



IJLSD

IFE JOURNAL OF LAW, SOCIETY AND DEVELOPMENT
FACULTY OF LAW
OBAFEMI AWOLOWO UNIVERSITY, ILE-IFE, NIGERIA

Volume 1 Number 1

(ISSN: 3122-0878)

CONTENTS

Pages

- A Critical Analysis of the Dispute Resolution Mechanism in the Delta State Electric Power Sector Law 2025: Section 63(2) of the Law in Focus
Ebiton Ogboka 1-13
- Legislative Expansion of Jurisdiction of Customary Court of Appeal in Nigeria
Ahmed Olasupo Bada, Dorcas A. Odunaike & Veronica N. Ekundayo 14-38
- DNA Forensics Across Borders: A Study of Criminal Justice Applications in Nigeria, South Africa and the United Kingdom
Ihekoronye Ugonna Sharon, Osinbajo Moriyike, Oke Olakulehin Luqman & Obafemi Sunday Abiodun 39-57
- Circadian Rhythm, Sleep Deprivation, and Criminal Responsibility in Nigeria: Emerging Jurisprudential Challenges
Mohammed Amali, Abubakar Kagu & Shalom Andemi----- 58-79 58-79
- Assessment of Laws and Practices Regulating Ship Collision and Limitation of Liabilities under International Maritime Law and its Applicability to Nigeria
Kamalu Felix Chikwad & Olagunju Gbadebo Anthony 80-94
- Driving Legal and Institutional Reforms for A Strong, Resilient, Independent and Effective Local Government Audit System
Kamal Dawud, Mustapha Saidu Baba & Abdulmalik Usman Akole 95-112
- An Appraisal of the Defence of Duress: A Comparative Examination under English Law and Nigerian Criminal Law
Zainab Akinde 113-123
- Legal and Operational Constraints in the Fight Against Economic and Financial Crimes in Nigeria: Lessons from American Model
Saka Muhammed Olokooba, Joshua Olukayode Olatoke (SAN), Adeniyi Sakariyau Abdullah, Zakariyyah Muhammed Lekan & Onasanya Precious Oluwapelumi 124-143
- Examining Legislative Oversight as a Catalyst for National Security in Nigeria
Obadan Arebamen Abibu 144-167
- Legal Framework on the Protection of Abandoned and Internally Displaced Children in Nigeria
Adetutu A. Adewole & Adesomi Favour 168-187
- Marriage Laws in Nigeria: Examining the Gaps, Challenges, and the Imperative for Legal Reform
Abiodun Amuda-Kannike SAN & Abdulrazaq Abolaji Amuda-Kannike 188-202
- Elections and Electoral Processes in the 21st Century in Nigeria: Issues of Electoral Integrity, Technology, and Voter Engagement
Akinsola O. K., Agboke M. O. & Oduyebo T.O. 203-234
- Treaty Ratification in Nigeria: Bridging the Gap Between International Obligations and Domestic Legal Efficacy
Ayodeji J. Fatehinse & Suulola Oluwaseun Oluwatimilehin 235-252
- Emergency Rule in Nigeria: A Constitutional Analysis under the 1999 Constitution (as Amended)
Dilibe Eche 253-296
- Sustainable Shipping and Marine Environmental Protection: Nigeria as A Regulatory Stress Test of International Maritime and Environmental Law
Abdulkareem Ademola Mashood & Usman Sani Salihu 297-313
- Unjust Removal of the Democratic Institution in Rivers State by the President of Nigeria Pursuant to Section 305 of the 1999 Constitution 'A threat to Democratic Principles'
Richard U. Oyiwona 314-329
- Medical Laws and Ethical Responsibilities of Healthcare Professionals in Nigeria: A Legal Perspective
Akinsola O. K., Agboke M. O. & Oduyebo T.O. 330-256
- Critical Examination of the Legal and Institutional Frameworks Prohibiting Cyberterrorism in Nigeria
Obadan Arebamen Abibu 357-382

IJLSD Vol. 1, No. 1, 2026
ISSN: 3122-0878

EDITORIAL BOARD

Editor-in-Chief
Prof. O. A. Fatula

General Editors

Prof. A. A. Popoola
Prof. L. A. Raimi
Dr. (Mrs.) A. A. Abuloye
Dr. N. K. Adegbite

Members of Editorial Board

Prof. A. O. Ogunfolu
Prof. S. A. Coker
Prof. O. A. Olaseeni
Prof. M. O. Adeleke

© Copyright 2026, Faculty of Law, Obafemi Awolowo University, Ile-Ife, Nigeria.

All Rights Reserved. No part of this publication may be reproduced without the prior permission of the Editorial Board. Opinions expressed in this Journal are those of the authors and do not necessarily reflect or represent the opinions of the Editorial Board, IFE JOURNAL OF LAW, SOCIETY AND DEVELOPMENT (IJLSD).

CONTENTS

- *A Critical Analysis of the Dispute Resolution Mechanism in the Delta State Electric Power Sector Law 2025: Section 63(2) of the Law in Focus*
Ebiton Ogboka ----- 1 – 13
- *Legislative Expansion of Jurisdiction of Customary Court of Appeal in Nigeria*
Ahmed Olasupo Bada, Dorcas A. Odunaike & Veronica N. Ekundayo ----- 14 – 38
- *DNA Forensics Across Borders: A Study of Criminal Justice Applications in Nigeria, South Africa and the United Kingdom*
Ihekoronye Ugonna Sharon, Osinbajo Moriyike, Oke Olakulehin Luqman & Obafemi Sunday Abiodun ----- 39 – 57
- *Circadian Rhythm, Sleep Deprivation, and Criminal Responsibility in Nigeria: Emerging Jurisprudential Challenges*
Mohammed Amali, Abubakar Kagu & Shalom Andemi----- 58 – 79
- *Assessment of Laws and Practices Regulating Ship Collision and Limitation of Liabilities under International Maritime Law and its Applicability to Nigeria*
Kamalu Felix Chikwad & Olagunju Gbadebo Anthony ----- 80 – 94
- *Driving Legal and Institutional Reforms for A Strong, Resilient, Independent and Effective Local Government Audit System*
Kamal Dawud, Mustapha Saidu Baba & Abdulmalik Usman Akole ----- 95 – 112
- *An Appraisal of the Defence of Duress: A Comparative Examination under English Law and Nigerian Criminal Law*
Zainab Akinde ----- 113 – 123
- *Legal and Operational Constraints in the Fight Against Economic and Financial Crimes in Nigeria: Lessons from American Model*
Saka Muhammed Olokooba, Joshua Olukayode Olatoke (SAN), Adeniyi Sakariyau Abdullah, Zakariyyah Muhammed Lekan & Onasanya Precious Oluwapelumi----- 124 – 143
- *Examining Legislative Oversight as a Catalyst for National Security in Nigeria*
Obadan Arebamen Abibu ----- 144 – 167
- *Legal Framework on the Protection of Abandoned and Internally Displaced Children in Nigeria*
Adetutu A. Adewole & Adesomi Favour ----- 168 – 187

- *Marriage Laws in Nigeria: Examining the Gaps, Challenges, and the Imperative for Legal Reform*
Abiodun Amuda-Kannike SAN & Abdulrazaq Abolaji Amuda-Kannike ----- 188 – 202
- *Elections and Electoral Processes in the 21st Century in Nigeria: Issues of Electoral Integrity, Technology, and Voter Engagement*
Akinsola O. K., Agboke M. O. & Oduyebo T.O. ----- 203 – 234
- *Treaty Ratification in Nigeria: Bridging the Gap Between International Obligations and Domestic Legal Efficacy*
Ayodeji J. Fatehinse & Suulola Oluwaseun Oluwatimilehin ----- 235 – 252
- *Emergency Rule in Nigeria: A Constitutional Analysis under the 1999 Constitution (as Amended)*
Dilibe Eche ----- 253 – 296
- *Sustainable Shipping and Marine Environmental Protection: Nigeria as A Regulatory Stress Test of International Maritime and Environmental Law*
Abdulkareem Ademola Mashood & Usman Sani Salihu ----- 297 – 313
- *Unjust Removal of the Democratic Institution in Rivers State by the President of Nigeria Pursuant to Section 305 of the 1999 Constitution 'A threat to Democratic Principles'*
Richard U. Oyiwona ----- 314 – 329
- *Medical Laws and Ethical Responsibilities of Healthcare Professionals in Nigeria: A Legal Perspective*
Akinsola O. K., Agboke M. O. & Oduyebo T.O. ----- 330 – 356
- *Critical Examination of the Legal and Institutional Frameworks Prohibiting Cyberterrorism in Nigeria*
Obadan Arebamen Abibu ----- 357 – 382

LIST OF CONTRIBUTORS

Abdulkareem Ademola Mashood	Federal University Dutsin-Ma
Abdulmalik Usman Akole	University of Maiduguri
Abdulrazaq A. Amuda-Kannike	AbolajiAbike Chambers
Abiodun Amuda-Kannike SAN	Kwara State University
Abubakar Kagu	Yobe State University
Abdulrazaq Amuda-Kannike	AbolajiAbike Chambers
Adeniyi Sakariyau Abdullah	University of Ilorin
Adesomi Favour	Redeemer's University, Ede
Adetutu A. Adewole	Redeemer's University, Ede
Agboke M.O.	Fountain University Osogbo
Ahmed Olasupo Bada	Legal Practitioner & Notary Public
Akinsola O.K.	Chrisland University
Ayodeji J. Fatehinse	Redeemer's University, Ede
Dilibe Eche	Texas United States
Dorcas A. Odunaike	Babcock University, Ilishan-Remo
Ebiton Ogboka	Admiralty University of Nigeria, Ibusa
Ihekoronye Ugonna Sharon	Babcock University, Ilishan-Remo
Joshua Olukayode Olatoke (SAN)	University of Ilorin
Kamal Dawud	University of Maiduguri
Kamalu Felix Chikwad	Lagos State University

CIRCADIAN RHYTHM, SLEEP DEPRIVATION, AND CRIMINAL RESPONSIBILITY IN NIGERIA: EMERGING JURISPRUDENTIAL CHALLENGES

*

MOHAMMED AMALI*
ABUBAKAR KAGU**
SHALOM ANDEMI***

Abstract

Circadian rhythm disruption and sleep deprivation are increasingly recognised as factors that can impair judgment, impulse control, and conscious awareness, all capacities essential for criminal responsibility. In Nigeria, however, criminal law has yet to meaningfully engage with these biological realities, relying instead on classical notions of voluntariness, intent, and culpability. The article adopts a doctrinal and interdisciplinary approach, integrating legal analysis with insights from sleep neuroscience to assess the potential relevance of sleep-related impairments as mitigating or exculpatory factors in criminal adjudication. The article examines the emerging jurisprudential challenges posed by circadian and sleep-related impairments, arguing that existing doctrines such as automatism, insanity, diminished capacity, and sentencing discretion, provide latent avenues for recognising circadian conditions within the Nigerian legal framework. A comparative analysis with the United States and the United Kingdom demonstrates how courts elsewhere have cautiously integrated sleep science to ensure proportionality and fairness while preserving doctrinal coherence. The article contends that the reluctance of Nigerian courts to integrate these factors represents a missed opportunity to align criminal responsibility with contemporary scientific understanding. The article advocates for a purposive judicial approach that incrementally accommodates circadian and sleep-related evidence without undermining legal certainty.

Keywords: Actus Reus, Automatism, Circadian Rhythm, Criminal Responsibility, Mens Rea, Neuroscience, Sleep Deprivation.

1. Introduction

With evolutions in neuroscience showing the effects of biological time on cognition, emotional regulation, and behavioural control, circadian rhythm and sleep deprivation have emerged as important concerns in criminal justice discourse. Globally, courts and scholars are increasingly recognising that disruptions to the sleep-wake cycle can impair judgment, heighten impulsivity,

and undermine the capacity of an individual to form intent or act voluntarily.¹ This growing interface between chronobiology and criminal law signals a shift towards incorporating scientific understandings of human functioning into legal evaluations of wrongdoing and procedural fairness.

Despite this global evolution, Nigerian criminal jurisprudence has remained largely silent on the doctrinal and evidentiary implications of circadian disruption and sleep deprivation. While doctrines such as insanity, automatism, and diminished capacity exist under relevant statutes, Nigerian courts are yet to consider sleep-related impairments as legally significant. This gap raises important questions for a justice system where overnight detentions, extended interrogations, and fatigue-related offences such as road traffic crimes, and security-sector misconduct, are common. This article examines the doctrinal, comparative, and human rights dimensions of integrating circadian science into Nigerian criminal law, exploring whether existing mechanisms can accommodate biological impairments without undermining legal certainty. The article is structured in six parts. Immediately after this introduction, part 2 deals with the conceptual analysis of the paper. Parts 3 and 4 deal with the linking of science to the doctrine, and the evidential and judicial gaps respectively. Part 5 is the cross-country analysis, while part 6 synthesizes findings, recommendations, and conclusion.

2. Conceptual Analysis

2.1 Circadian Rhythm

Circadian rhythm refers to the endogenous biological cycle that regulates essential cardiovascular functions, including blood pressure, heart rate, vascular tone, and metabolic homeostasis.² The circadian clock is an internal regulator in cells of organisms, and its operation coordinates physiological and behavioral activities with daily environmental variations within 24-hour cycles.³ Disruptions occur through irregular sleep patterns, shift work, long-haul travel, or some medical

* LLB (Maiduguri), BL, LLM (Huddersfield), PhD (Huddersfield), Senior Research Fellow, National Institute for Legislative and Democratic Studies, (National Assembly), +2348036091751, amalimoh@yahoo.com;

** PhD (Sussex), Associate Professor, Yobe State University, +2348064992178

*** LLB (Jos), BL, LLM (In-View), Managing Partner, S.D. Andemi and Associates (Adonai Chambers), +2348063628387, andemidashalom@gmail.com

¹ Clarence Watson and Kenneth J Weiss, 'Sleep Disorders and Criminal Behavior' *Behavioral Sciences & the Law* [2024] (42) (3) 176–185 <<https://doi.org/10.1002/bsl.2652>> accessed 21st January, 2026.

² Nuszkievicz Jarosław and others, 'Circadian Rhythm Disruptions and Cardiovascular Disease Risk: The Special Role of Melatonin' *Current Issues in Molecular Biology* [2025] (47) (8) 664 <<https://doi.org/10.3390/cimb47080664>> accessed 21st January, 2026.

³ Sujana Reddy, Vamsi Reddy, and Sandeep Sharma, 'Physiology, Circadian Rhythm' (StatPearls Publishing 2023) <<https://www.ncbi.nlm.nih.gov/books/NBK519507/>> accessed 21st January, 2026.

conditions. Scientific studies demonstrate that circadian misalignment can produce impairments similar to alcohol intoxication, including slowed reaction time, poor judgment, and increased impulsivity. In human beings, dysfunction or misalignment of the circadian clock with environmental cues alters the timing of the sleep-wake cycle, leading to a variety of circadian impairments.⁴

The circadian system coordinates fluctuations in attention, memory, motor skills, and impulse regulation across the day, making it central to understanding behavioural capacity at any given moment. Hormones such as melatonin induce sleepiness, and cortisol, which promotes wakefulness and alertness, rise and fall predictably across the day.⁵ These neurobiological rhythms create periods of optimal and suboptimal cognitive performance, commonly referred to as diurnal variation.⁶ Due to the earth's rotation around its axis, roughly every 24 hours, most life forms on the planet experience regular changes in light and temperature. Distinct categories of persons affected by this are flight crew members because long haul flights across multiple time zones desynchronize their internal clock. This misalignment known as jetlag, causes sleep disturbances and fatigue, factors that degrade their optimal performances. Various species, spanning from cyanobacteria to human beings, have been shown to develop internal biological clocks to predict and adapt to these daily fluctuations. The plant, *Mimosa Pudica* had the peculiarity of opening its leaves during the daytime and closing them at night.⁷ This plant maintained said specific behavior even once placed in complete darkness, hence, deprived of all temporal indices usually obtained from the light-dark cycle. A human equivalent to this attribute occurred in the case of *LeMaire v Maass*.⁸ The holding facility where the plaintiff was held contained cells that were lit 24 hours per day, which the plaintiff alleged, disrupted his sleep and led to psychological problems. The court found the 24-hour lighting conditions to be unconstitutional, stating that "there is no legitimate penological justification for requiring inmates to suffer physical and psychological harm by living in constant illumination."

⁴ Alina Patke and Others, 'Mutation of the Human Circadian Clock Gene CRY1 in Familial Delayed Sleep Phase Disorder' *CellPress* [2017] (169) (2) 203–215 <DOI> accessed 21st January, 2026.

⁵ Angela Clow and others, 'The Cortisol Awakening Response: More Than a Measure of HPA Axis Function' *Neurosci. Biobehav. Rev* [2010] (35) (1) 97–103 <DOI> accessed 21st January, 2026.

⁶ Madhavi Munnilar and others, 'Diurnal Variation in Variables Related to Cognitive Performance: A Systematic Review' *Sleep Breath* [2024] (28) (1) 495–510 <<https://pubmed.ncbi.nlm.nih.gov/37589927/>> accessed 21st January, 2026.

⁷ Colin Pittendrigh, 'Handbook of Behavioral Neurobiology: Biological Rhythms' in Jürgen Aschoff (ed), *Biological Rhythms* (1st edn, Springer 1981) <Biological Rhythms | Springer Nature Link> accessed 25th January, 2026.

⁸ 745 F Supp 623 (D Or 1990).

From the foregoing, internal physiological processes and overall functions are intricately linked to the natural cycle.⁹ For legal analysis, it is important to distinguish between circadian misalignment, sleep deprivation, and fatigue, because they represent different forms of biological impairment. These distinctions are crucial because they influence the type and degree of cognitive impairment relevant to assessments of intent and voluntariness. Furthermore, legal/medical intersection to circadian disorders has been postulated by legal scholars and medical professionals who note that circadian dysfunction is an "invisible disability" that may not always meet the objective impairment levels.¹⁰

2.2 Sleep Deprivation

Sleep plays a crucial role in curtailing impulsivity primarily by replenishing cognitive control resources.¹¹ Sleep deprivation refers to insufficient or fragmented sleep that is capable of affecting legally relevant mental processes. It is associated with neurobehavioral deficits that include impairments in cognitive and psychomotor functions and alterations of the mood.¹² Loss of sleep impairs executive functioning, which is central to forming intention, exercising self-control, and appreciating the consequences of one's actions.¹³ It also weakens memory consolidation and retrieval, heightens emotional volatility, and reduces the capacity to resist coercion, factors that can directly affect both criminal conduct and interactions with the justice system. These impairments raise important questions about culpability, voluntariness, and the reliability of statements made under those conditions.

A nuanced legal analysis requires distinguishing between several forms of sleep loss. Voluntary sleep deprivation such as staying awake for personal reasons may not excuse liability, but may still reduce cognitive capacity. Involuntary sleep deprivation may result from environmental pressures, coercive custodial conditions, or occupational demands, and this raises deeper concerns about fairness and agency. The law must also differentiate between acute deprivation, and chronic deprivation because their cognitive effects differ significantly. Additionally, circadian misalignment must be distinguished from pathological sleep disorders such as sleepwalking and

⁹ Sandra J Kuhlman, L Michon Craig, and Jeanne F Duffy, 'Introduction to Chronobiology' *Cold Spring Harb. Perspect. Biol.* [2018] (10) (9) <<https://doi.org/10.1101/cshperspect.a033613>> accessed 25th January, 2026.

¹⁰ Caroline Skolnik, and Sabra Abbott, 'Why Does the History of Circadian Rhythms Matter for Sleep Today?' *AMA J Ethics* [2024] (26) (10) <<https://doi.org/10.1001/amajethics.2024.816>> accessed 25th January, 2026.

¹¹ Cristiano L. Guarana and others, 'Sleep and Self-Control: A Systematic Review and Meta-Analysis' *Sleep Medicine Reviews* [2021] (59) <<https://doi.org/10.1016/j.smrv.2021.101514>> accessed 25th January, 2026.

¹² Jared D Minkel, S Banks, and D. Dinges, 'Sleep Deprivation: Neurobehavioral Changes' in Larry R. Squire (ed) *Encyclopedia of Neuroscience*, (Academic Press 2009) 997–1004 <<https://doi.org/10.1016/B978-008045046-9.00073-5>> accessed 25th January, 2026.

¹³ *ibid.*

parasomnias, which may eliminate conscious awareness entirely. Each category should have different implications for understanding culpability and voluntariness within the Nigerian context.

2.3 Relevance to Criminal Culpability

2.3.1 Actus Reus, and Mens Rea

The standard common law test of criminal liability is expressed in the latin phrase 'actus reus non facit reum nisi mens sit rea,' meaning 'the act is not culpable unless the mind is guilty.' Under Nigerian criminal jurisprudence, criminal liability is traditionally constructed around the concurrence of actus reus and mens rea, subject to the availability of recognised defences. Mens rea is the mental element, while actus reus is the physical element, and these two requirements were succinctly described by Tobi JSC in *Abeke v The State*¹⁴ in the following terms:

"Mens rea means a guilty mind. And actus reus means a guilty act. Put another way, the guilty mind instigates the guilty act or flows into the guilty act."

The absence of either element undermines culpability and vitiates conviction, and due to this, the courts are usually forensic with their analysis of what constitutes a guilty mind, or not. Nigerian courts have consistently affirmed this principle, emphasising that liability cannot attach in the absence of proof of the requisite mental element, except in strict liability offences where the mental element is irrelevant.¹⁵ In *Tobi v The State*,¹⁶ it was stressed by the Supreme Court that intention and knowledge can be reasonably inferred from surrounding circumstances, including the conduct of the accused before, during, and after the commission of the offence. In *Ikomi v. State*¹⁷, the court held that where the prosecution fails to establish the mental element required by statute, criminal responsibility cannot arise, regardless of the harmful outcome. Similarly, in *Njoku and Ors. v. The State*,¹⁸ the Supreme Court held that "a man intends the natural and probable consequences of his acts."

¹⁴ (2007) LPELR-311901 (SC).

¹⁵ *Jules Suinner v. Federal Republic of Nigeria* (2021) LPELR-53404 (CA); *Yusuf v The State* (2020) LPELR-51158 (CA).

¹⁶ (2017) LPELR-432660 (CA).

¹⁷ (1986) 3 NWLR (Pt. 28) 340.

¹⁸ (2012) JELR 54077 SC.

From the foregoing, criminal culpability in Nigeria is not a blunt instrument, but a calibrated legal concept balancing societal protection with constitutional commitments to fairness, proportionality, and justice.

2.4 Criminal Defences

Criminal defences serve as legal shields that can negate, reduce, or excuse liability for criminal acts. They are crucial in balancing the state's interest in punishing wrongdoing with the protection of individual rights. Specifically, defenses under Nigerian criminal law are those of insanity, intoxication, mistake of fact, self-defense, and duress. Most intrinsically linked to the theme of this article however, is the defense of insanity. As a result, the defense of insanity is the only defense from the aforementioned ones that this paper shall discuss.

2.4.1 Insanity

The defense of insanity occupies a central place in Nigerian criminal law as one of the recognised grounds for exempting an accused person from criminal responsibility. Where mental disorder deprives a person of the capacity to understand, control, or appreciate the nature of their conduct, the moral and legal basis for criminal culpability is undermined. In Nigeria, the defence of insanity is statutorily provided for under both principal criminal law regimes. Section 28 of the Criminal Code Act provides that a person is not criminally responsible for an act or omission, if at the time of doing the act, they were in such a state of mental disease or natural mental infirmity as to deprive them of the capacity to understand what they were doing. Section 51 of the Penal Code exempts persons from criminal responsibility where, by reason of unsoundness of mind, they are incapable of knowing the nature of their actions, or that what they are doing is wrong or contrary to law. Both provisions reflect the influence of the common law M'Naghten Rules,¹⁹ although contextually adapted to Nigeria's statutory framework.

In order to successfully invoke insanity as a defence, accused persons must establish that at the time of the commission of the offence, they were suffering from a mental disease or infirmity of such severity that it affected their cognitive or volitional capacity. Conditions such as schizophrenia, severe psychosis, or other recognised mental illnesses may suffice, provided they meet the statutory threshold. Mere eccentricity, moral depravity, or temporary emotional

¹⁹ The M'Naghten Rule is a legal test for insanity in criminal law, establishing that a defendant is not criminally responsible if, due to a mental disease or defect, they either did not know the nature and quality of their act or did not know it was wrong at the time of the crime.

disturbance does not amount to insanity in law, and this was the reasoning of the Supreme Court in *Francis Ero v. State*²⁰ when it held that:

eccentricity is a product of a self-induced personal and individual peculiarity of a disordered mind or disposition which markedly distinguishes the eccentric person from the ordinary and normal, or average person, but does not tantamount to mental unsoundness or insanity.

This case typifies the cautious approach Nigerian courts exercise towards the defence of insanity. In *Adio v. State*²¹, the court stressed that strange or violent behaviour alone does not necessarily prove insanity unless linked to a mental disease affecting the accused's capacity.

These decisions reflect judicial concern about the potential abuse of the defence, balanced against the need to protect genuinely mentally ill offenders from unjust punishment. The defence of insanity in Nigerian criminal law is somewhat narrow and heavily reliant on outdated conceptions of mental illness.²² This is because modern psychiatric insights recognise a spectrum of mental disorders that may impair judgment or self-control without completely extinguishing cognitive capacity. Nigerian law, however, remains largely tethered to the rigid cognitive tests inherited from the M'Naghten Rules. This raises important questions about the adequacy of the current framework in addressing the complexities of mental health and criminal responsibility in Nigeria because insanity as a defense under Nigerian criminal law represents a crucial, but limited concession to the realities of human psychology. It addresses permanent or recurring mental incapacity, somewhat negating loss of cognitive ability that are not of a permanent nature, and this is where conditions such as automatism come into play.

Automatism is a doctrine in criminal law that negates liability when an act is performed without conscious control or voluntary intent. Under Section 24 of the Nigerian Criminal Code, a person is not criminally responsible for acts done independently of the exercise of their will. Unlike insanity which addresses internal and long-term mental disorders, automatism typically arises from external or temporary conditions such as reflexive action, extreme fatigue, or environmental factors. Circadian rhythm disruptions and sleep deprivation can produce similar involuntary states. As such, automatism provides a doctrinal avenue for recognizing biologically induced involuntary conduct within the Nigerian criminal framework.

²⁰ (2013) LPELR-20869 (CA).

²¹ (1986) 2 NWLR (Pt. 24) 581.

²² *Popoola v The State* (2013) 17 NWLR (Pt 1382) 96 @ 21.

Despite its statutory recognition, Nigerian courts have rarely applied automatism in practice, and there is currently no reported case where sleep disorders or circadian impairment have been successfully invoked as a defence. This absence highlights a doctrinal gap because although Section 24 theoretically covers involuntary acts, judicial engagement with scientific evidence on circadian and sleep disorders is virtually non-existent. Incorporating such evidence could allow courts to distinguish between voluntary criminal conduct and actions driven by biological impairment, thereby improving the fairness and proportionality of judgments.

Comparative jurisprudence provides a roadmap for such recognition, and distinction. In the United Kingdom case of *R v. Burgess*,²³ the appellant was charged with wounding with intent to do grievous bodily harm. His defense was that during the event, he was sleep walking and suffering from non-insane automatism. The judge ruled that on the medical evidence available, the only defence was insanity. The jury found him not guilty by reason of insanity. On appeal, he argued that automatism should not be considered insanity. The Crown argued that he suffered from an abnormal state of mind and it was irrelevant how it arose. The court accepted that there was a failure in his mind which caused him to act as he did. The key issue therefore was whether that failure was a disease of the mind, or, rather, a defect or failure of the mind not due to disease. His appeal was dismissed. The court found that the failure in his mind was due to an abnormality which manifested itself in violence and may recur. Consequently, this was held to amount to a disease of the mind and the trial judge's application of insanity as a defence was therefore correct. Courts in the United States of America have also admitted expert testimony on sleep deprivation and circadian misalignment to challenge mens rea or support diminished capacity.²⁴

These examples demonstrate that scientifically grounded automatism can be integrated without creating a standalone doctrine, thereby preserving legal certainty while accounting for human biological limitations.

3. Linking Science to the Legal Doctrines

This section explores how circadian science can be meaningfully integrated into existing doctrines without necessarily creating new categories.

²³ (1991) 2 WLR 1206.

²⁴ *People v Schmidt* (1974) 56 Ill. 2d 572.

3.1 Circadian Rhythm and the Doctrinal Limits of Criminal Responsibility in Nigeria

Chronobiological evidence shows that significant disruptions in circadian functioning can meaningfully impair judgment, diminish self-control, and compromise the ability to form intent.²⁵ However, emerging scientific insights on circadian rhythm disruption exposes conceptual gaps in how Nigerian criminal law assesses intention, recklessness, and voluntariness. This provides a conceptual foothold for Nigerian courts to treat mental states of mind as biologically contingent, rather than purely abstract or static. When applied to criminal law, this position supports a nuanced enquiry into whether an accused suffering from severe circadian misalignment truly formed the level of intention or recklessness required by law.

A growing body of scholarship argues that circadian disruption should be recognised as a legally relevant mental state, particularly when assessing mens rea, or the admissibility of confessions.²⁶ If Nigerian criminal law already accommodates intoxication, and automatism, it is conceptually coherent to extend similar analytical attention to severe circadian impairments. Doing so would promote a more accurate and humane understanding of human behavior that is aligned with contemporary science. Integrating chronobiology into Nigerian legal doctrine therefore offers a principled pathway for reconciling scientific reality with foundational legal norms.

Circadian rhythm disruption challenges the rigid distinction between voluntary and involuntary conduct adopted in Nigerian jurisprudence. Extreme fatigue, or sleep inertia may produce conduct that appears deliberate, but lacks conscious control. This opens doctrinal space for circadian rhythm evidence to be considered either within insanity (automatism), or as a factor negating mens rea. Nigerian courts assess recklessness and negligence by reference to the objective "reasonable person" standard as illustrated in *R v Princewill*.²⁷ This standard assumes normal cognitive alertness and decision-making capacity. Circadian science undermines this assumption, particularly in cases involving commercial drivers, security personnel, pilots and crew, or medical professionals whose work patterns structurally induce sleep deprivation. Where circadian disruption is occupationally induced, attributing criminal negligence without contextual evaluation risks diluting the fault principle. The Supreme Court's reasoning in *Aoko v Fagbemi*²⁸ cautioned

²⁵ Saptadip Samanta and Debasis Bagchi, 'An Intricate Relationship Between Circadian Rhythm Dysfunction and Psychiatric Diseases' *Explor Neurosci.* [2024] (3) 321-351 <<https://doi.org/10.37349/en.2024.00053>> accessed 25th January, 2026.

²⁶ Zlatan Krizan, and Richard A Leo, 'How Sleep-Related Fatigue Impacts the Evidentiary Value of Statements and Confessions' *The Champion* [2023] (47) (8) 44-53 <<https://ssrn.com/abstract=4654862>> accessed 25th January, 2026.

²⁷ (1963) ALL NLR 478.

²⁸ (1961)1 ALL NLR 400.

against this mechanical application of criminal standards without regard to fairness and justice, and this supports a more contextualised assessment of blameworthiness. This suggests that Nigerian courts should incorporate circadian impairment into negligence analysis, especially where systemic factors contribute to the accused's condition.

Nigerian criminal law also recognises insanity as a complete defence under statutory provisions, requiring proof of a defect of reason arising from disease of the mind. However, circadian rhythm disruption rarely meets this threshold. Nigerian courts, as seen in *Ejinima v State*,²⁹ adopt a strict approach to insanity, leaving little room for partial mental impairment. This rigidity exposes a doctrinal gap because circadian disruption represents a form of diminished cognitive capacity that falls short of insanity, yet significantly affects culpability. This was evident in the earlier discussed case of *R v. Burgess*.³⁰

The absence of a formal diminished responsibility doctrine in Nigerian law³¹ also heightens the importance of judicial creativity in integrating circadian evidence into mens rea evaluation and sentencing discretion, rather than forcing it into ill-fitting doctrinal categories. Conceptually, circadian rhythm disruption invites Nigerian courts to re-conceptualize criminal liability as temporally and biologically situated, and the Supreme Court's purposive interpretive posture in cases such as *Attorney-General of the Federation v Abubakar*³² demonstrates judicial willingness towards adapting legal principles to evolving realities. Applying this approach, courts can accommodate circadian rhythm evidence without undermining doctrinal coherence, by treating it as relevant to intention, recklessness, voluntariness, and mitigation.

It suffices therefore, to state that Nigerian criminal liability doctrine, while formally settled, is substantively incomplete in its engagement with biological constraints on human behaviour. Circadian science does not negate responsibility wholesale, rather it refines the moral and legal evaluation of blame. Recognising this aligns Nigeria's criminal jurisprudence with its foundational commitment to justice, fairness, and individualized culpability.

²⁹ (1991) 2 NSCC; (1991) 6 NWLR (Pt 200) 627.

³⁰ [1991] 2 QB 92.

³¹ Paul Adole Ejembi, 'Criminal Responsibility and Defences for Persons with Diminished Mental Capacity under Nigerian Law: Towards a Paradigm Shift' [2017] *AFJCLJ* (2) <(PDF) EJEMBI: Criminal Responsibility and Defences for Persons with Diminished Mental Capacity under Nigerian Law: Towards A Paradigm Shift CRIMINAL RESPONSIBILITY AND DEFENCES FOR PERSONS WITH DIMINISHED MENTAL CAPACITY UNDER NIGERIAN LAW: TOWARDS A PARADIGM SHIFT*> accessed 25th January, 2026.

³² (2007) 10 NWLR (Pt 1041).

4. Evidential and Judicial Gaps

Despite doctrinal pathways, Nigeria's criminal jurisprudence as already articulated in this study, remains largely silent on circadian impairment. Without recognising the effects of fatigue, courts may attribute full culpability to defendants whose cognitive capacities were measurably impaired. This section examines how the evidential gaps affect both substantive and procedural justice.

4.1 Procedural and Evidentiary Implications for Nigerian Criminal Justice

4.1.1 Confessions and Interrogation Timing

Circadian science highlights that individuals questioned during night-time hours or after prolonged periods of being awake, experience heightened cognitive vulnerability, impaired judgment, and increased suggestibility.³³ These conditions directly affect the voluntariness and reliability of confessional statements, two pillars of admissibility under Nigerian law. Sections 28–29 of the Evidence Act require that confessions are made 'voluntarily', yet judicial assessments hardly focus on physiological impairments that may have been triggered by circadian disruptions. Integrating circadian insights would enable courts to recognise that night-time interrogations, extended detentions without rest, and questioning at biological 'low points' could significantly undermine voluntariness. Judicial evaluation of confessions should therefore consider whether fatigue compromised the suspect's cognitive clarity, comprehension of cautionary rights, or ability to resist subtle pressure.

4.1.2 Witness Reliability and Memory

Circadian disruption affects witness reliability by impairing recall accuracy, narrative coherence, and the ability to distinguish memory from suggestion. Nigerian courts traditionally place heavy reliance on demeanour and internal consistency as indicators of credibility. Research however reveals that sleep loss weakens memory encoding and consolidation, making witnesses more prone to incomplete recall, temporal disorientation, and confidence-accuracy dissociation where seeming certainty does not reflect truthfulness.³⁴ Tired or sleep-deprived witnesses may appear hesitant, confused, or inconsistent not because of deception, but due to biological impairment.

In forensic settings, circadian misalignment may heighten stress reactivity and emotional volatility, further contaminating recall during identification procedures and cross-examination. These effects

raise serious considerations for courts because testimony obtained from circadian-impaired witnesses may appear coherent, but cognitively compromised. This underscores the need for judicial sensitivity to the timing of events, interrogations, and testimony when assessing credibility and evidential weight.

4.1.3 Expert Evidence

Under the Evidence Act, 2011,³⁵ expert evidence is admissible where specialised knowledge is required to interpret facts beyond ordinary experience. Chronobiology and sleep science clearly fall within this domain. However, the implications of circadian disruptions on expert evidence in Nigeria is compounded by the structural scarcity of recognised experts in circadian science and sleep medicine, despite the growing judicial need for such specialised evidence. Courts may increasingly require expert testimony to explain the effects of sleep deprivation, shift work, or biological timing on cognition, behaviour, and responsibility, but the limited availability of suitably trained experts creates a credibility gap. This vacuum risks the admission of evidence from inadequately qualified professionals whose expertise lies only tangentially in related fields, thereby diluting scientific accuracy and undermining evidentiary reliability.

In the absence of clear standards for circadian expertise, judges may struggle to assess methodological soundness and probative value, potentially leading to overreliance on speculative or generalized opinions. The implication is a systemic challenge for Nigerian adjudication, restricting the effective use of expert testimony on the cognitive effects of fatigue.

4.1.4 Sentencing and Mitigation

Circadian disruptions have profound implications for sentencing and mitigation because they directly affect an offender's cognitive control. In sentencing, this is relevant for mitigation where the offence is linked to chronic fatigue, or systemic conditions beyond the individual's immediate control. Failure to consider circadian impairment risks imposing disproportionate punishment by overlooking context that influenced conduct. Careful judicial assessment would ensure that circadian disruption is not treated as an excuse, but as a scientifically grounded factor informing proportionality, rehabilitation prospects, and the tailoring of custodial or non-custodial sentences. Recognising circadian impairment as a mitigating circumstance would allow courts to assess culpability more accurately, especially in cases involving individuals subjected to extreme work schedules.

³³ (n 26).

³⁴ (n 26).

³⁵ Sections 68–77.

5. Comparative Perspectives

5.1 The United Kingdom

5.1.1 Legal and Regulatory Framework

The United Kingdom represents one of the most developed jurisdictions for integrating biological and cognitive vulnerability into criminal procedure. The central regulatory instrument is the Police and Criminal Evidence Act (PACE) 1984, especially Code C, which governs detention and interrogation. Code C restricts the questioning of suspects during certain night hours and mandates adequate rest, meals, and breaks. These requirements implicitly reflect the biomedical awareness that night-time questioning heightens suggestibility, cognitive overload, and coerced or unreliable admissions.

Although Code C does not use scientific terms like 'circadian rhythm, it contains several key provisions rooted in circadian logic as follows:

- i. prohibition of oppressive or prolonged late-night questioning unless strictly necessary;
- ii. mandatory sleep opportunity for detainees before extended interviews;
- iii. requirements for breaks between interview sessions to mitigate cognitive fatigue; and
- iv. special protections for vulnerable persons whose cognitive capacities may be further compromised by sleep loss.

5.1.2 Judicial Treatment of Fatigue and Sleep Disorders

Courts in the UK have shown a willingness to engage with scientific evidence relating to circadian disruption and sleep pathology in the following ways:

I. Automatism and Sleep Disorders

English courts have addressed parasomnias, sleepwalking, and other sleep-related conditions as bases for automatism. Cases such as the aforementioned *R v Burgess*³⁶ established that sleep disorders may constitute non-insane automatism or, in some instances, disease of the mind. This demonstrates judicial openness to biological explanations for impaired consciousness.

³⁶ (1991) 2 WLR 1206.

II. Voluntariness of Confessions

Courts in the UK assess whether a confession was made during a period of fatigue or cognitive impairment that could undermine free will. Factors such as time of questioning, length of detention, and degree of rest have been considered in evaluating compliance with PACE safeguards. In *Beeres v Crown Prosecution Service (West Midlands)*,³⁷ the appellant was convicted of assault, with the sole evidence against her being a confession made during a police interview. She argued that her confession should be excluded under sections 76 and 78 of the Police and Criminal Evidence Act 1984 (PACE) because she was sleep-deprived and intoxicated when interviewed, undermining her ability to give a voluntary and reliable confession. The court held that the interviewing officer had appropriately assessed the appellant's fitness to be interviewed despite her claims of tiredness and alcohol consumption. The court emphasised that the eight-hour rest requirement in PACE Code C does not automatically render a confession inadmissible if the suspect is properly assessed as "fit to be interviewed". The judge's findings, that the appellant was coherent, fit, and able to exercise her rights meant the confession was neither unfair nor rendered involuntary by the alleged lack of sleep. This case is directly relevant to voluntariness when physiological conditions are alleged to affect the reliability of confessions. It confirms that mere exhaustion, or lack of rest, does not automatically make a confession involuntary, but such factors can be relevant to the court's assessment of voluntariness and fairness under PACE.

Similarly, in *R v Nazish*,³⁸ while not solely based on circadian impairment, the circumstances in the case provides a useful illustration of voluntariness assessment where the defendant's physical/mental condition and its impact on the reliability of the confession were challenged. The legal issue here was whether conditions affecting a suspect's physical or mental state, even where not amounting to clear oppression, can justify exclusion of a confession in the interests of fairness and voluntariness under section 78 of PACE. The Court of Appeal confirmed that section 78 of PACE allows a court to exclude confession evidence if, in all circumstances, its admission would have such an adverse effect on the fairness of the proceedings that it ought not to be admitted. It was held that although the appellant's subjective experiences (e.g., exhaustion, stress) are not determinative per se, they are relevant contextual factors in assessing voluntariness and fairness, especially where they could undermine a suspect's capacity to understand rights or make a free choice. This case reinforces that voluntariness is a holistic enquiry not just about overt coercion or police oppression, but also whether the circumstances of detention or interrogation (including physical/mental state) could so affect the suspect's autonomy or reliability that a confession should be excluded.

³⁷ [2014] 2 Cr App R 8.

³⁸ [2014] EWCA Crim 2947.

III. Expert Evidence

Expert testimony on sleep disorders, microsleeps, or fatigue-related cognitive impairment is admissible where relevant. Courts may rely on neurologists, psychiatrists, and sleep specialists to interpret behaviour that cannot be explained by lay reasoning. Most UK case law relevant to sleep or circadian issues for instance, tend to arise in automatism or mental state contexts.³⁹

5.1.3 Operational Adaptations

Some police forces in the UK use fatigue-management protocols governing officer work schedules. The criminal justice system has also incorporated trauma-informed and vulnerability-sensitive interview practices, which align with chronobiological principles. Under PACE Code C, detainees must be “fit to be interviewed”, and provided adequate rest periods. Custody officers are also operationally responsible for assessing fatigue, disorientation, and reduced alertness. Interviews may also be postponed where a suspect is exhausted, or cognitive functioning appears impaired. This operates as a practical safeguard against circadian-related unreliability, even without explicit scientific terminology. It also means that circadian impairment indirectly informs voluntariness and fairness under sections 76 and 78 of PACE.

In critical industries such as the transport sector, the UK also maintains strict duty-time limitations for pilots, and drivers. Here, mandatory rest periods and maximum night-shift thresholds are strictly observed. In fact, fatigue is treated as an operational hazard akin to intoxication.⁴⁰ In the work place, the Work Time Regulations of 1998 limits work to a 48-hour working week, and specifies night time durations.⁴¹ There is also special protection for night workers, including free health assessments, and the right to transfer to day work where night work causes health problems.⁴²

5.1.4 Relevance to Nigeria

The UK model is highly relevant to Nigeria in addressing circadian impairments within the criminal justice system, not because the UK has an explicit “circadian doctrine”, but because it

³⁹ R v. Burgess (n 30).

⁴⁰ Health and Safety Executive, ‘Fatigue’ <<https://www.hse.gov.uk/humanfactors/topics/fatigue.htm>> accessed 25th January, 2026.

⁴¹ The Working Time Regulations 1998 <<https://www.legislation.gov.uk/uksi/1998/1833/contents>> accessed 25th January, 2026.

⁴² *ibid.*

demonstrates how institutional safeguards, professional discretion, and procedural fairness can mitigate the legal risks posed by fatigue, sleep deprivation, and biological misalignment. It provides a fully institutionalised model, showing how procedural safeguards, not necessarily new offences or defences, can integrate circadian awareness. The UK experience shows that circadian impairment can be addressed through interpretation, institutional design, and procedural safeguards, without destabilizing criminal law doctrines.

5.2 The United States of America (USA)

The USA model on circadian impairment in the criminal justice system is empirically driven, expert-centric, and constitutionally interventionist. The model rests on four pillars of empirical social-science evidence, constitutional interrogation doctrine, judicial openness to expert testimony, and policy diffusion from psychology into policing. Circadian impairment is therefore treated as a measurable risk factor for unreliable confessions and wrongful convictions. Hinged on the Fifth, and Fourteenth amendments,⁴³ courts in the USA assess whether a confession is the product of a free and unconstrained will, using a totality of the circumstances test. Circadian impairment fits squarely within this analysis, and the USA Supreme Court has long recognised that sleep deprivation can render confessions involuntary, even without physical abuse.

In *Ashcraft v Tennessee*,⁴⁴ the defendant, Mr. Ashcraft, was questioned intermittently by several officers over a period of about thirty-six hours during which time he neither had rest nor sleep. The court held that even if the Mr. Ashcraft made a confession, it was not voluntary, but compelled, and that his conviction, resting upon the alleged confession, must be set aside because it showed a situation inherently coercive.⁴⁵ In *Spano v New York*,⁴⁶ a young man of no previous criminal record was indicted for first-degree murder. He retained counsel and surrendered to police at 7:10 p.m. He was then subjected to persistent and continuous questioning by an assistant prosecutor and numerous police officers for virtually eight hours until he confessed. He had repeatedly requested, and been denied an opportunity to consult his counsel. At his trial in a state court, his confession was admitted in evidence over his objection, and he was convicted and sentenced to death. In reversing the decision, the Supreme Court held that the petitioner's will was overborne by official pressure and fatigue, and as a result, his confession was not voluntary, and its admission in evidence violated the Due Process Clause of the Fourteenth Amendment.⁴⁷

⁴³ Privilege against self-incrimination, and voluntariness and fundamental fairness respectively.

⁴⁴ 322 U.S. 143 (1944).

⁴⁵ 322 U. S. 153.

⁴⁶ 360 U.S. 315 (1959).

⁴⁷ 360 U. S. 315-324.

In *Reck v Pate*,⁴⁸ exhaustion and physical weakness was used as a ground for ruling a confession inadmissible. The petitioner then, a mentally retarded 19-year-old youth with no criminal record, was arrested on suspicion of stealing bicycles. After being held virtually incommunicado and interrogated by groups of police officers for nearly four days while being sick, inadequately fed, without a hearing, and without the advice of counsel, family or friends, he confessed to participation in a murder. At his trial for murder, his two written confessions were admitted in evidence over his timely objection, and he was convicted and sentenced to prison for 199 years. In setting the decision aside, the court held that the petitioner's confessions were coerced, and that the State violated the Due Process Clause of the Fourteenth Amendment by using them as evidence in his trial.⁴⁹

Another landmark case in the US, famously known as the Norfolk Four,⁵⁰ is widely cited as a significant example of false confession and miscarriage of justice. In this case, Michelle Moore-Bosko was raped and murdered in Norfolk, Virginia, by Omar Ballard. Based on false hunches and blinded by tunnel vision however, Norfolk police detectives ignored Ballard and interrogated numerous other suspects. They elicited provably false confessions from Danial Williams, Joseph Dick, Eric Wilson and Derek Tice, who eventually came to be known as the Norfolk Four. They were each wrongfully convicted of the rape and murder of Moore-Bosko, and spent many years in prison before being formally exonerated. The interrogations that led to their false confessions were lengthy. Danial Williams was interrogated for more than 11 hours overnight before falsely confessing in early morning hours. Joseph Dick was interrogated for more than nine hours. Eric Wilson was interrogated for approximately 10 hours, while Derek Tice was interrogated for over 11 hours. Danial Williams for example, was so tired that at one point in his interrogation he fell asleep.⁵¹

It is clear that the aforementioned cases aligned with the doctrine in *Ashcraft v. Tennessee*,⁵² but later decisions retreated from this position. In *Crooker v. California*,⁵³ the court upheld a confession obtained after approximately 14 hours of questioning, stressing the suspect's education, intelligence, and the absence of physical mistreatment. By shifting attention from duration to the

⁴⁸ 367 U.S. 433 (1961).

⁴⁹ 367 U.S. 433-444.

⁵⁰ Mid-Atlantic Innocence Project, Norfolk Four (Derek Tice, Danial, Joseph Dick, Eric Wilson) <<https://exonerate.org/victory/norfolk-four-derek-tice-danial-williams-joseph-dick-and-eric-wilson/>> accessed 25th January, 2026.

⁵¹ (n 26).

⁵² 322 U.S. 143 (1944).

⁵³ 357 U.S. 433 (1958).

personal characteristics of the accused and the surrounding conditions, the Crooker case marked a clear deviation from *Ashcraft*. This signalled that the length of interrogation alone no longer automatically sufficed to invalidate a confession. This deviation was further entrenched in *Culombe v. Connecticut*⁵⁴, where the Court explicitly rejected the idea that any single factor, including duration, could be determinative of involuntariness. Although the interrogation in this case spanned several days, the court declined to treat this fact as constitutionally decisive, instead portraying *Ashcraft* as an exceptional case involving extreme and uninterrupted pressure. This analytical shift effectively diluted *Ashcraft's* force, transforming it from a governing principle into a cautionary illustration of egregious police conduct.

The deviation from *Ashcraft* continued after the landmark case of *Miranda v. Arizona*,⁵⁵ in what would later be referred to in US jurisprudence as the post-Miranda era, signifying the body of criminal-procedure jurisprudence that developed under the influence of the Miranda warning regime. Conceptually and doctrinally, the post-Miranda era shifted the constitutional focus of interrogation law from substantive coercion to procedural safeguards. Before Miranda, courts assessed confessions almost entirely under the Due Process voluntariness test, asking whether the will of the suspect was overborne by factors as seen in *Ashcraft*. Post-Miranda, the presence or absence of warnings, and whether the suspect invoked or waived those rights, became a central determinant of admissibility. As a result, lengthy interrogation is no longer presumptively suspect if Miranda warnings were given and not invoked.

The post-Miranda era is also characterised by judicial tolerance of extended custodial questioning, provided procedural compliance is maintained. Courts increasingly admit confessions obtained after hours of interrogation on the basis that the suspect was informed of the right to remain silent, and to counsel, and did not clearly assert those rights. Decisions such as the one in *Berghuis v. Thompson*⁵⁶ illustrates this trend. In this case, the Supreme Court upheld a confession obtained after nearly three hours of questioning, focusing on the suspect's failure to clearly invoke his right to silence rather than the psychological impact of sustained interrogation.

Another key ingredient of the post-Miranda era is the reflection of a broader recalibration of police-suspect power relations, where formal legality often substitutes for substantive fairness. Thus, when scholars and courts refer to the post-Miranda era, they describe a legal landscape in which interrogation practices are judged primarily through procedural compliance with Miranda, rather than through the stricter psychological-coercion lens exemplified in *Ashcraft*.

⁵⁴ 367 U.S. 568 (1961).

⁵⁵ 384 U.S. 436 (1966).

⁵⁶ 560 U.S. 370 (2010).

The contemporary position therefore reflects a settled deviation, in that *Ashcraft* remains good law only for extreme, continuous, and sleep-depriving interrogations, while modern jurisprudence tolerates extended questioning so long as voluntariness, assessed contextually, is formally maintained.

Importantly, and although not particularly related to criminal responsibility, it is pertinent to note that US courts have also addressed issues related to circadian rhythm disruption primarily within the context of disability law, (e.g., Social Security claims) and employment law. However, due to the fact that identifying cases where a court explicitly “admits circadian impairment” as a universally defined legal condition is complex, as it is often treated as part of a broader medical or psychiatric impairment rather than a standalone legal category. In *Attmore v. Colvin*,⁵⁷ the Ninth Circuit Court of Appeals reviewed a case where the claimant had repeated hospitalizations and difficulty with a consistent schedule as a result of bipolar disorder, which impacted her ability to work. The court considered evidence of her symptoms, including not sleeping and experiencing hallucinations, in the context of her overall impairment and eligibility for benefits.

5.3 Comparative Synthesis: Nigeria, The United States of America, and the United Kingdom

Across these three jurisdictions, a central comparative challenge lies in the disconnect between scientific understanding of circadian rhythm disruption and legal tests for voluntariness and criminal responsibility. While all three jurisdictions formally prohibit coercive interrogation and require that confessions must be voluntary, none has developed a doctrinal framework that expressly integrates sleep deprivation, fatigue, or circadian misalignment as independent legal determinants. Nigerian courts continue to rely on the voluntariness test under the Evidence Act and “trial-within-trial” procedure, UK courts operate through statutory exclusion for oppression or unreliability under PACE, and U.S. courts apply a constitutional totality-of-the-circumstances analysis. In each system, however, chronobiological impairment remains treated as incidental rather than foundational, leaving courts ill-equipped to assess how fatigue can subtly but decisively undermine cognitive autonomy and rational decision-making.

A second shared challenge is the tension between procedural compliance and substantive fairness. In the UK and the USA especially, formal safeguards such as legal representation, recorded interviews, or Miranda warnings, are often treated as sufficient indicators of voluntariness even where questioning occurs during circadian troughs, or after prolonged wakefulness. This

⁵⁷ No. 13-36048 (9th Cir. 2016).

procedural emphasis risks obscuring the reality that a suspect may technically “comply” with legal formalities while being functionally impaired by circadian impairments. Nigeria faces a related but more acute difficulty, because although statutory protections exist, inconsistent enforcement and weak documentation of interrogation conditions make it difficult for courts to meaningfully evaluate the impact of fatigue or deprivation. Across jurisdictions, this raises a normative concern that formal legality may mask psychological coercion, particularly in cases heavily reliant on confessional evidence.

Finally, the comparative analysis exposes a broader jurisprudential challenge concerning criminal responsibility and evidentiary reliability in an era of advancing neuroscience and psychology. Scientific research increasingly demonstrates that sleep deprivation heightens suggestibility, impairs judgment, and increases the risk of false confessions, but legal doctrine in all three systems remains largely reactive, rather than anticipatory. The absence of explicit legal standards addressing interrogation timing, rest requirements, or circadian vulnerability leaves courts dependent on judicial intuition (creativity), rather than structured guidance. For Nigeria, the challenge is both doctrinal and institutional, for the UK and the USA, it is primarily conceptual. Collectively, these systems face an emerging imperative to recalibrate criminal procedure to reflect the cognitive realities of fatigue, lest criminal responsibility be assessed on evidence obtained under conditions fundamentally incompatible with meaningful free will.

6. Findings, Recommendations, and Conclusion

6.1 Findings

This study finds that there are doctrinal gaps in Nigerian law on the subject. Nigerian criminal law largely assumes rationality, intent, and voluntariness at all times. There is no statutory recognition of cognitive impairment arising from circadian disruption or sleep deprivation. While doctrines such as automatism, and mental impairment exist, courts have not explicitly applied them to fatigue- or sleep-related impairment.

The study also evinces procedural and evidentiary weaknesses in Nigerian criminal jurisprudence on circadian rhythms and sleep deprivation generally. Nigerian courts often rely on common-sense reasoning rather than scientific evaluation when assessing confessions, witness reliability, or culpability. Nighttime interrogations, prolonged custody without rest, and lack of expert assessment expose defendants to higher risks of involuntary statements and wrongful convictions. There is also a shortage of forensic and sleep-science experts to provide credible evidence in cases where circadian factors are relevant.

Another finding of this study pertains to the impact of circadian disruption on criminal responsibility. Despite proof of the effects of Circadian disruption, Nigerian jurisprudence has not yet considered such biological states as mitigating factors, creating a gap between scientific understanding and legal assessment.

6.2 Recommendations

Based on these findings, this study proposes normative, policy, and doctrinal reforms. Legislative amendments to the Criminal Code and Penal Code are recommended in order to explicitly recognise cognitive impairment arising from severe sleep deprivation or circadian disruption. Such provisions would clarify when fatigue may undermine intent, voluntariness, or conscious control. Parliament should also enact statutory safeguards limiting nighttime interrogations, requiring mandatory rest periods for detainees, and mandating documentation of sleep conditions during custody. Additionally, police regulations and detention protocols should incorporate fatigue-related provisions, including maximum interrogation durations and circadian-sensitive questioning policies.

Regarding procedural and judicial reforms, a trauma, and fatigue-informed credibility model, already gaining traction in comparative jurisdictions, would enhance the fairness of Nigerian trials. Clear temporal safeguards, including maximum continuous interrogation periods and mandatory rest intervals must also be introduced. Legislative guidance could prohibit interrogation beyond a specified number of hours without rest, and restrict questioning during late-night or early-morning hours except in strictly justified circumstances. Such reform would transform general rights to humane treatment into operationally enforceable standards, thereby aligning Nigerian practice with contemporary scientific understanding of cognitive fatigue. Such an approach also encourages courts to evaluate the timing of events, the witness's sleep state, and environmental pressures that may have compromised memory formation.

Strengthening judicial understanding of scientific methods and ensuring clearer admissibility standards would allow Nigerian courts better integration of chronobiological evidence into case analysis. In this regard, the judiciary can play a key role by issuing Practice Directions specifying the conditions under which nighttime hearings, statements, or investigative actions may be deemed appropriate. Courts should also develop bench-marks that synthesise chronobiological research for judges and magistrates, ensuring scientifically accurate decision-making. Voluntariness tests for confessions should be reformed to include circadian vulnerability as a factor, similar to how courts evaluate intoxication or mental distress. These reforms would strengthen procedural fairness while aligning Nigerian law with emerging global standards.

At the institutional level, law enforcement agencies should adopt fatigue-risk management systems in order to prevent errors, misconduct, and unsafe operational practices. Establishing medical evaluation protocols for sleep-related defences would ensure that claims of cognitive impairment are properly assessed by qualified professionals.

Finally, investment in training and funding for forensic neurologists, psychiatrists, and sleep scientists on circadian vulnerability is essential to building a sustainable framework for integrating chronobiology into Nigerian criminal justice. Consequently, the National Judicial Council should incorporate training modules on sleep deprivation, circadian rhythm, and interrogation psychology for judges and magistrates. This institutional reform would ensure that statutory amendments are meaningfully applied and would promote doctrinal coherence across Nigerian courts, reducing inconsistency in voluntariness determinations.

These legislative proposals seek to reposition Nigerian criminal procedure from a formal voluntariness model to a substantive cognitive-fairness framework, ensuring that criminal responsibility and confessional evidence are assessed in light of the biological limits of human decision-making. By embedding circadian and sleep-related considerations into statute, Nigeria can address an emerging jurisprudential challenge before it crystallises into systemic injustice.

6.2 Conclusion

Bridging the gap between biomedical science and criminal law requires legislative reform, judicial education, and institutional capacity-building. Recognising circadian and fatigue-related impairment does not undermine responsibility, rather, it ensures that the justice system evaluates human behaviour with accuracy, fairness, and scientific insight. Integrating these reforms will promote procedural fairness, protect constitutional rights, and enhance the credibility of Nigerian criminal jurisprudence in line with global best practices.