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Comparative Analysis of Household Attitude toward Environmental Transforming Behaviour (HETB) Before and During COVID-19 Pandemic Lockdown in Yenagoa Metropolis, Bayelsa State, Nigeria

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Abstract
Household behavioural change is a critical aspect of addressing contemporary challenges related to shifting lifestyles, global temperature rise, and environmental degradation. Important factors such as environmental awareness, economic incentives, social norms, and information availability help drive household behavioural change towards sustainability. Collaborations among household members and participation in sharing economies are also pivotal in achieving similar results. Furthermore, practices such as composting, rainwater harvesting, and organic agriculture have emerged as effective strategies. Protection Motivation Theory (PMT) as a framework aids the understanding of variables influencing behavioural change, particularly in the context of the COVID-19 lockdown. Findings revealed positive changes in HETB, household green product use, and the rate of environmental behaviour during the COVID-19 lockdown, emphasizing the potential for a more sustainable future. The study recommended that households adopt specific pro-environmental behaviours, building on the lessons learned during the pandemic lockdown.

Keywords: COVID-19, Household Environmental Transforming Behaviour, Environmental Transforming Behaviour, Sustainability.

Introduction

Household behavioural change has become a pressing concern in the contemporary world due to evolving lifestyles, escalating global temperatures, and escalating environmental degradation. In response to these challenges, there is a growing need for households to adopt behavioural changes that contribute to a more sustainable future. This literature review delves into existing research on household behavioural changes promoting sustainable living, drawing insights from scientific journals, reports, and books. A study by Cucchiella *et al.* (2020) explores the factors influencing households' willingness to adopt sustainable living practices and highlights key drivers, including environmental awareness, economic incentives, social norms, and the availability of information, emphasizing that households are more likely to embrace sustainable living when perceiving personal and societal benefits.

The United Nations Environment Programme (2021) focusing on the impact of agricultural activities on global biodiversity explained the critical role of household behavioural change in influencing consumption patterns, waste management practices, and

the spread of invasive species. It advocates for sustainable living practices such as composting, rainwater harvesting, and the adoption of organic agriculture to support biodiversity conservation. Similarly, Schor and Thompson (2014) examined sustainable living practices worldwide and discussed how collaborative efforts within households, participation in sharing economies, and the promotion of collaborative consumption contribute significantly to sustainable living. These studies and reports agreed that fostering household behavioural changes towards sustainability is a crucial step in building a more sustainable future.

This paper highlights environmental awareness, economic incentives, social norms, and the availability of information as significant drivers of such behavioural changes.

Additionally, embracing practices like composting, rainwater harvesting, and organic agriculture emerges as effective strategies for promoting sustainable living. Collaborations among household members and active participation in sharing economies also play pivotal roles in achieving sustainability. The subsequent section outlines the assumptions of Protection Motivation Theory (PMT) adopted as a framework for understanding the variables influencing behavioural change, particularly in the context of the COVID-19 pandemic lockdown while section three covers the research design and sampling techniques employed to investigate household environmental transforming behaviour (HETB) before and during the lockdown in Yenagoa city. Finally, the study's findings regarding HETB, household green product use, and the rate of environmental behaviour are presented, offering insights into the positive changes observed during the COVID-19 lockdown and their implications for a sustainable future.

Conceptual/Empirical Review

Household behavioural change is a serious issue in the contemporary world. Changes in lifestyle, rising global temperatures and environmental degradation are some of the significant factors that have resulted in the need for households to adopt behavioural changes that foster a more sustainable future. This literature review evaluates the available literature on household behavioural changes that promote sustainable living, including sources from scientific journals, reports, and books.

Cucchiella, et al. (2020) investigate the drivers of household willingness to adopt sustainable living practices. The authors observe that the most significant drivers of sustainable living include environmental awareness, economic incentives, social norms, and availability of information. They concluded that households are most likely to adopt sustainable living practices when they perceive personal and societal benefits.

The report from UNEP (2021) identifies that household behavioural change plays a critical role as it affects consumption patterns, waste management practices, and the spread of invasive species. In the report, the authors suggest that sustainable living practices such as composting, rainwater harvesting, and adoption of organic agriculture are critical in promoting biodiversity conservation. Juliet and Craig (2014) examined various case studies of sustainable living around the world. The book discusses how collaborations between household members, participation in sharing economies, and collaborative consumption contribute to sustainable living.

Promoting household behavioural changes towards sustainability is a critical step towards building a more sustainable future. Our review of the available literature indicates that the most significant drivers of such behavioural changes are environmental awareness, economic incentives, social norms, and availability of information. Composting, rainwater harvesting, and the adoption of organic agriculture are some of the best practices households can adopt to promote sustainable living. Finally, research suggests that collaborations among household members and participation in sharing economies contribute to sustainable living.

Theoretical Framework

The Protection Motivation Theory (PMT) propounded by R.W. Rogers in 1975 provides the frame for analyzing the subject of this paper. The theory seeks to explain how fear appeals influence health-related behaviours and has since been applied to various contexts including natural disasters and public health crises (Rogers, 1975). PMT posits that individuals adjust their behaviours in response to perceived threats, such as natural disasters or pandemics, based on their threat and coping appraisals (Floyd et al., 2000; Maddux & Rogers, 1983). According to PMT, people are motivated to take protective actions if they perceive a serious threat and believe they are capable of effectively addressing it. For instance, during the COVID-19 pandemic, individuals might adopt behaviours like

maintaining physical distance if they perceive the virus as a severe threat and believe that such actions will effectively mitigate the risk (Rogers, 1983).

Threat appraisal involves assessing the perceived severity of a threat and one's vulnerability to it. This includes evaluating the seriousness of the potential harms and the likelihood of being affected, as well as considering the perceived rewards of current behaviours. Higher perceived severity and vulnerability are likely to increase the motivation to engage in protective behaviours, whereas perceived rewards of existing behaviours may decrease this motivation. Coping appraisal, on the other hand, focuses on self-efficacy and response efficacy—one's belief in their ability to perform the protective behaviour and the effectiveness of that behaviour, respectively. Additionally, coping appraisal considers the costs associated with taking protective actions. According to PMT, higher self-efficacy and response efficacy, combined with lower perceived costs, enhance the likelihood of engaging in adaptive behaviours (Maddux & Rogers, 1983; Floyd et al., 2000).

Applying PMT to behaviour change during the COVID-19 pandemic, it can be observed that households were more likely to adopt environmentally friendly behaviours if they perceived a severe threat from the pandemic and believed that such behaviours would effectively reduce the threat. This is influenced by factors such as the perceived severity of the pandemic and the effectiveness of the protective measures, alongside individuals' self-efficacy. Household perceptions of health threats, family income, and social environment also play roles in shaping pro-environmental behaviours. People often tend to engage in behaviours like cycling or walking, which are seen as more environmentally friendly, compared to behaviours like reducing vehicle miles or avoiding idling (Rogers, 1975).

Despite its broad application, PMT has faced criticism. Some argue that it oversimplifies the complexity of human motivation by not accounting for emotional and social factors influencing decision-making (Milne, Sheeran, & Orbell, 2000). The linear relationship proposed by PMT between threat and coping appraisals and behavioural intention may not be applicable in all contexts, particularly under high-stress conditions where individuals might respond unpredictably (Rippetoe & Rogers, 1987). Furthermore, the theory's reliance on self-reported measures has been criticized for potential bias and inaccuracies (Conner & Norman, 2005). Recent research suggests integrating PMT with other theoretical frameworks to better capture the complexity of health behaviours and motivations (Tannenbaum et al., 2015).

Methodology

The study adopted the correlational study design. To select the sampling technique for the study, both probability and nonprobability sampling techniques were adopted. The purposive/judgmental sampling techniques were used by the researcher to select the respondents that possess the required characteristics and information that the researcher is seeking, in this case, the population comprised mainly male and female households within Yenagoa city. Data collected for this study were collected primarily with a self-administered questionnaire to the respondents, which was retrieved from them after sampling. The results of the data collected were collated and statistically analyzed using simple percentages to find out the extent of variation. Results were presented in tables and charts to summarize the revealed facts, and to present them in such a way that all the imported factors as contained.

Results & Discussion

Households Environmental Transforming Behaviour

In analysing Households Environmental Transforming Behaviour (HETB) before and during the COVID-19 Pandemic Lockdown, Household attitude; level of green product use and the rate of HETB were the indicators used to measure HETB.

Figure 1.0 below examines HETB before and during COVID-19 Pandemic Lockdown, findings from the study indicated an increase in Pro-Environmental Behavior (PEB) from70.9% to 91.7% respectively with regards to separate items for recycling; increase from 61.9% to89.9% respectively with regards to buying products with less packaging and also avoid excess package; increase from 33.4% to 45.9% respectively with regards to dispose batteries in proper collection container instead of waste basket; increased from 61.8% to 85.3% respectively with regards to walking or cycling for short journey less than 2-3 miles; increases from 69.4% to 86.2% respectively with regards to using public transport rather than travel by car; increases from 77.9% to 89.9% respectively with regards to turning off electronic before leaving the house; increases from 54.3% to 75.7% respectively with regards to using energy saving appliances before leaving the house; Lastly the study indicated an increase from 43.9% to 75.7% respectively with regards to using renewable energy sources before leaving the house during lockdown.

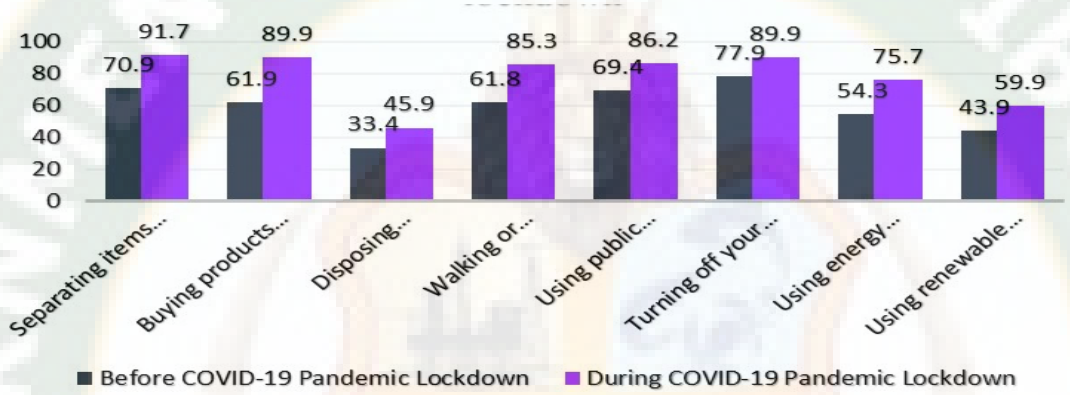


Fig 1.0 Respondent's Attitude Towards Environmental Transforming Behaviour Before and After Lack-Down
Source: Field Survey, 2022

Household Level of Green Product Use before and during COVID-19 Lockdown

In analysing the Level of Green Product Use by Households Before and During the COVID-19 Pandemic Lockdown, house cleaners, reusable products, recycled products, solar power outdoor speakers/phone chargers, rechargeable batteries/flashlights, eco-laptops/computer accessories and wool fool were the variables the researcher used in measuring Household Level of Green Product Use.

Firstly, **figure 1.1** below examines the Household level of house cleaner usage (laundry and detergents) before and during the COVID-19 Pandemic Lockdown. Finding from the figure shows that, higher of the respondents 48.9% moderately use a housecleaner, while a lower number of them 11.7% highly use a housecleaner before lockdown; During Lockdown, a higher number of them 51.7% highly use house cleaner; while the lower number of them with 23.2% moderately use house cleaner.



Fig 1.1: Housecleaner (Laundry/Detergents)

Source: Field Survey, 2022

Figure 1.2 below examines Households level of reusable water bottle/coffee cup usage before and during COVID-19 Pandemic Lockdown. Finding from the figure shows that, a higher number of respondents 36.7% used reusable water bottles/coffee cups at a low rate; while a lower number of them moderately used reusable water bottles/coffee cups 30.6% before the lockdown. During the Lockdown, a higher number of them 49.7% highly used reusable water bottles/coffee cups; while a lower number of them 19.1% used reusable water bottles/coffee cups at a very low rate.



	Low	Moderate	High
Before COVID-19 Pandemic Lockdown	36.7	30.6	32.7
During COVID-19 Pandemic Lockdown	19.1	31.2	49.7

Fig 1.2: Reusable Water Bottle/Coffee Cup
Source: Field Survey, 2022

Figure 1.3 below examines Households' level of recycled products use such as Fabric Cloths, Table Linen, Toilet Tissues and Floor Mates, before and during the COVID-19 Pandemic Lockdown. Finding from the figure shows that, a higher of respondents 39.9% moderately use recycled products, while a lower number of them 29.6% use recycled products at a low rate. During the Lockdown, a higher number of them 53.2% highly used recycled products, while a lower number of them 29.6% used recycled products at a low rate.

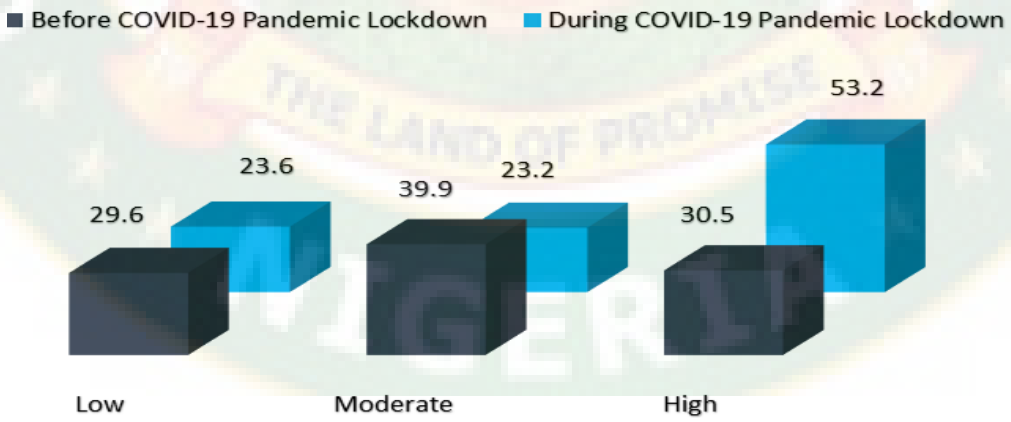
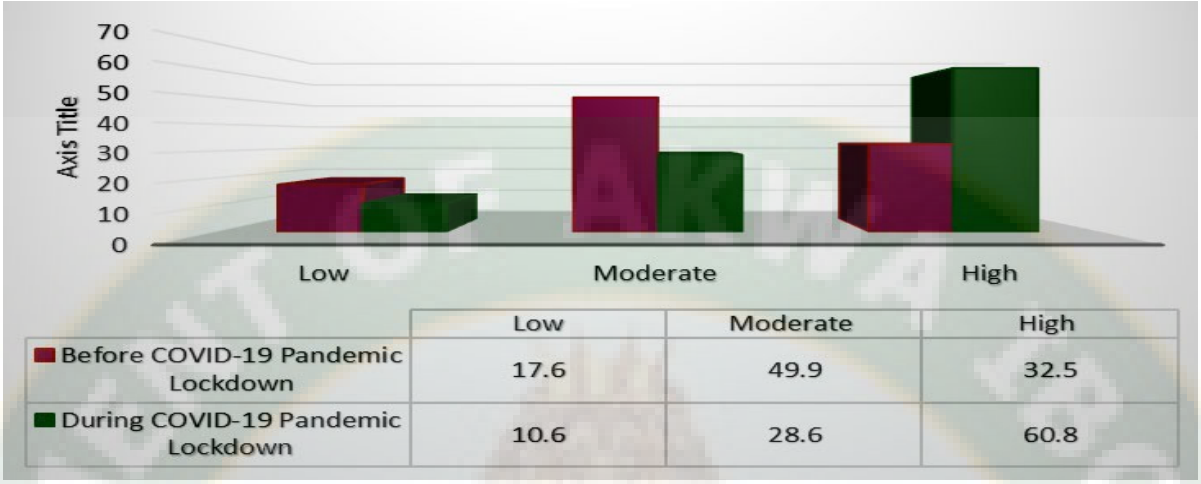


Fig 1.3: Recycled products (Fabric Cloths, Table Linen, Toilet Tissues and Floor Mats)
Source: Field Survey, 2022

Figure 1.4 below examines Households' level of Solar Power Outdoor Speaker and Phone Charger use before and during the COVID-19 Pandemic Lockdown. The results from the figure show that, of respondents, 49.9% moderately use Solar Power Outdoor Speaker

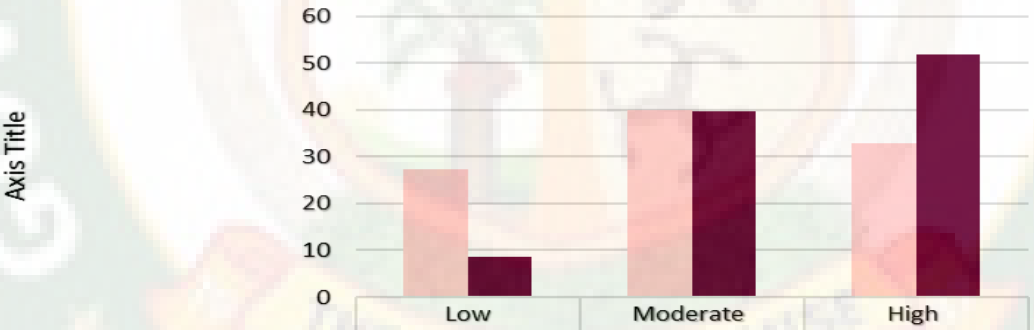
and Phone Charger, and 17.8% of them use Solar Power Outdoor Speaker and Phone Charger low rate. During the Lockdown, 60.8% of them highly used housecleaners, while 10.6% used housecleaners at a low rate.



	Low	Moderate	High
Before COVID-19 Pandemic Lockdown	17.6	49.9	32.5
During COVID-19 Pandemic Lockdown	10.6	28.6	60.8

Fig 1.4: Solar Power Outdoor Speaker and phone charger
Source: Field Survey, 2022

Figure 1.5 below examines Households' level of Rechargeable Battery/Flashlight usage before and during the COVID-19 Pandemic Lockdown. Finding from the figure shows that, of respondents with 39.9% moderately use Rechargeable Batteries/Flashlights; and 27.2% of them use Rechargeable Batteries/Flashlights at a low rate before the Lockdown. During the Lockdown, 51.8% of them highly used Rechargeable Batteries/Flashlights, and 8.6% of them used Rechargeable Batteries/Flashlights at a low rate.



	Low	Moderate	High
Before COVID-19 Pandemic Lockdown	27.2	39.9	32.9
During COVID-19 Pandemic Lockdown	8.6	39.6	51.8

Fig 1.5: Rechargeable Batteries/Flashlights
Source: Field Survey, 2022

F**igure 1.6** below examines the Household level of Eco-laptop/Computer Accessories use before and during the COVID-19 Pandemic Lockdown. Finding from the figure shows that, higher of respondents with 40.9% moderately use Eco-laptop/Computer Accessories; and 19.2% of them use Eco-laptop/Computer Accessories at a low rate. During the lockdown, a higher number of them 45.6% moderately used Eco-laptop/Computer Accessories, and 0.6% of them used Eco-laptop/Computer Accessories at a low rate.

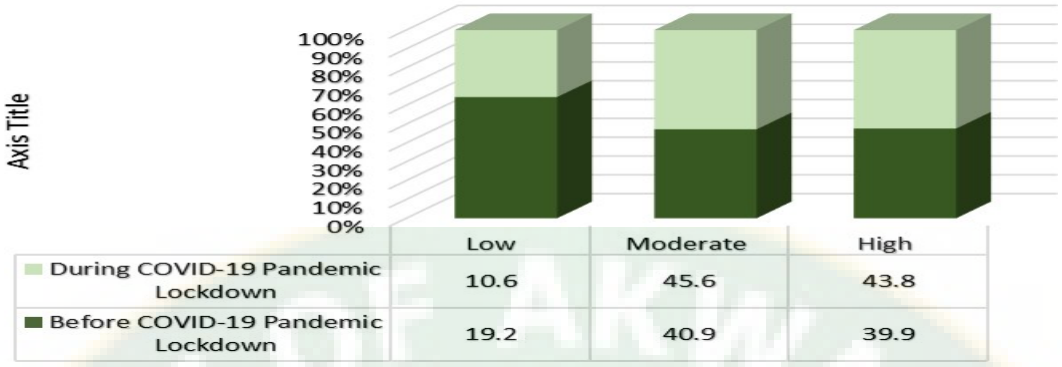


Fig 1.6: Eco-laptops/Computer Accessories
Source: Field Survey, 2022

Lastly, **figure 1.7** below examines Households' level of Wool footwear use before and during the COVID-19 Pandemic Lockdown. Finding from the figure shows that, of respondents with 38.9% of respondents used Wool footwear, and a lower number of them 29.9% used Wool footwear low rate before the lockdown. During the Lockdown, a higher number of them 51.8% highly used Wool footwear; and 8.6% of them used Wool footwear at wear low rate.

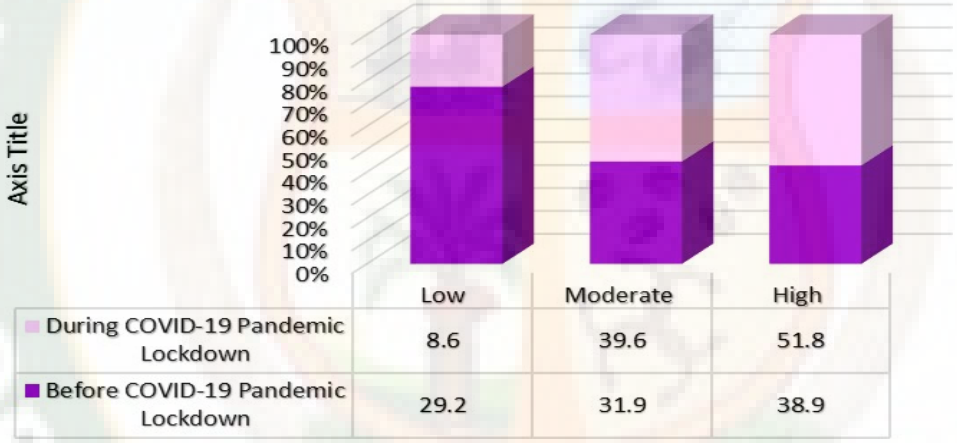


Fig 1.7: Wool Foot Wear
Source: Field Survey, 2022

The Rate of Household Environmental Transforming Behaviour Before and During COVID-19 Pandemic Lockdown

Table 1.8 examines the rate of Households Environmental Transforming Behavior (HETB) before and during COVID-19 Pandemic Lockdown. From the table, the highest number of respondent's rates of HETB before the COVID-19 lockdown were 1 (124/32.3%); while the least were 5,6 and 7 (8/2.1%). During the COVID-19 lockdown, the highest numbers of respondent rates of HETB were 9 and 10 (93/24.2%); while the least were 2 and 5 (15/3.9%).

Table 1.8: The Rate of Household Environmental Transforming Behaviour Before and During COVID-19 Pandemic Lockdown.

RESPONDS	Before COVID-19 Pandemic Lockdown		During COVID-19 Pandemic Lockdown	
	Frequency (n=384)	Percentage (%)	Frequency (n=384)	Percentage (%)
1	124	32.3	46	12.0
2	91	23.7	15	3.9

3	24	6.3		
4	29	7.6	30	7.8
5	8	2.1	15	3.9
6	8	2.1	31	8.1
7	8	2.1		
8	37	9.6	61	15.9
9	31	8.1	93	24.2
10	24	6.3	93	24.2

Source: Field Survey, 2022

In addition to the analysis above, the table above clearly indicated a moderate increase in the rate of HETB during the COVID-19 lockdown in comparison with the rate before the COVID-19 lockdown. It is crystal clear that the COVID-19 lockdown has moderately influenced HETB during the lockdown.

Hypothesis ($H_0$1) There is no difference in Household Environmental Transforming Behaviours (HETB) before the COVID-19 lockdown and during the COVID-19 lockdown.

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	HETB test before COVID-19 Pandemic lockdown.	3.78	384	3.162	.161
	HETB test during COVID-19 Pandemic lockdown.	7.06	384	3.092	.158

Source: Field Survey, 2022

The table above shows the descriptive statistics of the paired samples test for each level of the variables. In effect, it shows that the measurement of the HETB before the COVID-19 lockdown and the HETB during the COVID-19 lockdown has different mean values. The mean value and standard deviation for the test before the COVID-19 Lockdown is M=3.78, SD=3.162 while during the COVID-19 lockdown is M=7.06, SD=3.092. Since the mean value of the HETB test during the COVID-19 lockdown is greater than the mean value of the HETB test before the COVID-19 lockdown we can conclude that the test is very effective and statistically significant.

Paired Samples Test

		Paired Differences					T	Df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	HETB before COVID-19 Pandemic lockdown. – HETB during COVID-19 Pandemic lockdown	-3.279	5.036	.257	-3.784	-2.773	-12.757	383	.000

Source: Field Survey, 2022

Again, the results of the paired sample t-test show that the mean difference (Md=-3.279, SD=5.036) is confirmation that the test between the HETB before COVID-19

lockdown and HETB during lockdown is statistically significant at 0.5 level of Significance. It also revealed the t-value (t=-12.757), df=383, p<0.000, 95% CI, r=.257 These results have several inferential implications, from which we can draw a logical conclusion. Firstly, the Mean difference of the paired sample t-test is -3.279 which by the presence of the negative sign implies that there is effectiveness in the HETB test before lockdown and the HETB test during COVID-19 lockdown. Secondly, since the p-value at the 2-tailed test (p<0.000) is less than the mean difference (Md=-.-3.279) it means that the paired sample t-test of the two variables is statistically different from zero (0).

Hence, we can therefore conclude that there is a statistically significant difference between the before-test and the during test-or between the HETB test before the COVID-19 lockdown and the HETB test during the COVID-19 lockdown.

So, we will reject the null hypotheses and accept the alternate hypotheses, because the treatment administered was effective. The alternate hypothesis as proven by the test above is restated thus: "There *is a significant difference in Household Environmental Transforming Behaviours (HETB) before COVID-19 lockdown and during COVID-19 lockdown".*

Findings

Looking keenly from the point of Household Environmental Transforming Behaviours, findings from this study indicated that households significantly developed more environmentally friendly behaviour during the outbreak of COVID-19 when compared to before. However, the area households significantly developed more environmentally friendly behaviour including separating waste items for recycling, buying products with less packaging, avoiding excess packages in purchase, disposing of batteries in proper collection containers instead of waste baskets during the lockdown, resorting to walking or cycling for short journey less than 2-3 miles instead of use any sophisticated means of transportation etc. This result is similar to the report by Samuli, et al., (2020), According to the report, people resorted to buying products with less packaging, avoiding excess packages in the purchase and separating waste items for recycling during the COVID-19 lockdown.

The findings of this study also confirmed the study conducted by Fuwape, Okpalaonwuka and Ogunj (2020), which revealed that Lagos, Kaduna and Port Harcourt, saw limited use of fossil fuel generators for power generation and public transportation among residents, which are potential contributors to air pollution levels in the regions. The findings also aligned the outcome of related study by Dickson (2022), which assert that the outbreak of COVID-19 not only resulted in serious harm to human lives but also caused heart-breaking financial and political emergencies as well assignificant social and economic disruption in Nigeia. Consequently,the pandemic has heightened human suffering, undermined the economy, turned the lives of billions of household around the globe upside down, and significantly affected the health, economic, environmental, and social domains.

Based on the analysis of Household Level of Green Product Use (HLGPU), this study showed that there was a significant increase in green products during the outbreak of COVID-19 when compared to before. The various preferences of the green products of the households range from using house cleaners, reusable products, recycled products, solar power outdoor speakers/phone chargers, rechargeable batteries/flashlights, wool fool, rechargeable batteries/flashlights, foot wears etc The finding is affirmed by the studying of Jribi et al., (2020) who opined that covid-19 crisis increases household green product purchase intentions.

Conclusion and Recommendation

Findings on Environmental Transforming Behaviours (ETB) confirmed that most households separated waste items for recycling during the Lockdown more than they did before the

lockdown. This made them resort to buying products with less disposable packaging and also avoided excessive package purchases during the Lockdown than before the lockdown. In a nutshell, a higher percentage of households developed a positively high ETB during the lockdown than before the lockdown. Also, findings on Household Level of Green Product Use (HLGPU) showed a variation of the population preference of HLGPU ranging from using housecleaners, reusable products, recycled products, solar power outdoor speakers/phone chargers, rechargeable batteries/flashlights, eco-laptops/computer accessories batteries/flashlights, Eco-laptop/Computer, and foot wears. As such it was confirmed that the level of Green Product Use (GPU) was high during lockdown and lower before the lockdown.

The COVID-19 pandemic lockdown among other things aroused the consciousness of environmental health among humans leading to PEB. With lessons learnt in the lockdown, households are hereby required to form a habit-specific PEB- to lead a life that helps reduce environmental degradation and promote the use of home appliances conservatively.

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