

Drug Epidemiology as a Critical Subject of Global Health, Mental Health, and Health Equity: Advances, Trends, and Contemporary Issues

Joshua Owolabi ^{1,2}

¹Department of Anatomy, University of Global Health Equity, Butaro, Rwanda; ²Department of Anatomy, Babcock University, Ilishan-Remo, Nigeria

Correspondence: Joshua Owolabi, Department of Anatomy, University of Global Health Equity, Butaro, Rwanda, Tel +234-80-6488-4305, Email jowolabi@ughe.org

Abstract: Drug epidemiology basically involves the methodical study of the incidence, distribution, and impact of drug or substance abuse in populations and associated factors with a view to proffering solutions or interventions. Drug epidemiology has significantly evolved over the years. The nature of substances that are being used or abused has also drastically evolved, just as the factors that are associated are also evolving. Populations appear to have observable trends or patterns and characteristic underlying factors that are primarily responsible for the trends. Unfortunately, there have not been adequate efforts to appreciate the evolutions that have characterized the patterns of drug or substance abuse or the factors that are responsible for these trends. This is also because drug epidemiology has arguably not been given the attention that it probably deserves worldwide. Judging by recent developments and data on prevalence, drug epidemiology warrants significant attention. This article provides insights into drug epidemiology, not just as a concept but a subject of public and global health, and health equity. It also highlights challenges and matters arising in drug epidemiology, sheds light on contemporary issues, and attempts to suggest solutions. Finally, it advocates for policies and practices that are in line with global realities and trends.

Keywords: drug epidemiology, substance abuse, mental health, global health, equity

Drug Epidemiology as a Relatively Neglected Aspect of Epidemiology

A psychoactive substance or agent is a drug or substance that influences brain functions and causes changes in behavior, mood, awareness, thoughts, feelings, or state of mind. It is not out of place to consider drug epidemiology a relatively neglected or unexplored aspect of epidemiology. Obviously, classical epidemiology has primarily focused on the distribution of diseases of the body within populations. It is interesting to note that even global statistics on health conditions and problems hardly pay commensurate attention to the problem of drug epidemiology. On the other hand, evidence abounds that drug epidemiology constitutes a significant proportion of what contributes to the global burden of diseases globally, with significant effect on quality of life as well as socioeconomic and psychological well-being. The fact that adequate attention has not been paid to drug epidemiology in the context of epidemiology as a domain of medical and health science therefore warrants attention and critical analysis. Part of the challenges that might have contributed to this scenario as illustrated might be partly because classical epidemiologists hardly consider the problem of drug and substance abuse as much as they study bodily and infectious diseases within populations, while individuals who are interested in drug and substance abuse hardly consider it a primary public health and epidemiology topic of interest. This anomaly has lasted too long considering the implications, and hence requires critical and urgent attention.

While efforts to change this narrative might begin with awareness creation, it is important to equally consider the need to educate epidemiologists, medical scientists, and public health personnel on the problems of drug epidemiology, as well as its dynamics in different contexts, populations, and even cultures. Epidemiological evidence should inform policies.^{1,2} It might not be out of place to state that epidemiologists need to pay more attention to studying drug epidemiology critically. This is evident

from a need for significant publication emphasis on the subject in many parts of the world. There is thus a need — an urgent one at that — to train people and personnel and to build research capacity on the subject of drug epidemiology, as this could improve the attention that might be given to the subject.

There is also a critical need to make resources available, and these might include funding as well as opportunities and support for training. More than ever before, there should be quality programs that are dedicated primarily to drug epidemiology. It is equally important to note that context plays significant roles in what has to be understood about drug epidemiology. For example, the opioid epidemic has become of critical health importance in North America or more specifically in the US. On the other hand, one of the most significant drugs of interest in South Africa in recent times has been the cocktail locally named *nyaope*. The most populous African country, Nigeria, in West Africa has in recent times struggled with illegal repurposing of medicinal drugs and their abuse, among which codeine has become quite notorious. This made the government of Nigeria, in conjunction with other stakeholders, ban codeine, which ordinarily is contained in cough syrup, because of overwhelming evidence of its abuse for psychoactive purposes. These scenarios, among others, indicate that the problem of drug epidemiology needs to be understood from specific and diverse contexts through quality investment of research effort toward understanding the dynamics in specific populations. Drug epidemiology is an evolving health and societal challenge. For example, cannabis was reported to have overtaken alcohol and tobacco in terms of popularity among abusers at a point in time.^{3,4}

Drug Epidemiology as a Critical Topic in Health Equity

It is critical to appreciate the place of epidemiology in health equity.^{2,5} Braveman and Gruskin⁶ defined equity in health as the absence of systematic disparities in health (or in the major social determinants of health) among groups with different levels of underlying social advantage/disadvantage, ie, wealth, power, or prestige. Drug epidemiology is currently a critical topic in health equity. For example, when addressing substance abuse and drug epidemiology, classical medical textbooks will most likely readily address problems that are associated with opioid epidemics, and one might simply say that this is the case because it is relevant to the developed part of the world that globally shapes narratives on health topics. Unfortunately, no significant information is found in the literature — whether in classical textbooks or even academic journals — on topics that address drug epidemiology in developing parts of the world, including the aforementioned instances of *nyaope* or illegally repurposed and abused codeine. *Nyaope*'s abuse is not just endemic, but has ripple effects that extend beyond individuals' health to include social spheres, families,⁷ and society.^{8–11} There are several similar psychoactive agents and locally produced cocktails and illicit drugs that are abused in several African countries or other parts of the world. It is thus clear that global efforts that are channeled toward addressing problems of drug epidemiology have been premised largely on the classical understanding of drug epidemiology from the developed part of the world. This further serves as a pointer to the fact that as a matter of health equity, the rest of the world needs to be taken into consideration in terms of their specific challenges or realities and the dynamics that shape such challenges or realities in every part of the world.

Again, looking at Africa, for instance, the current trend suggests that a significant proportion of the African population might be abusing different substances that might not even be considered of significant importance in the global scheme of things when the problem of drug epidemiology or the subject is being addressed. Without prejudice, there are indications that stakeholders in relevant health disciplines, including global health, have only poorly appreciated the problem of drug epidemiology in parts of the world other than their primary environment and domains. It is clear that not many people from the developing parts of the world can afford to procure and use routinely classical drugs like cocaine and heroin when the costs of such drugs are even beyond the economic and physical reach of the average person in these populations. Therefore, overly emphasizing the need to control such drugs of abuse in these populations amounts to overly addressing problems that might not be of top primary relevance to these populations. The more relevant problems, such as those that include codeine and *nyaope* abuse,⁸ as well as the use of various and diverse readily available flora and fauna preparations and cocktails, such as *datura*¹² and lizard dung/droppings¹³ are hardly ever considered. This reality is thus a clear pointer to the need to appreciate drug epidemiology as a critical topic in global health and health equity.

Trends and Advancements in Drug Epidemiology

The problem of drug and substance abuse and its epidemiology is an evolving one, with various dynamics shaping its trends and advances. It is important to pay adequate attention to both trends and the factors that influence the trends in order to properly appreciate the problem and adequately address it. For example, socioeconomic factors, lack of education on the consequences of abusing nonrecommended medical drugs, and poor policy implementation and pharmaceutical regulatory measures might have significantly contributed to the abuse of medical drugs.¹ This would include such instances as codeine abuse to the point of endemicity in northern Nigeria. On the other hand, the US opioid epidemic might have been partly caused by systemic inequities, regulatory loopholes, and lack of adequate appreciation of the problem by the public and stakeholders until an epidemic tipping point was reached. These are just a few instances of a need to appreciate trends in drug epidemiology and the factors that shape them. Very importantly, attention should be paid to emerging substances that are being abused and misused. The emergence of some of these substances has been linked to the search for the cheapest or most readily available ones or more potent alternatives. In certain other instances, lack of regulatory coverage for certain emerging substances of abuse created loopholes that are exploited by the producers, since regulators might not initially catch up with them. It might be helpful to highlight recent developments that have characterized the patterns of drug use by clarifying substances into the conventional psychoactive drugs and the unconventional psychoactive substances.

Conventional Psychoactive Drugs

The top-ranking psychoactive substances include alcohol, caffeine, nicotine, marijuana/cannabis, opioids, heroin, LSD, cocaine, and amphetamines. A 2015 report indicated that 4.9%, 22.5%, and 3.5% of the global adult population abused alcohol, tobacco products, and cannabis, respectively, to the point of causing disorders. The UNODC⁴ *World Drug Report 2021* showed that cannabis, pharmaceutical opioids, and cough syrups currently top global annual prevalence, at 10.8% (male 18.8%, female 2.6%), 4.7% (male 6%, female 3.3%), and 2.4% (male 2.3%, female 2.4%), respectively. Alcohol, tobacco/nicotine, and caffeine have always been at the top of the list of abused substances globally. They are also generally legal, despite causing significant negative effects on mental health and well-being in many instances. On top of the list of the illicit drugs is cannabis. Clearly, the rate at which certain already well-studied and appreciated psychoactive agents are being abused has increased and patterns have evolved dramatically.¹⁴ It is also clear that approaches to dealing with these problems should evolve and be more holistic and contextually appropriate.

The legal tools that are tailored toward control, regulations, and deterrents are still very valid and vital. When the impacts of substance use are then considered in terms of not just the criminal tendencies that come with them but also the dangers to mental and psychosocial well-being, all legally and morally legitimate methods should be deployed. Very important is also the need to consider the fact that the uses of these agents in society also affect the quality of life to such extents that they should be controlled and regulated. The impacts are not limited just to those who make a deliberate choice and habit of using these substances but also those who are victims of vulnerabilities that border significantly on social factors and inequities, particularly in social spaces and contexts. Furthermore, the fact that altered behaviours and judgments are typically fallouts of substance use is also deserving of attention. Therefore, the current efforts aimed at regulations and control should be sustained. Furthermore, there is a need to improve on the policies from not just the legal perspective but through efforts to address the inequities that account for vulnerability to abusing substances or suffering the direct and indirect consequences.

Unconventional Psychoactive Substances

The patterns of use or abuse of unconventional psychoactive substances remain poorly understood in many instances. Unconventional psychoactive substances are often used by trial and error or through a desperate effort to achieve a desired level of psychoactive state or “high” with almost anything possible. In such attempts, substances are tested, experimented with, and when found to be potent enough, become progressively abused by the “pioneer users”, who also recruit more users until a tipping point is attained when it becomes endemic. Typically, socioeconomic factors become increasingly influential and significant. These factors, alongside the increased popularity of the substance,

might promote abuse to a point when they become synergistic enough to promote a sharp upsurge in the trend, leading to an epidemic. A number of substances have fallen into this category. This is another clear indication that drug epidemiologists should pay attention to surveillance systems that can help to track trends, report incidents, and predict tipping points while developing strategic efforts and collaborations to avoid drug- and substance-use epidemics. In other words, applying similar strategies as used in infectious disease epidemiology will be of significant value.

A number of drugs have now been dubbed emerging or new psychoactive substances.^{15,16} For new-generation psychoactive substances, the term “novel psychoactive substances” (NPSs) is now used for certain synthetic and illicitly repurposed drugs, such as designer drugs.^{17,18} One thing is clear: what constitutes the major new psychoactive substances could differ from place to place. While global records show that NPSs are synthetic or designer drugs in general, it is clear that cocktails or concoctions, illicitly repurposed pharmaceutical drugs, and fauna- and flora-derived substances might be the real new psychoactive substances in developing parts of the world, as evidenced in the work of Dumbili et al.¹⁹ What is evident from such observations again is the fact that there is a need to bring in the philosophy and conscious consideration of equity into research and reports with regard to understanding trends or contextual scenarios and conducting research into drug epidemiology. Taking a relatively holistic approach to new or emerging unconventional drugs, the following categories of unconventional psychoactive substances have emerged most recently.

Illicit Repurposing of Pharmaceutical Drugs

Pharmaceutical drugs are now, arguably more than ever, before illicitly repurposed and used as psychoactive agents. A notorious example is the codeine in cough syrup, as well as opioids, a problem that has in several places reached an endemic stage, as it is being referred to as an opioid epidemic. The abuse of codeine that once reached an epidemic stage to the extent of declaring a state of emergency in Africa is a prime example.²⁰

Flora- or Plant-Based Psychoactive Substances and Fauna

Flora of various kinds have always been used as psychoactive agents. For example, the presence of nicotine in kola nuts has made it popular in West Africa. However, there are situations that are now reaching alarming states, such as in the case of datura, which can result in acute toxicity and potential death, in addition to the addictive potentials and its consequences on mental health and well-being in general.¹² Datura abuse falls into the category of abused flora-derived substances. Another notorious plant is *Salvia divinorum*, reportedly hallucinogenic, with its main psychoactive ingredient being salvinorin A. Its other effects include aversion, anhedonia, and depressant-like and sedative-like effects.^{21–23} In other instances, animal- or other fauna-derived substances are also abused. A notorious instance is that of lizard dung or droppings.¹³

New or Modified Products

Certain classical NPSs may fall into this category.¹⁶ These might include synthetic or designer drugs, for example. Synthetic cannabinoids and cathinone might be such examples.

Mixed Preparations

Psychoactive preparations in the form of mixtures, concoctions, and cocktails are quite diverse. They are somewhat traditional in certain instances, with typical local recipes that might not be easily deciphered, a situation that could make the problems more complicated to address. For example, nyaope remains a notorious cocktail that is being abused in Southern Africa.²⁴ Clearly, this points to contextual diversities in what constitutes new and emerging trends in substance abuse.

Having attempted to categorize the relatively new and emerging substances of abuse, it is evident that a major concern here is the difficulty of tracking, controlling, and addressing the health problems that result from their use clinically. This would further point to a need to promote drug epidemiology with quality representations of the diverse contexts, globally, regionally, and locally. Global reports should investigate contexts other than just the predominant global scenarios. Quality data should also be used to inform policies, especially in the area of public health or global health and drug-use control, as well as clinical practices.

Conclusion

Drug epidemiology should be equitably considered an integral aspect of epidemiology and global health. It is clear that drug abuse and its epidemiology are dynamic and evolving. Such evolution could also follow contextual patterns globally. Also, the underlying influencing factors could vary from place to place. It is thus important to consider health equity a philosophy or guiding principle when considering research, reporting, or seeking interventions to the problems that are associated with drug epidemiology. Clearly, there is an urgent need to equip epidemiologists and other stakeholders with adequate skills and understanding of the actual landscape of drug epidemiology globally. Drug epidemiology as a field requires adequate attention that should be reflected in training, funding, support, and conversations on the topic. Very importantly, interventions should be evidence-based and health equity principle-guided.

Funding

This research received no specific grant or financial support from any funding agency in the public, commercial, or not-for-profit sectors.

Disclosure

The author declares no conflict of interest in this article.

References

1. Compton WM, Thomas YF, Conway KP, Colliver JD. Developments in the epidemiology of drug use and drug use disorders. *AM J Psychiatry*. 2005;162:1494–1502.
2. Brownson RC, Hartge P, Samet JM, Ness RB. From epidemiology to policy: toward more effective practice. *Ann Epidemiol*. 2010;20(6):409–411. doi:10.1016/j.annepidem.2010.03.003
3. Seitz NN, Lochbühler K, Atzendorf J, Rauschert C, Pfeiffer-Gerschel T, Kraus L. Trends in substance use and related disorders: analysis of the epidemiological survey of substance abuse 1995 to 2018. *Dtsch Arztebl Int*. 2019;116(35–36):585–591. doi:10.3238/arztebl.2019.0585
4. The United Nations Office on Drugs and Crime (UNODC). World drug report. United Nations publication; 2021. Available from: https://www.unodc.org/res/wdr2021/field/WDR21_Booklet_2.pdf. Accessed November 18, 2022.
5. Carter-Pokras OD, Offutt-Powell TN, Kaufman JS, Giles WH, Mays VM. Epidemiology, policy, and racial/ethnic minority health disparities. *Ann Epidemiol*. 2012;22(6):446–455. doi:10.1016/j.annepidem.2012.04.018
6. Braveman P. Gruskin SDefining equity in health. *J Epidemiol Community Health*. 2003;57:254–258. doi:10.1136/jech.57.4.254
7. Madiga MC, Mokwena K. Depression symptoms among family members of Nyaope Users in the City of Tshwane, South Africa. *Int J Environ Res Public Health*. 2022;19(7):4097. doi:10.3390/ijerph19074097
8. Mokwena K. Consider our plight: a cry for help from nyaope. *Health SA Gesondheid*. 2016;21:137–142. doi:10.1016/j.hsag.2015.09.001
9. Fernandes L, Mokwena KE. The role of locus of control in nyaope addiction treatment. *S Afr Fam Pract*. 2016;58(4):153–157. doi:10.1080/20786190.2016.1223794
10. Mthembi PM, Mwenesongole EM, Coled MD. Chemical profiling of the street cocktail drug ‘nyaope’ in South Africa using GC–MS I: stability studies of components of ‘nyaope’ in organic solvents. *Forensic Sci Int*. 2018;292:115–124. doi:10.1016/j.forsciint.2018.08.001
11. Bala S, Kang’ethe SM. The dangers associated with female adolescents consuming Nyaope Drug in Butterworth, South Africa. *J Hum Rights Soc Work*. 2021;6:307–317. doi:10.1007/s41134-021-00173-1
12. Singh S, Kosana D, Lal R. Long-term intentional *Datura* use and its consequences. *Indian J Psychiatry*. 2019;61(5):543–544. doi:10.4103/psychiatry.IndianJPsychiatry_276_18
13. Bhad R, Ambekar A, Dayal P. The lizard: an unconventional psychoactive substance? *J Subst Use*. 2016;21(2):113–114. doi:10.3109/14659891.2014.987836
14. Gowing LR, Ali RL, Allsop S, et al. Global statistics on addictive behaviours: 2014 status report. *Addiction*. 2015;110(6):904–919. doi:10.1111/add.12899
15. Pantano F, Graziano S, Pacifici R, Busardò FP, Pichini S. New psychoactive substances: a matter of time. *Curr Neuropharmacol*. 2019;17(9):818–822. doi:10.2174/1570159X1709190729101751
16. Shafi A, Berry AJ, Sumnall H, Wood DM, Tracy DK. New psychoactive substances: a review and updates. *Ther Adv Psychopharmacol*. 2020;10:2045125320967197. doi:10.1177/2045125320967197
17. European Monitoring Centre for Drugs and Drug Addiction. European drug report 2016: trends and developments. Lisbon: Publication Office of the European Union; 2016. Available from: <https://www.emcdda.europa.eu/system/files/publications/2637/TDAT16001ENN.pdf>. Accessed November 18, 2022.
18. Specka M, Kuhlmann T, Sawazki J, et al. Prevalence of Novel Psychoactive Substance (NPS) use in patients admitted to drug detoxification treatment. *Front Psychiatry*. 2020;11(569):1–9. doi:10.3389/fpsy.2020.00569
19. Emeka W, Dumbili EW, Ikenna D, Ebuonyi ID, Kenneth C, Ugoeze KC. Emerging trends in drugs, addictions, and health new psychoactive substances in Nigeria: a call for more research in Africa. *Emerging Trends Drugs Addict Health*. 2021;1:100008. doi:10.1016/j.etdah.2021.100008
20. Akande-Sholabi W, Adisa R, Ilesanmi OS, et al. Extent of misuse and dependence of codeine-containing products among medical and pharmacy students in a Nigerian University. *BMC Public Health*. 2019;19:1709. doi:10.1186/s12889-019-8074-5

21. Butelman ER, Kreek MJ. Neuropathology of drug addictions and substance misuse volume 2: stimulants, club and dissociative drugs, hallucinogens, steroids, inhalants and international aspects; 2016:739–746.
22. Veltri C, Grundmann O. Current perspectives on the impact of Kratom use. *Subst Abuse Rehabil.* 2019;10:23–31. doi:10.2147/SAR.S164261
23. Mekuriaw B, Belayneh Z, Yitayih Y. Magnitude of Khat use and associated factors among women attending antenatal care in Gedeo Zone health centers, southern Ethiopia: a facility based cross sectional study. *BMC Public Health.* 2020;20:110. doi:10.1186/s12889-019-8026-0
24. Fernandes L, Mokwena KE. *Nyaope* addiction: the despair of a lost generation. *Afr J Drug Alcohol Stud.* 2020;19(1):37–51.

Substance Abuse and Rehabilitation

Dovepress

Publish your work in this journal

Substance Abuse and Rehabilitation is an international, peer-reviewed, open access journal publishing original research, case reports, editorials, reviews and commentaries on all areas of addiction and substance abuse and options for treatment and rehabilitation. The manuscript management system is completely online and includes a very quick and fair peer-review system. Visit <http://www.dovepress.com/testimonials.php> to read real quotes from published authors.

Submit your manuscript here: <http://www.dovepress.com/substance-abuse-and-rehabilitation-journal>