Year (Yıl) : 2020 Volume (Cilt) : 7 Issue Number (Sayı) : 2 Doi : 10.4103/JNBS.JNBS_9_20

Received/Geliş 19.05.2020 Accepted/Kabul 21.07.2020 JNBS, 2020, 7(2):70-77

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EXPOSURE TO AFLATOXIN AND AGGRESSIVE BEHAVIOR AMONG WISTAR ALBINO RATS

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Ethics committee approval: The research was a seminal paper for which no ethical is issued due to University being shut down due to Industrial action and Covid-19 pandemic

Abstract

The exposition of Aflatoxin B1 (AFB) in aggression-intruding behavior in Wistar rat were assessed. Rodents in the experimental group (Group A, n= 6) were orally infused with AFB diluted in dimethylsulfoxide administered 0.3mg/kg/day on days 1 12. Controls received distilled water similarly on days 1-12 days (Group B). For the observation, an intruder was introduced into the cage containing the residents who are experimental rats treated with Aflatoxin and rats in the control treated with distilled water. Records of observations of territorial aggressive behaviours exhibited by the experimental and control rats towards the inntruder were recorded. Each rat was given 3 trials of 5 minutes each. The study utilized the Randomized Blocked Two-Way ANOVA (factors time line x treatment) followed by a post-hoc analysis using Bonferroni correction to analyse the data and Statistical significance was set at p < 0.05. Results demonstrated that exposure to Aflatoxin significantly influenced aggressive behaviour among Wistar rats F (1,322) = 29.89, p < 0.001, η^2 = .09. Aflatoxin-treated animals significantly exhibited more aggressive behaviour than animals treated with distilled water (Bonferonni= 4.04, p<.001). Exposure time to Aflatoxin interacted with treatment to significantly influence aggressive behaviour among Wistar rats F (1,322) = 3.26, p < 0.001, $\eta 2= .10$. Mean comparison reveals that there was no significant difference in aggressive behaviour of Aflatoxin treated and the distilled water treated rats from day 1-7. However, significant differences was observed from the 8th day onward to the 12th day. Aggressive behaviour increased by 10% as the chronic exposure increase more than seven days. It was concluded that aflatoxin induced toxicity in rodents influenced aggression as it exacerbates neuro-cognitive decline and brain bio-chemicals distortions leading to aggression behavior.

Keywords: aflatoxin toxicity, aggression-intruding behavior, neuro-cognitive, wistar rats

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1. Introduction

Aggression is an innate social trait that animals uses to defend their own territory, maintain resources and improve the probability of successful mating, thus an adaptive behaviour. However, the behavior is no longer adaptive and is called maladaptive or pathologic aggression, when it is excessive, detrimental, disrupts the social order and its cost far outweigh its benefit. Unreasonable level of aggression in responses to incitement, indirect violence or non-threatening social cues have a detrimental effect on individuals and the community (Aleyasin, Flanigan & Russo, 2018). Unnecessarily high irritability and aggression are widely recognized as symptoms of many neuropsychiatric disorders, which can have an effect on the patients' quality of life and their caregivers (Aleyasin et al., 2018).

Aggressive behaviour is also identified as symptomology of Post-traumatic Stress Disorder (PTSD), Alzheimer's disease, depression, schizophrenia and substance abuse. Besides, excessive aggressive behavior poses a health risk to individuals and the community at large, treatments are restricted and largely ineffective (Aleyasin et al., 2018). Nevertheless, multifactorial underlying causes of human aggression include; policy, socioeconomic, cultural, medical and psychological factors. It has also become clear that some forms of aggression, such as impulsive aggression (which occurs during emotional excitement and provocation), have an underlying neurobiology that researchers were only beginning to comprehend (Liu et al., 2013). Intrinsic and extrinsic causes (for example, social and dietary effects, endocrine and neurophysiological regulation mechanisms) may create, induce and modulate an aggressive behaviour. Both of set of variables are related; in evolutionary adaptation processes they undoubtedly played important roles (Liu et al., 2013). Furthermore, in accordance with the modulated aggressiveness due to neurophysiological processes it is usually unclear how dietary variables such as cholesterol, tryptophan, fatty acids and neurotoxic substance, for example aflatoxins influenced aggressive behaviour.

Aflatixins belongs to the family of Mycotoxins; these are metabolites harmful to living creatures found in naturally occurring fungi. Aspergillus Flavis, Aspergillu Parasiticizus and aflatoxin B1 (AFB1) are among the known most effective teratogenic toxins, mutagens and cancer-causing fungi (Parmar, Sharma, Anerao & Roy, 2016). The strong concentration of aflatoxins in animal feeds have been identified to trigger pathological issues in animals and notable financial losses to farmers, domestic animals were identified to be the most vulnerable (Parmar et al., 2016). Aflatoxin is a leading feed borne toxins in many of the animal organisms, and has been implicated in the etiology of human liver cancer through multiple clinical research studies (Kihara et. al., 2000), and one of the most potent cancer-induced agents. In livestock, for instance, cow, chicken or pig, etc., household animals such as dogs, cats and goats have been associated with aflatoxicosis.

Congenital deformities, skeletal abnormalities in the intrauterine development of wistar rats' babies were caused by exposure aflatoxins (Kihara et. al, 2000). (Aflatoxins). The effect of toxicology on human and animal activity in the last four decades has grown in understanding and the neuro-social implications. For example, before birth, it has been implicated in the behavioral and intellectual deficit in geo-spatial cognitive capacities of Wistar rat weanlings exposed to AFB (Kihara et al., 2000). Parmer et al. (2016) have also implicated Aflatoxins in the damage to neurobehavioral quality and synapses in chicks.

These study is premised on the growing concern that nutrition, which is essential for brain growth and functioning; is connected with aggression psychopathology (Brown, 2020). There is a strong indication that nutrition can modulate greater levels of violent and aggressive behaviour at the societal level based on studies from public health and neuroscience. In addition to major fatty acids in children, adolescents and adults, the regulation of the dietary intake of vitamin and mineral were found to significantly diminished aggressive behaviours throughout the developmental milestones (Brown, 2020). In studies on developmental milestones, early life nutrition was found to significantly modulate anti-social aggression and disruptive behaviour at age 3, disruptive and hostile behaviour during childhood and continues to play a major role young adults aggression (Brown, 2020; Liu et al., 2004). This finding is further supported by the fact that dietary stimulation of anti-social behaviour increased at age 3 to 17 years, and increased aggressive behaviour at age 23 years (Raine, 2003). This trend broadly confirms the hypothesis that food intake plays a significant role in the development of and remediation of biological and neurobiological induced violent behavior, and that at least part of the dietary intake affects aggression behaviour (Brown, 2020).

Children in Sub-saharan Africa including Nigeria, early in life are exposed to aflatoxins right from uterus through mothers' intake, Pre-weaning period, and after weaning to maize, peanut food and other foods high in aflatoxins (Mupunga, Mnggawa, & Katerere, 2017; McMillan et al., 2018). The bulk of these children are subject to elevated rates of aflatoxin during their lives, as most populations depend on subsistent farming and have little to no practices used to regulate the contamination of aflatoxins. Aflatoxin exposure have been associated with poor growth (underweight) and low immunity among children below age five years (Mupunga, Mngqawa, & Katerere, 2017; McMillan et al., 2018). Based on these, this study address the role of Aflatoxins in aggression behaviour and its implication for aggressive behaviour in humans exposed to its chronic dosage using the animal model.

Aflatoxins is currently being implicated in the aggression behavior in animal models. Aggression is a being studies in the pattern of territorial aggression. Territorial aggression which can be defined by individuals or by group preventing someone trespassing through individu-

als territory, as a norm for individuals of similar species, as the action organized toward the protection of a region; furthermore, the trait is established in animals that defend against and for intruders (Saunders Comprehensive Veterinary Dictionary, 2007). It is a significant part of intra-explicit challenge that can enable animals to access and hold restricted resources that improve their endurance and wellness (Seebacher et al., 2013). Aggression is often utilized in the protection of region or offspring, and in light of the danger of conspecific assault (Miczek et al., 2001, 2002). Aggression additionally happens when animals vie for foods, water and different assets important for endurance and proliferation (Takahashi et al., 2012).

Excessive territorial aggressive behaviour have been explained in term of alteration in the functioning of variety of neurological regions where violence has its biological roots. It have been proposed that bio-chemical interaction at the various synapses interface acted in different ways to trigger the display or tempering of aggressive tendencies in animals. In any event, these sources have being linked to serotonin and glutamine neurotransmitters (Takahashi, Lee, Iwasato, Itohara, Arima, Bettler, Miczek, & Koide, 2015; Wlassoff, 2015). Some researches has also shown that activities in the synapses can have an intensive impact on people's social characteristics. In particular, it was demonstrated that irregular synapse activities may trigger aggressive behaviour (Morrison and Melloni, 2014; Seo, Patrick & Kennealy, 2008; Wlassoff, 2015; Zhao and Gammie, 2014). The serotonin inadequacy paradigm proposed that pleasant emotions, rational coordinated action and a pleasant social image are exhibited once present in optimal quantity. Serotonin, a "happiness hormone" as implicated is said to affect the physiological environment, nerve cells, emotional function and intellectual performance if inadequate may trigger aggression, negative feelings and disruptive behavior (Takahashi et al. 2015; Wlassoff 2015). Aggression is also linked to disruptions in the cycle of glutamate / GABA-glutamine neurotransmitters. Synapse of glutamate helps strengthen the sensory focal system (Takahashi et al, 2015; Wlassoff, 2015; Zhao & Gammie, 2014). The way this neurotransmitter works is that it reduces discouragement, stabilise emotional disposition and increased mental awareness. Glutamate infusion in animals ' brains was found to increase their levels of aggression against other mice when incited (Seo, Patrick & Kennealy, 2008: Wlassoff, 2015; Zhao & Gammie, 2014) (Morrison & Melloni, 2014). Wlassoff, 2015; Zhao & Gammie, 2014). Overabundance of glutamate in the body has been emphatically connected to uneasiness, mood swings, hyperactivity, and disorganisation that may trigger aggression in certain individuals. Aggression control is basic to diminished odds of an individual having psychological maladjustment (Wlassoff, 2015; Zhao & Gammie, 2014).

Be that as it may, there is minimal distributed information on the neurobehavioral impacts of AFB on social conduct in animals or in humans. Studying the effects of Aflatoxin on territorial aggression increase the understanding of its implication to human behavior, this is because most animal model and human studies usually arrive at similar results. Identifying the possible effect accompanying the consumption of food products contaminated with Aflatoxin unsuspectingly in the society is an effort towards combating the menace the toxin is causing in the society. Only one study of the functional effects of prenatal AFB exposure has been completed to date (Kihara et al, 2000). The present study, therefore, was conducted to determine the behavioral effects on the social behaviour in wistar rats. This study is of benefit being that researchers rely on animal research to uncover fundamental aggression elements such as factors fueling, mental quest for violence, activation and incentives towards gaining an understanding of the neurobiological processes underlying aggression. Through Psychotherapeutic studies into aggression, pathological hostility is being identified and controlled (Liu et al. 2013). Aggression have been correlated with disability in multiple cognitive functions, based on a decade of developments in study and the capacity to suppress desires, modulate actions, and recognize, for example, the consequences of actions. They are assumed to have been attributed to neurological and brain function injury, violence, impairments. Therefore the need for understanding the neurobiologic disability origins of violence in the brain and neuronal systems (Blake & Grafman 2004; Brainfacts.org, 2008). The usefulness of this scientific endeavor include expanded usage for therapeutic services (e.g., emergency, psychological and critical care) reducing cost of public safety, and of a larger interest to the criminal justice system relevant to neuroscience, psychiatry and psychology, because they include a broad variety of adverse consequences of brain malfunction (Liu et al, 2013). Thus, understanding the mechanism for Aflatoxins modulated aggression will provide information for treatment options and prevention of dietary induced aggression.

1.1. Hypotheses

- 1.Rats exposed to Aflatoxin will significantly exhibit more territorial aggressive behaviour than rats exposed to distilled water
- 2.Rats exposed to Aflatoxin treatment for longer days will significantly exhibit more territorial aggressive behaviour than rats exposed to Aflatoxin treatment for a shorter period.

2.Materials and Methods

The research was a seminal paper for which no ethical is issued due to University being shut down due to Industrial action and Covid-19 pandemic.

2.1. Design

The design used in this study is 2-Independent group randomized design.

2.2. Subjects

A total 16 male Albino rats (Rattus norvegicus) housed

together in a North-Kent plastic breeding cages under constant and stable room temperature ($24\pm2oC$) and relative humidity of 50–60%, with a 12 hours light- 12 hours dark cycle were used for the study. The rats were between 5-6 weeks old (Mage = 5.23(SD=2.17) weeks). Food and water were available ad libitum.The rats were randomly divided into two groups comprising of 6 males as experimental group, 6 males as control group and 4 males as intruders for aggressive behaviour observations. 150-200 gm with a mean weight of 168.56 mg (S.D = 7.88) The animals were humanely handled in accordance with the protocol for Animal Care and Use Regulation Ethical Committee of the University of Ibadan, Ibadan, Nigeria.

2.3. Instruments

Distilled water administered orally as a placebo to the rats in the control group. Aflatoxin solution diluted with dimethyl sulfoxide (DMSO) was also administered orally to the experimental group. A blue, black and red marker for easy identification of the rats from control and experimental groups. Experimental cages (12 North-Kent Plastic cages (38cm x 25cm x 18cm) was used to house the rats. Each cage has the top and floor of stainless steel grid filled up with beddings). Stopwatch /Timer - for time keeping and recording and recording sheets.

2.4. Chemicals

Aflatoxin B1 were purchased from Sigma Chemical Company, St. Louis, MO, USA. Ddimethyl sulf-oxide (DMSO) from same organisation was used to dissolve the AFB1 to a stock solution (25 mg/ml) and diluted to appropriate treatment concentrations. All the chemicals used, including solvents, were of high purity and analytical grade. Aflatoxin solution (0.3mg/kg) for each of the rat was prepared daily and orally administered based on the weight of each rat (for the daily weighing using weighing balance of rats).

2.5. Behavioral test:

Resident-intruder paradigm: This method involves a male rat, a system close to that in which animals are used and sometimes maintain and protect their territories, and serious fights, which are assumed to be natural fights, may occur in circumstances where inhabitants face an unknown male attacker on their territory and trigger aggressive behaviour (Barnett, 1975) The scenario may include searching (patrolling), approach, investigation, threats fighting, chasing, dominant posturing and urging inhabitants to behave aggression fully to intruders. The nature of the intruders, especially the size or hormone of the attackers and the previous experience of the occupant, differs between the attacking inhabitant and the adversary. The resident attacker design was also recognized as the intruding aggressive model. The frequency of aggressive behavior was included by de Almeida and Lucion (1997). It analyzed the frequency and duration of these behavioral actions and positions. For rats, the overall hostility level was determined as the maximum

intensity number of tail rattle + chases + bites + cinches + rolling and tumbling fights + chasing + nasal contacts. The impact in displaying these seven aggressive behavioral elements of large individual differences was reduced in this approach (de Almeida et al. 2008).

2.6. Procedure

The research started with the acquisition of 16 male Albino rats weighing 180 to 200 grams from the animal house of the Faculty of Veterinary Medicine, University of Ibadan. They were housed in North Kent Plastic breeding cages in the veterinary animal research laboratory for two weeks to get acclimatized with the laboratory environment. The rats were randomly assigned into two groups of experimental and control and the intruder group. They were all marked with tail rings in different colours for identification purpose. Data collection for this research took a duration of 24 days of alternate day active treatment and observation making 12 days of active treatment. The rats were weighed on each day of treatment and administered with 0.3 mg/kg body weight of Aflatoxin solution for the experimental group and distilled water for the control. The rats were allowed a period of 30 minutes before observations to ensure the onset of the effect of the treatment.

For the observation, an experimental rat treated with Aflatoxin or control rat treated with distilled water were taken as the residents while an intruder was introduced into a cage containing the residents at interval. Four designated males rats that are neither in the control or experimental were utilized as intruders for aggressive behaviour observations of the residents. Records of observations of territorial aggressive behaviours exhibited by the experimental and control rats towards the intruder were recorded. Each rat was given 3 trials of 5 minutes each. Average records of aggressiveness was taken for each rat as record of aggressive behaviour for the experimental period. The rats were properly fed after each experimental process for 24 hours before the next experimental process. The treatment and observation process was repeated every other day for 12 days. The behavioral observation of interest for this research is the Resident-Intruder paradigm focusing on the behavior performed by the experimental rats as strongly dependent on the behavior performed by the intruder. Therefore, the following attributes of behaviours were recorded as aggression (tail rattle, chases, bites, cinches, rolling and tumbling fights, chasing, nasal contacts) and also salient aggressive acts such as aggressive posture and sideway threats.

After treatment, the rats were observed for aggressive behaviour. A statistical frequency Table was drawn that consists of a tally box, number of territorial aggressive displays, frequency, and duration. Thereafter a tally was ticked against the intruder rat exhibited aggressive cues towards the resident, this was done for each group (control and experimental), within the 0-5 minutes. The scores of each intruder male rat was gathered and at the end of the experiment for analysis.

2.7. Method of Statistical Analysis

All statistical analyses were performed using the software package SPSS (version 20). Behavioral parameters of the RI test were analyzed using Randomized Blocked Two-Way ANOVA (factors time line × treatment) followed by a post-hoc analysis using Bonferroni correction. Data are presented as mean + standard error of the mean (s.e.m.). Statistical significance was set at p < 0.05.

3. Results

The first hypothesis stated that Rats exposed to Aflatoxin will exhibit more aggression than rats treated with distilled water was tested using the Randomized Factorial ANOVA and the result presented in Table 1.

Table 1. Summary Factorial ANOVA table showing the influence exposure to Aflatoxin on aggression behaviour.

Source	Sum of Squares	df	Mean Square	F	Sig.	η²
Treatment	1367.388	1	1367.388	29.886	.000	.085
Days	2336.319	11	212.393	4.642	.000	.137
Treatment * Days	1642.706	11	149.337	3.264	.000	.100
Error	14732.736	322	45.754			
Corrected Total	21222.989	347				

The result from Table 1, shows that exposure to Aflatoxin significantly influence the exhibition of more aggressive behaviour among Wistar rats F (1,322) = 29.886, p < 0.001, η 2= .09.

Table 2. Summary Bonferonni mean comparison analysis showing the mean difference between rats exposed to Aflatoxin and those exposed to Distilled water.

Treatment	Mean	S.E	Bonfe Difference (I-J)	Sig.⁵
Experimental	9.821	.563	4.044*	.000.
Control	5.777	.563		

*. The mean difference is significant at the .05 level.

From the analysis, mean differences showed that Aflatoxin-treated animals significantly exhibited higher aggressive behaviour than animals treated with distilled water. The mean differences were significant (Bonferronni = 4.04, p<.001). The result demonstrated that aggressive behaviour increased by 8.5% with exposure to Aflatoxin among the animals treated with Aflatoxin compared to the control group. Based on this, hypothesis states that rats treated with Aflatoxin will significantly exhibit more territorial aggressiveness than rats treated with distilled water is accepted.

The second hypothesis stated that rats chronically exposed to Aflatoxin for longer period of time will significantly display more aggressive behaviour compared to Wistar rats treated with distilled water. This hypothesis was also tested using the Factorial ANOVA and the result presented in Table 1. The result from Table 1 shows that longer period or time of exposure to Aflatoxin significantly influence aggressive behaviour among Wistar rats F (1,322) = 3.264, p < 0.001, $\eta 2 = .10$.

Table 3. Bonferonni post Hoc analysis showing mean differences based on Treatment and period of days of exposure to Aflatoxin.

Days	Treatment		LSD	S.E	Sig
1.00	Experimental -	Control	3.278	2.255	.147
2.00	Experimental -	Control	444	2.255	.844
3.00	Experimental -	Control	2.056	2.255	.363
4.00	Experimental -	Control	1.611	2.255	.475
5.00	Experimental -	Control	889	2.255	.694
6.00	Experimental -	Control	-2.500	2.761	.366
7.00	Experimental -	Control	2.000	2.761	.469
8.00	Experimental -	Control	8.250*	2.761	.003
9.00	Experimental -	Control	4.667	2.761	.092
10.00	Experimental -	Control	7.250*	2.761	.009
11.00	Experimental -	Control	10.083*	2.761	.000
12.00	Experimental -	Control	13.167*	2.761	.000

*. The mean difference is significant at the .05 level.

The result of mean comparison of experimental to control group reveals that there was no significant difference in aggressive behaviour of Aflatoxin treated and the distilled water treated rats from day 1-7. However, significant differences were observed between Aflatoxin treated and the distilled water treated rats from the 8th day onward to the 12th day. Longer period of chronic exposure induced higher aggressive behaviour in the Aflatoxin treated rats. The result demonstrated that aggressive behaviour increased by 10%. The pattern of mean differences as the chronic exposure increases is presented in fig 1.



Figure 1. Interaction graph showing the interaction between time of exposure and treatment to Aflatoxin among Wister rats.

The line graph shows that longer period of chronic exposure induced higher aggressive behaviour in the Aflatoxin treated rats from the 8th – 12th days of the exposure. Based on this, hypothesis stated that rats chronically exposure to Aflatoxin for longer period of time significantly display more aggressive behaviour among Wistar rats treated with distilled water. Based on this, hypothesis stated that rats chronically exposure to Aflatoxin for longer period of time will significantly display more aggressive behaviour among Wistar rats treated with distilled water is thus accepted.

4. Discussion

The result demonstrated that aggressive behaviour increased with exposure to Aflatoxin among the animals treated with Aflatoxin compared to the control group. It was presumed that the neurotoxic effect of aflatoxin impacted on the emotion regulating areas within hypothalamic and limbic brain areas that modulates aggression. It is believed that the ability to evaluate the situation appropriately and react accordingly when confronted with an intruder was greatly hampered by neuro-cognitive decline and distortions of the brain bio-chemicals thus the excessive aggression. Thus increasing levels of neurot0xicity was associated with corresponding aggression to the environment. This findings is agreement with Kihara et al (2000) who has implicated prenatal exposure to AFB in behaviourial and cognitive deficit in pre-weaning offspring and geo -spatial abilities in the post-weaning offspring of Wistar rats. Also, Parmer et al. (2016) implicated Aflatoxins exposure in neurobehavioral toxicity and neurotransmitter disruption in chicks. Bbosa et al. (2012) have established that the mycotoxins and metabolites, particularly their aflatoxins and other substances, interfere with healthy functioning by creating a chemical and oxidative stress that induces carcinogenicity, speed up nerve cell death and inhibit protein production. In the field of brain chemistry and the work of mycotoxins, especially aflatoxins have been documented to be toxic. Neurological symptoms such as neurocognitive and altered sleep cycle and the symptoms of damage to the mind, such as discontent, muscle tremor, convulsions, loss of memory, epilepsy, idiocy, loss of muscle coordination and anomalous feelings, resultant from neurotransmitter deficiencies (Bbosa et al. 2012). In the same trend, Bahey et. al. (2015) has shown that the application of AFB1, causes multiple histopathological changes including cell degeneration, dilation of blood vascular and a significant decrease in frontal cortex thickness, and hippocampal pyramid cell layers. The amount of astrocyte production in the frontal cortex was significantly decreased without neuronal improvements. Stagkourakis et al (2018) clarify the role of Aflatoxins in violence. Stagkourakis et al (2018) have shown that rodents with the highest levels of aggression are also shown to have more activated neurons in the PMv of the hypothalamus, which is a significant emotional centre of euphoria, sadness and anger. Conversely, they are able to

prevent an aggressive attack by deactivating PMv neurons. Brief PMv cell activation causing violence has been identified. They also reverse the "dominant/submissive" roles by deactivating PMv nerve cells in dominant rodents which made the dominant rodents become submissive and vice versa. The potential to shift to dominant / submissive PMv-area control means the ability to reduce or aggravate neuropathic behavior of the aflatoxis. Recent studies have shown that bilateral PMV lesions in female rats significantly reduced the sexual behavior of females and maternal attacks against male intruder (Ferriera & Hansen, 1986). Looking at these trends, it is demonstrated that diet high in Afaltoxins disrupts and crosses the brain-barrier and neurotransmitter activities leading to neuro-cognitive impairment and disturbances in brain bio-chemicals interaction. This has implication for aggressiveness and irritability in humans who consumes food high in Aflatoxin contamination after long exposure causing malnutrition, especially in children (Redmond et al., 2016).

5. Conclusion

Aggression behavior of resident Wistar rats in resident/ intruder encounters was significantly influenced by prolong duration of exposure to aflatoxin. The number of aggression attacks and the length of the attacks increased substantially over time. As identified the neurotoxic effect of aflatoxin impacted on the emotion regulating areas within hypothalamic and limbic brain areas that modulates aggression. It is believed that the ability to evaluate the situation appropriately and react accordingly when confronted with an intruder was greatly hampered by neuro-cognitive decline and distortions of the brain bio-chemicals thus the excessive aggression. This study recognize the important role of biochemical factors in abnormal behavior. Toxic contamination of diet with aflatoxins have adverse, immediate and longterm effects on aggressive behaviour in rodents and by implication humans especially children.

This current research provides a communication pathways that can provide a clearer understanding of the association between nutritional intake, central nervous system and individual's psychological health status. Aside the fact that Aflatoxins leads to poor brain development and neurotoxicity of the central nervous system in childhood, it is established that it may be responsible for aggressiveness and irritability among children and infants. In increasing public health safety, there is need to promote Aflatoxin free and quality diet among children especially those under-five so as to considerably decrease violent and aggressive activity at the community level. At the clinical level, diet high in Afaltoxins, for example maize prepared meals may trigger aggressiveness and irritability in patients with psychiatric and behavioral disorders. Thus, quality diet low in Aflatoxins can reduce costs and improve patient results during hospitalization. These findings may lead to greater acceptance that neuro-toxins intake affect the incidence of irritability and

aggressiveness in rodents and possibly humans among health practitioners and health care providers addressing aggression and psychological disorders.

Patient informed consent : There is no patient informed consent

Ethics committee approval : The research was a seminal paper for which no ethical is issued due to University being shut down due to Industrial action and Covid-19 pandemic.

Conflict of interest : There is no conflicts of interest to declare.

Financial support : No funding was received.

Author contribution area and rate: 100% authorship

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