/the-pink-tax-why-are-women-and-men-treated-differently-when-it-comes-to-sales> [access: 15.07.2024].
- LONDON ASSEMBLY ENVIRONMENT COMMITTEE (2018), Plastics Unflushables: Submitted Evidence, Greater London Authority, https://www.london.gov.uk/sites/default/files/plastics_unflushables_submitted_evidence.pdf [access: 15.07.2024].
- MERTON R. K. (1968), Social theory and social structure, The Free Press, New York.
- MILLS C. W. (1959), The Sociological Imagination, Oxford University Press, New York.
- MOČIBOB M. (2021), Istraživanje o menstrualnom siromaštvu, Udruga PaRiter, <https://pariter.hr/wp-content/uploads/2021/02/Menstrualno-siromastvo-izvjestaj-1-1-1.pdf> [access: 10.07.2024].
- PARITER (2023), Stvari na vidjelo: izvještaj o utjecaju rezultata istraživanja o menstrualnom siromaštvu u periodu od 2021. do 2023. godine, Udruga za ljudska prava i građansku participaciju PaRiter, <https://pariter.hr/stvari-na-vidjelo-izvjestaj-o-utjecaju-rezultata-istrazivanja-o-menstrualnom-siromastvu-u-periodu-od-2021-do-2023-godine> [access: 15.07.2024].
- PAVIĆ Ž., ŠUNDALIĆ A. (2021), Uvod u metodologiju društvenih znanosti (drugo dopunjeno izdanje), Filozofski fakultet u Osijeku, Osijek.
- RITZER G. (1997), Suvremena sociologijska teorija, Nakladni zavod Globus, Zagreb.
- SCACCIA A. (2019), Everything You Need to Know About Using Menstrual Cups, Healthline, <https://www.healthline.com/health/womens-health/menstrual-cup#takeaway> [access: 29.07.2024].
- SIKIRIĆ SIMČIĆ A. M. (2021), Preporuke nastavno na provedeno istraživanje o menstrualnom siromaštvu, <https://pariter.hr/wp-content/uploads/2021/02/Sikiric-Simcic-Preporuke-FINAL-1.pdf> [access: 10.07.2024].
- THE LANCET REGIONAL HEALTH-AMERICAS (2022), Menstrual health: a neglected public health problem, “The Lancet Regional Health-Americas”, 15, 100399, <https://doi.org/10.1016/j.lana.2022.100399>.
- TORCHIA I. (2021), Who menstruates? People menstruate, The Lift by Knix, <https://knix.com/blogs/knix-blog/who-menstruates-people-menstruate> [access: 15.07.2024].

-
- UNFPA (2022), Menstruation and human rights. Frequently asked questions, United Nations Population Fund, <https://www.unfpa.org/menstruationfaq> [access: 15.07.2024].
- VAN EIJK A. M., ZULAIKA G., LENCHNER M., MASON L., SIVAKAMI M., NYOTHACH E., UNGER H., LASERSON K., PHILLIPS-HOWARD P. A. (2019), Menstrual Cup use, leakage, acceptability, safety, and availability: a Systematic Review and meta-analysis, "The Lancet Public Health", 4(8), pp. 376-393.
- WEIR C. S. (2015), In The Red: A private economic cost and qualitative analysis of environmental and health implications for five menstrual products [Diplomski rad], <https://dalspace.library.dal.ca/handle/10222/76546>.