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Cigarette Butts; A Little Leaven That Leaveneth the Whole Lump

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ABSTRACT

Tobacco The tobacco industry has introduced the most abundant forms of plastic (microplastic) into human waste streams with no intended managerial strategies over the centuries. They have maintained monetary gain but shifted blames to the end users, making butts "it's small, "it does not matter" the most abundant untamed litters globally. The butts are said to release over 400 carcinogenic chemicals when discarded inhumanly into the environment (air, water and land); with attended effects on the environmental resources and human beings. The basis of this study is to draw public attention and cultural waste management practices towards Cigarette butts in Bayelsa State considering the vast and high ecological sensitivity of the state and the region at large. About 240 pieces of carefully designed schedules covering demographic features, smoking frequencies, awareness, smoking environment and butts management culture were utilized to elucidate the objectives of the study. The chains of smokers were more between the ages of 36-45years and lesser between the ages of 20-25years; 92% of smokers were male making them the most likely gender to litter the environment with cigarette butts; of the totals smokers 67% respondent don't know that cigarette butts is non-biodegradable and very toxic to the environment. 34% respondent smokes in conspicuous environment; 19% inconspicuous milieu (hideout and ghettos), 23% in controlled designated areas and 24% agreed to smoke in an undesignated environment (Streets). Dumping in trash accounted for 24%, 30% selectively discarded in shops, clubs, malls etc. while 46% admitted to have discarded butts randomly, exposing the environment to arrays of toxins. Therefore, creating awareness is necessary but holding the tobacco companies accountable for butts' management is very optimal.

INTRODUCTION

A cigarette is a narrow cylinder containing a combustible material (mostly tobacco) rolled into thin paper for smoking purposes. The Cigarette is ignited at one end, causing its fume to be orally inhaled via the opposite end. Although, the term cigarette literally means anything smoking in this paper the term is narrow to tobacco smoking which can be distinguished from the rest by size, use of processed leaf, and paper wrapping.

According to Robert (2005), Tobacco smoke is a sooty aerosol produced by the incomplete combustion of tobacco during the smoking of cigarettes and other tobacco products; by exposing the products to temperature burning ranging between 40°C between puffs to about 90°C during a puff. Records shows that in such process thousands of chemical substances are generated by combustion, distillation, pyrolysis and pyrosynthesis; of such substances including polycyclic aromatic hydrocarbons (benzopyrene), tobacco-specific nitrosamines (NNK, NNN), aldehydes (acrolein, formaldehyde), carbon monoxide, hydrogen cyanide, nitrogen oxides (nitrogen dioxide), benzene, toluene, phenols (phenol, cresol), aromatic amines (nicotine, ABP (4-Aminobiphenyl)), and harmala alkaloids (*ibid*, 2005).

In the quest for reducing the health implications of the associated smoke (reduce risk of lung cancer) and to provide comfort for the smokers (preventing tobacco flakes from getting on the smoker's tongue), several

mechanisms have been device and of such methods is the introductions of cigarette filters also known as butts (Iso, 2007; Kennedy, 2012; Murray, *et.al.* 2020). Accordingly, Thomas, *Iet.al.* (2019) open that cigarette filter (butts); reduce "tar" and nicotine smoke yields by 50%. Rothwell (1999) also confirmed the 20-50% reduction in risk of lung cancer for long-term smokers of filtered cigarettes as compared to smokers of non-filtered cigarettes. However, the filter otherwise known as butts is non-consumable but discarded, creating aesthetic nuisances and creating a mountain of environmental waste to humankind and other environmental resources.

The Cigarette filters (BUTTI) are made of plastic cellulose acetate fiber, paper or activated charcoal which when tossed into the environment, not only dump plastic, but also the nicotine, heavy metals, and other associated chemicals they've absorbed into the surrounding environment. This has exposed the environment and human health to a high risk of contamination through the food chain; making it a pertinent aspect of waste management to review.

Statement of Problem

It will interest you to know that, Smokers around the world buy roughly 6.5 trillion cigarettes (each with butts) every year (i.e 18 billion every day) (Novotny *et. al.* 2009). Each year, an estimated 4.5 trillion cigarette butts are left over; only but third of which make it into the trash, the

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rest are casually flung into the street or out a window; placing them the most common form of litter worldwide (Moriwaki *et. al.* 2009; Slaughter *et.al.*, 2011).

The butts is said to release over 40 carcinogenic chemicals (carbon monoxide, hydrogen cyanide, nitrogen oxides, polycyclic aromatic hydrocarbons, ammonia, acetaldehyde, formaldehyde, benzene, phenol, argon, pyridines and acetone etc.) into the environment before turning into microplastic pollutants (Thomas *et. al.* 2019). Each butt contained about 15,000+ non-biodegradable microplastic cellulose acetate made from plasticized fibers (Belzagui *et. al.* 2021) while the cigarette paper is also treated with harmful chemicals like potassium citrate (for a faster burn rate) that contain toxic metals such as lead, cadmium and arsenic (Podraza KD, Director, 2023). Unfortunately, the microplastics takes 10 to 15 years to completely degrade which is traceable to caused sub-lethal effect in the stomachs of sea birds, turtles, whales, fishes in the form of digestion, and potentially leading to poisoning or starvation (Lusher, 2015; Woods *et.al.*, 2016; AraÃjo & Costa, 2019; Green, Kregting & Boots, 2021). This will further devastate the quality and quantities of surface water resources available for rural dwellers (Ebuete, *et. al.*, 2023).

Research also had that Butts are acutely toxic to the freshwater *Cladoceran Ceriodaphnia Cf Dubia* at 0.06, 0.16, and 1.7 mg butts/l (Warne, Patra and Cole, 2002). Also toxic to *Ceriodaphnia cf dubia* and freshwater fathead minnow (*Pimephales promelas*) at concentrations between 8.9 and 25.9 mg/l and to *Vibrio fischeri* at concentrations between 104 and 832 mg butts/l (Micevska, Warne & Pablo, 2006; Slaughter, Gersberg & Watanabe, 2011). However, butts are frequently more severe on the larvae via sediments than exposures via water (Nitschke *et. al.* 2023).

In human, Microplastic is linked to fertility issues like low sperm count and miscarriages (Zhang, Chen, Ma, Sun and Wang, 2022); intestinal damage via the build-up of toxins in the gut that leads to intestinal inflammation and other disorders (Hwang, Choi, Han, Jung, Choi and Hong, 2020) and even mutations in DNA (Campanale *et.al.*2020).

On land, the butts hinder the germination of shoots (10% for grasses and 27% for clover) and the development of plants (Kadir & Sarani, 2015; Sanon, 2019). It also stunts the shoots of plants, reducing their length by 13 and 28 percent, respectively (Belzagui *et. al.*2021). According to Kadir and Sarani, (2015) land birds that always line their nest with Cigarette butts, as fumigant and inhalant to ward off predators may experience long-term genetic damage and other health risks due to their exposure to toxic chemicals; these tell more of the food chain and the food web. Furthermore, a discarded cigarette butt is linked to large wildfires, resulting in the destruction of wildlife, vegetation, property and loss of tourism centers (American Nonsmokers' Rights Foundation, 2018).

From the foregoing, it is clear that Cigarette butts are

ubiquitous, toxic and intractable type of marine and land litter that is rather treated with contempt. Butts are the most abundant form of plastic waste in the world, with about 4.5 trillion individual butts stacking up in parks, beaches, oceans, streets, city sidewalks, bus stops and other places where all other types of littering are frowned upon, but has never received the accorded grimaced in public spaces; hence the important of this study.

Today the world is at its peak to beat plastic pollutions that is why Plastic waste management has reflected in two consecutive years (2018 and 2023) and still holding for the year 2024 (*Planet vs. Plastics*) Theme for the United Nation World Environment Day celebrated every 5th of June, to scale up actions towards environmental management and sustainability. This unwavering commitment to end our addictions to plastic for the sake of human and planetary health will remained rhetorically unless cigarette butts management is also given equal attentions. The cigarette butts are a known micro plastic of human and environmental impact that is treated with highest level of negligence and contempt; that is why this research is aimed at Cigarette Butts Management in the Niger Delta region of Nigeria, with attended view to draw public attentions and culture waste management practices towards Cigarette butts in Bayelsa State.

The Niger Delta region is the second largest wetland in the world; where Bayelsa State is the lowest lowland states in Nigeria with countless rivers, creeks, rivulets, ponds, estuaries etc. directly draining into the Atlantic Ocean whose sensitivity is of high recommendations in view of cigarette butts management.

METHODS

Study Area

The study is conducted within the Yenagoa metropolis (i.e within the 15km radius). Yenagoa is the Capital city of Bayelsa State. It is located at the Southern part of Nigeria at coordinates 4°55'29"N and 6°15'15"E (Fig.1); covering an area of about 706km^s with a population of 352,285 at the year 2006 census (NPC, 2006)

Research Design

The study adopted a Survey Design using field observations, focus group discussions and administration of schedules. The schedules were randomly distributed among purposively selected six communities (Igbogene, Akenfa, Edepie, Biogbolo, Amarata and Swali) making a total of 240 respondents within the Capital City (see Fig. 1); others secondary data is based on document searches from scientific literature, medical journals, chemical abstracts, US Patents, tobacco abstracts, papers presented at tobacco meetings and court documents.

The concept of age, sex and smoking frequency adopted and integrated into butts littering-behavior questions as to guide the objectives of the study. The second aspects deal with populace cognitive awareness of butts and its negative positions to the environment, human

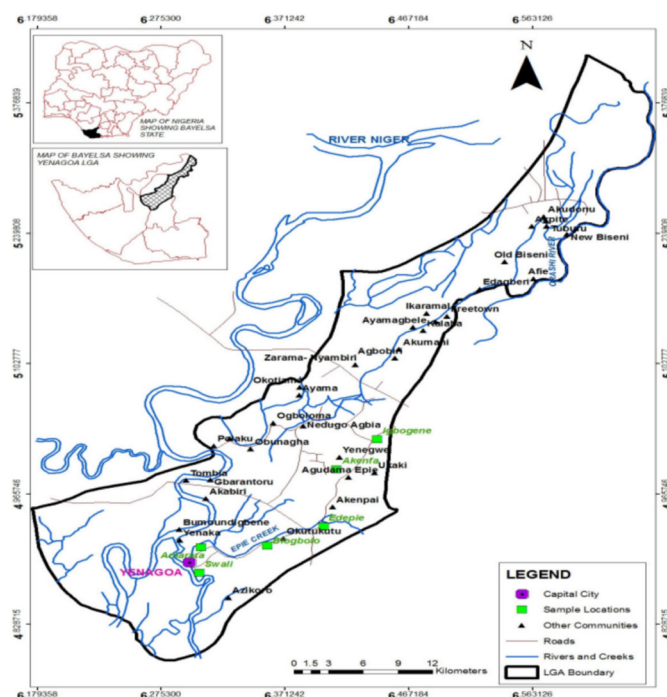


Figure 1: Map of Yenagoa City showing Sample Points

Source: Researcher, 2023.

and ecological features. The third aspect deals with the smoking environment and butts management strategy adopted by smokers in the management of cigarette butts in our society.

RESULTS

Despite been an environmental blight on streets, sidewalks, and other open areas in the cities and in the rural areas that routinely get into waterways, and eventually oceans to increased hazards in the waterways and oceans; Cigarette butts remained the “last acceptable form of littering.”

leaching nicotine and heavy metals before turning into microplastic. Moreover, I quote a Professor of History of Science, Stanford University Prof. Robert Proctor “Cigarette filters are the deadliest fraud in the history of human civilization”. This is because the producers have adopted different economic delusive designs to sustain their economic gain leaving behind the woes unattended to both users and non-users. The table below presented information relating to sex, age, smoking frequencies, smoking environment, awareness and concerned, and management culture of the butts syndicates (Table 1).

Table 1: Basic information of Cigarette Butts in the study area

Smoking age	Age bracket	Frequency	% Frequency
	20-25	24	10
	26-35	53	22
	36-45	72	30
	46-55	48	20
	56-65	43	18
Sex	Male	220	92
	Female	20	8
Smoking frequency(s) per day (24hrs)	2-7PCS	53	22
	8-13	49	20
	14-19	56	23
	20-25	42	18
	26-31	40	17
Smoking environment	Conspicuous	82	34
	Inconspicuous	46	19
	Designated	54	23
	Undesignated	58	24

Awareness	Yes	80	33
	No	160	67
Butts waste management	Trash Dumping	57	24
	Selectively Discarded	73	30
	Randomly Discarded	110	46

Source: Researcher, 2023.

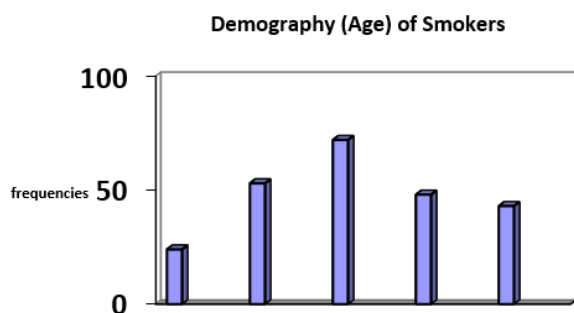


Figure 2: Demography (age) of smoker

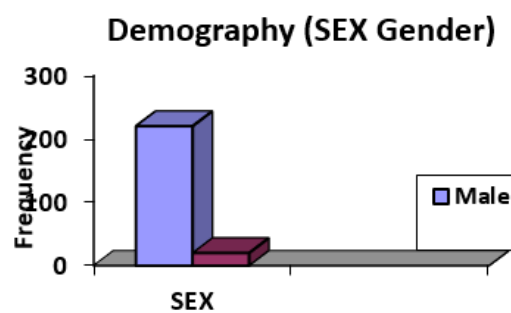


Figure 3: Demography (Sex gender) of smoker

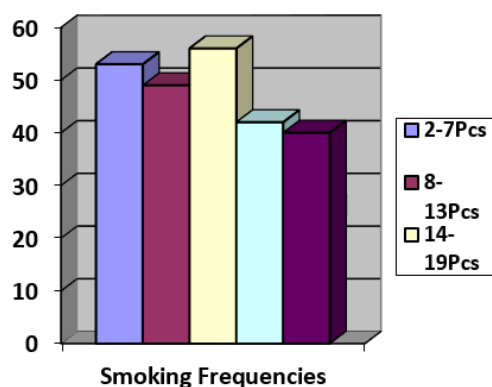


Figure 4: Smoking frequency(s)

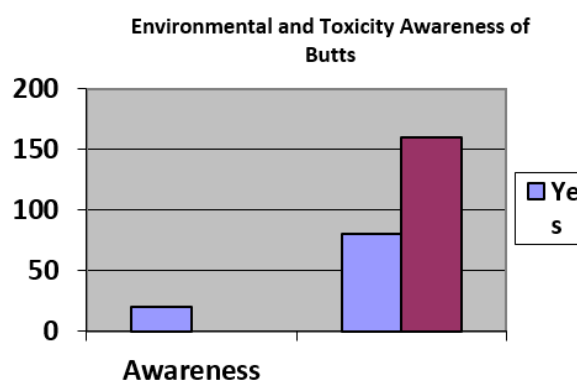


Figure 5: Environmental and Toxicity awareness of butts

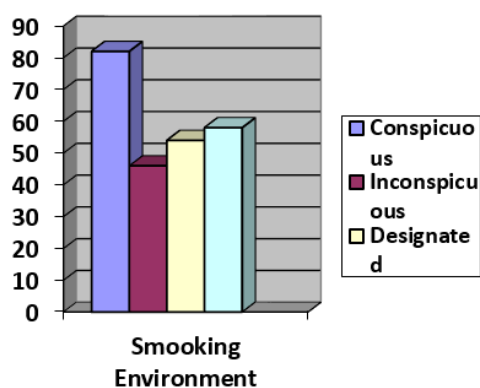


Figure 6: Smoking environment

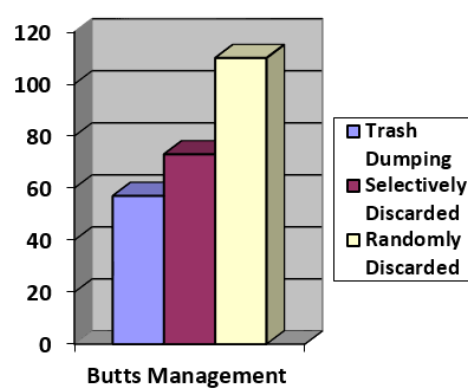


Figure 7: Butts Managements

Table2: Testing the Relationship/Correlations between the Smoking Environment and the Management of Cigarette Butts in Yenagoa using Chi-Square (χ^2) at 5% limits.

Smoking Environment	Butts Waste Management	Total
82	57	139
46	73	119
54	110	164
58	0	58
240	240	480

Source: Researcher, 2023.

Table 3: $X^2 = 115.15$: Coefficient of Contingency/Magnitude of Relationship/ Association (ϕ) = 7.433

Observed Variables (O)	Expected Variables (E)	O-E	O-E ²	O-E ² /E
82	70	12	144	2.06
57	70	13	169	2.41
46	119	73	5329	44.78
73	119	46	2116	17.78
54	82	28	784	9.56
110	82	28	784	9.56
58	29	29	841	29
[58]	[58]	0	0	0

Source: Researcher, 2023.



Figure 8: Butts carried by flashflood into Rivers



Figure 9: Butts Conspicuously Dump

Age

Smoking is an influential act that deals with age bracket that is why producers highly recommended for age 18+. By virtue of this study, the smoking age between 20 - 25years were 10%; 26 - 35years were 22%; 36 - 45% years were 30%; 46-55years were 20% and 56 - 65years were 18% (Table 1.). From indications, the chains of smokers were more between the ages of 36-45years and lesser between the ages of 20-25years; which is similar with the report of Cornelius *et. al.* (2019) stating that it is only about 8% of 18–24-year-old adults in the United States are cigarette smokers. This is true due to socio-cultural influences were adults between 20-25years are still under parental care and yet still dependent within the study area. Further, a disparity observed with older age is that, smokers find time to quite or better redirect their smoking desires into something resourceful as advanced in age.

Sex

The study shows that by sex gender, the proportion of men are more likely to be smokers irrespective of their low populations compared with the female within the country. They occupied 92% of the total responded as against just but 8% female. However, this is contrarily to the developed countries where women (female) are more than men in tobacco smoking are (Webler & Jakubowski, 2022; Schultz *et.al.*2013). Culture, values and believed system often influenced the difference in the observation. The Ijaw traditions annihilate the values of female smokers and placed them as wore among societal class (This demonstrated the feelings of belonging to a stigmatized group); hence the disparities as the few female smokers tends to hide and smoke indoor which technically and literarily make them managed the butts subconsciously. Webler and Jakubowski (2022) further confirmed that Women littered fewer butts than did men.

Frequency(s)

Smoking frequencies has a placed in Cigarette butts littering. The frequency is always directly proportionately with the number of sticks. The fewer the sticks per day, the more conscious the managerial culture according to Darabi, Hassani and Alinejad (2023); Gay *et.al.* (2023). Our study revealed that 22% smokers smokes 2-7pieces a day; 8-13 piece a day accounted for 20%; 14-19pieces accounted for 23%; 20-23pieces accounted for 18% and 26-31pieces accounted for 17% (Table 1).

Similar report was made by Webler and Jakubowski (2022), asserting that over 40% reported smoking 1–5 cigarettes a day, and only 4% smoked 20 or more cigarettes a day. Nitschke, *et.al.* (2023) also found that people who smoked fewer cigarettes a day were more likely to have disposed of their last butt properly; therefore the man who smokes more is likely to tossed butts around the environment and is believed to pollute the environment more with butts. People who smoked more also reported littering more butts (X2); increasing the littering rate from 2.3 to six

butts per day as daily consumption of cigarettes (Webler & Jakubowski, 2022).

Awareness

Awareness to the toxicological effect of cigarette butts goes a long way towards butts' management. It will interest you to know that more than 67% respondent don't know that cigarette butts is non-biodegradable and very toxic to the environment; thus littering the environment with butts is a common and acceptable way of butts disposal (table 1) after all it's small, "it doesn't matter". Novotny, Lum and Smith (2009) stated that cigarette butt littering is "mostly ignored" among smokers and "it may even be a part of the smoking ritual for smokers to lost their chemically induced rose-colored glasses on the ecological effects of the butts. In one study, Sanon (2019) added that Smokers admit littering cigarette butts possibly, as they thought cigarette butts are biodegradable and somehow do not consider them as litter.

Webler & Jakubowski (2022) in their study also found that", 79% of respondents disagreed that Cigarette butts are litter, only 9% agreed while 11% had no opinion. Granados, *et.al* (2019) also point out that majority (82%) had heard the term butts, but do not considered Butts as an environmental harm at some level. On the other hand, Men were slightly more likely than women to disagree that cigarette butts are litter (Rath *et. al.*, 2012). Miller (2017) asserted also that if smokers were not aware of the environmental consequences that discarding a cigarette butt on the ground can have, the smoker would not have a conscious thought telling them to protect the environment because they would not know that discarding onto the ground could cause environmental problems. Terry (2015) added that lack of awareness, lack of receptacles, and ordinances that move smokers outdoors increases cigarette butt littering.

Smoking Environment

The smoking environment clinched directly with butt management culture. It is an observable fact that the environment influences the littering believed and culture. From our study, 34% respondent agreed that they smoke in conspicuous environment; 19% in an inconspicuous milieu (hideout and ghettos); 23% at controlled designated areas like shops and bars while only 24% agreed they smoke in an undesignated environment (Streets). Plate 2 is a good example of a smoking in a controlled and conspicuous environment, where despite the poor butt management culture; the seller (shop owner) makes some level of collections. On the other hand, plate 1 shows a free care disposal of butts that is been swept away by flash flooding in the area.

Study by Darabi, Hassani and Alinejad (2023) state that cigarette butts in commercial, residential, and recreational areas was estimated to be 0.27, 0.079, and 0.17µg per square meter, respectively. The largest observational study of smokers' littering behavior in public spaces found that 57% of people observed smoking littered one

or more butts, and overall, 65% of cigarette butts were littered (Schultz, *et.al.*2013). A study of 219 smokers in downtown Wellington, NZ found that 76% of smokers that littered their butts are strongly tied to the smoking environment (Patel, Thomson and Wilson, 2013). In the 2013 Litter Attitudes and Behaviors study, 68% of respondents said that they threw butts out due to habit (Texas Department of Transportation, 2013). Miller (2017) also agreed that out of 244 participants, 137 (56%) of respondent discarded their cigarette improperly. On the coronary, Webler & Jakubowski (2022) reported a positive significant correlation with age and litters “younger people littered butts more frequently”.

Literarily, a well-coordinated environment will have their smoking ashtray at reach while exclusively designating smokers into a confined and well-placed environment. This gives sense of butt’s managerial culture particularly in Public institutions like Banks, Companies, etc. (Plate 2). The spatial and temporal variation of CBPI and leakage of heavy metals from cigarette butts into the urban environment is due to lack of awareness.

Butts Waste Management

Research shows that 5.6 trillion cigarettes are smoked each year, but only two thirds are properly disposed of (WHO, 2022). About 30% to 40% of all litter found in coastal and urban litter is from cigarette butts. This revealed the poor managerial skills of cigarette users with the whole blame on the producer. Our studies revealed that 57 respondent accounted for 24% dump their waste in trash; 73 (30%) selectively discarded it particularly in shops, clubs, mall etc.; while 110 (46%) admitted to have discarded butts randomly (Table 1). Similarly, Martin (2015) confirmed that only 10% of cigarette butts deposits in litter receptacles, 35% of smokers toss five or more cigarette butts per pack on the ground randomly considering it to be very small and matters not. Here the proportion of respondent (35%) that dump butts randomly also admitted to drop into gutters or storm drains thinking it is a safe way to extinguish cigarette butts; a contributing act to ocean littering. Report shows that Cigarette butts are the most common debris item collected along waterways during the Ocean Conservancy's yearly International Coastal Cleanup (Yadav, *et.al.*, 2021).

According to Webler and Jakubowski (2022); male gender are likely to litter the environment with cigarette butts that accounted for 92% of the total responded. Men more likely to have littered in the past month than women according to Rath *et. al.* (2012). Patel, Thomson and Wilson (2013) also added that majority (77%) reported tossing a butt to the ground at least once in their lifetime are male; 66% of men reported tossing a butt out a car window at least once in their lifetime. Surprisingly, the total 60% recorded by Rath *et.al.* (2012) that recalled disposing of a butt properly in a trashcan or a public ashtray in the past month are women (82%).

In other perspectives, Nitschke, *et. al.*(2023) found that people who smoked fewer cigarettes a day were more

likely to have disposed of their last butt properly. This is also applicable in our study as most persons particularly the younger people that smoke less in hideout (indoor smoking) and among aged groups often disposed their butts properly. The study has showed that awareness on Cigarette butts management is still in the docket in the study area, about 67% responded reported not to be aware of the health implications associated with cigarette butts.

CONCLUSION

Cigarette filters are the deadliest fraud in the history of human civilization; the big tobacco industries never let truth get in the way of profits. They rather invest in time and money in research (introducing delusive filters and filters changing colors) to keep the business growing financially. The big tobaccos are spoiling the worth of humanity; they are intelligently cruel to use innocence as a tool, filter as weapon and designed as a dagger. Currently, they have shifted blames on the end users for littering the environment; underscored by the fact that littering is an issue with individuals’ behavior rather than a collective societal problem in trash disposal.

The study revealed 10% smoking age between 20 - 25years; 26 - 35years were 22%; 36 - 45% years were 30%; 46-55years were 20% and 56 - 65years were 18%. By gender, the male canter paths occupied 92% of the total respondents as against 8% female, which placed the female smokers on a stigmatized group. The study also revealed that by smoking frequencies per day; 22% smokes 2-7pieces a day; 20% smokes 8-13 piece; 23% smokes 14-19pieces a day; 18% smokes 20-23pieces a day and 26-31pieces accounted for 17%. Awareness to the toxicological effect of cigarette butts on the ecosystems, ecological resources and human; 67% respondent don’t know that cigarette butts is non-biodegradable and very toxic to the environment; thus littering the environment with butts is a common and acceptable way of butts disposal after all it’s small, “it doesn’t matter”.

The smoking environment also influences the littering behavior of smokers so also norms, believed and culture that guide a range of litter attitudes and behaviors. The study revealed that 34% smokes in conspicuous environment; 19% in an inconspicuous milieu (hideout and ghettos); 23% at controlled designated areas like shops and bars while only 24% agreed they smoke in an undesignated environment. The Butts managerial attitudes is very low in the study area as only 24% dump their waste in trash; (30%) selectively discarded it particularly in shops, clubs, mall etc.; while 110 (46%) admitted to have discarded butts randomly, turning our natural water bodies and the oceans to waste receptacles. This further questions the quality of the flora and fauna in the study area. At 0.05% critical level, there is a positive correlation between smoking environment cigarette butts management culture ($X^2 115.15 > d.f 7.815$) which accounted for 74% relationships. This further point to the fact that the smoking environment, settings and operational rules influences butts management. It is

unsparing for one to caused environmental imbalance to gullible individual with just a meal hence, “if you can’t quite, then don’t litter the environment”

RECOMMENDATIONS

- Expanding public awareness and education via public lectures and campaign
- The big Tobacco company should be held responsible for their pollutants (duty of cares)
- Sanctioned stiff penalties for litters of cigarette filters in the state.
- Adoption of community-based social marketing (selecting behaviors, identifying barriers & benefits, developing strategies, conducting a pilot, and broad-scale implementation) campaign to alter improper cigarette disposal behavior in the state.

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