FACTORS MILITATING IMPACT OF INDISCRIMINATE DISPOSAL OF DIAPERS AND WOMEN SANITARY PADS ON ENVIRONMENTAL HEALTH IN YOBE STATE, NIGERIA

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Abstract

There is an emergence of indiscriminate disposable of diapers and women sanitary pads across cities and communities in Nigeria. This has resulted in the spread of communicable diseases across these cities and communities. To probe this menace in Yobe State, Nigeria, this study investigates Damaturu, Bade, Potiskum Geidam and Nguru Local Government Areas are prone to the indiscriminate disposal of diapers and women sanitary pads. The study adopts the cross-sectional survey research design involving the administration of questionnaires, observations and in-depth interviews. The study utilized analysis of variance (ANOVA) to test the research hypotheses so as to make decision on desired significance level. The study results reveal that the supply of waste containers in Yobe State was statistically insignificant with respect to attitude towards disposed diapers and menstrual waste disposal. The study concludes that disposal of baby diapers and women sanitary products has environmental and health effects in the society. However due to the lack of better disposal methods, diapers and menstrual products end up in land-fills and this aggravates the spread of communicable diseases such as cholera, bacteria and viruses. The study recommends that governments at all levels in Yobe State should create awareness about the incidence of disposing waste diapers and sanitary products.

Keywords: Diapers, women, sanitary, environmental health, land-fills

Introduction

The disposal of used diapers is a critical eco-technological problem aggravated by the exponential increase of global consumption rate each year. The resource-consuming production and disposal of used diaper waste have led to many environmental issues and poses a threat to public and environmental health. Multiple versions of diapers have been created and

modified for wider application over the years. Nevertheless, this has also increased the difficulty for disposal and recycling when the diapers have been used and turned into waste (termed generally as "used diapers"). The growth of public awareness on environmental impacts (such as greenhouse effect, air and water pollution) brought by used diapers has led to the use of materials with lower negative effects during production and also the development of environmental friendly treatment and re-cycling methods for used diapers (Khooa, Phang, Min, Lim, Lam and Ma. 2019).

Disposable diapers represent an important product in the parenting journey that offers high convenience, performance, and affordability. In common household practice, disposable diapers are discarded after one-time use, which contrasts with cloth diapers that are reusable but otherwise needs to be soaked, washed, dried and folded, thus making disposal diapers a preferred option and becoming indispensable especially for working parents. Since the introduction of disposable diapers in the early 1960s, it has become an integral part of the economy that gradually expands the baby diaper industry (EDANA, 2008). The phenomenon of menstruation portends great impact on the environment and its calls for concern. Environmental effect of menstrual hygiene and related issues has been downplayed Nigeria. Mensuration is a natural and biological phenomenon among female population of reproductive age, majority of who menstruate between two and seven days each month. This has to do with the monthly periodic bleeding arising out of the menstrual cycle (Adekunle & Elizabeth 2019). The increased use of disposable diapers is associated with a number of environmental health challenges. The soiled diapers have two destinations. They either find their way to the disposal sites and landfills, or they litter public spaces where they are an aesthetic nuisance. This negligent disposal of soiled disposable diapers therefore increases the amount of human excreta in solid waste. It also exposes people who deal with solid waste such as municipal employees and waste pickers to contaminants which could cause serious illnesses as they may handle raw faucal matter in the process of disposing of soiled disposable diapers. Waste pickers use bare hands to salvage materials and food disposed of at the landfills (Ayalon 2009). Disposable baby diapers have almost become indispensable in the list of baby care products as their use has been increasing steadily over the years. Although disposable baby diapers were used traditionally for their convenience especially when travelling, nowadays they are generally used in many parts of the developed and developing world as a replacement for cloth diapers (Kamat and Malkani 2003).

Many local authorities in the developing world lack the adequate means to handle and dispose waste in an environmental friendly manner hence the cities are grappling with the management of used disposable diapers and

menstrual pads, often referred to as absorbent hygienic products (AHPs). Whereas it is common to see these AHPs thrown away at undesignated places, the practice has created unsightly images in towns, especially in the developing world (Wambui, Muchiri and Makindi 2015).

Disposable diapers represent about 4% of solid waste and are third largest single consumer item in landfills which are discarded after a single use. These disposals pose great burden on landfill sites and health related impact on our environs. However, soiled diapers are burnt, buried in the ground or thrown dumped in illegal dumpsites by mothers or caregivers and this could result in the spread of communicable diseases such as cholera. Due to indiscriminate disposal of these disposable diapers, they either find their way to disposal sites and landfills, or litter public spaces, including farmlands, where they constitute an aesthetic nuisance. The refuse disposal systems in developing countries are inadequate and it is common to find refuse containing human waste such as disposable diapers due to their traditional methods of mixing waste and dumping it at the tipping sites or unguardedly along road sides. These negligent disposals of soiled disposable diapers carry bacteria, viruses, and when in the environment can be transmitted directly or indirectly. Some waste pickers use bare hands to salvage materials disposed of at the landfills (Ntekpe,Mbong, Edem & Hussain 2020). Disposal of soiled baby diapers is a major global environmental problem as they constitute a large percentage of the municipal solid waste. The disposable diapers require 500 years to fully decompose because of its durable plastics and superabsorbent polymer. Soiled disposable diapers contain untreated urine and feces which increases the threat of bacteria and viruses leaching into surface and ground water. Landfilled diapers also increase the prevalence of greenhouse gases like methane (Justinah, 2020).

The diapers disposed of at dumpsites and open dumps are taking a lot of time to decompose, as many haven't decomposed yet. This is posing a greater risk as they are potentially contaminating water sources and, in some instances, reported to be blocking sewer systems and storm drains, thereby leading to sewage bursts and flash floods or stagnant water in storm drains. The local board does not reach some areas for waste collection, and where they collect, the board lacks consistency in meeting the stipulated collection schedule. This makes solid waste, including these diapers, a problem in residential areas, as many baby caretakers end up disposing of these diapers in a way that is unfriendly to the environment, as evidenced by visible illegal dumps (Kudakwashe, Karen, Tatenda & Oshneck 2023).

The specific objectives of this study is to analyze the level of awareness people have about the incidence of disposing diapers/women sanitary pads and whether this level of awareness affects their product choice and the

adequacy supply of waste container within the area/site. Research questions explored for this study are; what level of awareness people have about the incidence of disposing diapers/women sanitary pads? and what are the measures taken by government towards supply of adequate waste container within the area/site of the study? Hypotheses of this study is stated as Null as: $H0_1$ the Level of awareness has no significance influence on attitude towards baby diapers and menstrual waste disposal. $H0_2$: Supply of waste container has no significance influence on attitude towards baby diapers and menstrual waste disposal.

Public and Environmental Health in Nigeria

Nafiu, Maryam, Ibrahim, Victoria and Ijanu (2024) examined the effect of the use of baby diapers on public and environmental health of Dutse Jigawa State. A structured questionnaire was used in three purposely selected areas of Godiya Miyyetti, Takur Adua and Gida Dubu where 120 questionnaires were distributed to households purposively. It was found that over 85% of the respondents use baby diapers on their children. While the used diapers are indiscriminately disposed of in an open dump space. The average household spending on diapers ranges between ₦1000 and above more than ₦2000 per month. The most common diaper health problems are rashes, red skin, swelling, irritation, fungal infection of the genital areas and vaginitis as a result of prolonged use. Disposable baby diapers are popular among mothers as they find comfort in using them and the number is likely to increase with the increasing number of working class mothers in these areas. The study recommends that manufacturers should find ways to produce more environmentally and health-friendly diapers, while mothers should be using these diapers with precaution on their children.

Adekunle and Elizabeth (2019) assessed the Menstrual Waste Disposal and the Environment: The Role of Adult Education in Nigeria. A self-constructed questionnaire was used to elicit information for the survey design research. While multistage sampling technique was used to select 194 participants of females within the age range of 20 and 59 in Akungba-Akoko, Ondo State. The four research questions raised for the study were answered descriptively while the two hypotheses were tested using inferential statistics at 0.05 level of significance. Finding revealed among others that though the female adults were aware of the environmental implication of indiscriminate menstrual waste disposal, they practices does not correlate with their awareness because menstrual waste disposal knowledge is not in public domain, while the knowledge gained is informal from older women who themselves lack adequate knowledge. It was therefore recommended among others, that adults deserves to be empowerment by Adult Education through Menstrual Waste Education (MWE) to improve hygiene as well as the

environment during menstrual cycle due to the precarious situation it places on women.

Justinah (2020) Investigated on the Disposal of Disposable Child Diapers by Caregivers and Their Environmental Health Implications in Kenya: A Review Reviews were conducted using search terms to identify available articles and journals via the PubMed, Google Scholar and Science Direct search engines. The review managed to gather information on the practices of diaper disposal and their effects to the environment. This research therefore looked at the environmental health effects caused by used baby diapers in solid waste. It also evaluated the worldwide options of its disposal such as composting, landfilling, incinerating and recycling with energy generation and then selecting the most practical, sustainable, effective and efficient method of disposing soiled diapers. In conclusion, there are improper practices of disposing diapers among the caregivers. Improper disposal also leads to adverse environmental implications. The study recommends the awareness of mothers and caregivers be raised on proper practices of diaper disposal and their environmental implications.

Elizabeth, Aled and Dannielle (2019) examined a public awareness of the environmental impact of menstrual products and product choice. A mixed method approach was taken, using online surveys and focus groups. The results of the study show that most participants were not aware at the amount of plastic in disposable menstrual products, and that there are other issues linked to their environmental impact that people are generally not aware of. Some participants were more aware of the issues than others and the research suggests that those with a higher awareness are more likely to choose products that are less harmful to the environment. Based on these findings, future actions and areas of further research are suggested.

Kudakwashe Karen Tatenda, Oshneck (2023) assessed the environmental challenges of disposable baby diapers in Hwange, Zimbabwe. Questionnaires, interviews, and field observations were used for data collection in this study. Data collected from the field was analyzed using Statistical Package for Social Sciences (SPSS) version 25.0 and Microsoft Excel. The study findings show that pollution, diseases, and odours are the major challenges of poor waste management associated with disposable baby diapers in Hwange ZPC residential areas. The study recommends the involvement of responsible authorities in conscientious recycling and education on waste management. The research also recommends the need to conduct longitudinal research to establish the position of local and central government in the bid to promote a safe and healthy environment in mining towns such as Hwange, as they are overlooked.

Theoretical Framework

According to Crofts (2012) schoolgirls from low- middle-income families often struggle to manage their monthly periods. They are constrained by practical, social, economic and cultural factors. The main problems faced are: the expense of commercial sanitary pads, lack of water for bathing and washing of menstrual materials, dirty latrines – the hygiene hazards and unpleasantness, lack of hygienic anal cleansing materials, unsuitable places to dry menstrual materials, lack of access to pain relief (analgesic) drugs, inadequate waste disposal facilities, lack of privacy for changing menstrual materials, leakage from poor-quality protection materials, lack of resources for washing such as soap and basins, limited education about the facts of menstruation, limited access to counselling and guidance, fear caused by cultural myths, embarrassment and low self-esteem, and the unsupportive attitudes of some men. The process and management of menstruation is often shrouded in mystery. In schools, there is usually a lack of physiological education. This is often attributed to predominantly male science teachers feeling uncomfortable about teaching such a subject, especially if they have not received formal training in how to do so. At home, advice (traditionally given by aunts and grandmothers) is often insufficient. The latter can be partly attributed to the dispersion of families from their places of origin, especially with increased urban migration during the last two decades. Older women often considered 'wise' are also often illiterate or uneducated themselves, and may recount and reinforce myths that are biologically incorrect. Cultural restrictions and discriminatory gender roles exacerbate women's difficulties during menstruation.

In developing countries, the use of disposable diapers is steadily increasing posing a big challenge in management of the associated waste since these countries lack the expertise and financial resources that can help in adoption of state of art technologies to deal with solid waste. In African countries, disposable diapers seem to have overtaken the recyclable cloth diapers possibly due to their convenience and attached level of sophistication and affluence. In Kenya like in most African countries, the use of disposable diapers is on the rise. However, managing and handling soiled diapers is an important challenge in the country with most caregivers unaware of the environmental and health risks associated with improper management of this waste and also the safe methods of disposing soiled diapers. It is therefore, against this background that the study sought to assess soiled diaper disposal practices among caregivers in the low income urban settings of Nairobi County and to determine the level of awareness on the environmental and health risks associated with poor disposal of soiled diapers (Virginia 2018).

According to Shin and Jin, (2018), 240, 000 tons of used diapers are generated in Korea every year leading to increased methane production and leaching of organic compound into the soil and ground water. In Europe, 95% of families prefer disposable baby diapers with an estimation of about eight million disposable diapers used every day, accounting for about 3% of total household waste generated on a daily basis (Lauren & Lawrence, 2014 cited in Virginia, 2018).

The continued reliance on disposable diaper use will soon reach a critical environmental point if not checked owing to the fact that they take more than 500 years to degrade and thus there is need for a paradigm shift so that caregivers understand the importance of other options like reusable diapers and also elimination communication where caregivers use infant's natural timing and signals to determine when they need to defecate or urinate (Bender &She, 2017 cited in Virginia, 2018).

Research Methodology

The study covered 5 local government areas of the state. The local government areas includes: Damaturu, Bade, Potiskum, Gaidam and Nguru LGAs. Yobe is a State located in northeastern Nigeria, a mainly agricultural state, it was created on 27 August 1991. The state was curved out of Borno State. The capital of Yobe State is Damaturu. The climate condition of Yobe State is warm with daily temperature of 37^0C (98.6^0F). November being the sunniest month and rainy day is between August and December. The major ethnic groups living in Yobe State are the Fulani and Kanuri, while other ethnic commjunities include Bolewa, Ngizim, Bade, Hausa, Ngamo, Shuwa, Bura, Marghi, Karai Karai and Manga.

This research work employed a cross sectional survey on five (5) selected local government areas of Yobe State, Nigeria. The areas are Damaturu, Bade, Potiskum Geidam and Nguru. Information was collected using a structured questionnaire, distributed to household purposively. The study used 95% confidence interval and 9% margin of error using the population size of less than 600,000. The combined sample population drawn was 131 in the study areas. Responses received were analyzed using frequency count and simple percentage for the research questions. Data analysis was done using descriptive statistics. The hypotheses was tested using one way Analysis of Variance (ANOVA) at 5% significance level.

Results and Discussion

Socio-Demographic Characteristics of Respondents

Table 1 Age Distribution of Respondents

Age (Years)	**Frequency**	**Percentage (%)**
21-25	30	23
26-30	42	32
31-40	51	39
40 and above	8	6
	131	**100**

Source: Field work (2024)

Table. 1 revealed that majority of the participants are Females within the age of 21 to 25 years followed by those within the age of 40 and above.

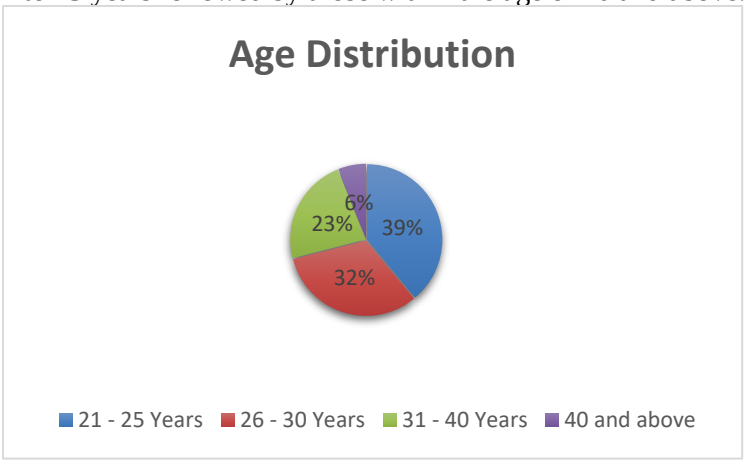

Fig. 1 Chart of participants Age Distribution

Table 2 Years in Marriage Distribution of Respondents

Years in Marriage	**Frequency**	**Percentage (%)**
1-5	41	31
6-10	34	26
11-15	46	35
16 and above	10	8
	131	100

Source: Field work (2024)

Table. 2 revealed that majority of the participants spend about 1 to 5 years in marriage followed by those within the years of 16 and above.

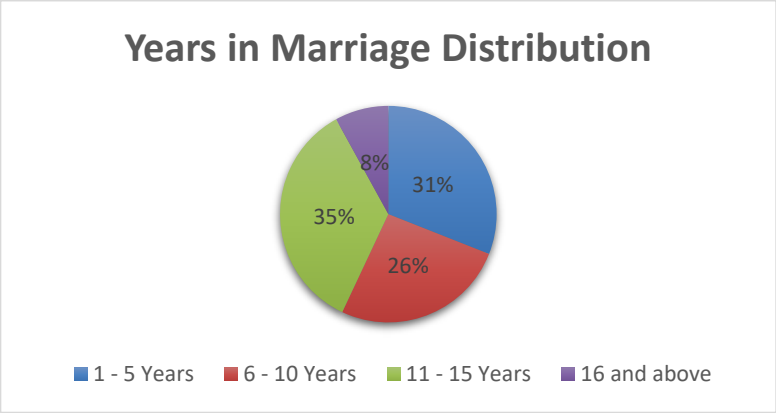

Fig. 2 Chart of participants Years in Marriage Distribution

Table 3 Number of Children Distribution of Respondents

Number of Children	**Frequency**	**Percentage (%)**
1-3	66	50
4-6	42	32
7-9	14	11
10 and above	9	7
	131	100

Source: Field work (2024)

Table. 3 revealed that majority of the participants has about 1 to 3 children within the study period followed by those having 10 children and above.

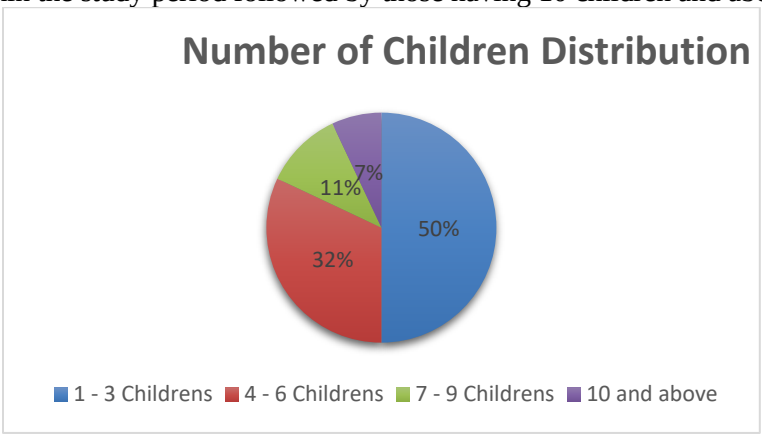

Fig. 3 Chart of participants Number of Children Distribution

The Bio-data of the respondents in Table 1 to 3 indicates that majority of the respondents are between the ages of 26 to 40-years old with about 11

to 15 years of marriage experience. Looking at the number of children's of the respondents, 50% have 1 to 3 children, 32% have 4 to 6 children, 11% have 7 to 9 and 7% have 10 and above children respectively.

Research Question 1: Does the people aware of the incidence of disposing waste diapers/sanitary products?

Item	Responses	Frequency	Percentage
There is a clear awareness provided by government concerning diapers and menstrual waste disposal	Yes	29	22
	No	102	78
		131	**100**
Effective policy measures for managing diapers and menstrual waste disposal has been provide	Yes	27	21
	No	104	79
		131	**100**
Government attitude towards discouraging environmental waste issues is encouraging	Yes	30	23
	No	101	77
		131	**100**
Lack of social amenities contributes to inadequate disposal of baby diapers and menstrual waste	Yes	91	69
	No	40	31
		131	**100**
Government attitude is effective in creating hygienic baby diapers and menstrual waste disposal	Yes	63	48
	No	68	51
		131	**100**

Table 4: Response on Government's level of awareness on the incidence of disposing diapers/sanitary products?

The responses with respect to level of awareness people have about the incidence of disposing diapers/sanitary products indicated that majority of the respondents (78%) opposed the idea while only (22%) are in support. Likewise on the provision of effective policy measures for managing diapers and menstrual waste disposal (21%) agreed while the remaining (79%) not

agreed. Responses on clear awareness provided by government concerning diapers and menstrual waste disposal shows that (77%) are in opposed but only (23%) supported. Finally, on the issue of lack of social amenities contributes to inadequate disposal of baby diapers and menstrual waste (69%) positive the remaining (31%) negative.

Research Question 2: What are the measures taken by government towards supply of adequate waste container within the area/site of the study?

Table 5: Response on measure taken by government towards supply of adequate waste container within the study area

Item	Responses	Frequency	Percentage
Government provide adequate supply of waste containers within the locality	Yes	29	22
	No	102	78
		131	**100**
Baby diapers and Menstrual waste disposal in streams or sea cause destructions to aquatic animal	Yes	121	92
	No	10	8
		131	**100**
Baby diapers and Menstrual waste disposal on land causes environmental pollution	Yes	92	70
	No	39	30
		131	**100**
Inadequate flushing of diapers and sanitary pads causes blockage in toilets	Yes	99	76
	No	32	24
		131	**100**
Hygienic diapers and menstrual waste disposal creates unhealthy in environment	Yes	102	78
	No	29	22
		131	**100**

The responses on measure taken by government towards supply of adequate waste container within the study area indicated the (22%) agreed while (78%) disagreed. Response on disposing diapers and menstrual waste in streams or sea cause destructions to aquatic animal (92%) accepted, the remaining (8%) not accepted. In other way, responses on Baby diapers and

menstrual waste disposal on land causes environmental pollution revealed that (92%) agreed and the remaining (30%) not agreed.

Research Question 3: What measures can we adopt to achieve better disposal of baby diapers and menstrual waste?

Table 6: Response on measures adopt on baby diapers and menstrual waste disposal

Item	Responses	Frequency	Percentage
Baby diapers and menstrual waste disposal has to do with availability of facilities	Yes	70	53
	No	61	47
		131	**100**
Knowledge on baby diapers and menstrual waste disposal is necessary to the society	Yes	101	77
	No	30	23
		131	**100**
Awareness via social media on diapers and menstrual waste disposal is of great important	Yes	99	76
	No	32	24
		131	**100**
Proper implementation of policy in relation to baby diapers and menstrual waste disposal is necessary	Yes	83	63
	No	48	37
		131	**100**

Majority of the responses with respect to required necessary knowledge to the society on disposal of diapers and menstrual waste revealed that (77%) are supported while the remaining (23%) are in opposed. In same vein, the awareness via social media is of great important indicated that (76%) shows positive responses only (24%) negative.

Research Question 4: what are health and socio-economic issues on the use of disposable diapers and menstrual waste?

Table 7: Response on health and socio-economic issue on baby diapers and menstrual waste disposal

Item	Responses	Frequency	Percentage
There is a Physical/Social Discomfort in the use of baby diapers and menstrual product	Yes	119	91
	No	12	9
		131	**100**
Use of diapers and menstrual waste products may cause Rashes, Swelling, Itching etc	Yes	71	54
	No	60	46
		131	**100**
There is a proper awareness by the Doctors on Nursing Mothers	Yes	63	48
	No	68	52
		131	**100**
Regular changing of baby diapers and menstrual waste product may reduce infectious diseases	Yes	102	78
	No	29	22
		131	**100**

The majority of respondents on use of diapers and menstrual waste products may cause rashes and other illness revealed that (54%) responds positive and (46%) negative. Whereas, (78%) indicated that regular changing of baby diapers and menstrual waste product may reduce infectious diseases only (22%) indicated negative.

Research Question 5: What are the nature of removing, replacing and changing baby diaper and menstrual waste?

Table 8: Response on nature of removing, replacing and changing baby diapers and menstrual waste disposal

Item	Frequency	Percentage
Nature of Removing		
Once spoiled	62	47
On free time	30	23
On timely basis	39	30

	131	**100**
Nature of Replacement		
Immediately	70	53
Not immediately	40	31
Sometimes	21	16
	131	**100**
Nature of Changing		
Once spoiled	66	50
Once a day	21	16
Twice a day	44	34
	131	**100**

On the nature of removing, replacing and changing of baby diapers and menstrual waste product revealed that (47%) remove once spoiled, (23%) remove on free time while (30%) remove on timely basis. (53%) replace immediately, (31%) replace not immediately and (16%) replace sometime.

Research Questions 6: what are the method/Period of disposing diapers and menstrual waste?

Table 9: Response on the method/period of disposing baby diapers and menstrual waste.

	Item	**Frequency**	**Percentage**
	Method of Disposing		
	Flushing	11	8
	Dust bin	89	68
	Pit latrine	31	24
		131	**100**
	Period of Disposing		
Monthly		22	17
	Weekly	35	27
	Everyday	74	56
		131	**100**

Majority of respondents (68%) disposed diapers and menstrual waste product in dustbin, (24%) in pit latrine while only (8%) use flushing.

Testing of Research Hypotheses

The research hypotheses of this study tested using Analysis of variance (ANOVA)

H01: Level of awareness has no significance influence on attitude towards baby diapers and menstrual waste disposal.

Table 10. ANOVA of Baby diapers and Menstrual waste disposal attitude by level of awareness

Level of Awareness	Sum of Square	df	Mean square	F	Sig.
Between Groups	7.636	3	2.545	2.231	.058
Within Groups	208.665	170	1.227		
Total	216.301	173			

The Above Table 10. Shows that F value of 2.231 and critical value of .058 testing at alpha (α) of 5% significance level. The critical value is less than the F value, so the null hypothesis which stated that 'level of awareness has no significant influence on attitude towards baby diapers and menstrual waste disposal is rejected and conclude that the means of at least two groups are statistically insignificant. This confined with the finding of Adekunle and Elizabeth (2019) who found that level of awareness was not statistically significant with respect to the knowledge of menstruation and its management. The finding contradicts with the work of Elizabeth, Aled and Dannielle (2019) who found that the respondent's level of awareness was statistically significant with respect to the knowledge of menstruation and its management.

H02: Supply of waste container has no significance influence on attitude towards baby diapers and menstrual waste disposal.

Table 11. ANOVA of Baby diapers and Menstrual waste disposal attitude by supply of waste container

Supply of Waste Container	Sum of Square	Df	Mean square	F	Sig.
Between Groups	2.053	3	.068	.463	.058
Within Groups	209.670	169	1.24		
Total	211.723	173			

The Above Table 11. Shows that F value of .463 and critical value of .058 testing at alpha (α) of 5% significance level. The F value is greater than the critical value at alpha (α) level, so the null hypothesis which stated that 'supply of waste container has no significant influence on attitude towards baby diapers and menstrual waste disposal is rejected and conclude that the means of at least two groups are statistically insignificant. This corresponds with the finding of Elizabeth, Aled and Dannielle (2019) who found that supply of waste container was not statistically significant with respect to the knowledge of menstruation and its management.

Conclusion and Recommendations

Disposal of baby diapers and women sanitary products has environmental and health effects in the society. However due to the lack of better disposal methods, diapers and menstrual products end up in land field and this will leads to spread of communicable diseases such as cholera, bacteria and viruses. It is necessary for the government to provide a waste containers within the rural and semi urban areas of the state such as Gashua, Nguru and Potiskum local government areas. Government should also create awareness about the incidence of disposing waste diapers and sanitary products. Women deserve awareness to better knowledge on menstruation hygiene during their menstrual period.

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