

A STUDY ON CONSUMPTION PATTERN OF SANITARY NAPKIN AND ENVIRONMENT DEGRADATION

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Abstract— The research paper high spots the issue of women hygiene products that are becoming a serious environmental issue due to the non-biodegradable raw materials. In the manufacturing of most sanitary pads raw materials like wood pulp, polyethylene etc are used consisting high carbon footprints poisoning habitat. Some firms use alternative absorbent fibres like bamboo, jute, banana fibre having lower level of carbon footprints. The findings of the paper have been based on a secondary comparative study of firms which produce eco-friendly sanitary napkins with those that use non-biodegradable raw materials. It has been found that the firms using eco-friendly raw materials cause a positive externality, whereas the latter cause a negative external effect.

The paper uses primary data to analyse the women preference among synthetic and organic sanitary napkin and it has been found that only 1/4 of women population uses organic sanitary napkins and women prefer synthetic napkins more than organic sanitary napkins. The factors have been listed for detailed understanding. Further it uses municipal solid waste act to highlight the insufficiency of government in this context. The external effects of non-biodegradable sanitary napkins cause those to be considered as bad good.

1. Introduction

1.1 Brief

Environment degradation is any change or interference to the environment which comprehends to be unpleasant. Environment degrades due to water degradation, lower air quality, extensive exploitation of resources, disappearance of wildlife and pollution. Population, per capita affluence and technologies increasing pollution have direct impact on environment. In an economy with the expansion of population, demand for commodities increases prompting industrialization and use of technologies dependent upon resources leading to exploitation of resources. Industries in the process of manufacturing emerges harmful toxic gasses like carbon monoxide, hydrogen sulphide, solvents and other wastes as by-product passed to the sink capacity of the environment. Today's era is the "Age of plastic" which is a ubiquitous component in industrial sector. Unfortunately, plastic contributes to the degradation of environment as during manufacturing of plastic various toxic chemicals are released like carcinogenic, neurotoxic, and hormone-disruptive chemicals which find their way in ecology through land, water and air pollution. Many industries use plastic as a raw material in manufacturing of goods, women hygiene products industry is one among them. Sanitary napkins comprise of multi-layered structure made up of non-biodegradable materials like polyethylene, polymeric films, wood pulps degrading environment each day, which is the leading concern of the economy. The top sheet of sanitary napkin consists of thermoplastic fibre and hydrophilic absorbent fibre, the absorbent core is made up of wood pulp and polyethylene and polymeric film used as barrier sheet are non-breakable by bacteria and poisons environment. India being a developing country has population of 1343.27 million out of which 429 million women are classified in the age group of 15-59. According to National Family Health Survey, 77.5% of urban and 48.2% of rural Indian female population use disposable sanitary pads. This much consumption of sanitary napkins will generate around 16180 tons of waste per month which are non-decomposable and emerges harmful gases in the atmosphere. Women hygiene products are the necessary commodities but from the point of view of environment they are the bad commodities but feminine population dependency on sanitary napkin has increased notwithstanding of its negative effect on environment.

1.2 Objectives

1. Sale analysis of eco-friendly and non-eco-friendly industries of sanitary napkins.
2. Analysis of the Acts given by the Indian government.

1.3 Methodology

In this research paper qualitative methodology is used. With the help of secondary data consumption pattern

of sanitary napkin is examined and linked with the sale of two firms: whisper- producing synthetic sanitary pads and Saathi- producing organic sanitary pads to show the market failure due to the negative externality produced by the synthetic sanitary napkins. Moreover, in this research paper Acts given by Indian Government in order to decompose menstrual waste are analysed.

LIMITATIONS: Due to the lack of attention paid in the context of decomposing menstrual waste by Government, limited data is available.

2. Literature Review

2.1 Review

In the project, The Shakti by Miss World Manushi Chhillar in order to spread awareness on menstrual hygiene with Chief Minister Manohar Lal Khattar announced free supply of sanitary napkin in schools of Haryana for the social welfare. In fact, according to Hindu article Akshay Kumar stated that “sanitary napkins must be distributed to the society free of cost”. Other activists like Hari Mohan started campaign against the implementation of 12% GST on sanitary napkins and in his support said, “This campaign was necessary as these products are used during the days of mensuration which is a necessity and instead of giving subsidies, sanitary napkins are placed under the luxury goods slab”. All the protests and projects are initiated for social welfare by spreading the menstrual hygiene awareness in the society and for the betterment of women which were using soil and ashes instead of napkins as menstrual absorbent. But sanitation issues create environmental problems. According to a campaign under Karcha Project “on an average woman throws around 150 kg of non-biodegradable absorbent on land or other water bodies per year” which are not decomposable. Swati Singh Sambyal (senior research associate at centre for science and environment) stated “on the major issue with sanitary napkin is its classification between weather it is bio-medical or plastic waste. Katkar PM and Asagekar SD in their research paper “Natural and Sustainable Raw Materials for Sanitary Napkin” elaborated the manufacturing of sanitary napkin and the raw material used in napkin which are harmful for the habitat. Moreover, suggesting the eco-friendly raw material as substitutes of chemicals and polyethylene. This research paper emphasis on the externalities generated by the sanitary napkin industries with respect to environment.

3. SECONDARY ANALYSIS: CASE STUDY ON P&G

P&G Hygiene and Health is the leading industry in the women hygiene products. All the feminine hygiene products are manufactured under the brand name of “whisper”. The market share of P&G hygiene products has grown from 50% in 2009 to 56% in 2015 as a result of the PGHH’s price cut in 2011 preceding its competitors. Johnsons and Johnsons being the second largest-player in the market of sanitary napkin with the market share of 28% through its brands stayfree and sofy failed to compete with PGHH. According to MOSL, the net sale of the P&G hygiene products was

Table 1 Gross Sale Of P&G Hygiene Products

INR M	FY11	FY12	FY13	FY14	FY15	FY16
GROSS SALE						
FEMININE HYGIENE	6,235	8,122	10,883	13,462	15,327	17,486
GROWTH(%)	3.2	18.1	17.3	10.9	16.8	0.5

Source: Company, MOSL

With the price 4.125 rupees per pad in 2011 pre-price cut and 3.75 rupees per pad in 2014 post price cut the gross sale increased from 6,235M to 17,486M. But whisper is a synthetic sanitary napkin which consists of polyethylene and polymeric fibre for barrier sheets, cotton and wood pulp for absorbent core which are thrown in fields or water bodies and are non-biodegradable polluting environment.

Alternatively, the cofounder of Saathi brand: Amrita Saigal, Tarun Bothra came up the new idea of using eco-friendly raw material in the making of sanitary pads. With the innovation, Saathi is the leading manufacturer of 100% biodegradable sanitary napkins in India. The major constituent used in manufacturing of Saathi sanitary pad is the banana fibre as an absorbent core which can be decomposed and available natural resource in the economy. These feminine products are pleasing for skin, environment and community. The target market is the higher and middle-income groups who are concerned for the

environment or deals with skin sensitivity. The expected annual sale is 344,000 with the price 22.25 rupees per pad.

Table 2 Raw Materials used in Sanitary Napkins and Their Impact on Environment.

SHEETS	NON-BIODEGRADABLE RAW MATERIALS USED (WHISPER)	IMPACT ON ENVIRONMENT	BIODEGRADABLE ALTERNATIVE RAW MATERIALS USED (SAATHI)	IMPACT ON ENVIRONMENT
TOP SHEET	Thermoplastic fibre, Hydrophilic absorbent fibre. Top sheet is made up of Polypropylene fibre.	UV lights, heat and pollutants interact with polypropylene molecules. A lot of waste is generated with the use of Polypropylene.	Organic cotton or TENCEL Bio-soft fibre.	Organic cotton is grown using methods and material having low impact on environment by avoiding the use of pesticides and fertilisers. TENCEL Bio-soft fully biodegradable and hydrophobic in nature and extra softness.
ABSORBENT CORE	Wood pulp (bleached)	Use of bleached wood pulp leads to deforestation. It emerges greenhouse gases NO ₂ , CO ₂ and SO ₂ leading to air pollution. It produces significant quantity of dioxins.	Bamboo fibre, Jute fibre and Banana fibre.	They are naturally soft and does not require any chemical to soften it. They are cheap and extracted from natural resources. They are bio-degradable and have no negative effect on environment and categorized as eco-friendly fibres.
BARRIER SHEET	Made up of Polyethylene, Polymeric fibre.	Polyethylene and Polymeric fibres are inert and unbreakable by bacteria and thus causes water pollution, soil degradation.	Bio-based plastic prepared from starch. Petroleum based fibre is replaced by Poly Lactic Acid.	PLA is an alternative sustainable replacement derived from corn-starch. It is thermoplastic biodegradable polymer material. It's get decomposed and do not pollute environment.

3.1 Demand Analysis

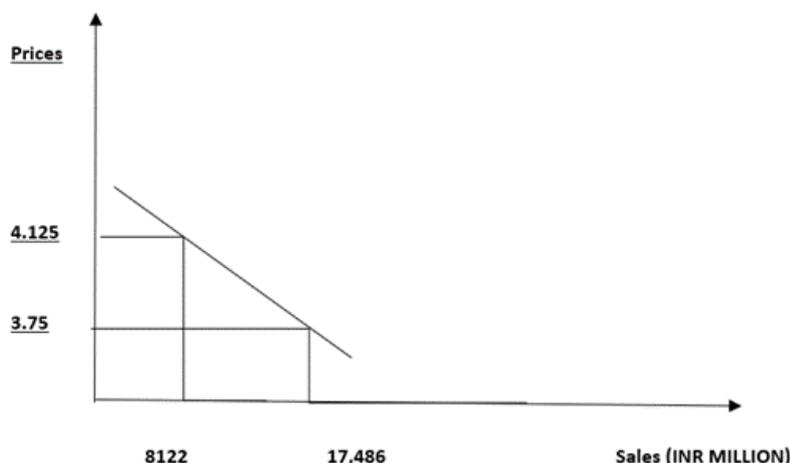


Figure 1 Sale of P&G Hygiene Products

a) Demand curve of P&G Hygiene and Health feminine products

The downwards sloping straight line is the demand curve of the PGHH implying with the price reduction the sale has increased.

$$\text{SOCIAL COST} = \text{PRIVATE COST} + \text{EXTERNAL COST}$$

The low price of synthetic sanitary pads implies that firms producing synthetic sanitary pads do not take external cost into consideration as the raw material used in the production of such pads produces negative externalities by degrading environment. Hence, firms consider only private cost not social cost and ignores external cost.

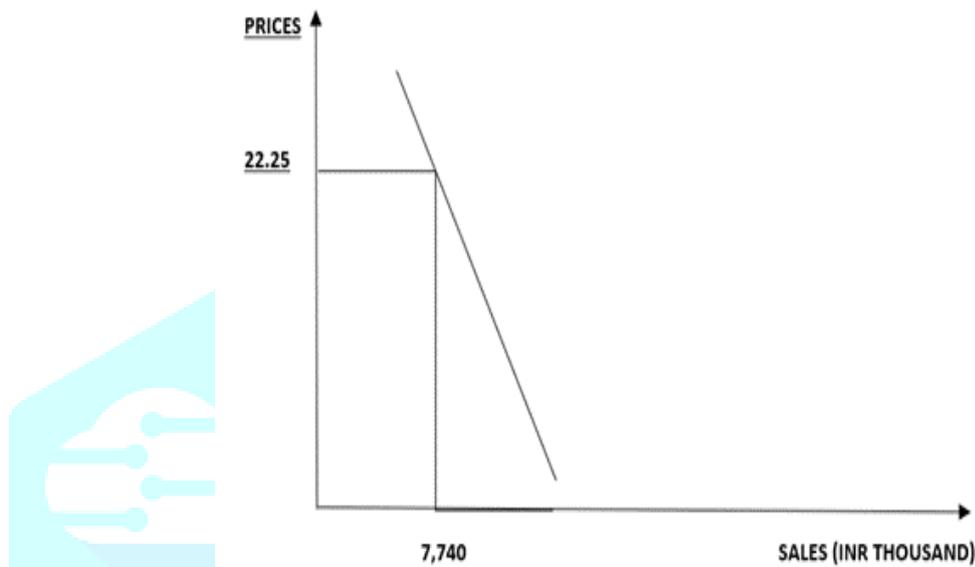


Figure 2 Sale of Saathi Sanitary Napkin

b. Demand curve of Saathi pads: biodegradable and eco-friendly

$$\text{SOCIAL BENEFIT} = \text{PRIVATE BENEFITS} + \text{EXTERNAL BENEFITS}$$

The higher price of organic sanitary napkins implies that firms producing organic sanitary napkins produces positive externalities by using eco-friendly raw materials in production of such pads. Hence, such firms take external benefits into consideration.

By comparing the figures, a and b we can analyse that P&G acquires large segment of women hygiene goods market with lower price and creates negative externality to the society by using non-decomposable materials like polyethylene and polymeric fibre as raw materials which are harmful for women health as well as it degrades soil fertility and pollutes water bodies. The lower price of whisper implies that it has ignored the external cost in the form of degradation of environment which is beard by the society.

Firms manufacturing synthetic sanitary pads spawn negative externality as their target is profit maximisation and considers only private cost and benefit instead of social cost and benefits.

Whereas Saathi pads share small market share of market due to higher prices, as it creates positive externality to society by offering organic and biodegradable sanitary napkin which are 100% safe for the skin as well as for the environment. By using natural resource, banana fibre Saathi protects both home as well as environment. The raw materials used in manufacturing of sanitary napkins doesn't pollutes environment unlike synthetic one. The higher price implies that it creates social benefit to the society and the aim of the firm is social welfare instead of profit making.

4. PRIMARY ANALYSIS

The findings in this paper have been supported by a primary survey conducted in Delhi. The method used for sampling is snowball sampling which is a type of non-probability sampling. The women population is chosen under the age group of 15-60 in Delhi. The questionnaire has been attached as Annexure 1. The survey was conducted in order to understand the awareness of women regarding the environmental effects

of sanitary napkins. It further questions their preference and willingness to transit from synthetic sanitary napkins to organic sanitary napkins.

Table 3

QUESTION	RESPONSES		
	Yes	No	Unsure
Use of Sanitary Napkin	96.9%	3.1%	
Use of Synthetic Napkin	63.3%	36.7%	-
Use of Organic Napkin	14.3%	85.7%	-
Aware of Effects of sanitary napkins	69.4%	19.4%	11.2%
Organic Sanitary napkins have positive environmental effect	54.1%	10.2%	35.7%
Synthetic Sanitary napkins have negative environmental effect	62.2%	9.2%	28.6%
Disposal of sanitary Napkin in non-eco-friendly way	99%	1%	-
Easy availability of organic napkin	24.5%	28.6%	46.9%
Purchase organic napkins from market	53.1%	-	39.8%
Purchase organic napkins online	7.1%	-	39.8%
Prefer lower cost synthetic napkin over high cost organic napkins	28.6%	45.9%	25.5%
Choice between organic and synthetic napkins affected by number of sanitary napkins used in one menstrual cycle	40.8%	55.1%	4.1%
Willing to purchase organic sanitary napkin than synthetic napkins	66.3%	4.1%	29.6%

The questions involved knowing whether or not the respondent has knowledge about the environmental effects that sanitary napkins have; synthetic as well as organic. If they know the ill effects, it was further asked if they would rather use organic sanitary napkins in order to promote a positive effect on the environment. For deeper understanding, the respondents were also asked if they were willing to purchase organic sanitary napkins given the higher costs. The respondents were also questioned on the consumption of sanitary napkin and their preference linked with the number of days in their menstrual cycle. This was done to understand if there is a correlation between the number of days in a menstrual cycle and the preference and willingness.

It was found via the survey that 96.9% respondents used sanitary napkins, out of these 96.9% respondents there were 63.3% who used synthetic sanitary napkins and 14.3% used organic sanitary napkins. 69.4% respondents are aware of the impact of sanitary napkin on environment, whereas, 19.4% of respondent are unaware and rest are unsure if sanitary napkin have any impact on environment or not. 54.1% and 62.2% of respondents are aware of positive impact of organic sanitary napkin on environment and negative impact of synthetic sanitary napkin on environment respectively, 10.2% and 9.2% of respondents are unaware of the impact of organic and synthetic sanitary napkin on environment, whereas 35.7% and 28.6% of respondents are unsure. 99% of respondents use unhygienic methods of disposing sanitary napkins, that is, by wrapping them and throwing in household garbage. For the environment betterment only, the use of organic sanitary napkins is inevitable but only 24.5% of respondents find it easier to purchase organic sanitary napkins 46.9% of respondents are unsure and rest find it difficult to purchase organic sanitary napkins. Out of 14.3% of respondents using organic sanitary napkins, 53.1% of respondents purchase it from market and 7.1% of respondents purchase it online. Women preference between organic and synthetic sanitary napkin is influenced by the price of napkins, 28.6% of respondent prefer lower cost synthetic sanitary napkin over higher cost organic sanitary napkin, and 45.5% of respondents prefer organic sanitary napkin and rest are unsure. Furthermore, it was found that, 40.8% of respondents showed positive correlation between choice between the synthetic and organic sanitary napkin and napkins used in one menstrual cycle. It has been found that 66.3% of respondents are willing to use organic sanitary napkins for the betterment of the environment and society whereas, 4.1% of respondents are not willing and 29.6% of respondents are unsure.

Linking the analysis with the women preference of sanitary napkins between synthetic and organic sanitary napkins:



Figure 2

This implies that women prefer synthetic napkins among all the brands available in women hygiene product industry. Moreover, only 32% of respondents are aware of organic sanitary napkins and 14% of respondents uses it. The demand for synthetic pads exceeds the demand for organic ones, because of different market strategies, synthetic sanitary napkins are advertised more as compared to organic ones, that's is why, women are not much aware of organic sanitary napkins. The price of organic pads is higher than the synthetic sanitary napkins which influence the women's choice between them. Moreover, the availability of both the napkins differs, synthetic sanitary napkins are easily available in market and online as compared to organic sanitary napkins. Women prefer synthetic one over organic which creates external cost to the society.

5. POLICY IMPLICATION

The Government of India has made numerous waste management laws however according to 3, 6, 8, and 25 sections of EPA (Environment Protection Act) Government came up with Municipal Solid Waste Rule, 2000 and The Bio-Medical Waste Rule, 1998 when we take menstrual hygiene wastes into consideration.

Municipal Solid Waste 2000

Under municipal solid waste comes the food items, households waste and bio-degradable waste to be managed and decomposed. Such wastes are collected from house to house, restaurants, hotels, slumps, office complexes and commercial areas etc and transferred to the community bin via small vehicles or hand-driven carts. Bio-Medical and industrial waste shall not be combined with municipal solid waste as such wastes are decomposed with different techniques. Municipal solid wastes are segregated among degradable and non-degradable wastes manually before they are decomposed in landfills.

Bio-Medical Waste Rule, 1998

Whereas Bio-Medical wastes are the wastes generated during the treatment of any human kind or animal such as human anatomical waste and animal waste which deals with humans and animals tissues, organs and body parts. It includes chemical waste used in biological research, solid waste like materials contaminated with blood, cotton, dressing, lines, and biddings. Waste sharp (needles, syringes, glass, any material causing cuts), biological and biotechnology waste are a part of bio-medical waste. According to the bio-medical rule all the wastes are first graded among the 1-10 categories designed by the authority and then decomposed using separate techniques and methods assigned to each category. For instance, materials soaked with blood are microwaved to destroy the bacteria causing diseases, some waste are decomposed using chemical reactions and bio-degradable wastes are deeply buried under the landfills.

According to CPCB and the Municipal-Waste Management sanitary napkins, diapers, condoms are categorised under the household's wastes which are decomposed after the segregation. Whereas according to category 6, schedule I Bio-Medical Waste Rule 1998, all the materials contaminated with blood along with other body fluids, biddings are categorised as bio-chemical waste. With the same schedule, category 2 involves organs, body parts, tissues, bleeding parts of animals under the category bio-medical waste.

In the process of mensuration, a part of endometrium is sheds causing menstrual bleeding which is merely lining made up tiny blood vessels. This matter is in hype for debates where the question for what reasons menstrual hygiene products are not categorised as bio-medical wastes. As according to the act such bio-medical wastes are microwaved, autoclaved so that the pathogens can be destroyed instead of burring them in landfills because the strong viruses like Hepatitis B & C can easily endure even in tiny drop of blood or anybody fluid which is harmful for the environment and human kind. Similarly, feminine hygiene products comprise of familiar kind of toxic pathogens which causes diseases to the people handling dumps and poisons environment by degrading lands, soil and water bodies.

DR. Vinod Babu (former head of hazardous waste: CPCB) disagreed to consider sanitary napkins and diapers as bio-chemical waste as he considered menstrual waste as body fluid like spit and urine.

With the current situation of the environment, there is a need for proper decomposition of sanitary napkin with suitable technique so that involved pathogens in it can be destroyed before it touches the environment in order to protect habitat. Either it must be categorised under section 6 or section 2, schedule I, Bio-Medical Waste Rule 1998, or must be included as separate category. The proper decomposition of menstrual waste by developing a separate category of menstrual hygiene waste cannot be ignored with the increase demand of sanitary pads. But it is just a recommendation and no actions has been taken by the government shows lack of attention to this issue yet.

6. CONCLUSIONS

According to primary data, it has been analysed that, 61% of women's population are aware of negative impact of synthetic sanitary napkins on environment. There is lack of awareness and availability of organic sanitary napkins, only 32% of women are aware of organic sanitary napkins and 28% of women find it easy to purchase them. Moreover, sanitary napkins are dumped unhygienically, 99% of women throws sanitary pads in open by wrapping it and dumping in household garbage.

It won't be wrong to say that menstrual hygiene products are necessity for women and they must be aware of such products available in the market for their own health but we can't deny the fact that these products are harmful for the environment. The research paper concludes that according to the women preference in feminine hygiene products the sanitary napkin market fails as women preference is synthetic sanitary pads due to its low cost but such pads degrade environment and are non-decomposable. Even after studying the Act initiated by Indian Government it is concluded that there is lack of attention paid in this matter as menstrual waste is treated as household waste under Municipal Solid Waste according to CPCB.

Due to various awareness programs and steps taken by Government there is widespread use of sanitary napkins in urban area as well as the small set up of firms of sanitary napkin in rural area has increased its demand which has increased the burden of menstrual waste growing every day. It's high time that the awareness programme must be directed in the right path where people gets pure knowledge of merits and demerits of highly preferred synthetic sanitary pads. There should be a balance between home and environment as both health of women and environment are equally important.

Moreover, on the part of government, there must be support given to the new techniques producing organic sanitary pads which are biodegradable like Saathi, heyday etc and some restriction must be out on the use of synthetic sanitary pads. Secondly, Government must segregate menstrual waste from household waste and decompose them with different techniques and method instead of burring them in landfills. Either they must be included under bio-chemical waste or separate category must be formed under CPCB.

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