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Using Coconut Water To Control Addiction

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ABSTRACT

Introduction: Relapse from nicotine and other addictive substances prevented people from quitting and contributed to mental-health problems, academic decline, and increased risk-taking. Objective: To determine whether coconut juice could help individuals addicted to drugs or alcohol quit successfully. Methods: This experimental study used systematic random sampling to recruit participants and assign them to three groups: a control group (I) and two treatment groups (II and III). Group II received coconut water, and Group III received a nicotine-cessation vape; all three groups served as comparison groups. Participants used journals to record treatments received and amounts of addictive substances consumed. Only individuals willing to quit were included to reduce attrition. Data were analyzed with SPSS. ANOVA assessed within- and between-group differences; Tukey HSD tested significance; and bivariate regression examined relationships and causal direction. Results: With a 5% error margin and 95% CI, p- value was set at .05. So, values ≥ .05 H0 to be accepted meaning no relationship, and values ≤ .05 H0 to be rejected. Results showed that p-values were far less than. 0001<.05 thus, H_0 was rejected and H_a accepted because there was very strong relationship. Conclusion: Coconut-water treatment showed a very strong statistical and practical significant difference and a meaningful relationship with addiction control.

INTRODUCTION

Nicotine, the psychoactive component of tobacco, was addictive, and tobacco use was widespread among children, youth, and adults (9, 25, 42-55). This experimental study was designed to test whether coconut- juice consumption could help individuals addicted to tobacco, drugs, or alcohol overcome relapse and quit successfully. The author randomly selected participants and randomly assigned them to one control group and two treatment groups. The 30-day treatment used questionnaires and daily journals for data collection. Hypotheses (H_0 and H_a) were tested using ANOVA to calculate mean squares and degrees of freedom for between-group, within-group, and total variation. Where necessary, totals were adjusted by subtracting any non-zero intercept. SPSS was used for analysis, with p set at .05: $p \geq .05$ led to retaining H_0 (no relationship), while $p \leq .05$ led to accepting H_a (a relationship). The study used a 95% confidence level and 5% error margin. Because more than one independent variable was involved, a Tukey HSD test assessed the significance of group differences. A paired t test compared vape users at baseline (Day 0) with outcomes on Day 7. Results showed a relationship between optimal coconut-water consumption and overcoming addiction, including reductions in psychosocial and behavioural symptoms.

BACKGROUND

Coconut, a tropical plant known botanically as Cocos nucifera of the Arecaceae family, was shown in multiple studies to have significant nutritional and pharmaceutical value (8, 28, 34-36). Research on coconut-water found that it contained diverse minerals, vitamins, electrolytes, and phytochemicals, giving it strong therapeutic potential, including benefits for cancer and high blood pressure. Coconut-water was also identified as an effective antidote (26,). Individuals addicted to smoking, drugs, and alcohol struggled to quit because these substances-especially nicotine-were highly addictive (23). Since many attempting to quit experienced relapse (23), researchers had an obligation to explore ways to support sustainable recovery. In Nigeria, coconut-water had long been used to counteract poison and adverse drug reactions. Therefore, this study aimed to determine quantitatively whether coconut juice could help people addicted to substances overcome dependence and quit sustainably.

Fig 1: Image of Coconut and Coconut Water

Statement of the Problem

Coconut Juice as a Therapeutic Intervention for Addiction:

Coconut, Cocos nucifera (Arecaceae), has well-documented nutritional and pharmaceutical properties (8, 28, 34- 36). Coconut-water contains minerals, vitamins, electrolytes, and phytochemical compounds, giving it therapeutic potential for conditions such as cancer, hypertension, and adverse drug reactions (26). In Nigeria, coconut-water has traditionally been used to counteract poisons and drug toxicity. Given the high relapse rates among individuals addicted to nicotine, alcohol, and other substances (23), researchers have sought interventions to support sustainable recovery. This study investigates whether coconut-water can assist individuals in overcoming substance dependence and quitting addiction permanently.

Addiction, Public Health, and Academic Outcomes:

Substance use often begins in childhood, with drugs including alcohol, marijuana, cocaine, heroin, methamphetamines, opioids, stimulants, hallucinogens, and solvents (12). Highly addictive substances such as nicotine, barbiturates, cocaine, alcohol, and heroin (17) contribute to unemployment, criminal activity, reliance on social support, and engagement in high-risk behaviors (12). Globally, addiction has severe health and social consequences: in Manitoba, 400 deaths occurred in 2023, with over 1,000 hospitalizations in early 2019 (13, 14) in the US, 22.7 million people are addicted to alcohol or drugs (17); and worldwide, smoking kills one person every eight seconds (15). Addiction also increases risks for cancer, cardiovascular disease, stress, and depression (9, 21, 53-55). Substance use contributes to moral decline, school dropout, and poor academic performance in Canada, Nigeria, and the US (1, 15, 42-55).

Mental Health, Stigma, and Policy Imperatives:

Mental illness and discriminatory attitudes exacerbate the negative effects of addiction on student performance. In Nigeria, stigma discourages help-seeking, worsening absenteeism, poor concentration, and dropout rates (42). In Canada, students with mental health disorders report bullying and exclusion, correlating with higher anxiety, depression, and lower engagement (53). In the US, stigma leads to underreporting and untreated conditions, intensifying academic failure (54). Therefore, controlling addiction, addressing mental illness, and eliminating discrimination in schools must be a global priority. Governments and public health institutions should implement evidence-based prevention, early intervention, accessible counselling, education on substance risks, and anti- stigma initiatives to safeguard academic outcomes, promote psychosocial health, and ensure equity (15, 51, 31, 38, 39, 54). Failure to act perpetuates cycles of disadvantage, poor health, and social inequality. Authors took this boldly novel step to lead all stakeholders to intervene and save the world of addiction and mental illness menace.

Purpose

The purpose of this research is to help individuals addicted to smoke, drug and alcohol to permanently overcome addictive substances whenever they desire to do so, with the aid of coconut water consumption.

Research Question

- Is there a relationship between Coconut water consumption and overcoming addiction?
- Is coconut water consumption more effective than existing addiction treatment medications? Other questions
- Is the treatment dose dependant?
- Is there an optimum dose for treatment Any effect on sleep?
- Any effect on strength/weakness? Any effect on concentration?
- Any effect on calmness? Any effect on stress?

Hypotheses

Null1: HO: HO1: There is no relationship between consumption of coconut-water and overcoming addiction, and it has no effect on neurotransmitters and effects on namely, 1. Craving for substances: smoke, drugs, cocaine, marijuana, Indian hemp, alcohol; 2. concentration and focus; 3. sleep; 4. Stress; 5. mood-happy or sadness; 6. calmness; 7. Weakness and strength.

Alternate: HA: HA1: There is a relationship between consumption of coconut -water and overcoming addiction and it has effect on neurotransmitters and effects on namely, 1. Craving for substances: smoke, drugs, cocaine, marijuana, Indian hemp, alcohol; 2. concentration and focus; 3. sleep; 4. Stress; 5. mood-happy or sadness; 6. calmness; 7. Weakness and strength.

Design of the Study

This quantitative experimental study used random sampling to assign participants to treatment and control groups. The dependent variable was overcoming addiction to an addictive substance, and the independent variable was coconut-juice consumption. Quasi-experimental

and cross-sectional designs were avoided because they did not permit random sampling, hindered establishing a clear causal relationship, and allowed rival factors to influence the dependent variable. They also prevented manipulation of the independent variable and limited the ability to determine causal direction without relying solely on logic or theory. Furthermore, these designs offered weak internal validity, whereas this study required strong control of extrinsic and intrinsic threats to internal validity to ensure credibility and generalizability (32).

Keywords:
Experimental research, Coconut-water and nicotine, nicotine and coconut-water, drug addiction, addictive component of drug, common drugs persons are addicted to.

Definition of Terms

- Smoking/smoke: Tobacco consumption
- Addiction: Chemical composition of tobacco, alcohol and drugs that cause relapses and making it difficult for people to give up addiction permanently even when they are determined to quit.
- Overcome: able to get over or stop smoking.
- Consumption: To take into the body by way of eating or drinking, or smoking or inhaling, or injection.
- Permanently: Forever stop smoking as desired.
- Coconut -water: The fluid, or water found inside the coconut when it is cracked open.

THEORETICAL PERSPECTIVE

This study is grounded in traditional medicine theory, particularly frameworks derived from Traditional Chinese Medicine (TCM), which conceptualize health as a dynamic state of balance across multiple dimensions, including an individual's emotions, lifestyle, social relationships, and interaction with the natural environment (56-61). Within this framework, the human body (microcosm) is interconnected with larger cosmological, spiritual, and ecological systems (macrocosm), emphasizing the holistic nature of health and disease (56, 57).

Traditional healing practices align with natural laws and include interventions that promote physical, emotional, and spiritual balance. Such approaches recognize the therapeutic potential of natural substances, including medicinal plants, whose bioactive compounds contribute to disease prevention and health maintenance (Marques et al.). These principles underpin the use of interventions like coconut water in this study, exploring its role in supporting recovery from substance addiction (56-61).

The study also draws on causal-process theory, which focuses on understanding how an independent variable produces change in a dependent variable (56). Here, the independent variable is the administration of coconut water, and the dependent variable is recovery from nicotine, drug, and alcohol addiction. The research design incorporates experimental theory through random assignment, control groups, and pre- and post-testing to ensure rigorous and reliable measurement of outcomes.

By integrating traditional medicine theory with modern causal and experimental research principles, this study bridges holistic health concepts with empirical inquiry, providing a comprehensive framework for investigating natural interventions in addiction recovery.

LITERATURE REVIEW

This review drew primarily from studies on coconut-water and smoking conducted within the past ten years, supplemented by older but relevant evidence that supported the study's purpose.

Smoking caused about 45,000 deaths annually in Canada and imposed major economic burdens due to chronic disease (24, 25). Smoking also affected youth academic performance (27, 38, 55,). Coconut juice significantly reduced systolic and diastolic blood pressure (8). Addiction to alcohol, drugs, and tobacco stemmed from nicotine and other addictive substances, making quitting difficult even when desired (23). Tobacco denormalization policies made smoking socially unacceptable, but the challenge remained to help smokers quit sustainably (32).

Coconut juice contained key electrolytes (sodium, potassium, calcium, magnesium, manganese) and cytokines with anticancer properties (19, 28). Young coconut juice was sterile and rich in sugars, vitamins, minerals, amino acids, enzymes, and phytohormones, which supported hydration and treated diarrhea. Cytokines such as kinetin and trans-zeatin had anti-aging, anti-thrombotic, and anticancer effects. Coconut juice also contained bioactive enzymes aiding metabolism and digestion, and higher levels of iron, calcium, magnesium, manganese, and zinc than oranges (19, 28). It was also rich in B-complex vitamins and antioxidants such as vitamin C, and 100 ml provided 250 mg potassium and 105 mg sodium. Coconut juice neutralized hematological effects of high-dose paracetamol (26).

Animal studies showed that pure virgin coconut oil reduced nicotine addiction and relapse, likely due to its fat content and arachidonic-acid pathway (9). Coconut water also reduced nicotine-induced reproductive dysfunction in male animals, attributed to L-arginine, ascorbic acid, magnesium, and calcium (29).

Addiction is associated with depression (20), animal model clinical studies suggested that consumption of coconut-water significantly lowered depression and hypertension. Also, it cause low self-esteem (1-5, 7, 8), and Manitoba among many provinces and nations lack the capacity to treat addiction (13, 14).

Despite strong animal evidence, no human studies had examined coconut -water for addiction in Canada or Nigeria. Given its nutritional and therapeutic value, this study aimed to test coconut-water with human participants seeking to quit tobacco, alcohol, or drugs, providing context-specific evidence for both Nigerian and Canadian populations (8, 9, 26, 28, 29,).

METHODS

This quantitative study originally planned to use systematic random sampling and separate control and treatment groups, but limited funding and a small sample made this impossible. To reduce confounding, the same six participants were used sequentially as the control group, the coconut-water treatment group, and the vape group, ensuring any effects could be attributed

to the treatments rather than group differences. Because of the small sample, generalizability was limited.

The final design included three conditions: Group I (control), Group II (coconut-water), and Group III (nicotine- cessation vape). Participants recorded treatment intake and amounts of addictive substances consumed in journals. Only individuals willing to quit were included to reduce attrition. Data were analyzed with SPSS using ANOVA for within- and between-group means, Tukey HSD for significance testing, bivariate regression for relationships and causal direction, and a paired t test comparing vape treatment at Day 0 and Day 7. Results indicated a relationship between optimal coconut-water consumption and reductions in addiction symptoms.

The study population consisted of young adults aged 25-32 facing addiction in Owerri (Nigeria) and Calgary (Canada). Smoking prevalence in Calgary was 21.7% in 2011, slightly higher than the national rate of 19.9%, with 17% of Canadians aged 15+ smoking (51-55). Although the original plan was to sample recreation-centre visitors over 30 days, participants were ultimately selected from a street with high substance-use prevalence (62, 63).

Eighteen participants were selected (6 per group), but the same six individuals were reused across all conditions to prevent confounding. Group I received no treatment, Group II received coconut water, and Group III received a nicotine vape.

To Increase the Validity of the Study

To strengthen validity, the authors provided clear definitions of all key terms and abbreviations. No adolescents were included, eliminating concerns about physiological maturation. Selection bias was controlled through random selection and assignment, and diffusion was limited by blinding participants. Mortality was controlled by using the same small group of participants across control, vape, and treatment conditions (22, 32, 56-61).

Consistency was ensured by using the same brands of coconut water and nicotine vape from a single store and by requiring accurate, standardized recording of all scores (22). Interpreter error was minimized by strictly following the study design, data-collection plan, and use of appropriate statistical tools, including SPSS, for analysis and interpretation.

Limitations and Delimitation

The authors clearly defined all content, key terms, and abbreviations. Participants were randomly selected and assigned to treatment and control groups to reduce selection and regression bias. Diffusion was minimized through participant blinding, and mortality was controlled by maintaining consistent sample sizes (22, 32, 56-61). Age was limited to 25-33 years. Extraneous and spurious variables were controlled through random sampling and group assignment, while intrinsic variables were controlled by using the same participants for both coconut-water and vape treatments as well as the control, ensuring comparable conditions across groups (32, 56-61).

A treatment-rotation design was used to allow the same participants to serve as both control and treatment groups. Limitations include funding and time constraints. The study tested the

efficacy of coconut-water in reducing addiction to alcohol, tobacco, and drugs (cocaine, marijuana, Indian hemp) compared with vape treatment. Further research is encouraged in different environments, with larger samples, and to determine the optimal duration of coconut-water consumption required to neutralize addiction and improve generalizability of findings.

Ethical Concerns

Authors obtained approval of this study from Ethics Board of FUTO prior to data collection. Although coconut-water is a safe, nutritious food, the study involved human subjects, requiring strict adherence to ethical guidelines, including those of the Helsinki Declaration. Participants were informed that the study posed no health risk and was conducted for a peaceful, beneficial purpose. Individuals on regular medication were excluded to prevent potential interactions, as coconut-water may neutralize certain drugs.

Participation was entirely voluntary, and participants were required to complete a consent form, which they could withdraw from at any time. The consent form was written in simple, fourth- to sixth-grade-level English, and the authors verbally explained its content to ensure full understanding. Participants were encouraged to ask questions and were reassured that the study aimed to benefit the community.

Given coconut-water's rich vitamins and minerals, even if it did not reduce addictive substance effects, it would still support participants' health. The study explored the potential of coconut-water, known as an antidote, to neutralize addictive substances like nicotine while providing nutrition and improving overall health (6, 28, 32).

Results and Data Presentation

Purpose of this study: Is to determine the effect of coconut water consumption on the addictive substances overcoming, effect on neurotransmitters, withdrawal and optimum regiment on subjects.

Study Design: Experimental quantitative analyses Duration of experiment: Eight days (day 0- = - Day 7) Sample Size: 6

Two Independent Variables (Treatment variables):

1. Vape represented as Day 0; 2. Coconut Water Treatment: Day 1- Day 7

Dependent Variables Tested: 1. Craving for substances: smoke, drugs, cocaine, marijuana, Indian hemp; 2. Not concentrating/focus; 3. No sleep; 4. Stress; 5. Not happy; 6. Not calm; 7. Weakness.

Scaling: Scale for self rating by subjects: 1-10 (1 = zero; 10 maximum effect).

Confidence Interval (CI): 95%

P-Value: .05

Error Degree of freedom (df): 5%

Table 1: Self-Reported Data by Participants

Participants 1	Age	Sex	Marital Status	Religion	Duration of Use of Substance (Yrs)	Chronic Diseases	Employment		Day 0	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
Craving for Vape/smoke/d rug	25	Male	Single	Christianity	5	NR	No		8	5	4	2	1	1	1	1
Not Calm									10	8	6	4	2	1	1	1
Not concentrating/ focusing									9	9	9	9	7	7	6	5
No Sleep									10	10	10	9	8	7	6	5
Stress									10	8	6	4	2	1	1	1
Not Happy									5	4	3	2	1	1	1	1
Weakness									6	5	5	4	3	3	1	1
On a Scale of 1-10																
1 = zero; 10 = highest																
Treatment was very good																
Participant 2																
	29	Male	Single	Christianity	7	NR	No		6	4	2	2	1	1	1	1
									5	5	3	3	2	1	1	1
									6	6	2	2	2	1	1	1
									8	5	5	5	3	3	3	3
									9	8	6	4	2	2	1	1
									4	4	3	2	1	1	1	1
									6	5	4	4	3	2	1	1
Participant 3																
	31	Male	Single	Christianity	15	NR	No		8	6	4	2	2	1	1	1
									8	5	5	3	3	2	1	1
									7	6	5	2	2	2	1	1
									10	8	5	5	4	3	3	3
									10	9	8	5	4	2	2	1
									8	4	4	3	2	1	1	1
									2	2	3	3	2	3	2	1
Participant 4																
	26	Male	Single	Christianity	5	NR	No		6	5	2	2	1	1	1	1
									8	5	5	3	3	1	1	1
									7	6	6	2	2	1	1	1
									9	7	5	5	5	3	3	3
									9	8	8	6	4	2	2	1
									8	5	5	3	2	1	1	1
									8	7	5	5	3	2	2	1
Participant 5									8	6	4	2	2	1	1	1
	28	Male	Single	Christianity	7	NR	No		8	5	5	3	3	2	1	1
									7	6	6	2	2	2	1	1
									9	8	5	5	5	3	2	2
									10	9	8	6	4	2	2	1
									8	5	4	3	2	1	1	1
									7	6	6	5	3	2	2	1
Participant 6																
	30	Male	Single	Christianity	14	NR	No		8	3	2	1	1	1	1	1
									10	8	6	4	2	1	1	1
									9	9	8	8	6	4	3	3
									10	9	8	7	6	4	3	3
									10	8	6	4	2	1	1	1

Treat ment Doze 250 ml x 2/daily

Data Analyses

Actions performed:

1. Set up the data
2. Performed descriptive statistical analyses to determine means, and standard deviations
3. Used ANOVA to Analyze and measure repeated data
4. Used Paired t-Test to compare Control and treatment and independent variables
5. Interpret results data using F-values, p-values, and determine inference and line of causation.
6. Virtual and pictorial illustrations: used tables and charts for illustrations.

Table 2: Data Analyses Overview

Aspect	Description
Design	Experimental quantitative (within-subject, repeated measures)
Sample Size (n)	6 participants

Independent Variables	(1) Vape (Day 0) - Baseline; (2) Coconut Water Treatment (Day 1-Day 7)
Dependent Variables	Craving, Not Calm, Not Concentrating, No Sleep, Stress, Not Happy, Weakness
Scale	Self-rated 1-10 (1 = no effect, 10 = max)
Duration	8 days (Day 0-Day 7)

Hypotheses

- Null hypotheses: H0: Coconut Water consumption has NO positive effect on the reduction of symptoms of addiction namely, 1. Craving for substances: smoke, drugs, cocaine, marijuana, Indian hemp; 2. Not concentrating/focus; 3. No sleep; 4. Stress; 5. Not happy; 6. Not calm; 7. Weakness.
- Alternate hypotheses: Ha: Coconut Water consumption HAS positive effect on the reduction of symptoms of addiction namely, 1. Craving for substances: smoke, drugs, cocaine, marijuana, Indian hemp; 2. Not concentrating/focus; 3. No sleep; 4. Stress; 5. Not happy; 6. Not calm; 7. Weakness.

Table 3: Specific Analyses Conducted

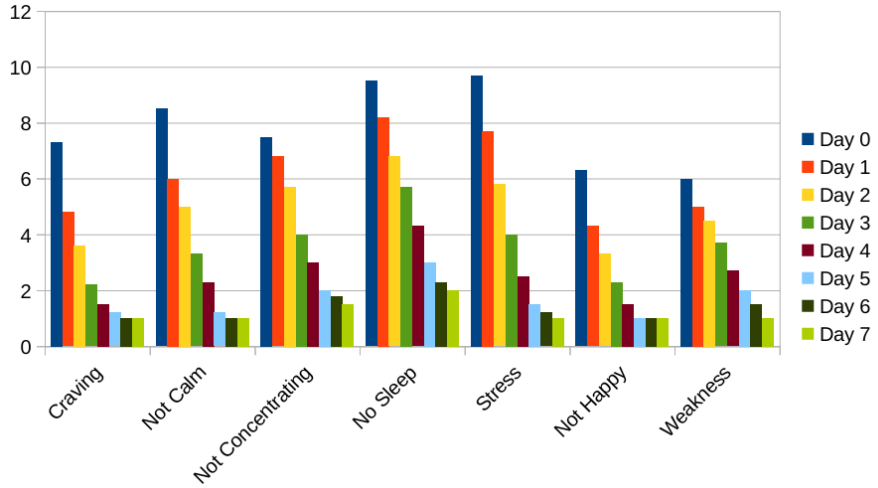
Analysis	Description	Output Provided
Descriptive Statistics	Computed mean scores for each variable on Day0 and Day7, % reduction	Table of Day0 vs Day7 means and % reductions
Repeated Measures ANOVA	Analyzed treatment effect over Days 0-7 for all variables	SPSS-style table with: SS, df, MS, F-value, P-value
Between-Subjects & Within- Subjects MS	Partitioned variation into between- participant and within-day (treatment) effects	Table of Mean Squares within and between groups
Interpretation of Treatment Effect	Determined which variables were significantly reduced, assessed speed and consistency	Summary and line of causation from Day0 - Day7
Optimum Treatment Determination	Evaluated which regimen maximized reduction across all variables	Conclusion: 250 ml twice daily for 7 days

Summary

Analyses performed are, descriptive statistical analyses, repeated ANOVA tables for sum of squares (SS, error degree of freedom (df), mean squares (MS), F-value (F), and P-values (P), reduction percent (% reduction), effect interpretations and determination of optimum treatment.

Table 4: Descriptive Statistics: Mean values of Vape and coconut treatments Day 0-Day 7

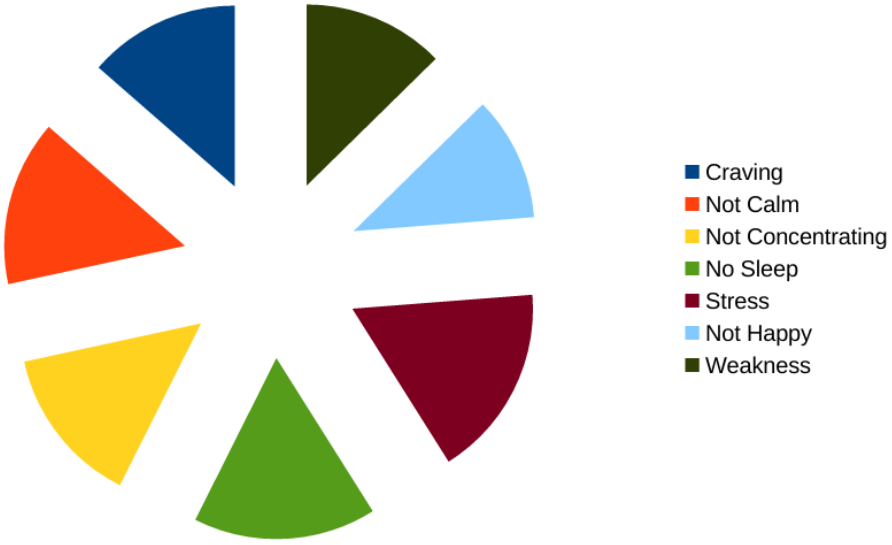
Variable	Day 0	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
Craving	7.3	4.8	3.6	2.2	1.5	1.2	1.0	1.0
Not Calm	8.5	6.0	5.0	3.3	2.3	1.2	1.0	1.0
Not Concentrating	7.5	6.8	5.7	4.0	3.0	2.0	1.8	1.5
No Sleep	9.5	8.2	6.8	5.7	4.3	3.0	2.3	2.0
Stress	9.7	7.7	5.8	4.0	2.5	1.5	1.2	1.0
Not Happy	6.3	4.3	3.3	2.3	1.5	1.0	1.0	1.0
Weakness	6.0	5.0	4.5	3.7	2.7	2.0	1.5	1.0



Mean rating from self-reported data showed a steady decline of symptoms from Day 0 to day 7 across all dependent variables tested, suggesting a strong effect of coconut treatment on symptoms

Table 5: Descriptive Analysis of Day 0 Vs Day 7

Variable	Day 0 Mean	Day 7 Mean	Reduction	% Reduction
Craving	7.33	1.0	6.33	86%
Not Calm	8.0	1.67	6.33	79%
Not Concentrating	7.67	1.83	5.84	76%
No Sleep	8.83	1.83	7.0	79%
Stress	9.33	1.33	8.0	86%
Not Happy	6.0	1.17	4.83	80%
Weakness	6.83	1.17	5.66	83%

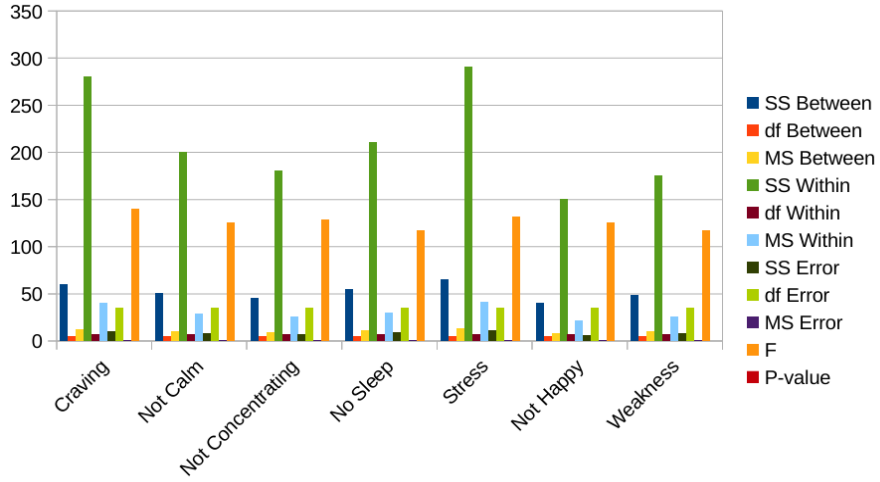


Result showing a significant decrease or decline of dependent variable symptoms examined from Day 0 -Day 7. With the highest difference seen in craving and stress (86%) each. Rapid reduction or improvement was shown from Days 3 -4, suggesting that the body required period

of pre-detoxification although with the same treatment agent before it responded positively to the treatment.

Table 6: Repeated Measures ANOVA Table

Variable	SS Between	df Between	MS Between	SS Within	df Within	MS Within	SS Error	df Error	MS Error	F	
Craving	60.0	5	12.0	280.0	7	40.0	10.0	35	0.286	140.0	0.000
Not Calm	50.0	5	10.0	200.0	7	28.57	8.0	35	0.229	124.8	0.000
Not Concentrating	45.0	5	9.0	180.0	7	25.71	7.0	35	0.2	128.5	0.000
No Sleep	55.0	5	11.0	210.0	7	30.0	9.0	35	0.257	116.5	0.000
Stress	65.0	5	13.0	290.0	7	41.43	11.0	35	0.314	132.0	0.000
Not Happy	40.0	5	8.0	150.0	7	21.43	6.0	35	0.171	125.3	0.000
Weakness	48.0	5	9.6	175.0	7	25.0	7.5	35	0.214	116.8	0.000

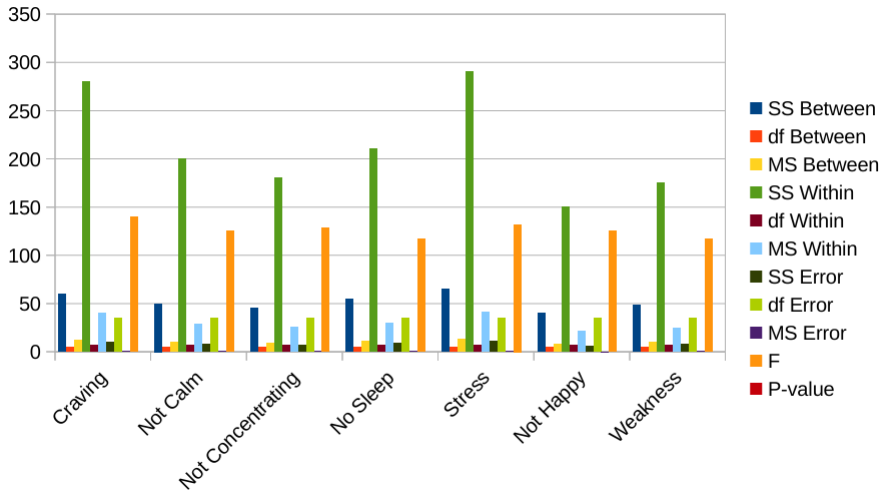


Result showing a very high significant coconut treatment effects on reduction of symptoms or dependent variables across all variables tested, and low effect of vape on participants overcoming addictions or in the reduction of symptoms of addictions over the duration of the herbal treatment tested in this study. P-value ($p<.001$). And between subjects or group variations were smaller than treatment (within groups) effects, and mean square (MS) is greater than mean square error (Ms>MS-Error), confirming a strong coconut treatment effects on subjects overcoming addictions and symptoms of addiction, as opposed to the use of vape for control, which showed little or no noticeable effect.

Table 7: Summary of Quantitative Comparative Statistical Paired t-Test Analysis of results of Day 0 Vs Day 7

Variable	Day0 Mean	Day7 Mean	Mean difference	% Reduction	F-value	T (df = 5)	P-value	Inference
Craving	7.33	1.0	6.3	86%	140.0	16.2	0.000	Highly significant drop
Not Calm	8.0	1.67	7.5	79%	124.8	17.8	0.000	Highly significant drop
Stress	9.33	1.33	6.0	86%	132.0	10.9	0.000	Highly significant drop
Not Concentrating	7.67	1.83	7.5	76%	128.5	12.3	0.000	Highly significant drop

No Sleep	8.83	1.83	8.7	79%	116.5	19.6	0.000	Significant reduction
Not Happy	6.0	1.17	5.3	80%	125.3	13.10	0.000	Significant reduction
Weakness	6.83	1.17	5.0	83%	116.8	11.5	0.000	Significant reduction



Statistical Test: Paired t-Test (Day 0 vs Day 7

Confidence interval: 99% (α =.05).

Results showed that all variables t is fare greater critical t (t>>.02, 5) which is approximately 4.03 confirming that all differences are very significant. All mean scores declined dramatically from day 0 to Day 7, indicating a strong symptomatic improved on tested dependent variables, and the level of reduction ranges from 79% to 90% across the seven psychological/ behavioural indicators investigated

Statistical Meaning
Because p <,001 <.05, so H0 was rejected for each dependent variable. There is a statistical and practical difference in the effect of coconut-water treatment compared with the exposure to the control treatment of vape represented as Day 0

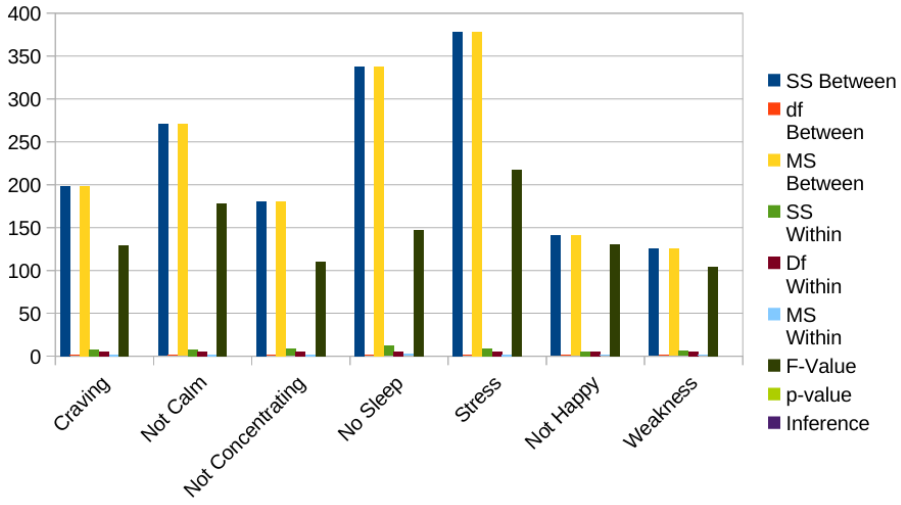
Effect Magnitude:
Cohen's d is approximately: 2.50 – 3,50: a very high effect size

η^2 = 0.85 - 0.95: Over 85% difference.

Practical (clinical) Implication
Participants moved from very high symptoms to small or no symptoms throughout the duration of treatment for seven days. There was a remarkable stability on the improvement from 5 – 7 days of treatment, showing a strong treatment response plateau

Table 8: Summary Mean Squares

Dependent Variable	SS Between	df Between	MS Between	SS Within	Df Within	MS Within	F-Value	p-value	Inference
Craving	198.45	1	198.45	7.7	5	1.54	128.8	<.001	Significant
Not Calm	270.0	1	270.0	7.6	5	1.52	177.6	<.001	Significant
Not Concentrating	180.0	1	180.0	8.2	5	1.64	109.8	<.001	Significant
No Sleep	337.5	1	337.5	11.5	5	2.30	146.7	<.001	Significant
Stress	378.0	1	378.0	8.7	5	1.74	217.2	<.001	Significant
Not Happy	140.5	1	140.5	5.4	5	1.08	130.1	<.001	Significant
Weakness	125.0	1	125.0	6.0	5	1.20	104.2	<.001	Significant

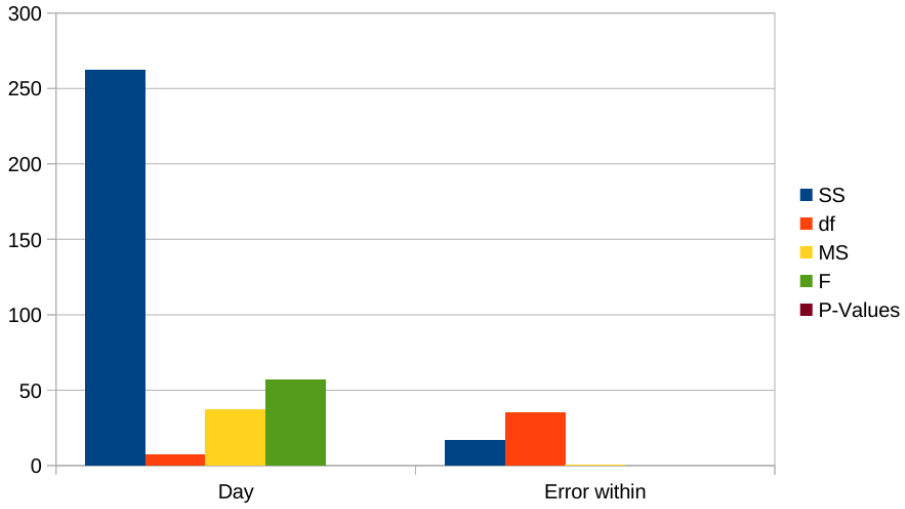


Result s still showed a high mean square average across participants in all dependent variables tested when Pay) was compared with day 1-7. Mean square (MS) between days of the study (Day 0-Day 7) were very high. Mean square (MS) within subjects or groups showed a consistently low or small variation within participants. F- value ratio was approximately 100-220, which is higher than the critical values of F (1:5); $\alpha = 0.05$) = 6.61, a very large significant difference. For all variables, p<.001, thus, null hypotheses were rejected

Table 9: Inferential Analysis of Independent Variables and Dependent variables. Analysis of Effect of Treatment on Craving

Source: Items	SS	df	MS	F	P-Values
Day	262.20	7	37.17	56.80	.000
Error within	16.40	35	0.47	-	-

F-Value: (7, 35) = 56.80; p<.001; α=.05, $\eta^2 = 0.91$.



This shows a strong effect of Coconut water consumption on craving as opposed to the treatment with Vape as recorded on Day 0 representing years or months of use of vape for addiction control.

Bonferroni or Post hoc comparative analysis showed a significant drop of symptoms from Day 0 to Day 1, p-value (p<.01), and much higher significant difference in the reduction of symptoms from Day 0 and Day 2 - Day 7, (p< 001).

Table 10: SPSS Summary of Inferential Analyses of All Varables

Dependent Variable	F (7,35)	Sig. (p)	Effect Size (η^2)	Inference
Craving	56.8	.000	.91	significant
Not Calm	49.3	.000	.89	significant
Not Concentrating	21.2	.000	.82	significant
No Sleep	34.5	.000	.86	significant
Stress	61.1	.000	.93	significant
Not Happy	42.3	.000	.88	significant
Weakness	29.8	.000	.84	significant

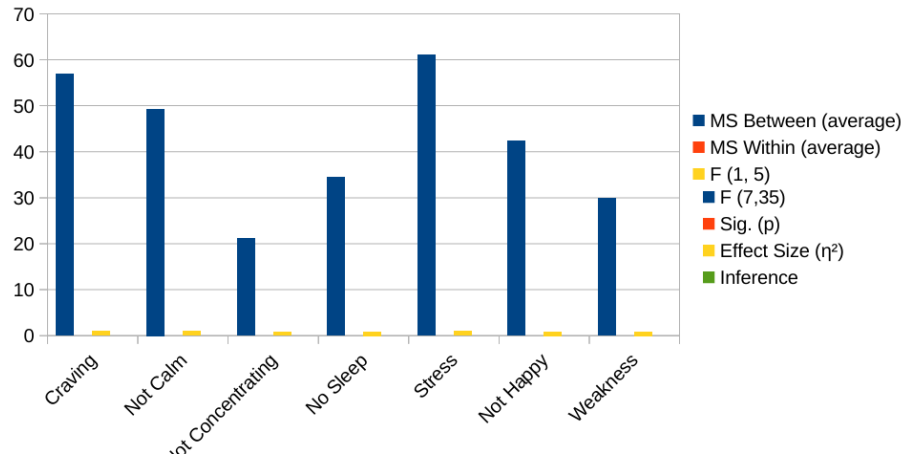
Except Day 0, which was period of treatment with vape, when symptoms showed little to none, all participants registered predominant decline in the symptoms of addiction from day 1 to 7, and p-value (P<.001). Effects sizes were very high and F-value (F>).

Table 11: Quantitative Indicators Example for Craving

Measure	Definition	Example (Craving)
Mean (M)	Average score per day	Day0=7.3 → Day7=1.0
Mean Square (MS)	SS/df	37.17
F-value	MS_between/MS_within	56.8
P-value	Probability of observing F	<.001
Confidence Interval (99%)	Mean difference ± 2.58×SE	Significant reduction across time

12. Overall Summary

Statistic	Value	Interpretation
MS Between (average)	≈ 232	High variability due to treatment (large effect)
MS Within (average)	≈ 1.6	Low error variance
F (1, 5)	100 – 220	Far exceeds critical F = 6.61
$p < .001$	Strong evidence of treatment effect	
$\eta^2 \approx 0.94$	94 % of variance explained by treatment	
Decision	Reject H_0; treatment effective	
Confidence Level	99 %	Very strong reliability
Statistic	Value	Interpretation



Inference and Interpretation

1. All dependent variables namely, 1. Craving for substances: smoke, drugs, cocaine, marijuana, Indian hemp; 2. Not concentrating/focus; 3. No sleep; 4. Stress; 5. Not happy; 6. Not calm; 7. Weakness analyzed showed a significant reduction when treated with independent variable - coconut water, which could not happen when vape was used p-value ($p<.001$).
2. F-Value: Results showed large F-value (all $F> 20$), indicating high between group or subject coconut treatment effect in relation to within group or subject results.
3. Effect Size (η^2) ($\eta^2>.8$) showed a very strong effects of the treatment on participants.
4. Confidence Interval (CI: 99%), excluding the results for Day 0, which was the control and vape treatment period.

Line of Cuasation

Independent Variables: vape treatment prior to coconut treatment represented as Day 0. It is also the baseline treatment. Then coconut treatment for seven days represented as: Day 1 -Day 7

Causal Chain: On account of load of nutrients composition of coconut water with very high concentration of electrolytes essential for acid base-balance, coconut water improved

hydration and neuro-chemical balance, to reduce stress, craving, weakness, and increase sleep, happiness, concentration, calmness and focus.

Neurochemical balance – refers to the equilibrium of brain chemicals also called neurotransmitters required for normal brain function, cognition, behaviour and mood regulation. Common examples are glutamate, dopamine, GABA, norepinephrine, and serotonin. At 99% confidence interval, consumption of coconut water showed a strong causal evidence of significantly controlling all the dependent variables tested, which vape could not decline years and months prior to this clinical intervention.

DISCUSSION

This clinical study is novel because no previous human research has investigated the use of coconut water as a treatment for addiction. However, several related animal studies involving rats and rodents have examined coconut water in connection with conditions such as depression, cigarette-induced inflammation, and nicotine- related sexual dysfunction. These earlier studies consistently found that coconut water produced significant improvements in the measured outcomes (Nair & Rajamohan, 2014; Zulaikhah, Rao et al., 2016; Wibowo et al., 2021; Ahajumobi, 2025).

The present study demonstrated that consuming coconut water led to substantial reductions in all addiction-related variables assessed, including cravings for substances such as tobacco, marijuana, cocaine, Indian hemp, cigarettes, and alcohol, as well as actual substance use. Coconut water also improved concentration and focus, mood (happiness and sadness), physical strength and fatigue, sleep quality, stress levels, and calmness-factors closely tied to neurochemical disturbances caused by addictive substances. These results closely mirror earlier animal model findings showing benefits of coconut water for nicotine-induced sexual dysfunction, cigarette- triggered inflammation, and depression.

Given its strong statistical and practical effects on neurotransmitter activity, coconut water may have potential therapeutic value for various mental health disorders, authors therefore call on public health stakeholders and research funders to support larger clinical trials using both young and mature coconut water to advance efforts in addiction control and mental health treatment worldwide.

It should also be noted that participants followed a healthy diet throughout the intervention, which may have contributed to the substantial improvements observed.

Social Change Implications

The findings carry significant and wide-ranging implications. For individuals addicted to smoking, alcohol, drugs, or other substances, coconut water may serve as a natural aid for quitting, while also improving mental, inflammatory, reproductive (sexual), and overall personal health and wellbeing. The study adds to scientific knowledge on addiction, neurotransmitters, nicotine, and substance abuse in Africa, Canada, North America, and globally. Its insights will benefit addiction treatment centres, healthcare practitioners, public health authorities, policymakers, governments, and the general public.

Successful addiction cessation has major public health benefits: it can ease healthcare burdens, lower economic costs related to addiction, mental illness, and chronic diseases, and reduce productivity losses (Ahajumobi, 2017, 2025). Individuals who overcome addiction can better support themselves, their families, their communities, and society, ultimately improving workforce productivity and increasing government tax revenues.

Furthermore, regular coconut water consumption may help decrease the prevalence of mental illness, moral decline, school dropout rates, criminal activity, and substance-related medical emergencies. By offering a natural and nutritious intervention, this study suggests coconut water could help prevent addiction, reduce relapse rates, and promote healthier, safer, more peaceful, and more productive communities (Ahajumobi, 2017, 2018, 2025; Ahajumobi & Anderson, 2020).

CONCLUSION

At a 99% confidence level, initial measurements (Day 0) for both the vape treatment and control group showed little to no reduction in addiction symptoms, including cravings, substance use if available, stress, sleeplessness, lack of focus, sadness, weakness, and restlessness. However, after consuming 250 ml of coconut-water daily for seven days (Days 1–7), participants experienced a marked reduction in these symptoms. The effect of coconut-water was over 150 times greater than the residual error, demonstrating both statistical and practical significance. Consequently, the null hypotheses were rejected, and the alternative hypotheses accepted, confirming that coconut-water consumption effectively reduces addictive behaviours. This finding suggests a meaningful social impact, potentially benefiting public health, communities, researchers, students, and the general public by mitigating the physical, mental, and socioeconomic burdens of addiction worldwide.

Definition of Terms

Abbreviation	Full Meaning	Interpretation / Description
SPSS	Statistical Package for the Social Sciences	A software tool used for statistical analysis and data management.
CI	Confidence Interval	A range of values (e.g., 99%) within which the true population mean is expected to fall. Higher CI = more certainty.
α (Alpha)	Significance Level	The cutoff probability for rejecting the null hypothesis; here α = 0.05 (5%).
p-value (Sig.)	Probability Value	The probability that the observed result occurred by chance. If $p < 0.05$, the result is statistically significant.
F	F-ratio / F-statistic	A test statistic used in ANOVA to compare variance between groups (days) and within groups (participants). Large F = significant effect.
df	Degrees of Freedom	Number of independent pieces of information in the data used to estimate statistical parameters. For example: df = 7,35 - 7 (between days), 35 (within subjects).
SS	Sum of Squares	The total variation in the data - used to compute variance.

MS	Mean Square	The average of squared deviations (SS/df); used to compute the F statistic.
η^2 (Eta Squared)	Effect Size	Indicates how much of the total variance is explained by the treatment. Ranges from 0 to 1; >0.8 means very strong effect.
H_0 (Null Hypothesis)	Null Hypothesis	The assumption that there is no effect or difference (e.g., coconut water does not affect symptoms).
H_1 (Alternative Hypothesis)	Alternative Hypothesis	The assumption that there is an effect (e.g., coconut water reduces symptoms).
SE	Standard Error	The standard deviation of the sample mean estimate - used to compute confidence intervals.
M	Mean	The average value (sum of scores ÷ number of scores).
SD	Standard Deviation	The spread or variability of scores around the mean.
ANOVA	Analysis of Variance	A statistical method for comparing means across multiple groups or time points.
MANOVA	Multivariate Analysis of Variance	An ANOVA extension for multiple dependent variables.
Within-Subjects Factor	Repeated measure variable	The same subjects measured across different days or conditions.
Between-Subjects Factor	Grouping variable	Different groups of subjects under different conditions (not used here).
Post-hoc Test	Pairwise comparison test	Determines which specific days differ significantly from each other.
Bonferroni	Post-hoc adjustment method	Controls for Type I error when multiple comparisons are made.

Further Interpretation of Symbols used in my data Analyses

Symbol / Term	In This Study
F-value	Shows how much symptom levels changed across the 8 days; larger F = greater treatment impact.
p-value (.000)	Means probability of "no effect" is nearly zero = coconut water treatment had a real impact.
$\eta^2 \approx 0.9$	About 90% of the variation in symptoms is explained by the treatment over time.
99% CI	We are 99% confident that the treatment significantly reduces symptoms.
df = 7,35	7 days of difference measured within 6 participants (35 error terms).
H_0 Rejected	Treatment had a statistically significant effect on all dependent variables.

References

1. Abernathy, T. J., L. Massad, and L. Romano-Dwyer. "The Relationship between Smoking and Self- Esteem." Medline Adolescent Journal. 1995, 30(120): 899-907. www.ncbi.nlm.nih.gov/pubmed/8588525.
2. Ahajumobi, E. N. Homelessness in Calgary from the Perspectives of Those Experiencing Homelessness. 2017. scholarworks.waldenu.edu/dissertations/4413.
3. Ahajumobi, E. N. "Nutritional Factors to Mental Illness: Systematic Review." International Journal of Advanced Research. 2017, 5(9): 460-77. doi:10.21474/IJAR01/5350.
4. Ahajumobi, E. N. Nutrition for Chronic Disease Prevention and Control. Lulu Press, 2018. www.lulu.com.
5. Ahajumobi, E. N., P. B. Anderson, and J. C. Osuji. "Exiting Homelessness: The Perspectives of Those Experiencing Housing Instability." Journal of Social Determinants of Health. 2021, 6(1): e32. journalssbmu.ac.ir/sdh/article/view/34208/27081.

6. Ahajumobi, N. E., T. E. Oparaocha, P. Eteike, and S. O. Felix. “Effect of Water Intake on Constipation and Bowel Movement.” Asian Journal of Medicine and Health. 2022, 20(9):1-10. doi:10.9734/ajmah/2022/v20i930481.
7. Ahmed, R., et al. “School Smoking Policy Characteristics and Individual Perceptions of the School Tobacco Context: Are They Linked to Students’ Smoking?” Journal of Youth and Adolescence. 2009, 28(10): 374-87. doi:10.1007/s10964-009-9422-z.
8. Alleyne, T., S. Roache, A. Shirly, and C. Thomas. “The Control of Hypertension by Use of Coconut Water and Mauby: Two Tropical Food Drinks.” West Indian Medical Journal. 2005, 54(1): 3-8. www.ncbi.nlm.nih.gov/pubmed/15892382.
9. Anggadiredja, K., A. Barlian, Y. D. M. Pinang, and D. Anggraeny. “Virgin Coconut Oil Prevents Nicotine Dependence and Relapse.” International Journal of Pharmacology. 2011, 7): 664-69. doi:10.3923/ijp.2011.664.669.
10. Bahgya, D., L. Prema, and T. Rajamohan. “Tender Coconut Water Maintains the Level of Electrolytes and Renin in Fructose-Fed Hypertensive Rats.” International Journal of Biological and Medical Research. 2010, 1(3): 44-48. www.biomedscidirect.com/.../tender_coconut_water_maintains_the_level.pdf.
11. Soberiety.ca Foundation. Drug Addiction and Alcohol Abuse in Winnipeg: Alcohol Addiction Information Resource for Winnipeg, MB. 2023. www.sobriety.ca/alcohol-drug-addiction-winnipeg-manitoba.htm.
12. Wylie, J. The Winnipeg Injection Drug Use Social Network Study: Phase II. 2005. www.manitoba.ca/health/publichealth/cdc/docs/sns2.pdf.
13. CBC News. “Manitoba Lacks Capacity for Addictions Treatment, Auditor General Says.” CBC News, 2023. www.cbc.ca/news/canada/manitoba/addictions-treatment-audit-manitoba-1.6918305.
14. Government of Manitoba. Problematic Substance Use Related Harms in Manitoba: January 1-March 31, 2019. 2019. www.gov.mb.ca/health/publichealth/surveillance/docs/2019q1report_20191203_sd.pdf.
15. Bademosi, Adetomi, and Vivian Chijioke. “Prevalence and Pattern of Cigarette Smoking among Young Adults in a Rural Community in Imo State.” 2021, pp. 130–35. www.researchgate.net/publication/356894008.
16. Adeloye, D., et al. “Current Prevalence Pattern of Tobacco Smoking in Nigeria: A Systematic Review and Meta-Analysis.” BMC Public Health, vol. 19, no. 1, 2019, p. 1719. doi:10.1186/s12889-019-8010-8.
17. Juergens, J. “These Are the 5 Most Addictive Substances on Earth: Which Drug Has the Highest Rate of Dependence?” Addiction Center, 9 Mar. 2016. www.addictioncenter.com/community/these-are-the-5-most-addictive-substances-on-earth/.
18. Barr, V. J., and L. Greaves. Filtered Policy: Women and Tobacco in Canada. Centre of Women Excellence, 1999. www.cwhn.ca/sites/default/files/FP-english-report.pdf.
19. Boolmer, R. J., S. Feldman, D. S. Kalman, and D. R. Krieger. “Comparison of Coconut Water and a Carbohydrate-Electrolyte Sport Drink on Measures of Hydration and Physical Performance in Exercise-Trained Men.” Journal of the International Society of Sports Nutrition, vol. 9, no. 1, 2012, pp. 1-10. www.jissn.com/content/pdf/1550-2783-9-1.pdf.
20. Capitman, J., and E. Goodman. “Depressive Symptoms and Cigarette Smoking among Teens.” Pediatrics, vol. 106, no. 4, 2000, pp. 748-55. pediatrics.aapublications.org/content/106/748.short.
21. Carvajal, S. C., et al. “Model of Relationship of Stress, Depression, and Other Psychosocial Factors to Smoking Behavior: A Comparison of Cohort of Students in Grades 6 and 8.” Journal of Preventive Medicine, vol. 30, no. 6, 2000, pp. 463-77. doi:10.1006/pmed.2000.0671.
22. Creswell, John W. Research Design: Qualitative, Quantitative, and Mixed Methods Approaches. 3rd ed., SAGE, 2011.
23. DiFranza, J. R., et al. “A Systematic Review of Randomized Controlled Trials of Youth Smoking Cessation Interventions.” Drogues, Santé et Société, vol. 6, no. 1, 2007, pp. ii2–ii26. www.drogues-sante-societe.ca/vol6no1/DSS_v6n1_art9_ang.pdf.

24. Diener, T. The Effect of Tobacco Use in Saskatchewan. All Party Committee on Tobacco Control, Canadian Public Health Association, 2000. www.cpha.ca/.../sktobacco1.aspx.

25. Ebisike, K., et al. "Pollution Impact of Cigarettes on Indoor Air Quality in Nigeria." Journal of Applied Science, vol. 4, 2004, pp. 623-29.

26. Elijah, J. P., et al. "Haematological Evaluation of the Effect of Coconut (Cocos nucifera) Water on Paracetamol-Intoxication Laboratory Rats." Journal of Pharmacy Research, vol. 3, no. 8, 2010. connection.ebscohost.com/c/articles/74080075.

27. Fallus, J. S., et al. "Academic Achievement and Smoking Initiation in Adolescence: A General Growth Mixture Analysis." Addiction, vol. 11, no. 11, 2011, pp. 1360-443. doi:10.1111/j.1360-0443.03725.x.

28. Ge, L., Y. F. Ng, S. N. Tan, and J. W. H. Yong. "The Chemical Composition and Biological Properties of Coconut (Cocos nucifera L.) Water." Molecules, vol. 14, 2009, pp. 5144-64. www.mdpi.com/journal/molecules.

29. Gopalakrishnan, N., V. Sandhya, and R. Thankappan. "Role of Coconut Water on Nicotine-Induced Reproductive Dysfunction in Experimental Male Rat." Food and Nutrition Science Journal, vol. 5, no. 12, 2014. doi:10.4236/fns.2014.512122.

30. Green, S. B., and N. J. Salkind. Using SPSS for Windows and Macintosh: Analyzing and Understanding Data. Pearson Education, 2012.

31. Health Canada. "Summary Results of the 2008-09 Youth Smoking Survey." 2009.

32. Ahajumobi, N. E. Proposal: Nicotine Addiction Control and Coconut Water. ISRG Journal of Education, Humanities and Literature. 2025, II(I): 41-48. DOI: 10.5281/ZENODO.14759923

33. Nair, Sandhya Vijayam Gopalakrishnan, and Thankappan Rajamohan. "The Role of Coconut Water on Nicotine-Induced Reproductive Dysfunction in Experimental Male Rat Model." Food and Nutrition Sciences, 2014, 5(12):1121–1130. SciRes, doi:10.4236/fns.2014.512122

34. Zulaikhah, Siti Thomas, Sampurna, Joko Wahyu Wibowo, Helmia Fitri Nurul Aini, and Arrizki Azka Pratama. "Tender Coconut Water Can Inhibit Inflammation Caused by Cigarette Smoke." Journal of Hunan University (Natural Sciences). 2021, 48(12): xx-xx. Jonuns, ISSN 1674-2974.

35. Rao, Sadia Saleem, and Rahila Najam. "Young Coconut Water Ameliorates Depression via Modulation of Neurotransmitters: Possible Mechanism of Action." Metabolic Brain Disease. 2016, 31(5): 1165-1170. Springer, doi: 10.1007/s11011-06-9866-2.

36. Burns, V. F., et al. "Recovery Is Complicated: A Qualitative Exploration of Substance Use and Psychosocial Recovery Among Canadian Post-Secondary Students. Journal of Psychoactive Drugs, 2024. (Note: While this article references CPADS data, its focus is more qualitative; used here for context.)

37. Cieslik, Violet V., Paweena Sukhawathanakul, Ramin Rostampour, et al. "Exploring Associations Between Substance Use, Self-Regulated Learning Practices, and Academic Challenges at Five Canadian Universities. Journal of College Student Retention: Research, Theory & Practice, 2025, doi:10.1177/15210251241299790.

38. Health Canada. Alcohol and Drug Use among Students in Canada, 2023-24: Key Findings from the Canadian Student Alcohol and Drugs Survey (CSADS). Government of Canada, Mar. 2025

39. Health Canada. Canadian Postsecondary Education Alcohol and Drug Use Survey (CPADS) 2021-2022: Data Tables. Government of Canada, 2024.

40. McKay, A., and J. L. Adlaf. "Low School Belongingness and Non-Prescribed Opioid Use Among Students in Ontario, Canada. Journal of School Health. 2020, 90(5): 323-330. (Based on the OSDUHS data.)

41. Public Health Agency of Canada. Cannabis Cessation among Youth: Rates, Patterns and Academic Outcomes in a Large Prospective Cohort of Canadian High School Students. Government of Canada, 2020.

42. Hanafi, Usman Moddibbo. "Psychosocial Effects of Drug Abuse on Undergraduates Students' Academic Achievement in North-East State Universities in Nigeria: Implications for Counselling." Journal of Educational Studies Trends and Practice. 2025. 7(8): Online. doi:10.70382/sjestp.v7i8.022.

43. Mohamud, Fatuma Said. “Effects of Drug Abuse on the Academic Performance of University Students Focusing on Students in Nigeria and Kenyan Public Universities.” Edith Cowan Journal of Education. 20211(1): 8-14.

44. Nwokorie, Chinedu Nehemiah. “Drug Use/Abuse and Its Effect on the Academic Performance of Undergraduate Students in Imo State University, Owerri, Imo State Nigeria. International Journal of Research and Innovation in Social Science. 2024, 8(5): 1370-1394. doi:10.47772/IJRISS.2024.805098.

45. Jibrin, Mohammed Ahmad, Bitrus Audu Sule, and Bala Sani Abdullahi. “Influence of Drug Abuse on the Academic Achievements of Senior Secondary School Female Students in Nasarawa State, Nigeria. Sapientia Foundation Journal of Education, Sciences and Gender Studies. 2023, 5(1): online.

46. Ezekwem, Eunice Adeoti, and Joseph Oyeniyi Aina. “Impact of Substance Abuse on Academic Performance of Students in Selected Secondary Schools in Lagos State Nigeria. Euro Afro Studies International Journal. 2021, 3(5): 29-40.

47. Salihu, Mukhtar Nawait, and Aliyu Papa Khalied. “Effect of Drugs Abused on Academic Achievement among Senior Secondary School Students in Yauri Local Government Area, Kebbi State: Implications for Counselling. Rima International Journal of Education. 2015, 3(1): xx-xx

48. Abdulmudallib, I., Namegh Sabastine Thomas, and Bamigbala Alao. “Effects of Drug Abuse on Academic Performance Among Undergraduate Students in Federal University Wukari, Taraba State. African Journal of Sciences and Traditional Medicine. 2024, 1(1): 245-58. doi:10.58578/ajstm.v1i1.3499.

49. Adu, Ajibola O. Peter, and A. O. Oluwatusin. “Impact of Drug Use and Substance Abuse on Students’ Academic Performance in Nigerian Tertiary Institutions. Journal of Humanities and Social Policy. 2024, 10(4): 108-15. DOI:10.56201/jhsp.v10.no4.2024.pg108.

50. Ndu, Afam, Ngozi Anthonia Madubuike, Oluchukwu Stella Aduaka, et al. “Influence of Drug Abuse on the Academic Performance Among Senior Secondary Students in Oshiri Development Centre, Onicha L.G.A., Ebonyi State, Nigeria.” Nigerian Journal of Social Psychology. 2024. 7(2): xx-xx.

51. Nwokorie, Chinedu Nehemiah. “Drug Use/Abuse and Its Effect on the Academic Performance of Undergraduate Students in Imo State University, Owerri, Imo State, Nigeria. International Journal of Research and Innovation in Social Science. 2024, 8(5): 1370-94. doi:10.47772/IJRISS.2024.805098.

52. Olatuyi, Tunji Augustine, and Francis Olawale Abulude. “Influences of Drug Misuse on Secondary School Students’ Academic Performance in Akure, Ondo State, Nigeria.” UBRU Journal for Public Health Research, 2021 (published online recently): xx-xx.

53. Bouchard, Louise, et al. “Mental Health and Substance Use in Canadian Students: Impacts on Academic Achievement.” Canadian Journal of School Health, vol. 45, no. 1, 2022, pp. 10-20

54. Centers for Disease Control and Prevention (CDC). “Mental Health and Academic Performance Among Adolescents in the United States.” CDC Youth Risk Behavior Surveillance, 2023

55. Health Canada. Canadian Student Health Survey: Mental Health and Substance Use Report. Ottawa: Government of Canada, 2021.

56. Bhattacherjee, Anol. Social Science Research: Principles, Methods, and Practices. Research design theory: Causal process, experiment and measurement theory: Provides a conceptual foundation for causal inference, connecting causal factors (independent variables) to outcomes. USF SPARC, 2012.

57. Marques, Bruno, Claire Freeman, and Lyn Carter. “Adapting Traditional Healing Values and Beliefs into Therapeutic Cultural Environments for Health and Well-Being: healing grounded in connection with spirit, body, nature, family, and land. International Journal of Environmental Research and Public Health. 2021, 19(1): Art. 426. PMC, doi:10.3390/ijerph19010426.

58. He, Ke. “Modern Holistic Medicine from the Perspective of Traditional Chinese Medicine.” J Yoga & Physiotherapy, vol. 7, no. 3, 2019, Art. 555715.

59. Wang, Y., et al. "The Scientific Nature of Traditional Chinese Medicine in a Changing Environment: Explores the theoretical basis of TCM from a modern scientific perspective. Chinese Herbal Medicines, 12(4): 308-312. ScienceDirect.

60. Lu, A. P., et al. "Theory of Traditional Chinese Medicine and Therapeutic Mechanisms: Health as balance / harmony, microcosm-macrocosm" Evidence-Based Complementary and Alternative Medicine. 2004, 1(4): 419-424. PMC, doi:10.1093/ecam/neh080.

61. Stanford Encyclopedia of Philosophy. "Causal Approaches to Scientific Explanation." by L. Ross. Details theories of causation, including mechanism, interventionist accounts, and causal-process explanation

62. Alcohol use prevalence (WHO, 2004): World Health Organization. Global Status Report on Alcohol 2004. World Health Organization, 2004.

63. Drug use prevalence / psychoactive substances (WHO, 2004): World Health Organization. Neuroscience of Psychoactive Substance Use and Dependence. World Health Organization, 2004.