

UTILISING CLOTHING WASTE TO ALLEVIATE PERIOD POVERTY IN SOUTH AFRICA.

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ABSTRACT | Period poverty is a problem affecting schoolgirls in South Africa and often results in them missing school during menstrual cycles. Concomitantly, discarded clothing is contributing to a growing landfill crisis. To mitigate the effect of these problems, the ‘Sustain Her’ voluntary community-based project, an initiative by a South African non-profit organisation aimed to utilise discarded clothing to create reusable sanitary pads that could be gifted to schoolgirls. This paper aims to answer the research question: How can clothing waste be utilised to create reusable sanitary pads and empower communities? This aim is pursued by first contextualising the ‘Sustain Her’ project and secondly by contextualising the opportunities and challenges of the ‘Sustain Her’ project. The research methodology employed is qualitative autoethnography because the author facilitated and participated in the ‘Sustain Her’ voluntary community-based project, and the findings of the paper are based on the author’s personal experience and observations recorded in personal reflective notes. The ‘Sustain Her’ project showed that it is possible to recycle discarded clothing to create reusable sanitary pads for schoolgirls, to mitigate period poverty. To that end, community volunteers appeared eager to be involved in the ‘Sustain Her’ project, and seemed empowered to sort clothing, and perform basic cutting and hand sewing operations. The volunteers’ machine sewing skills varied which made achieving a consistent quality of sanitary pad challenging. Several volunteers appeared eager to develop their machine sewing skills but due to various challenges, training was not possible.

1. Introduction

“Period poverty” is a term that refers to the lack of financial means to obtain menstrual products, such as sanitary pads (Department of Women, Youth and Persons with Disabilities, 2019; Michel et al., 2022; United Nations Population Fund (UNFPA), 2022; Vardapetyan, 2021). Period poverty is a global problem that affects millions of women and girls (Michel et al., 2022; The World Bank, 2023). It is estimated that seven million South African schoolgirls suffer from period poverty which results in them missing up to five days of school every month (Ekane, et al., 2014; I_Menstruate, 2023; Kgwere, 2016; Khamisa et al., 2022; Modise, 2013). The implication is that period poverty is a potential barrier that may inhibit girls from attaining essential education.

Menstrual products can be disposable or reusable. Disposable menstrual products are only used once for a few hours and are therefore not environmentally sustainable because they result in large amounts of waste (The World Bank, 2023; United Nations (International) Children’s (Emergency) Fund (UNICEF), 2019). Disposable menstrual products are often discarded in landfills, flushed down the toilet, which causes sewerage blockages, or burned, resulting in toxic air pollution (Khamisa et al., 2022; UNICEF, 2019). Reusable menstrual products, however, such as sanitary pads made from fabric and silicon menstrual cups, provide a more sustainable alternative because they can be used multiple times and therefore greatly reduce waste (UNFPA, 2022; UNICEF, 2019).

Reusable sanitary pads have the potential to provide a long-term solution to period poverty because they require less financial investment in the long term than disposable menstrual products and can be constructed from fabrics that are easy to obtain, such as from clothing waste. Large volumes of clothing are disposed of annually, with two-thirds discarded within one year of purchase (Dean, 2020; Santi, 2023; Zurich, 2023). Excessive clothing consumption and disposal, coupled with a lack of textile recycling programmes in South Africa, has resulted in an ever-growing landfill crisis (Dean, 2020; Jenkin & Hattingh, 2022; Nkosi, 2022; Qukula, 2022; Rewoven, 2023; Santi, 2023; Wadula, 2022; Zurich, 2023). To mitigate the effect of these problems, discarded clothing could be utilised to create reusable menstrual products and potentially empower communities. This was the goal of the ‘Sustain Her’ project, an initiative by a South African non-profit organisation (NPO), which aimed to utilise discarded clothing to create reusable sanitary pads that could be gifted to schoolgirls to alleviate the effect of period poverty.

This paper embeds itself in the research question: How can clothing waste be utilised to create reusable sanitary pads and empower communities? To align with the research question, this paper has a two-part aim. Firstly, to contextualise the ‘Sustain Her’ voluntary community-based project and, secondly, to contextualise the opportunities and challenges of the ‘Sustain Her’ voluntary community-based project.

2. Literature Review

Menstruation is a normal monthly occurrence for women and girls from the age of puberty to menopause (National Health Service (NHS), 2023; UNICEF, 2018). However, due to lack of accurate menstruation knowledge, the menstrual experience is often accompanied by feelings of shame and secrecy perpetuated by social myths such as ideas that girls are unable to perform everyday activities such as cook food, bathe, or sleep in their own beds during their periods (Barrington et al., 2021; Davis et al., 2018; ElGilany et al., 2005; Hennegan et al., 2021; McMahon et al., 2011; Miirio et al., 2018; Montgomery et al., 2016; Thomson et al., 2019; UNICEF, 2019). As a result of these misconceptions and negative attitudes towards menstruation, and the embarrassment associated with not being able to afford menstrual products, girls are often reluctant to discuss their period-related challenges (Boosey et al., 2014; Dolan et al., 2013; Mason et al., 2013; McMahon et al., 2011; Montgomery et al., 2016; Sommer & Kirk, 2008). As such, despite much research being conducted with regard to the effects of period poverty on schoolgirls, it is possible that the effects of period poverty are worse than currently reflected in the literature. However, the literature suggests that period poverty has a negative effect on the physical, mental, and socio-economic wellbeing of schoolgirls (Department of Women, 2017; Rodriguez, 2021).

Studies indicate that, to overcome the effects of period poverty, some schoolgirls may engage in transactional sex or use inappropriate alternative menstrual products, which can negatively impact their health (Chinyama et al., 2019; I_Menstruate, 2023; Khamisa et al., 2022; Malusu & Zani, 2014; Mason et al., 2013; Montgomery et al., 2016; Nobelius et al., 2010; Ssewanyana & Bitanirwe, 2019; Tegegne & Sisay, 2014; UNFPA, 2022; Phillips-Howard et al., 2015). Transactional sex in the context of period poverty is the act of trading sexual relations for menstrual products or for money to purchase menstrual products (Tegegne & Sisay, 2014; Tellier & Hyttel, 2018). This behaviour increases the risk of teen pregnancy, early marriage and contracting sexually transmitted diseases such as the Human Immunodeficiency Virus (HIV) (Mason et al., 2013; Tellier & Hyttel, 2018). Despite these risks, studies indicate that sex in exchange for menstrual products is socially acceptable in many countries (Mason et al., 2013; Tegegne & Sisay, 2014).

Alternative menstrual products such as leaves, newspaper, cotton wool and old rags are utilised by many schoolgirls when they cannot obtain menstrual products (Chinyama et al., 2019; I_Menstruate, 2023; Khamisa et al., 2022; Montgomery et al., 2016; Ssewanyana & Bitanirwe, 2019; Tegegne & Sisay, 2014; UNFPA, 2022). These alternatives are often unhygienic because they disintegrate during use or cannot be thoroughly cleaned, which can cause reproductive tract infections and even infertility (Baker et al., 2017; I_Menstruate, 2023; Mishra, 2015; Montgomery et al., 2012; Ssewanyana & Bitanirwe, 2019; The World Bank, 2023).

Alternative menstrual products are often ineffective at absorbing menstrual fluid, resulting in leaking and staining on girls' clothing (Chinyama et al., 2019; Montgomery et al., 2016). Studies indicate that visible leaks cause shame and embarrassment for schoolgirls and are often the focus of derogatory comments from classmates (Boosey et al., 2014; Mason et al., 2013; Miiró et al., 2022; Montgomery et al., 2016). Bullying by peers, coupled with the shame of not being able to access menstrual products, causes psychological distress and decreased self-confidence in schoolgirls (Department of Women, 2017; Ssewanyana & Bitanirwe, 2019; Tegegne & Sisay, 2014).

The fear of embarrassment and bullying increases the likelihood of girls being absent from school during their periods (Boosey et al., 2014; Davis et al., 2018; International Federation of Red Cross and Red Crescent Societies (IFRC), 2013; I_Menstruate, 2023; Mansoori et al., 2020; Mason et al., 2013; Mason et al., 2015; Miiró et al., 2018; Montgomery et al., 2016). Studies further indicate that the fear of menstrual leaking decreases girls' ability to concentrate during lessons and reduces their willingness to participate in classroom activities (Jewitt & Ryley, 2014; Mason et al., 2013; McMahon et al., 2011; Tegegne & Sisay, 2014; Van Biljon & Burger, 2019). Frequent absenteeism and the inability to concentrate in class because of menstrual period associated fears, results in gaps in knowledge, decreases academic performance and increases the likelihood that girls will leave school before completing their education (Boosey et al., 2014; I_Menstruate, 2023; Tamiru, 2014; United Nations Educational, Scientific and Cultural Organization (UNESCO), 2015; UNFPA, 2022). Lack of education diminishes a girl's employment options and increases the probability that she will remain in poverty (Department of Women, 2017; The World Bank, 2023).

In 2017 the Department of Women, a ministry of the South African government, published the Sanitary Dignity Policy Framework (Department of Women, 2017). The aim of this framework was "to promote sanitary dignity" and to set out standards for providing menstrual products to those affected by period poverty (Department of Women, 2017, p. 3). According to this framework, access to menstrual products to ensure dignity during menstruation is a fundamental human right that must be provided for by the government (Department of Women, 2017). Since this framework was published the South African government, in partnership with the private sector, has launched several campaigns to distribute disposable sanitary pads to schoolgirls in low-income areas across South Africa (I_Menstruate, 2023; Parliamentary Monitoring Group, 2018a, 2018b; Van Biljon & Burger, 2019). However, the distribution of these disposable sanitary pads has allegedly been sporadic and unreliable (I_Menstruate, 2023; Parliamentary Monitoring Group, 2018a, 2018b; Van Biljon & Burger, 2019).

Distributing disposable sanitary pads to schoolgirls regularly requires consistent financial investment, which makes this type of campaign challenging (Tegegne & Sisay, 2014), whereas reusable sanitary pads

require a once-off investment because they can be used multiple times, thereby providing a long-term solution to period poverty. Studies indicate that the distribution of reusable menstrual products to schoolgirls, such as silicon menstrual cups and reusable sanitary pads, significantly reduces incidences of school absenteeism amongst girls (Hennegan & Montgomery, 2016; Montgomery et al., 2016; Tegegne & Sisay, 2014; Wilson et al., 2014). As such, it is argued that providing reusable menstrual products to girls affected by period poverty is likely to improve their school attendance and improve their chances of completing their education and escaping poverty.

Menstrual cups are made from medical grade silicon and require specialised knowledge and technology to construct (UNICEF, 2019), whereas reusable sanitary pads are constructed from a combination of absorbent and waterproof fabrics, that are stitched together by hand or with a sewing machine (Tegegne & Sisay, 2014; UNICEF, 2019). This means that reusable sanitary pads can be created by anyone with basic sewing skills and access to the appropriate fabrics. Appropriate fabrics are easy to obtain because large volumes of clothing are disposed of annually (Dean, 2020; Santi, 2023; Zurich, 2023). It is estimated that the rate of fabric and clothing production and the rate at which consumers dispose of their clothing has doubled in the past 20 years (Dean, 2020; Santi, 2023; Zurich, 2023). This is projected to increase in the future, with approximately 148 tonnes of fabric waste being produced by the fashion industry by 2030 (Bailey et al., 2022; Dean, 2020; Stanescu, 2021). It is estimated that at the end of their perceived useful lives, 85% of clothing will be discarded into landfills and 15% will be donated for reuse or recycling (Bailey et al., 2022; Burns, 2019; DeVoy et al., 2021; Ellen MacArthur Foundation (EMF), 2017; United States Environmental Protection Agency (EPA), 2023; Fletcher & Grose, 2012; Kadolph, 2011; Zurich, 2023).

Clothing discarded in landfills decomposes vastly differently (Fletcher, 2000). Natural fabrics such as cotton, silk, wool, and linen decompose relatively quickly, within two weeks to five years (Fletcher & Grose, 2012; Manteco, 2023). This process is, however, retarded by the application of synthetic dyes and chemical finishes during production and if natural fibres have been blended with synthetic fibres (Fletcher, 1997; Manteco, 2023). Synthetic or manmade fabrics such as spandex and polyester decompose over a much longer period, between 20 and 200 years (Fletcher & Grose, 2012; Uren, 2015).¹ As synthetic fabrics decompose, they break down into microplastics and flow out of the landfill in the leachate (Silva et al., 2021; Svedin, 2020; Weinstein, et al., 2016).² Despite leachate being treated before it is released into the environment, microplastics are not readily removed during this treatment (Silva et al., 2021; Weinstein et al., 2016). This is problematic because, if consumed, microplastics can cause damage to the cells, inflammation, and oxidative stress (Danopolous et al., 2022; Gerretsen, 2023; Huang et al., 2021). But since synthetic fabrics take a long time to decompose, they contribute to landfills becoming full and being prematurely closed (Fletcher & Grose, 2012; Uren, 2015). This is a problem that South Africa is currently facing. Large metropolitan areas such as Johannesburg and Cape Town are rapidly running out of landfill space (Nkosi, 2022; Qukula, 2022; Wadula, 2022). New landfills could be constructed, but this is a long, expensive process, and requires large areas of land, which is in short supply (Wadula, 2022).

In terms of the 15% of used clothing that is donated for resale or recycling, only 20% is suitable for resale (Schumacher & Forster, 2022). The remaining 80% is donated to the second-hand market in developing countries, recycled into lower-grade fabric goods such as insulation, or discarded into landfills (Schumacher & Forster, 2022). Less than 1% is recycled into new fibres for use in clothing (Schumacher & Forster, 2022). South African statistics are not available, but since fabric recycling programmes are limited in South Africa (Jenkin & Hattingh, 2022; Rewoven, 2023), it is likely that most donated clothing is not fit for resale or donation to the underprivileged and is thus discarded into a landfill.

Creating reusable sanitary pads from clothing waste is not only environmentally sustainable, but it also has the potential to empower communities. The literature documents several programmes in Africa in which schoolgirls and disadvantaged members of the community are taught how to create reusable sanitary pads (Ssewanyana & Bitanihirwe, 2019; Tegegne & Sisay, 2014). These programmes empower schoolgirls to

¹ Synthetic fabrics are derived from petroleum through chemical processing (Kadolph, 2011).

² Microplastics are pieces of synthetic fibres that are smaller than five millimetres (Costa et al., 2010; De Falco et al., 2018).

overcome the challenges of period poverty whilst simultaneously equipping community members with skills and knowledge for future employment (Jenkin & Hattingh, 2022; Ssewanyana & Bitanihirwe, 2019).

3. Methodology

The research methodology employed was qualitative autoethnography. Ethnography is the examination and description of social phenomena (Babbie, 2021; Lichtman, 2023; Silverman, 2004). Data is gathered by researchers primarily through observation of the social phenomenon, which is recorded in field notes (Lichtman, 2023; Silverman, 2004). Autoethnography is a class of ethnography in which the researcher records, examines and describes their own experience of a social phenomenon (Çayır, 2020; Poulos, 2021). As such, researchers fulfil the dual role of participant and observer in autoethnographic studies (Çayır, 2020; Poulos, 2021). Autoethnographic methodology was applied in this paper, because the author facilitated and participated in the ‘Sustain Her’ voluntary community-based project, and the findings are based on the author’s personal experience and observations, which were recorded in personal reflective notes.

The ‘Sustain Her’ project is an initiative of a Johannesburg-based NPO. The project participants included the author, the director of the NPO and community volunteers, including student volunteers from a Johannesburg-based higher education institution. The director of the NPO granted permission for the names of the project and of the NPO to be included in this paper. However, to avoid any possible negative effects because of this paper, and to protect the privacy and integrity of the NPO director, community volunteers, the higher education institution and the schoolgirls who benefitted from this project, all identifying names of people and associated organisations have been omitted.

4. Contextualising the ‘Sustain Her’ Voluntary Community-Based Project

The ‘Sustain Her’ voluntary community-based project aimed at creating reusable sanitary pads from clothing waste to reduce waste discarded into landfills. At the same time, gifting these reusable sanitary pads to schoolgirls could potentially reduce the likelihood of absenteeism from school, thereby sustaining their educational journey.

4.1 Clothing Sorting Event

The first phase of the ‘Sustain Her’ project was to sort through clothing donations and determine what could be used for the reusable sanitary pads. The clothing sorting event was held on Mandela Day, 18 July 2023, at a school in Johannesburg. Volunteers were invited to participate in the clothing waste sorting event via online groups and social media pages. Three types of fabric were required to create the reusable sanitary pads, namely, T-shirting, towelling and waterproof fabric. Volunteers were verbally briefed on the types of clothing to sort. Volunteers were advised not to gather light-coloured T-shirts, such as white or pastel colours, that could be easily stained by menstrual fluid. Once all the T-shirting, towelling and waterproof fabric had been sorted, a large volume of clothing remained. It was then decided by the author and the NPO director that these clothing items could be used to create bags in which to carry the reusable sanitary pads.

4.2 The Development of the Reusable Sanitary Pad

The author developed the reusable sanitary pad design, which consisted of four layers; two outer layers, an absorbent layer, and a waterproof layer. The outside layers were cut from clothing made from cotton T-shirting. The outside T-shirting layers of the reusable sanitary pad were oval shaped for easy sewing, and also provided ‘wings’ on the sides to wrap around the underwear gusset and were clipped together with snap fasteners. Cotton T-shirting was utilised for the outer layers because of its absorbency, ease of laundering and comfortability.

The absorbent layer was cut from cotton towels and face cloths because the double-knit structure of towelling makes it ideal for absorbing menstrual fluid, laundering and comfortability. The absorbent towelling layer was cut in a rectangular shape, of the same length as the outer layers, and the approximate width of an underwear gusset. This shape ensured that the top and bottom edges of the absorbent towelling layer were attached to the outer layers, with minimal bulk at the width to ensure comfortable fastening around the underwear gusset.

The waterproof layer was cut from faux leather or raincoat fabric in the same oval shape as the outer T-shirting layers. However, few raincoats and faux leather clothing were donated to the NPO, so faux leather fabric was purchased for the reusable sanitary pads to improve their waterproof properties. Pads made with a double layer of raincoat fabric were recommended for light flow days. However, the aim was to make most pads with a faux leather waterproof layer.

The reusable sanitary pad was assembled by first stitching the absorbent towelling rectangle onto the oval waterproof layer. The oval T-shirting layers were then pinned in place on top of the towelling layer and underneath the waterproof layer, and then stitched together. Stitching the edges of the three oval layers together ensured that the waterproof layer could not shift inside the pad during wear or laundering and that the whole pad was waterproof, to prevent leaks. Once the layers had been stitched together, the outer raw edges were overlocked to prevent fraying, provide strength, and promote longevity.³ Thereafter, snap fasteners were stitched on either side of the oval ‘wings’ so that the reusable sanitary pad could be secured around the underwear gusset.

Since the outer layers looked the same, a mark was embroidered on the top T-shirting layer, above the absorbent towelling layer. This was done to identify the absorbent side to be placed against the body, and the waterproof side to be placed onto the underwear gusset. To distinguish between the raincoat and faux leather reusable sanitary pads, those with two raincoat layers were embroidered with “L” to indicate use for light flow days, and those with a faux leather layer were embroidered with “H” for heavy flow days.

Schoolgirls were gifted three light flow pads and three heavy flow pads in a fabric carrier bag as part of a reusable menstrual kit. The kit included a small waterproof purse to store soiled pads until laundering. A pamphlet with important menstruation and laundering instructions was also included in the kit, accompanied by soap and vinegar for washing the pads. The components were packed into a small plastic bucket with a lid, to enable discreet washing and storing of reusable sanitary pads.

4.3 Construction Events

The NPO hosted several reusable sanitary pad construction events, during which volunteers cut the fabric layers out of the clothing waste, pinned the layers together, used sewing machines to assemble the reusable sanitary pads and applied hand sewing techniques to embroider ‘L’ or ‘H’ on the pads and attach the snap fasteners. Large construction events took place every three months on Saturday mornings at a Johannesburg school. Workstations were set up where cutting, pinning, machine sewing and hand sewing operations were performed by volunteers, in an informal production line. In addition, smaller construction events were hosted on weekday mornings, where unemployed parents and pensioners from the community volunteered to cut out the fabric layers and complete hand sewing operations on already assembled reusable sanitary pads.

In addition to these events, the ‘Sustain Her’ community-based project partnered with the fashion department at a Johannesburg-based higher education institution to host machine sewing sessions. These sessions took place every Friday morning for a month. In these sessions third-year student volunteers utilised their machine sewing skills and clothing construction experience to assemble the reusable sanitary pads.

³ Overlocking is a special stitch created with four or five threads which wrap around and enclose the raw edges of fabric to prevent fraying.

As soon as enough reusable sanitary pads had been completed, the NPO hosted a kit packaging event where high school learners volunteered to pack the reusable menstrual kit components into buckets.

5. Findings: Autoethnographic Reflections

At the beginning of this project, the author and the NPO director explored options to create awareness of the aim of the 'Sustain Her' project to provide reusable sanitary pads for schoolgirls. It was determined that the project would be promoted through a poster shared on social media pages, online groups and at community gatherings. The author and NPO director were aware of the culture of secrecy and shame associated with menstruation and grappled with word choice and colour selection for posters, to present the topic of menstruation and the aim of 'Sustain Her' gently to the community. For example, deciding between words such as 'sanitary' versus 'menstrual' and 'towels' versus 'pads' and using pink rather than red in the posters to avoid associations with blood. The project was promoted by the NPO director and community leaders at community gatherings. However, when male community leaders promoted the project, they appeared uncomfortable and often did not share all the necessary information with the community.

Despite this, the 'Sustain Her' project was well supported by the community, with approximately 20 to 30 people at a time attending the various sorting, construction, and packaging events. Most volunteers were women, but there were several young boys and men who participated in the project. Most of the men who participated were fathers of daughters. Over time the culture of secrecy surrounding menstruation appeared to shift in the community as more women and girls began discussing their menstrual difficulties at the 'Sustain Her' construction events. Noticeably more men without children began participating in the construction events and expressed that this was because they wanted to support their female friends who volunteered in the project.

Overall, the sorting, construction and packaging events yielded positive experiences because many volunteers appeared eager to get involved and contribute to the project. It was further observed that bringing a group of volunteers together to work towards a common goal encouraged a jovial atmosphere where people appeared to enjoy the opportunity to meet new people and build relationships in communities. In some cases, such as with adolescents, volunteers seemed to enjoy the social atmosphere to such an extent that the quality and pace of their work decreased, as the construction event progressed. One young man began cutting fabric in the air, because there was no space on the table where he was sitting, as it was surrounded by volunteers. He appeared reluctant to move away from the other volunteers to another available table, despite encouragement from the author and the NPO director.

However, at the sorting events, volunteers initially appeared to struggle to identify and distinguish between the types of fabric. This may be because the author did not show them an example of the reusable sanitary pad that was going to be created, to provide visual context of the fabric required. Additionally, most of these volunteers had not previously made their own clothes, so this may explain their lack of fabric knowledge. To remedy this, the author engaged in a discussion with the volunteers and demonstrated which fabrics and related clothing items were required. Thereafter the volunteers appeared to be better able to identify and sort the clothing correctly.

A few volunteers expressed apprehension because they lacked sewing skills and were not sure how they could contribute to the project. Such volunteers were encouraged and coached to identify and sort the different types of fabric, cut fabric, pin the pieces together, iron the components where necessary and perform basic hand sewing operations. Most volunteers appeared to acquire these skills relatively quickly. However, a large portion of the construction process required machine sewing skills. A few volunteers, including the higher education fashion students, had extensive machine sewing experience, which was valuable in this project. A notable volunteer was an elderly gentleman in his seventies. His mother had taught him how to sew as a young man and he had been creating and tailoring his own clothing for decades. This gentleman sat for several hours sewing reusable sanitary pads of excellent quality before he asked the author, "What are we making?" The author then explained the goal

of the 'Sustain Her' project to him and he expressed delight at being involved, as he had three adult daughters and seemed to empathise with girls affected by period poverty.

A few volunteers had their own sewing machines, but their experience was limited to making basic clothing items and home soft furnishings such as children's dresses, curtains, and pillowcases. The author assumed that since the reusable sanitary pad consisted of basic shapes, it would be easy for volunteers with limited sewing experience to sew. However, the inexperienced volunteers appeared challenged by having to sew multiple layers of fabric of different thickness and stretch properties together, which resulted in untidy puckering and gathers at the edges. Over time the author found that allocating a few people to pin the pieces together for an inexperienced machine sewer improved the quality of the sewing. This appeared to allow the inexperienced machine sewer to focus on sewing without needing to break concentration to pin pieces together. The author further found that requiring volunteers to pin two layers together with at least ten pins in a radial manner improved the quality of the sewing because the pieces were easier to handle during sewing.

The various levels of sewing experience of the volunteers resulted in large quality variations of the reusable sanitary pads. For this reason, the author checked that all the pads met a minimum quality standard before they were passed on to volunteers for the final hand sewing operations. In some cases, the assembled reusable sanitary pad had a few errors, which required the stitches to be unpicked and the pad to be reassembled. However, in other cases the pads were poorly assembled and could not be repaired and were discarded.

Volunteers attended these construction events when they were able and arrived and left of their own accord. It was therefore not possible to ensure that everyone received the same information and training at the same time. This meant that despite attempts to oversee all sorting, cutting, pinning, machine, and hand sewing operations, volunteers made errors such as cutting T-shirt layers from white fabric, pinning the pieces in the wrong order, not stitching all the layers together, or embroidering the pad on the wrong side. In some cases, these errors could be quickly remedied, but in other cases the errors were only identified when the reusable sanitary pad was almost complete. In these instances, the reusable sanitary pads had to be discarded because they were not fit for purpose. Overall, it appeared as though the sorting, cutting, pinning, machine, and hand sewing skills of the volunteers improved as the project progressed because over time fewer assembled reusable sanitary pads were discarded.

However, a few volunteers, despite coaching from the author, lacked the machine sewing skills necessary to assemble a reusable sanitary pad of sufficient quality that it could be gifted to a schoolgirl. To make the most of their machine sewing skills, these volunteers were redirected to assemble the fabric carrier bags, which were much easier to sew than the reusable sanitary pads. Constructing these bags appeared to be less stressful for the volunteers and they constructed good quality bags at a rapid pace. The construction of bags was led by an older woman in the community who, from the beginning of the project, elected to sew bags rather than reusable sanitary pads. This woman assumed the role of a leader and mentor, by guiding and supporting volunteers in the construction of bags. This enabled the author and NPO director to focus on the sanitary pad construction process.

Several volunteers, particularly school learners, expressed a desire to learn how to use a sewing machine. It was the intention of the author and the NPO director to encourage this desire to acquire new skills and to teach community members to sew. However, time was limited and the primary aim of the 'Sustain Her' community-based project was to create reusable sanitary pads for schoolgirls. For this reason, instead of training volunteers to use sewing machines, such volunteers were trained to identify and sort fabric, cut and pin fabric and perform hand sewing operations.

6. Discussion and Recommendations

The literature suggests that menstruation education for all people plays a vital role in removing shame and secrecy, as well as breaking down myths associated with menstruation (Khamisa et al., 2022; UNICEF, 2019). As such there is potential for the ‘Sustain Her’ voluntary community-based project to partner with a menstruation education programme as a two-pronged approach to alleviating period poverty in South Africa. Perhaps a representative from a menstruation education programme could accompany the NPO when the reusable sanitary pad kits are delivered to schools.

The ‘Sustain Her’ project relied on volunteers to create these reusable sanitary pads. As such, the production of reusable sanitary pads can be slow and, ultimately, the schoolgirls are dependent on the volunteers to elevate them out of period poverty. The opportunity exists to teach schoolgirls how to create their own reusable sanitary pads so that they are empowered to elevate themselves out of period poverty. However, this would require the provision of the fabric and sewing equipment, in addition to providing schoolgirls with sewing lessons. This requires a greater resource investment than is currently available. The author is exploring possibilities of creating reusable sanitary pads that can be constructed exclusively through hand sewing operations from clothing waste, to overcome the challenges of providing sewing machines to schoolgirls.

The literature indicates that several reusable sanitary pad programmes employ community members and train them to create reusable menstrual products (Jenkin & Hattingh, 2022; Ssewanyana & Bitanirwe, 2019). The possibility therefore exists that the skills acquired by volunteers during their participation in the ‘Sustain Her’ project will enable them to gain employment in clothing production or to start their own businesses creating reusable sanitary pads.

The author and the NPO are further exploring the possibility of creating a social media instructional video to provide step-by-step instructions on how to construct a reusable sanitary pad from clothing waste. This endeavour may inspire people who possess machine sewing skills to initiate similar projects to reduce the effects of period poverty in their communities.

However, it is noted that schoolgirls affected by period poverty likely also lack underwear. Lack of underwear makes the use of reusable sanitary pads difficult. As such the author and the NPO director are exploring campaigns that can be initiated to obtain funds to purchase underwear so that a pack of underwear can be included in each reusable sanitary pad kit.

The potential further exists for researchers to explore and quantify the amount of clothing that is diverted from landfill through the creation of reusable sanitary pads, as well as to examine the long-term effects of the ‘Sustain Her’ community-based project on breaking down menstruation myths and alleviating the effects of period poverty on school absenteeism.

7. Conclusion

Period poverty is a global problem affecting millions of schoolgirls. Not only is period poverty a barrier to accessing education, but it also has a negative impact on the physical and emotional well-being of schoolgirls. Provision of disposable menstrual products by state and privately funded campaigns is often sporadic and unreliable. Additionally, disposable menstrual products produce large amounts of waste, which is environmentally unsustainable. Reusable sanitary pads made from clothing waste are a potential long-term solution that overcomes the challenges of period poverty faced by schoolgirls and simultaneously prevents clothing waste from being discarded. As such, reusable sanitary pads made from clothing waste are a sustainable alternative to disposable menstrual products.

This paper set out to answer the research question: How can clothing waste be utilised to create reusable sanitary pads and empower communities? This was pursued by contextualising the ‘Sustain Her’ voluntary community-based project, as well as contextualising the opportunities and challenges encountered during the ‘Sustain Her’ project. The ‘Sustain Her’ project showed that it is possible that the design and making of sustainable solutions can be used as a strategy to recycle clothing that would otherwise be discarded into landfills, whilst at the same time empowering communities to develop new skills and potentially support the wellbeing of schoolgirls affected by period poverty.



Figure 1. Reusable menstrual kit including a bucket, instruction pamphlet, bottle of vinegar, soap and soap dish, waterproof purse, six reusable sanitary pads and a fabric carrier bag (underneath the reusable sanitary pads).

References

Babbie, E. (2021). *The practice of social research* (15th ed.). Cengage Learning.

Bailey, K., Basu, A., & Sharma, S. (2022). The environmental impacts of fast fashion on water quality: A systematic review. *Water*, 14(1073). <https://doi.org/10.3390/w14071073>

Baker, K. K., Padhi, B., Torondel, B., Das, P., Dutta, A., Sahoo, K. C., Das, B., Dreibelbis, R., Caruso, B., Freeman, M. C., Sager, L., & Panigrahi, P. (2017). From menarche to menopause: A population-based assessment of water, sanitation, and hygiene risk factors for reproductive tract infection symptoms over life stages in rural girls and women in India. *PLoS ONE*, 12, Article e0188234. <https://doi.org/10.1371/journal.pone.0188234>

- Barrington, D. J., Robinson, H. J., Wilson, E., & Hennegan, J. (2021). Experiences of menstruation in high income countries: A systematic review, qualitative evidence synthesis and comparison to low- and middle-income countries. *PLoS ONE*, 16(7), Article e0255001. <https://doi.org/10.1371/journal.pone.0255001>
- Boosey, R., Prestwich, G., & Deave, T. (2014). Menstrual hygiene management amongst schoolgirls in the Rukungiri district of Uganda and the impact on their education: A cross-sectional study. *Pan African Medical Journal*, 19(253). <https://doi.org/10.11604/pamj.2014.19.253.5313>
- Burns, L. D. (2019). *Sustainability and social change in fashion*. Fairchild Books. <https://doi.org/10.5040/9781501334092>
- Çayır, H. (2020). *Documentary as autoethnography: A case study based on the changing surnames of women*. Vernon Art and Science Inc. <http://ebookcentral.proquest.com/lib/ujlink-ebooks/detail.action?docID=6157952>
- Chinyama, J., Chipungu, J., Rudd, C., Mwale, M., Verstraete, L., Sikamo, C., Mutale, W., Chilengi, R., & Sharma, A. (2019). Menstrual hygiene management in rural schools of Zambia: A descriptive study of knowledge, experiences and challenges faced by schoolgirls. *BMC Public Health*, 19(16), 1-10. <https://doi.org/10.1186/s12889-018-6360-2>
- Costa, M. F., Ivar do Sul, J. A., Silva-Cavalcanti, J. S., Araújo, M. C. B., Spengler, A., & Tourinho, P. S. (2010). On the importance of size of plastic fragments and pellets on the strandline: A snapshot of a Brazilian beach. *Environmental Monitoring and Assessment*, 168(1-4), 299-304. <https://doi.org/10.1007/s10661-009-1113-4>
- Danopoulos, E., Twiddy, M., West, R., & Rotchell, J. M. (2022). A rapid review and meta-regression analyses of the toxicological impacts of microplastic exposure in human cells. *Journal of Hazardous Materials*, 427, Article 127861. <https://doi.org/10.1016/j.jhazmat.2021.127861>
- Davis, J., Macintyre, A., Odagiri, M., Suriastini, W., Cordova, A., Huggett, C., Agius, P. A., Faiqoh, Budiyan, A. E., Quillet, C., Cronin, A. A., Diah, N. M., Triwahyunto, A., Luchters, S., & Kennedy, E. (2018). Menstrual hygiene management and school absenteeism among adolescent students in Indonesia: Evidence from a cross-sectional school-based survey. *Tropical Medicine and International Health*, 23(12), 1350-1363. <https://doi.org/10.1111/tmi.13159>
- Dean, C. (2020). Waste – is it ‘really’ in fashion? *Fashion Revolution*. <https://www.fashionrevolution.org/waste-is-it-really-in-fashion>
- De Falco, F., Gullo, M. P., Gentile, G., Di Pace, E., Cocca, M., Gelabert, L., Brouta-Agnés, M., Rovira, A., Escudero, R., Villalba, R., Mossotti, R., Montarsolo, A., Gavignano, S., Tonin, C., & Avella, M. (2018). Evaluation of microplastic release caused by textile washing processes of synthetic fabrics. *Environmental Pollution*, 236, 916-925. <https://doi.org/10.1016/j.envpol.2017.10.057>
- Department of Women. (2017). *Sanitary dignity policy framework*. <http://pmg-assets.s3-website-eu-west-1.amazonaws.com/RNW3693sanitary.pdf>
- Department of Women, Youth and Persons with Disabilities. (2019, May 28). Menstrual hygiene day seeks to end more than just period poverty. *Government of South Africa*. <https://www.gov.za/news/media-statements/department-women-menstrual-hygiene-day-28-may-2019>
- DeVoy, J. E., Congiusta, E., Lundberg, D. J., Findeisen, S., & Bhattacharya, S. (2021). Post-consumer textile waste and disposal: Differences by socioeconomic, demographic, and retail factors. *Waste Management*, 136, 303-309. <https://doi.org/10.1016/j.wasman.2021.10.009>

Dolan, C. S., Ryus, C. R., Dopson, S., Montgomery, P., & Scott, L. (2013). A blind spot in girls' education: Menarche and its webs of exclusion in Ghana. *Journal of International Development*, 26(5), 643–657. <https://doi.org/10.1002/jid.2917>

Ekane, N., Nykvist, B., Kjellén, M., Noel, S., & Weitz, N. (2014). Multi-level sanitation governance: Understanding and overcoming challenges in the sanitation sector in sub-Saharan Africa. *Waterlines*, 33(3), 242–256. <https://doi.org/10.3362/1756-3488.2014.024>

El-Gilany, A. H., Badawi, K., & El-Fedawy, S. (2005). Menstrual hygiene among adolescent schoolgirls in Mansoura, Egypt. *Reproductive Health Matters*, 13(26), 147–152. [https://doi.org/10.1016/S0968-8080\(05\)26191-8](https://doi.org/10.1016/S0968-8080(05)26191-8)

Ellen MacArthur Foundation. (2017). *A new textiles economy: Redesigning fashion's future*. <https://www.ellenmacarthurfoundation.org/a-new-textiles-economy>

Fletcher, K. (1997). To dye or not to dye. *EcoDesign*, 5(3), 36. <https://katefletcher.com/wp-content/uploads/2012/03/EcoDesign-Vol-V-No-3-pp36.pdf>

Fletcher, K. (2000). The beginning of the end of life. *EcoDesign*, 8(2), 30–31. <https://katefletcher.com/wp-content/uploads/2012/03/EcoDesign-Vol-VIII-No-2-pp30-31.pdf>

Fletcher, K., & Grose, L. (2012). *Fashion & sustainability: Design for change*. Laurence King Publishing.
Gerretsen, I. (2023, January 4). Plastic pollution is one of the defining legacies of our modern way of life, but it is now so widespread it is even finding its way into fruit and vegetables as they grow. *BBC Future*. <https://www.bbc.com/future/article/20230103-how-plastic-is-getting-into-our-food>

Hennegan, J., & Montgomery, P. (2016). Do menstrual hygiene management interventions improve education and psychosocial outcomes for women and girls in low and middle income countries? A systematic review. *PLoS ONE*, 11, Article e0146985. <https://doi.org/10.1371/journal.pone.0146985>

Hennegan, J., Winkler, I. T., Bobel, C., Keiser, D., Hampton, J., Larsson, G., Chandra-Mouli, V., Plesons, M., & Mahon, T. (2021). Menstrual health: A definition for policy, practice, and research. *Sexual and Reproductive Health Matters*, 29(1), 1911618. <https://doi.org/10.1080/26410397.2021.1911618>

Huang, Z., Weng, Y., Shen, Q., Zhao, Y., & Jin, Y. (2021). Microplastic: A potential threat to human and animal health by interfering with the intestinal barrier function and changing the intestinal microenvironment. *Science of the Total Environment*, 785, 14736. <https://doi.org/10.1016/j.scitotenv.2021.147365>

I_Menstruate. (2023). *Bleeding in silence: Barriers to menstrual hygiene among school girls in South Africa*. Retrieved July 23, 2024, from <https://drive.google.com/file/d/1ZmXGDawKSa2M4YKzl8kvrsA8ezPW1F9H/view>

International Federation of Red Cross and Red Crescent Societies. (2013). *Menstrual hygiene: What's the fuss? Piloting menstrual hygiene management (MHM) kits for emergencies in Bwagiriza refugee camp, Burundi*. Retrieved July 23, 2024, from https://watsanmissionassistant.org/wp-content/uploads/2018/10/ifrc_mhm-kits-for-emergencies_case-study_final.pdf

Jenkin, N., & Hattingh, E. (2022). *Designing climate-compatible industrial strategies for South Africa: The textiles value chain*. Trade and Industry Policy Strategy. Retrieved July 23, 2024, from https://www.tips.org.za/images/TIPS_Designing_climate-compatible_industrial_strategies_for_South_Africa_-_The_textiles_value_chain_October_2022.pdf

Jewitt, S., & Ryley, H. (2014). It's a girl thing: Menstruation, school attendance, spatial mobility and wider gender inequalities in Kenya. *Geoforum*, 56, 137–147. <https://doi.org/10.1016/j.geoforum.2014.07.006>

Kadolph, S. J. (2011). *Textiles* (11th ed.). Upper Saddle River: Pearson Education.

Kgware, M. (2016). *Menstruation and menstrual hygiene management in selected KwaZulu-Natal schools*. Oxfam Australia. Retrieved July 23, 2024, from <https://oxfamlibrary.openrepository.com/bitstream/handle/10546/611723/rr-menstrual-hygiene-south-africa-010516-en.pdf>

Khamisa, N., Nanji, N., Tshuma, N., & Kagura, J. (2022). The relationship between menstrual hygiene management, practices, and school absenteeism among adolescent girls in Johannesburg, South Africa. *South African Journal of Child Health*, 16(1), 1-6. <https://dx.doi.org/10.7196/SAJCH.2022.v16i1.1803>

Lichtman, M. (2023). *Qualitative research in education: A user's guide*. Taylor & Francis Group. <https://doi.org/10.4324/9781003281917>

Malusu, L. N., & Zani, A. P. (2014). An evaluation of the perception of secondary school students towards menstruation in Kenya. *African Journal of Educational Technology*, 4(1), 83-96.

Mansoori, N., Tanweer, H., Ahmed, I., Noor, I. N., & Mubeen, S. (2020). Assessment of menstrual hygiene practices among adolescent schoolgirls in Pakistan. *Annals of Jinnah Sindh Medical University*, 6(2), 44-49. <https://doi.org/10.46663/ajsmu.v6i2.44-49>

Manteco. (2023). *Biodegradability in fashion: All you need to know*. Retrieved July 23, 2024, from <https://manteco.com/biodegradability-in-fashion-all-you-need-to-know/>

Mason, L., Nyothach, E., Alexander, K., Odhiambo, F. O., Eleveld, A., Vulule, J., Rheingans, R., Laserson, K. F., Mohammed, A., & Phillips-Howard, P. A. (2013). 'We keep it secret so no one should know'--A qualitative study to explore young schoolgirls' attitudes and experiences with menstruation in rural western Kenya. *PLoS One*, 8(11), Article e79132. <https://doi.org/10.1371/journal.pone.0079132>

Mason, L., Laserson, K. F., Oruko, K., Nyothach, E., Alexander, K. T., Odhiambo, F. O., Eleveld, A., Isiye, E., Ngere, I., Omoto, J., Mohammed, A., Vulule, J., & Phillips-Howard, P. A. (2015). Adolescent schoolgirls' experiences of menstrual cups and pads in rural western Kenya: A qualitative study. *Waterlines*, 34(1), 15-30. <https://doi.org/10.3362/1756-3488.2015.003>

McMahon, S. A., Winch, P. J., Caruso, B. A., Obure, A. F., Ogutu, E. A., Ochari, I. A., & Rheingans, R. D. (2011). 'The girl with her period is the one to hang her head': Reflections on menstrual management among schoolgirls in rural Kenya. *BMC International Health and Human Rights*, 11, 7. <https://doi.org/10.1186/1472-698X-11-7>

Michel, J., Mettler, A., Schönenberger, S., & Gunz, D. (2022). Period poverty: Why it should be everybody's business. *Journal of Global Health Reports*, 6, Article e2022009. <https://doi.org/10.29392/001c.32436>

Miir, G., Rutakumwa, R., Nakiyingi-Miir, J., Nakuya, K., Musoke, S., Namakula, J., Francis, S., Torondel, B., Gibson, L. J., Ross, D. A., & Weiss, H. A. (2018). Menstrual health and school absenteeism among adolescent girls in Uganda (MENISCUS): A feasibility study. *BMC Women's Health*, 18(4), 1-11. <https://doi.org/10.1186/s12905-017-0502-z>

Mishra, V. K. (2015). *Social and psychological impact of limited access to sanitation: MHM and reproductive tract infections* [Conference Contribution]. 38th WEDC International Conference, Loughborough University, United Kingdom. Retrieved July 23, 2024, from <https://hdl.handle.net/2134/31220>

Modise, T. (2013, August 15). *Sanitary towels still a luxury to millions of women and girl - North West Premier Thandi Modise* [Press release]. Retrieved July 23, 2024, from <https://www.gov.za/news/media-statements/sanitary-towels-still-luxury-millions-women-and-girl-north-west-premier>

Montgomery, P., Hennegan, J., Dolan, C., Wu, M., Steinfield, L., & Scott, L. (2016). Menstruation and the cycle of poverty: A cluster quasi-randomised control trial of sanitary pad and puberty education provision in Uganda. *PLoS One*, 11(12), Article e0166122. <https://doi.org/10.1371/journal.pone.0166122>

Montgomery, P., Ryus, C. R., Dolan, C. S., Dopson, S., & Scott, L. M. (2012). Sanitary pad interventions for girls' education in Ghana: A pilot study. *PLoS ONE*, 7, Article e48274. <https://doi.org/10.1371/journal.pone.0048274>

National Health Service. (2023). *Periods and fertility in the menstrual cycle*. Retrieved July 23, 2024, from <https://www.nhs.uk/conditions/periods/fertility-in-the-menstrual-cycle>

Nkosi, N. (2022, April 29). *City of Joburg running out of landfill space — report*. Retrieved July 23, 2024, from <https://www.sowetanlive.co.za/news/south-africa/2022-04-29-city-of-joburg-running-out-of-landfill-space-report/>

Nobelius, A. M., Kalina, B., Pool, R., Whitworth, J., Chesters, J., & Power, R. (2010). “You still need to give her a token of appreciation”: The meaning of the exchange of money in the sexual relationships of out-of-school adolescents in rural southwest Uganda. *The Journal of Sex Research*, 47, 490–503. <https://doi.org/10.1080/00224499.2010.494776>

Parliamentary Monitoring Group. (2018a, May 8). *Department of Women & Commission for Gender Equality Budget: Committee Report*. Retrieved July 23, 2024, from <https://pmg.org.za/committee-meeting/26223/>
Parliamentary Monitoring Group. (2018b, June 26). *Menstrual hygiene & sanitation for indigent women & schoolgirls: Department of Women briefings*. Retrieved July 23, 2024, from <https://pmg.org.za/committee-meeting/26504/>

Parliament of the Republic of South Africa. (2018). *A report of the National Treasury*. Retrieved July 23, 2024, from https://www.parliament.gov.za/storage/app/media/Pages/2020/september/23-09-2020_NT_Presentation_Financial_Management/APPROPRIATIONBILL.pdf

Plan International. (2022). *A bleeding shame: Menstrual hygiene management in South Africa*. Retrieved July 23, 2024, from <https://plan-international.org/publications/bleeding-shame/>

Reddy, S. (2023). *The Miir family's economic legacy*. Retrieved July 23, 2024, from https://www.writing.com/main/view_item/item_id/2293922-The-Miir-Familys-Economic-Legacy
Republic of South Africa Department of Environmental Affairs. (2018). *Waste Management in South Africa: Challenges and Opportunities*. Retrieved July 23, 2024, from https://www.environment.gov.za/sites/default/files/reports/wastemanagementreview_2018.pdf

Republic of South Africa National Department of Health. (2016). *National Adolescent and Youth Health Policy*. Retrieved July 23, 2024, from <https://www.health.gov.za/index.php/2014-03-17-09-09-38/strategic-documents/category/342-2016-04-29>

Sahoo, K. C., Hulland, K. R., Caruso, B. A., Swain, R., Freeman, M. C., Panigrahi, P., & Dreibelbis, R. (2015). Sanitation-related psychosocial stress: A grounded theory study of women across the life-course in Odisha, India. *Social Science & Medicine*, 139, 80–89. <https://doi.org/10.1016/j.socscimed.2015.06.031>

Saleem, A., Adnan, M., & Rafi, M. (2020). A study of social issues during menstruation among female students. *Journal of Education and Educational Development*, 7(2), 225–240. <https://doi.org/10.22555/joeed.v7i2.3127>

Save the Children. (2022). *Gender equality and menstrual health management: A critical analysis*. Retrieved July 23, 2024, from <https://savethechildren.org.za/content/dam/global-reports/menstrual-health-management.pdf>

Smith, S., & Mbatha, L. (2010). *The role of menstrual hygiene management in reproductive health*. University of KwaZulu-Natal. Retrieved July 23, 2024, from https://researchspace.ukzn.ac.za/xmlui/bitstream/handle/10413/10487/Smith_Steve_2010.pdf

Somerset, J. (2019). *Changing attitudes: Gender, menstruation, and the fight for girls' education*. University of Sussex. Retrieved July 23, 2024, from <https://sussex.ac.uk/research/centres/multisensory-research/menstruation>

Tjon A. Ten, V. (2007). *Menstrual hygiene: A neglected condition for the achievement of several millennium development goals*. European Commission. Retrieved July 23, 2024, from <https://eprints.worc.ac.uk/2633/1/Menstrual-Hygiene-Impact-on-MDGs.pdf>

Thapa, D. K., & Choulagai, B. (2018). Knowledge and practices on menstrual hygiene management among school girls of selected schools in Kathmandu Valley. *Journal of Chitwan Medical College*, 8(3), 61-65. <https://doi.org/10.3126/jcmc.v8i3.22649>

Tsakos, D. (2023). *The hidden face of menstrual poverty in South Africa*. Retrieved July 23, 2024, from <https://drive.google.com/file/d/1yGwZrZbtZ4l3fP3JxDWbzHaG/view>

UNICEF. (2014). *Menstrual hygiene management in emergencies: Good practice note*. Retrieved July 23, 2024, from <https://www.unicef.org/reports/menstrual-hygiene-management-emergencies>

World Health Organization. (2020). *Menstrual health and hygiene*. Retrieved July 23, 2024, from <https://www.who.int/news-room/fact-sheets/detail/menstrual-health-hygiene>

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