Level of Concordance Between Urine Drug Test Results And Self-Report Among Patients Attending the Substance Use Disorders Clinic in Federal Neuropsychiatric Hospital Maiduguri

Placidus N OGUALILI,[1] Yesiru A KAREEM,[1,2] John D SHAM,[1] Fatai A KAREEM,[3] Dennis A DAVURUK,[1] Qudus O LWAL,[1] Fatima A ALI,[1] Umar B MUSAMI,[4] Ibrahim A WAKAWA[4]

ABSTRACT

Background: Substance use disorders are among the most common disorders seen in the Mental Health facility. Discrepancies in harmonising self-reports and laboratory results significantly mar the assessment of these disorders. So many factors account for this, such as the timing of the test and the nature of the substance used, among others. **Objective:** The study determined the sociodemographic and clinical correlates involved with regard to agreeableness between self-report and urine drug test results among patients being treated for substance use disorders. **Methodology:** A cross-sectional study from March to May 2022 involved patients treated for substance use disorders at Maiduguri. The authors encountered 109 clients based on scheduled appointments using information from the register kept by health records staff. The study pathway included information, obtaining consent, and administering questionnaires designed by the authors along with the Drug Abuse Screening Test version 10 (DAST-10). Seventy-five (75) patients all met our inclusion criteria and thus fully participated. **Results:** The minimum age was 18 years, and the maximum was 58 years. Sixty-nine (92%) were males. Thirty-one (41.3%) of them were secondary school leavers, and 17 (22.7%) were in higher institutions. Sixteen (21%) were Civil servants, and 5 (6.7%) were unemployed. A bivariate association using chi-square and t-test showed that academic qualification related significantly with DAST-10 score (P = 0.005). Occupation was also associated significantly with DAST-10 score (P = 0.033). The UDT report was positive for 67(89.3%) but only tallied with self-report for 23 (30.7%) participants. There was a wide margin of disagreement between substances detected by UDT and self-report of substance use. **Conclusion:** Self-report of substance use did not directly concur with UDT results. This underscores the need for further scrutiny and caution while using any approach as a stand-alone, especially when planning for interventions.

Keywords: Agreeableness, Drug misuse, Self-description, Urine drug toxicology

OPEN ACCESS

Affiliation

[1]Department of Mental Health, Federal Neuropsychiatric Hospital, Maiduguri, Borno State.
[2]Directorate of Clinical Services, Neuropsychiatric Hospital, Aro, Abeokuta. Ogun State. Nigeria.
[3]Toxicology Laboratory, Science Laboratory Department, Gateway ICT Polytechnic, Ogun State.
[4]Department of Mental Health, College of Medical Sciences, University of Maiduguri, Borno State.

***Correspondence**

Yesiru A Kareem. Department of Mental Health, Federal Neuropsychiatric Hospital, Maiduguri.
***Tel:** +234 803 115 8584*

***Email:** mallamkay15@gmail.com*

Article Metrics

***Submitted:** 5 Jan 2024*
***Accepted:** 10 Feb 2024*
***Published:** July-Dec 2024*

Journal Metrics

***p- ISSN:** 1115-0521*
***e-ISSN:** 3027-2890*
***Website:** www.orientjom.org.ng*
***E-mail:** editorojm@gmail.com*

Publisher

cPrint, Nig. Ltd
E-mail:

Access to the article

Website: *http://www.orientjom.org.ng*
: DOI: 10.5281/zenodo.13905703

How to cite this article

P N Ogualili, Y A Kareem, J D Sham, F A Kareem, D A Davuruk, Q O Lwal. Level of Concordance Between Urine Drug Test Results And Self-Report Among Patients Attending the Substance Use Disorders Clinic in Federal Neuropsychiatric Hospital Maiduguri. Orient J Med, 2024;36(3-4):99-108. DOI:10.5281/zenodo.13905703

INTRODUCTION

Self-report and urine drug analysis are the most often used methods to track substance usage for clinical and research purposes.[1] Large-scale epidemiological research often prefers self-reports as a means of data collection.[2] Self-report measures can be obtained through various modes of administration, including self-administration via paper-and-pencil questionnaires, computer-assisted self-interviews or interactive voice recording, and personal (interviewer-administered) interviews.[3] Questions about the accuracy of self-reported substance use are commonly posed.[1] Research findings indicate that self-report cannot be naively accepted due to many factors; under-reporting has been recorded in the workplace, as high as 70%.[2] Also, a study on self-report showed that the participants under-reported their substance usage by.[1]

Self-reports may suffer from inaccurate reporting but can be verified with objective measures. Alternative assessment techniques, such as biological measurements, are also frequently used to measure substance use or to validate self-report measures of substance use.[3] In drug testing, a biological sample is used to determine whether a specific drug or its metabolites are present within a particular time frame.[4]

Drug testing can be carried out on various biological specimens, including urine, blood, hair, saliva, sweat, nails (toe and finger), and meconium.
Urine is the most commonly obtained specimen for drug testing due to its noninvasive route and ease of sample collection. Both parent drug and metabolites may be detected in urine specimens and are usually in higher concentrations than in blood or serum samples.[5] There are two main types of UDTs, screening and confirmatory tests. Initial drug tests or screens are performed using immunoassay technology and are conducted in the laboratory or onsite with point-of-care testing.[5] Immunoassays allow for a large number of specimen screens to be completed and provide relatively rapid results.[6] Generally, immunoassays use antibodies to detect the presence of drug metabolites or classes of drug metabolites in the urine. Unfortunately, immunoassays will also detect substances with similar characteristics, resulting in cross-reactivity leading to false positive results. Thus a detailed history of all over-the-counter, herbal, and prescription drug use must be obtained before taking a sample. While most assays have been redesigned to eliminate these possible occurrences, certain compounds may give a false positive due to cross-reactivity with other substances.[7]

The assessment of substance use disorders can thus be marred by these discrepancies in harmonizing self-reports and laboratory results. So many factors from the side of UDT may account for the differences. They include the timing of the test, nature of the substance being used, quality of the test kit, drug's half-life, subject's state of hydration and fluid balance, frequency of drug usage, route of administration, and cut-off concentration utilized by the testing lab to identify the drug. Other anomalies found in the urine screen could be indicative of falsified results or sample tampering.

All initial testing conducted with immunoassays are considered presumptive, and clinicians need to use clinical judgment, patient history, and collaborative information to decide whether confirmatory testing is necessary for optimal patient care.[5] Gas chromatography/mass spectrometry (GC-MS) is considered the criterion standard in confirmatory testing. It can identify specific molecular structures and quantify the amount of a drug or substance in the sample.[6] The GC-MS assessments, however, need trained personnel, are time-consuming and costly, and thus are reserved for confirming positive drug screens. Liquid chromatography/tandem mass spectrometry (LC-MS/MS) offers an alternative to GC-MS for confirmatory testing and may be more time-efficient. Confirmatory testing should always be

conducted when making legal, forensic, academic, employment, or other decisions that have significant sequelae.[5]

Combining the tests gives an extremely low likelihood of false positives or false negatives. Detection of the substance of use is vital for assessing treatment needs and response in both research and more routine clinical settings. Combining data from urinalysis with patient self-reporting is a much more accurate measure of drug usage than using either method alone.[8] This study intends to highlight why it is desirous for Clinicians to know the implications of any approach they choose and the extent of reliance that can be conferred on the outcome.

The objectives of this study are to determine the pattern of substance use among participants, to determine associated sociodemographic and clinical correlates, and to evaluate the concordance between self-report of substance use and urine drug test results.

METHODOLOGY

A cross-sectional study carried out over three months (March–May) in 2021and involved patients diagnosed with substance use disorders in Federal Neuro-Psychiatric Hospital, Maiduguri. Appointments were scheduled using the medical health record register for substance use disorder. Interviews were first carried out; those not less than 18 years that admitted to having used in the preceding year, not in full abstinence in the past 30 days and yet to do a urine drug test were recruited for the study. They were then fully educated about the research and needed to do urine drug tests. All those that consented were then selected and participated on the date y of the encounter.

The register kept by health records staff showed that 424 cases of substance use disorder were seen in 2020, comprising 400 males and 24 females. The study pathway involved interviews, socio-demographic proforma, retrieval and perusal of case notes, administration of Drug Abuse Screening Test version 10 (DAST-10) and Urine Drug Test (UDT).

A total of 109 patients were encountered over study period. Seventy-five of them met the study criteria and participated. In contrast, others were dropped due to: (1) not using the substance in the last year, (2) fully abstinent, (3) using in the last 1year but not within 30 days before the study, (4) non-consenting, (5) rejecting to do UDT and (6) recently did UDT (≤2weeks before the study).

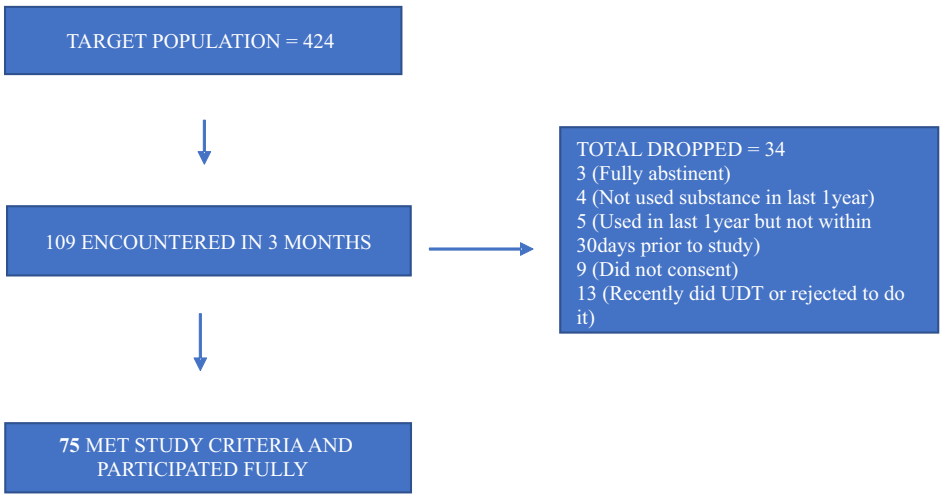

Figure 1: Sample Selection Flow

A checklist produced by the authors was used to source information on Socio-demographic and clinical data to ensure uniformity. Clinical and socio-demographic information sorted included: age, sex, educational status, occupational status, marital status, self-reported substances of use, duration of substance habit, nature of use, primary diagnosis, presence of comorbidity, type of prescription drug used, family history of mental illness and history of treatment for mental illness.

Figure 2: Socio-clinical Proforma

1. Serial Number
2. Date of completion
3. Patient's Initials
4. Age
5. Sex
6. Highest Level of Education
7. Occupational Status
8. Marital Status
9. Self-reported Substances of Use:
10. Duration of Substance Use Habit
11. Last use of Substance
12. Nature of Use
13. Presence of Behavioural Change
14. Types of Behavioural Change
15. Duration(s) of Behavioural Change
16. Main Diagnosis
17. Presence of Comorbidity
18. Type of Comorbidity
19. Family History of Mental Illness
20. The outcome of Urine Drug Toxicology
21. Substances Identified by Urine Drug oxicology
22. Presence of Forensic Issues
23. Type(s) of Forensic Issue
24. Current use of Medications
25. Last use of Medications

Drug Abuse Screening Test (DAST-10)

General Instructions:

"Drug use" refers to:

(1) The use of prescribed or over-the-counter drugs above the directions; and

(2) Any non-medical use of drugs.

The various classes of drugs may include cannabis (marijuana, hashish), solvents (e.g., paint thinner), tranquillisers (e.g., Valium), barbiturates, cocaine, stimulants (e.g., speed), hallucinogen (e.g., LSD), or narcotics (e.g., heroin). The questions do not include alcoholic beverages. Please answer every question. If you have difficulty with a statement, choose the most right response. These questions refer to drug use in the past 12 months.

Please answer No or Yes to each one of them.

Table 1: Drug-Abuse Screening Test-10

		Yes	No
1.	Have you used drugs other than those required for medical reasons?		
2.	Do you use more than one drug at a time?		
3.	Are you always able to stop using drugs when you want to?		
4.	Have you had "blackouts" or "flashbacks" as a result of drug use?		
5.	Do you ever feel bad or guilty about your drug use?		
6.	Does your spouse (or parents) ever complain about your involvement with drugs?		
7.	Have you neglected your family because of your use of drugs?		
8.	Have you engaged in illegal activities to obtain drugs?		
9.	Have you ever experienced withdrawal symptoms (felt sick) when you stopped taking drugs?		
10.	Have you had medical problems as a result of your drug use (e.g., memory loss, hepatitis, convulsions, bleeding, etc.)?		
	Total Score		

We took the UDT result as the "gold standard" to which self-report was compared. The outcome of UDT was recorded as positive if one or more substances were identified and negative when no substance was identified. Self-report was said to tally (agree) with UDT results when both report similar substances. Two of the authors worked with laboratory staff to ensure the maintenance of standards from sample collection, and testing down to interpretation. Ethical approval was obtained from the Research Ethics Committee of Federal Neuropsychiatric Hospital, Maiduguri.

RESULTS

The minimum age was 18 years, and the maximum was 58 years. The average age of the participants was 32 years. Cannabis was the most predominant substance of use in about half (49.3%), while 35 (46.7%) had psychosis at presentation.
10

Table 1: Sociodemographic Variables

		N=75	%
Gender	Male	69	92.0%
	Female	6	8.0%
Academic qualification	No education	9	12.0%
	Primary	5	6.7%
	Secondary	31	41.3%
	Tertiary	17	22.7%
	Quranic education	13	17.3%
Occupation	Farmer	15	20.0%
	Civil servant	16	21.3%
	Trader	15	20.0%
	Artisan	9	12.0%
	Labourer	6	8.0%
	Student	9	12.0%
	Unemployed	5	6.7%
Marital status	Single	46	61.3%
	Married	23	30.7%
	Divorced	6	8.0%
Age group (years)	18 – 27	30	40.0%
	28 – 37	31	41.3%
	38 – 47	9	12.0%
	48 – 57	3	4.0%
	58 – 67	2	2.7%

Table 2: Clinical Variables

		N=75	%
Number of substances being used	Single	11	14.7%
	Multiple	64	85.3%
Duration of habit	< 1year	1	1.3%
	1 - 5years	30	40%
	6 – 10years	19	25.3%
	> 10years	25	33.3%
Last use	< 24hours	20	26.7%
	1 – 6days	31	41.3%
	1 – 2weeks	16	21.3%
	3 – 4weeks	8	10.7%
Nature of use	Regularly	58	77.3%
	Irregularly	17	22.7%
Presence of comorbidity	Yes	15	20%
	No	60	80%

Table 1: DAST-10 Scores Of Participants

Score	Degree of problems related to substance use	N=75	%
1 – 2	LOW	4	5.3%
3 – 5	MODERATE	10	13.3%
6 – 8	SUBSTANTIAL	50	66.7%
9 - 10	SEVERE	11	14.7%

Table 2: Bivariate Association Between Dast-10 scores and Socio-Clinical Variables

Socio-clinical variable	Chi square/t-test	P value
Gender	3.261	0.353
Marital status	9.875	0.130
Occupation	34.36	**0.033**
Academic qualification	28.213	**0.005**
Duration of habit	7.892	0.545

Table 3: Contingency of Relative Frequencies of Agreement and Disagreement

Self-report	UDT result		Row total
	Positive	Negative	
Positive	20 (0.267)*	5 (0.067)	25 (0.33)
Negative	47 (0.627)	3 (0.040)*	50 (0.67)
Column total	67 (0.89)	8 (0.107)	75 (1.00)

* = Agreement/tally

Validity of self-report with UDT

Sensitivity $= \frac{20}{67} = 29.9\%$

Specificity $= \frac{3}{8} = 37.5\%$

Positive predictive value $= \frac{20}{25} = 80.0\%$

Negative predictive value $= \frac{3}{50} = 6.0\%$

Accuracy $= \frac{23}{75} = 30.7\%$

DISCUSSION

This study was carried out among patients attending substance use clinic of Federal Neuropsychiatric Hospital Maiduguri to determine the pattern of substance use among them, the associated socio-clinical correlates, and to evaluate the concordance between self-report of substance use and urine drug test results.

The study revealed that majority of people being treated for substance use disorders were males (92%). This was more than what the UNODC, Nigeria drug use Survey carried out in 2019 reported. It reported that 1 of every 4 drug users in Nigeria is a woman.[9] More men (annual prevalence of 21.8 per cent or 10.8 million men) than women (annual prevalence of 7.0 per cent or 3.4 million women) reported past-year drug use in Nigeria. The difference may be due to the nature of the present study which was hospital-based. This study finding showing that majority were in the age grouping 18 – 27years (40%) and 28 – 37years (41.3%) is comparable to the UNODC survey which showed that the highest levels of any past-year drug use occurred among those aged 25-39 years.[9]

The study found out that cannabis is the most predominant substance of use with about half of the respondents taking cannabis, which is relatable to the Nigerian survey which also reported that cannabis was the most commonly used drug. [9] This study revealed that as much as 85.3% of study participants used multip18e substances, which is close to the 95 per cent reported among high-risk drug users in Nigeria.[9]

The sensitivity of 29.9% also identifies the limitation on counting only on self report. This if further justified by Annekatrin *et al*., in a 2023 study, found that self-reported data underestimated the prevalence of young adults' exposure to illicit substances and the non-medical use of prescription drugs.[10] Percentage discrepancies between self-report and urinalysis were reported in some studies, at 13%, [2] 35%, [11] and at 3% for those who self-reported no use, 47% for those who reported usage, and 21% for those who reported abuse or dependence.[12] Fendrich M *et al* reported that concordance between self-reported and hair data varied from poor to moderate and that prevalence estimates of substance use were typically higher when using hair tests instead of self-reports.[13] Overall, associations between self-reported and bio-specimen confirmed use were in the low-to-moderate range and tended to be higher when shorter self-report recall periods were used and among substances with rapid metabolism.[14]

The accuracy in this study was 30.7% as many people present at a time when the UDT kit may not detect a positive use, giving more room to entertain the self-report. Self-report studies have many advantages such as being logistically more straight forward than obtaining specimens (e.g., urine, hair, blood, saliva, breath), but may suffer from specific disadvantages due to how subjects generally behave. Self-reported answers may be exaggerated; respondents may be too embarrassed to reveal certain private details; various biases, like social desirability bias, may affect the responses. Also, honesty and introspective ability could impact self-report outcomes used in research or treatment program evaluation. Other influences can be due to factors like location, stage of treatment, age, gender and involvement with the criminal system. Biological assays often only test for recent (days to weeks) or past use. In contrast, many studies examine

lifetime or months-long usage patterns.[15] Different reasons can account for the low accuracy. First, it takes a longer time (i.e., one day up to several weeks) before drugs or their metabolites can be detected in urine compared to blood or serum samples.[16] Falsification of results or sample tampering anomalies can occur in urine screening. This can be done by substituting the sample, diluting it with water or drinking much water close to sample collection time. Measures such as checking urine creatinine level, pH, specific gravity and bluing the water in the toilet/urine collection room have been used to detect tampered samples.

New psychoactive substances (NPS) also present a challenge for immunoassay screening, as available methods are typically directed only towards the conventional substances.[17] For example, amphetamines (amphetamine and methamphetamine), tetrahydrocannabinol carboxylic acid (THC, cannabis), morphine (heroin), and benzoylecgonine (cocaine). On the other hand, NPS are often designed to mimic and are chemical derivatives of conventional drugs; thus there is a possibility that certain NPS will also bind to (i.e. cross-react with) the antibodies used in immunoassay screening methods. This may account for difference in the UDT and the self-reporting.[18]

New psychoactive substances (NPS) also present a challenge for immunoassay screening, as available methods are typically directed only towards the conventional substances.[16] For example, amphetamines (amphetamine and methamphetamine), tetrahydrocannabinol carboxylic acid (THC, cannabis), morphine (heroin), and benzoylecgonine (cocaine). On the other hand, NPS are often designed to mimic and are chemical derivatives of conventional drugs; thus there is a possibility that certain NPS will also bind to (i.e. cross-react with) the antibodies used in immunoassay screening methods. This may account for difference in the UDT and the self-reporting.[17]

Therefore, a reputable drug test routine will thus employ a two-step approach—initial screen (immunoassay) and confirmatory (spectrometric analysis) as procedures to test for drugs.

In conclusion, self-report of substance use did not directly concur with UDT results. This underscores the need for caution in interpreting the results of self-report methods when documenting the prevalence of drug use or planning for interventions. Hence, combining information from UDT and self-report is a better way to assess drug usage than using either method alone. When appropriate confirmatory tests should be carried out, especially where relevant issues are at stake.

Study Limitations

This study is strengthened by the fact that we used information from self-report and UDT under the routine clinical scenario, in contrast to some studies in which such was collected in the context of research protocols ensuring anonymity and confidentiality. Thus, patients may under-report problems out of fear that it could jeopardize their status in treatment. It is however limited by the cross-sectional design, and thus did not consider the stage of treatment, which can be a limiting factor. Some notable differences may wrongly be attributed to patient factors rather than to the stage of treatment. Since the confirmatory test was not carried out, new psychoactive substances (NPS) may have posed challenges in correctly interpreting certain UDT results.

Also self-report and UDT information was collected under clinical assessment conditions, in contrast to some studies in which such was done in the context of research protocols with anonymity. Thus, patients may under-report problems out of fear that it could jeopardize their status in treatment.

Furthermore, the self-reported answers may be exaggerated; respondents may be too embarrassed to reveal certain private details; various biases, like social desirability bias, may affect the results. Also, honesty and introspective ability could impact self-report outcomes used in research or treatment program evaluation. Other influences can be due to factors like location, stage of treatment, age, gender and involvement with the criminal system.

CONCLUSION AND RECOMMENDATION

Self-report of substance use did not directly concur with UDT results. This underscores the need for caution in interpreting the results of self-report methods when documenting the prevalence of drug use or planning for interventions. Hence, combining information from UDT and self-report is a better way to assess drug usage than using either method alone. We thereby recommend that appropriate confirmatory tests should be carried out, especially where relevant issues are at stake. A reputable drug test routine will thus employ a two-step approach—initial screen (immunoassay) and confirmatory (spectrometric analysis) as procedures to test for drugs.

Acknowledgements

We thank the Management of the Drug Abuse Treatment and Rehabilitation Unit of Federal Neuropsychiatric Hospital, Maiduguri, including the staff and patients, Dr Ismail Adesina for editing, and Dr Abdulhakeem Shuaib for proofreading, the Research assistants and all who supported us in this study.

Funding

No funding was obtained for the conduct of this study.

Conflict of interest

No potential conflict of interest that exists in this publication.

Authors

P.N. Ogualili [1,2], Y.A. Kareem [1,2], J.D. Sham [2], F.A. Kareem [3], D.A. Davuruk [2], Q.O. Lawal [2], F.A. Ali [2], U.B. Musami [2,4], A.W. Ibrahim [2,4]

Author Contribution Statements

PNO and YAK devised the main conceptual ideas; while JDS, FAK, DAD and QOL worked out the study design. YAK, JDS and PNO analysed the data as FAA, UBM and AWI performed the data curation and interpretation. PNO, YAK, JDS and FAK made the original draft while DAD, QOL, FAA, UBS, and AWI reviewed the drafts. All authors provided critical feedback, manuscript preparation, and the final approval of the version to be published. All authors also consented to be answerable for the work regarding the accuracy, integrity, and resolutions.

REFERENCES

1. Denis C, Fatséas M, Beltran V, Bonnet C, Picard S, Combourieu I, Daulouède JP, Validity of the self-reported drug use section of the addiction severity index and associated factors used under naturalistic conditions. *Subst Use Misuse* 2012;47(4):356–363
2. Akinci IH, Tarter RE, Kirisci L. Concordance between verbal report and urine screen of recent marijuana use in adolescents. *Addictive Behaviors* 2001;26(4):613–619.
3. Richter L, Johnson PB. Current Methods of Assessing Substance Use: A Review of Strengths, Problems, and Developments. http://dx.doi.org/101177/002204260103100401, 2001 [cited 2024 Feb 6];31(4):809–832. Available from: https://journals.sagepub.com/doi/10.1177/00220426010310040 1
4. Baxter L, Brown L, Hurford M, Jacobs W, Kleinschmidt K, Kushner M, et al. Appropriate Use of Drug Testing in Clinical Addiction Medicine. American Society of Addiction Medicine 2017;1–56.
5. Moeller KE, Kissack JC, Atayee RS, Lee KC. Clinical Interpretation of Urine Drug Tests: What Clinicians Need to Know About Urine Drug Screens. *Mayo Clin Proc* 2017;92(5):774–796.
6. Armbruster DA, Schwarzhoff RH, Hubster EC, Liserio MK. Enzyme immunoassay, kinetic microparticle immunoassay, radioimmunoassay, and fluorescence polarization immunoassay compared for drugs-of-abuse screening. *Clin Chem* 1993;39(10):2137–2146.
7. Anderson L. Drug Testing FAQs. 2014;2014(August 21):1–10. Available from:

http://www.drugs.com/article/drug-testing.html
8. Zanis DA, McLellan AT, Randall M. Can you trust patient self-reports of drug use during treatment? Drug Alcohol Depend, 1994 [cited 2024 Feb 6];35(2):127–132. Available from: https://pubmed.ncbi.nlm.nih.gov/8055734/
9. United Nations Office on Drugs and Crime (UNODC). Drug Use Survey in Nigeria (2018). https://www.unodc.org/documents/data-and-analysis/statistics/Drugs/Drug_Use_Survey_Nigeria_2019_BOOK.pdf. analysis/statistics/Drugs/Drug_Use_ Survey_ Nigeria_2019_BOOK.pdf
10. Steinhoff A, Shanahan L, Bechtiger L, Ribeaud D, Eisner MP, Baumgartner MR, Quednow BB. When Substance Use Is Underreported: Comparing Self-Reports and Hair Toxicology in an Urban Cohort of Young Adults. *J Am Acad Child Adolesc Psychiatry* [homepage on the Internet] 2023 [cited 2024 Feb 6];62(7):791–804. Available from: https://pubmed.ncbi.nlm.nih.gov/36731790/
11. Mieczkowski T, Newel R, Wraight B. Using hair analysis, urinalysis, and self-reports to estimate drug use in a sample of detained juveniles. Subst Use Misuse [homepage on the Internet] 1998 [cited 2024 Feb 6];33(7):1547–1567. Available from: https://pubmed.ncbi.nlm.nih.gov/9657415/
12. Gignac M, Wilens TE, Biederman J, Kwon A, Mick E, Swezey A. Assessing cannabis use in adolescents and young adults: what do urine screen and parental report tell you? *J Child Adolesc Psychopharmacol* 2005 [cited 2024 Feb 6];15(5):742–750. Available from: https://pubmed.ncbi.nlm.nih.gov/16262591/
13. Fendrich M, Johnson TP, Becker J. The use of biological measures in social research on drug misuse. Research Methods in the Study of Substance Abuse [homepage on the Internet] 2017 [cited 2024 Feb 6];285–313. Available from: https://link.springer.com/chapter/10.1007/978-3-319-55980-3_14
14. Folk JB, Hirschtritt ME, McCrary QD, Kalapatapu RK. Agreement between Youth Self-Report and Biospecimen-Confirmed Substance Use: A Systematic Review. *Subst Use Misuse* [homepage on the Internet] 2022 [cited 2024 Feb 6];57(4):531–538. Available from: https://pubmed.ncbi.nlm.nih.gov/35006043/
15. Aarons GA, Brown SA, Hough RL, Garland AF, Wood PA. Prevalence of adolescent substance use disorders across five sectors of care. *J Am Acad Child Adolesc Psychiatry* [homepage on the Internet] 2001 [cited 2024 Feb 6];40(4):419–426. Available from: https://pubmed.ncbi.nlm.nih.gov/11314567/
16. Substance Abuse and Mental Health Services Administration. Clinical Drug Testing in Primary Care. Technical Assistance Publication (TAP) 32. HHS Publication No. (SMA) 12-4668. Rockville, MD: Substance Abuse and Mental Health Services Administration, 2012.
17. Dumbili EW, Ebuenyi ID, Ugoeze KC. New psychoactive substances in Nigeria: A call for more research in Africa. Emerging Trends in Drugs, Addictions, and Health [homepage on the Internet] 2021;1(December 2020):100008. Available from: https://doi.org/10.1016/j.etdah.2021.100008
18. Chermack ST, Roll J, Reilly M, Davis L, Kilaru U, Grabowski J. Comparison of patient self-reports and urinalysis results obtained under naturalistic methadone treatment conditions. *Drug Alcohol Dependence* 2000;59(1):43–44.