

## Perception of Consumers, Stakeholders, and Policy Makers on NAFDAC Anti-counterfeit Technologies and Interventions Regarding Counterfeit Drugs in Nigeria

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### Abstract

*Counterfeiting medicines is a global phenomenon affecting developed and less developed countries. The World Health Organization, in its report, describes counterfeit medicines as becoming “a global public health crisis. This study examines consumers, stakeholders, and policymakers' perceptions of NAFDAC anti-counterfeit technologies and interventions regarding counterfeit drugs in Nigeria. This study uses a qualitative research method to examine consumers, stakeholders, and policymakers' perceptions of NAFDAC anti-counterfeit technologies and interventions regarding counterfeit drugs in Nigeria. Participants were selected using convenience sampling, and data was collected through an online interview. Data were analysed using thematic analysis. Stakeholders emphasised the importance of NAFDAC having a comprehensive anti-counterfeiting strategy and implementing measures such as checking for NAFDAC registration numbers, inspecting packaging, and requesting seller receipts to identify genuine medicines. Policymakers at NAFDAC acknowledge the seriousness of the problem and recognise the roles of stakeholders in implementing anti-counterfeiting interventions. They emphasise the need for effective communication, engagement, and collaboration with healthcare professionals. Consumers express concerns about the accessibility to good quality medicines and the prevalence of substandard and counterfeit drugs. However, consumers also demonstrate a willingness to support NAFDAC's efforts and show a preference for quality medicines, which is a positive indicator for the Nigerian pharmaceutical industry. The findings underscore the importance of continuous efforts to raise awareness and implement effective anti-counterfeiting strategies to safeguard public health and combat the growing threat of fake drugs.*

**Keywords:** *Falsified, Substandard, Counterfeit, Knowledge*

### Introduction

Counterfeiting medicines is a global phenomenon affecting both developed and less developed or developing countries [1]. The World Health Organization, in its report, describes counterfeit medicines as becoming “a global public health crisis” [2]. The World Health Organization and International Federation of Pharmaceutical Manufacturers and Associations (WHO; IFPMA), define a

counterfeit medicine as “one which is deliberately and fraudulently mislabeled with respect to identity or source. Counterfeiting can apply to both branded and generic products, and counterfeit products may include products with the correct ingredients, wrong ingredients, without active ingredients, with insufficient quantity of an active ingredient or with fake packaging” [3]. In 2011, the WHO member states included counterfeit and substandard medicines under the new term ‘substandard

/spurious /falsely labelled /falsified /counterfeit medical products' (SSFFC) [4]. Substandard medicines are genuine medicines that have failed to pass the quality measurements and standards set for them. These quality tests have been derived from the official pharmacopoeias [5]. Falsified medicines refer to medical products with deliberate or fraudulent misrepresentation of their identity [5].

The threat of counterfeiting medicines is probably growing, particularly in poorer countries with weak regulatory mechanisms and poorly monitored distribution networks. There are a great many anti-counterfeit technologies available to manufacturers and brand owners, ranging from the very simple but effective to the highly sophisticated and extremely secure ones. The majority can be implemented on one or more of the packaging components; however, some features can even be applied at the product level, either by direct marking or by using physical or chemical markers within the formulation. The purpose of an anti-counterfeit feature is primarily to enable the authentication of an item by government, industry investigators, or, ideally, by the wider public. The second function may be to deter anyone considering counterfeiting a product based on the difficulty or cost involved against the likelihood of detection and prosecution.

The efforts of manufacturers to protect and distinguish their products from fake ones fail in the long run as technologies being employed by counterfeiters surpass theirs [6]. Over the years, the Nigerian government has made efforts to introduce a good healthcare delivery system, including providing quality, productive and affordable drugs. Therefore, through the Federal ministry of Health (FMOH), the government put intervention programs and policies in place to meet these needs. That led to the establishment of the National Agency for Food and Drug Administration and Control (NAFDAC) on January 1, 1994, as a parastatal of the federal ministry of health [7], [8], [9]. In rising to the challenge of counterfeiting (including food,

medicines, and other health products), NAFDAC is working hard to curb the menace of SFs in conjunction and collaboration with the health regulatory authorities of other countries [7]. Various interventions, including innovative technologies, have been used to solve problems. The previous and current Directors General of NAFDAC has introduced many strategies to fight the anti-counterfeiting war [10]. One major contributing factor to the prevalence of counterfeit medicines in Nigeria is the continued presence of the highly unregulated open drug markets across major cities of Nigeria, where medicines are sold in the open air on street corners, at kiosks, and at stalls.

## **Materials and Methods**

### **Study Design**

This study uses a qualitative research method to obtain in-depth information from respondents. Qualitative methods allow data to be collected using words rather than numbers. It provides a verbal description of an event or experience rather than numerical descriptions. This finding agrees with [11] who found that qualitative methods can be utilised to obtain more detailed information that is difficult to explain quantitatively. This qualitative research was used to unearth in-depth information from stakeholders, policy makers and consumers to know their perception of NAFDAC anti-counterfeit technologies and interventions regarding counterfeit drugs in Nigeria. The research was conducted in four states Lagos, Kano, Anambra and FCT Abuja. Participants were selected using a convenient sampling technique.

### **Study Location**

The selected states for the study are Lagos, Kano, Anambra and FCT Abuja. These states have the highest number of stakeholders due to the highly unregulated open drug markets in these states and the pharmaceutical industry, while most non-governmental organisations and development agencies involved in

pharmaceutical product importation and distribution are located in Abuja.

Lagos is Africa's largest and former capital city in terms of population, with about 15.9 million people living there. It is also the 4<sup>th</sup> largest economy in Africa [12]. It is in South-Western Nigeria. It is bounded on the west by the Republic of Benin, to the North and East by Ogun state, with the Atlantic Ocean providing a coastline on the south. The state has a territorial land area of 351,861 hectares and is made of five administrative divisions: Ikeja, Badagry, Ikorodu, Lagos (Eko), and Epe. The divisions are divided into 20 local governments and 37 Local Council Development Areas, respectively. The Lagos popular open drug market is in the state's Idumota (Lagos Island) area [12].

Kano state, located in the northern region of Nigeria, was created in 1967 and is the most populous in the country according to the national census done in 2006, with an estimated 20,000,000 in the year 2020. The state's capital and largest city is Kano, Nigeria's second most populous city after Lagos. Kano state borders Katsina State to the northwest, Jigawa state to the northeast, Bauchi state to the southeast, and Kaduna state to the southwest [13]. The Hausa and Fulani make up most of the Kano state's population. The Hausa language is the dominant language in the state, as it is in most of northern Nigeria. Kano consists of forty-four Local Government Areas [14].

Anambra state is in the southeastern region of the country. It was created on August 27<sup>th</sup>, 1991. It is bounded by Delta state to the west, Imo state to the south, Enugu state to the East and Kogi state to the North. There are over 9 million residents in the state, based on the 2022 census report. There are 21 local government areas, and the residents are primarily Igbo, with the Igbo language serving as the lingua franca throughout the state.

FCT, Abuja is the capital city of Nigeria, in the middle of the country. It rises behind the presidential complex, which houses the residence and offices of the Nigerian president

in the three-Armed zone on the city's eastern edge. The state was created in 1976 and is located in the Northern confluence of the Niger and Benue rivers [12]. It is bordered by the states of Niger to the west and northwest, Kaduna to the northeast, Nasarawa to the east and south, and Kogi to the southwest. It has a population of about 3,464,123 according to a 2022 population estimate [15]. Abuja is known for being one of the few purpose-built capital cities in Africa.

## **Study Population**

The study population comprised NAFDAC stakeholders who are dealers in pharmaceutical products or Marketing Authorization Holders (MAHs) of medicines and Consumers. The states are Lagos, Kano, Anambra, and Federal capital Territory (FCT), with the highest number of stakeholders.

## **Sampling Techniques**

This Qualitative study was conducted with a convenient sampling procedure, a non-probability sampling approach to identify the relevant officers, stakeholders, and consumers with adequate knowledge of the research topic and select.

## **Research Instruments for Data Collection**

Qualitative interview guides (unstructured questionnaires) were designed and comprised of open-ended questions. The in-depth Qualitative interview guides were used, including the types of questions to be asked, additional probes, and which personnel should be interviewed. Three Separate Interview guides were designed.

1. Policy maker or National Regulatory Authority,
2. Stakeholders and,
3. Consumers.

These guides were put on an online JotForm Application for ease of collection of responses (JotForm App was used to collect the responses online for the in-depth interview. JotForm enables one to create online forms, collect responses directly in emails and create fillable PDF forms.). The forms were distributed to the

three groups, as stated above. One group representing the Policy maker or Regulatory Authority had five respondents that participated. They were selected purposefully from (Drug Evaluation & Research, Lagos; Pharmacovigilance/Post Marketing Surveillance, Abuja; Ports Inspection, Anambra; State office Kano and Drug Registration & Regulatory, Lagos). The Second group is Stakeholders, with five participants from the various professional sectors (ACPN; NIROPHARM; PMG-MAN; AHAP & NGO). The third group represents the general consumers; five participants were drawn from the study centres, with two coming from Lagos.

### **Data Analysis**

The collected data was analysed using thematic analysis, where patterns and themes were identified, including categories. The study findings were presented through a comprehensive report, including direct participant quotes and a discussion of the identified themes and patterns. The report also included recommendations given by respondents on ways to reduce the rate of fake and substandard drugs in Nigeria.

### **Ethical Consideration**

To ensure the acceptability of this study, ethical approval was sought and obtained from the Federal Government Institutional Review Board and the National Health Research Ethics Committee of the National Institute of Medical Research affiliated with the Federal Ministry of Health. In addition, verbal and written consents were obtained from respondents before the commencement of administering questions and personal identifiers were removed from summary data. Also, data collected will be securely stored, and names of individuals were excluded in order not to identify the individuals as well as families or groups.

### **Results**

This section is a qualitative analysis of stakeholders' opinions on preventing counterfeit

medicines alongside the NAFDAC. The stakeholders were asked questions about anti-counterfeiting strategies and measures to fight counterfeit medicines, factors they consider before selling or recommending medicines to clients, and their opinions on stakeholders' groups that should work with NAFDAC to prevent counterfeit medicines. The responses provided were transcribed, and this report analyses and summarises the stakeholders' views.

### **NAFDAC's Anti-Counterfeiting Strategies**

When asked if NAFDAC should have anti-counterfeiting strategies or approaches to fight counterfeit medicine, stakeholders overwhelmingly agreed that NAFDAC should have such strategies. One stakeholder said that NAFDAC should increase its staffing to cover various populists. Another stakeholder said that NAFDAC is better positioned than the general public and medical professionals to identify counterfeit medicines and end the problem. They also suggested that NAFDAC should have an anti-counterfeiting strategy to assist them in fighting falsified medicines.

### **Stakeholders' Groups Working to Prevent Counterfeit Medicines**

When asked who they think is the stakeholders' group who should be working to prevent counterfeit medicines alongside NAFDAC, stakeholders agreed that the entire public should work with the agency to prevent counterfeit medicines. One stakeholder said, *"Everybody is a stakeholder issue, collaborates with the agency in fighting because if you do not play that role, you endanger your life or the life of your friends or lists every night. Every person should be conscious and first assist in the fighting."*

### **Factors Considered Before Selling or Recommending Medicines**

Stakeholders considered several factors before selling or recommending medicines to their clients. Quality and socioeconomic class

were the most important factors. One stakeholder said, *“Well, we not only distribute medicines and now that number because sometimes we have a medical alternative. You don’t. Some medicines don’t have alternatives and are registered; you need to save the patient. So, what do you do? Of course, quality is a big issue, especially economic.”*

### **How to Identify Good Quality Medicines**

When asked how to know that a medicine is good quality, stakeholders responded differently. One stakeholder said, *“We consider whether they’re registered medicines or not, whether they now have a NAFDAC number or not.”* Another stakeholder suggested that buyers should send codes to verify the products they are buying, especially when in doubt.

### **Selling/Distributing Medicines with NAFDAC Number**

Stakeholders were asked if they only sell/distribute medicines with NAFDAC numbers. Some stakeholders responded that they do not only sell/distribute medicines with NAFDAC numbers. One stakeholder said, *“I think that is identifying yourselves buying from...knowledge distributors. Stuff to consider.”* However, some stakeholders said they only sell/distribute medicines with NAFDAC numbers because it shows that NAFDAC has approved the medicines and are of good quality.

Respondents were asked to describe the roles of the stakeholders in developing the various anti-counterfeiting strategies. They were also asked what they think of the NAFDAC initiatives against substandard and falsified drugs and to mention those initiatives. They were asked to mention what could be done to improve it and to name what should be involved in developing interventions or strategies.

This section analyses stakeholders’ responses in a qualitative interview to gather insights on the roles of stakeholders in the development of various anti-counterfeiting strategies and the

initiatives taken by the NAFDAC against substandard and falsified drugs in Nigeria. The interview questions focused on stakeholder roles, NAFDAC’s initiatives, the effectiveness of the strategies, and ways to improve them. The following themes were developed from the responses:

### **Stakeholders’ Roles**

The stakeholders in developing anti-counterfeiting strategies were identified as professional bodies, trade groups, NGOs, universities, and everyone who could send proposals to NAFDAC. However, the primary agency for anti-counterfeiting strategies was acknowledged to be NAFDAC. The stakeholders should be involved in the conception of the strategies to give feedback and help the agency to draw up plans. One stakeholder noted that the company producing the products should be carried along in developing the strategies because they have so much to protect and can be the first to know when their products are being counterfeited or falsified.

### **NAFDAC’s Initiatives**

The stakeholders recognized the initiatives NAFDAC took in the fight against substandard and falsified drugs. The initiatives mentioned were capacity building, facility upgrades, staff training, and Mobile Authentication service or schemes (the MAS). However, they noted a need to research how effective the initiatives are, particularly in the marketplace and review the research to adjust the stages of the strategies.

### **Effectiveness and Ways to Improve Strategies**

The effectiveness of the strategies could not be accurately measured because research has not been done on them. Stakeholders suggested that there is a need for research to be done on strategies to check their effectiveness. They also emphasised the need to examine the entire distribution chain, particularly in Nigeria, where distribution is the biggest challenge. Stakeholders suggested that plugging the

leakages in the distribution network would make the circulation of substandard and falsified drugs unattractive.

What is the general role of NAFDAC stakeholders in implementing anti-counterfeiting interventions? What are the expected challenges in the implementation? How should these roles be communicated to stakeholders? In your opinion, how could the roles be made to improve? · What are the barriers the stakeholders could face? · How do you think the agency has taken the role into account in the intervention implementation?

The stakeholders were asked about their role in implementing anti-counterfeiting interventions, the expected challenges, and how these roles could be communicated and improved upon. The responses given by the stakeholders provide insights into the expectations and challenges of their role in the fight against counterfeit drugs in Nigeria.

The stakeholders supported NAFDAC's efforts in combating counterfeit drugs in the country. They emphasized the need for documentation by all stakeholders in the supply chain, including drug disposal, purchases, and sales. This is to enable easy tracing of the movement of the product in case of detection of counterfeit drugs. The community pharmacies were specifically expected to report to NAFDAC anytime they suspected a counterfeit product, or something was wrong. However, the stakeholders noted some challenges in implementing these interventions, with the country's business environment being one of them. They observed that people are too engrossed in business to pay attention to small details, leading to missing out on counterfeit drugs. There was a call for regular stakeholder meetings to create awareness and educate stakeholders on their responsibilities in combating counterfeit drugs.

The stakeholders also suggested that advocacy and awareness creation could improve the roles of the stakeholders in the fight against counterfeit drugs. They noted that if different

stakeholders are made aware of the nation's trouble with counterfeit drugs, they may become more active in reporting to NAFDAC. Social media was identified as a useful tool for communicating and reaching out to as many stakeholders as possible. They acknowledged NAFDAC's primary role in reporting cases of counterfeit drugs and emphasised the need for a flow of reports to the agency to enable effective intervention. They also recognised the challenges posed by the innovativeness of counterfeiters in changing tactics to evade detection. The stakeholders called for law enforcement agencies' support in addressing reported counterfeit drug cases.

The roles of Pharmacists and Healthcare providers in anti-counterfeiting interventions How to communicate these roles to pharmacists and healthcare providers, and how has NAFDAC considered these roles in the strategy.

The study also investigated the specific roles of pharmacists and healthcare providers in anti-counterfeiting interventions and how NAFDAC has incorporated these roles into its strategy. The responses of stakeholders were analysed to understand their perceptions of these issues. The results showed that pharmacists and healthcare providers play a critical role in stopping the circulation of counterfeit medicine and ensuring that patients have access to the right medicines.

One respondent said, "*pharmacists play more or less the role of a goalkeeper*" in stopping counterfeit medicine from getting to the patient. This role applies to other health workers who may hand the medicine to the final patient for consulting. Therefore, it is important that NAFDAC directly communicates with these stakeholders to ensure they know their roles and how to communicate them effectively. The stakeholders emphasised the importance of NAFDAC going into the space of social media and various means of communication to communicate effectively with people. They also suggested that NAFDAC needs a unit to handle this aspect of its strategy. However, one respondent expressed uncertainty about whether



NAFDAC has considered these stakeholders but mentioned constant interaction between NAFDAC and pharmacists.

The stakeholders suggested that other healthcare providers should be put under the umbrella of NAFDAC's anti-counterfeiting interventions, and workshops and symposia should be organised for pharmacists and healthcare professionals both in the community setting and hospital practice to carry them along and let them know some of these strategies and see how they can help and how they can assist.

Some notable stakeholder responses include: *"It is important that NAFDAC directly communicates with these stakeholders and ensure that they know their communication roles."* *"NAFDAC needs to have a unit to handle that goes into that space to communicate to people."* *"The pharmacist and healthcare providers should be encouraged to depart freely. Suspected. Contact."* *"There should be workshops and symposia organised for pharmacists and healthcare professionals both in the Community setting hospital practice to, you know, carry them along and let them know some of these strategies and see how they can help and assist."*

Do you have any comments for or against NAFDAC anti-counterfeit interventions?

This section shows the responses obtained from stakeholders at NAFDAC concerning their comments for or against NAFDAC anti-counterfeit interventions. The analysis highlights specific comments by the stakeholders and provides insights into their views on NAFDAC anti-counterfeit interventions.

Most stakeholders interviewed expressed their support for NAFDAC anti-counterfeit interventions. They noted that it is essential for NAFDAC to step up its efforts to combat counterfeit products, especially given the high danger posed by counterfeit products to public health and safety. One stakeholder remarked, *"we cannot afford to go to bed when we know that the danger of counterfeiting remains very*

*high, especially at this time."* They further noted that the decline in the value of the Naira has led to an increase in counterfeit products' prices, making it crucial for NAFDAC to deploy full vigilance to combat the menace of counterfeit products.

However, some stakeholders raised concerns about the effectiveness of NAFDAC's anti-counterfeit interventions. One stakeholder noted that TruScan, a tool used to detect counterfeit products, has been reduced significantly, and they hardly hear about it again. Another stakeholder also emphasised the need for vigilance to be fully deployed in combating counterfeit products, stating that *"there is room for improvement."* **"I mean, we cannot afford to go to bed when we know that the danger of counterfeiting remains very high, especially at this time."**

Generally, assess the effectiveness of NAFDAC's strategies to fight fake drugs in Nigeria.

In response to the question about the effectiveness of NAFDAC's strategies to fight fake drugs in Nigeria, the stakeholders had mixed opinions. Some respondents thought that NAFDAC's efforts were commendable, given the severity of the problem in the past. One respondent stated, *"NAFDAC deserves commendation."* However, some respondents expressed their reservations about the current situation. One stakeholder said, *"My fear is just that things appear to be quiet now, and they need to step up once again."* Another respondent said, *"Good on paper, but not properly or fully implemented. That's just my assessment."*

Furthermore, some respondents believe that more needs to be done to combat the issue of fake drugs in Nigeria. One stakeholder stated, *"In the fight against counterfeits and fake, falsified products, no stone should be left unturned. All hands must be on deck. We are talking about life here."* Another stakeholder likened the issue to insurgency and said, *"The fight should be fully engaged."*

How do you think the agency can evaluate the interventions? What should be the method of evaluating them? What could the stakeholders do to help in such an evaluation?

The stakeholders were asked how they think NAFDAC can evaluate interventions and what method should be used. The stakeholders gave some insightful responses. One stakeholder suggested that research should be conducted on the effectiveness of intervention strategies. Another stakeholder agreed that the agency should approach academic colleagues to help with the research. This research would guide the agency on the interventions that have been done and their results. This shows that stakeholders recognise the importance of data in evaluating interventions.

However, another stakeholder raised concerns about the lack of data in the country. They noted that the lack of data makes it difficult to evaluate interventions. They also suggested that NAFDAC should keep records of ongoing interventions. This would enable them to refer to the records and evaluate the interventions. They emphasised the importance of keeping records as long as ongoing interventions exist. Another stakeholder suggested that every piece of information is important, whether it worked or not. They emphasised that evaluations should be done on both successful and unsuccessful interventions. This would provide valuable insights into what works and what does not work. Overall, the stakeholders agree that data is essential in evaluating interventions. They suggest that the agency conduct research and keep records of ongoing interventions. They also suggest that evaluations should be done on successful and unsuccessful interventions.

Some responses are: *“I think now that we need to research the effectiveness of intervention strategies.”* *“As long as ongoing interventions exist, we can always refer to the records and do our process.”* *“Every piece of information is important, but we must evaluate them.”*

What would you like to add or offer towards implementing strategies to fight the counterfeiting of pharmaceuticals?

The stakeholders expressed concerns about the current state of the economy in Nigeria and how it has affected the fight against counterfeit pharmaceuticals. They emphasised the need for NAFDAC to step up its efforts in curbing the activities of counterfeiters before they cause further harm to the population. One of the stakeholders suggested that NAFDAC should consider implementing a system where individual companies must bring up their codes to be added to the NAFDAC number. This will help ease the identification of falsified products that carry fake numbers. The stakeholder noted that if a company identifies a product without that code, it is obvious that the product is fake, which will help curb the activities of counterfeiters. Moreover, the stakeholders suggested more private-sector participation in the fight against counterfeiting. This will help strengthen NAFDAC’s efforts and ensure the fight against counterfeiters is sustained.

### **Policymaker’s Qualitative Interview**

What do you think of accessibility to good quality medicines in Nigeria based on your perception as a regulatory Agency? How can you describe good quality medicine? Have you heard of any of these? Counterfeit medicine/ Substandard medicine/Adulterated medicine/ degraded medicine? Can you define them from your point of view? Do you think that these are a problem in Nigeria? Do you think the problem is worse or better than in the past? .... Why has the situation changed? Have you encountered a medicine which you think is of bad quality? How did you discover this? How were the cases handled? (Prevention from going back into the distribution chain, contacting companies whose products are involved before the destruction of the medicines) .... Which group of medicines do you think are counterfeited most?



The policymakers were interviewed on their perception of the accessibility of good quality medicines in Nigeria and the NAFDAC's efforts in combating the menace of counterfeit, substandard, adulterated, and degraded medicines. The major findings from their responses are presented as follows:

### **Accessibility to Good Quality Medicines in Nigeria**

The policymakers admitted that access to good quality medicines in Nigeria has greatly improved due to the NAFDAC's efforts in combating substandard and falsified medicines in the country. This implies that the regulatory agency has put measures in place to ensure that only good quality medicines that are fit for the intended use and safe for patients are made available to the public.

### **Definition of Good Quality Medicines**

The policymakers defined good quality medicines as fit for the intended use and safe for patients. They emphasised the importance of patient safety in defining good quality medicines.

### **Counterfeit, Substandard, Adulterated, and Degraded Medicines**

The policymakers admitted that they have heard of counterfeit, substandard, adulterated, and degraded medicines. They defined each of these terms from their point of view. Substandard medicines were defined as those that do not meet the required quantity to meet the specification, even though they come from a reputable manufacturer. Adulterated medicines were defined as products that do not carry the required active ingredients or are not manufactured according to good manufacturing practices. Degraded medicines are defined as medicines that lose their potency due to improper storage. Counterfeit medicines are defined as medicines that have been falsified to deceive patients and healthcare providers.

### **The Problem of Counterfeit, Substandard, Adulterated, and Degraded Medicines in Nigeria**

The policymakers admitted that the problem of counterfeit, substandard, adulterated, and degraded medicines exist in Nigeria. However, they claimed that the agency had worked greatly to combat this menace to a greater level.

### **Encountering Medicines of Bad Quality and Handling of Such Cases**

The policymakers admitted they had encountered medicines of bad quality. They did not provide any specific information about the medicines they encountered. However, they stated that the agency had implemented measures to prevent such medicines from returning to the distribution chain. They also stated that the agency contacts companies whose products are involved before the medicines are destroyed.

### **Group of Medicines Most Counterfeited**

The policymakers provided no information about the medicines most counterfeited in Nigeria. Therefore, it is difficult to ascertain the extent of the problem of counterfeit medicines in Nigeria.

What are the major challenges to fighting fake medicines in Nigeria? How do you think these can be best tackled (your suggestions)

One major challenge the respondents identified was the lack of government support and willpower to combat fake medicines. According to one interviewee, *"the government will come with very strong policies...policies that will be given to agencies to enforce."* Another interviewee also stressed the need for the *"government to see the urgency in assisting and supply[ing] all the necessary tools to fight this."* These responses imply a need for more action from the government to combat the issue of fake medicines in Nigeria.

Another challenge identified was the chaotic distribution chain, making tracking products and controlling counterfeit medicines difficult. One

interviewee suggested that the national drug distribution guidelines should be fully implemented to address this challenge. On the other hand, another suggested the traceability initiative being pursued by the Ministry of Health and NAFDAC as another way of ensuring control over the drugs moving in the supply chain.

Sensitisation was also identified as a key factor in tackling the problem of fake medicines. The interviewees suggested sensitisation should be done through the media, papers, radio, and social media to spread information about the dangers of fake medicines.

Punitive measures were also necessary to deter drug peddlers from circulating substandard medicines. According to one interviewee, *“until there should be punitive measures, strong ones...a lot of these drug peddlers have taken the whole society now.”* Another interviewee stressed the need for *“strong primitive punitive measures and a very strong sensitisation.”*

What do you think of the NAFDAC initiatives against substandard and falsified drugs? What are those initiatives? What do you think could be done to make it better?

The policymakers identified several initiatives to tackle the menace of substandard and falsified medicines. These include using TruScan for on-the-spot checks of products, mini-labs for testing identification and labelling evaluation, using MAS for antibiotics and antimalarials, and implementing a pharmaceutical traceability strategy. The officials noted that these initiatives were laudable but suggested the need for more post-marketing surveillance activities to improve their effectiveness.

Regarding NAFDAC’s initiatives against substandard and falsified drugs, the policymakers outlined several steps to prevent, detect, and respond to these products. The measures include good distribution practices, a surveillance system, sensitisation, and open destruction of substandard and falsified drugs. The officials also highlighted collaborations

with other countries and agencies, such as the Nigerian customs service, police, and immigration, as key strategies to combat the problem.

What should be involved in the development of interventions?

The policymakers highlighted several important factors that should be involved in developing interventions to address the challenges of counterfeiting and substandard medicines. One of the key themes that emerged was the need for a thorough assessment of the issues that contribute to counterfeiting and substandard medicines. This would involve identifying the major challenges and outlining proposed interventions. They emphasised the importance of engaging all relevant stakeholders, including regulatory agencies, the government, the police, and the community.

Sensitisation was also highlighted as a crucial factor in the development of interventions. Policymakers emphasised the need for stakeholders to be committed to the process and to work collaboratively to close the gap between regulators and the regulated. This would involve sharing intelligence and employing the necessary interventions to solve the challenges of counterfeiting and substandard medicines.

Whistleblowers were also mentioned as a critical factor in the development of interventions. Policymakers suggested that whistleblowers should be rewarded appropriately for providing information that could help curb the production and distribution of fake drugs. Additionally, they emphasised the need for stiffening laws to discourage individuals from producing and distributing substandard and falsified medicines.

Some of the responses that stood out include: *“Interventions are necessary. The major challenges should be properly outlined, and then the proposed interventions should also be outlined.”* This response highlights the need for a systematic approach to developing interventions. Another noteworthy response was, *“If everyone is involved in the process, we*

*all own the drug distribution process; the challenge of fake drugs will be curtailed to a large extent.*” This response emphasises the importance of engaging all stakeholders to address the challenges of counterfeiting and substandard medicines.

What do you think are the roles of NAFDAC stakeholders in implementing anti-counterfeiting interventions? How should these roles be communicated to stakeholders? In your opinion, how could the roles be made to improve? How do you think the NAFDAC has taken the role into account in the implementation of interventions?

The policymakers pointed out several stakeholders in implementing anti-counterfeiting interventions, such as manufacturers, importers, retailers, and sectoral groups. They highlighted that stakeholders’ primary role is ensuring compliance with regulatory requirements and supporting NAFDAC in implementing its interventions. These roles can be communicated through stakeholder engagements, NAFDAC’s website, and communication with sectoral groups. The policymakers noted that NAFDAC had considered the stakeholders’ roles in implementing interventions by carrying out stakeholder engagements before implementing interventions. However, they suggested that policies not favourable to pharmaceutical businesses, especially those related to the cost of pharmaceutical products, must be amended to make it easier for stakeholders to implement these interventions.

The policymakers emphasised the importance of stakeholder engagement in NAFDAC’s policies and decision-making, noting that stakeholders must be sensitised, educated, and involved in the fight against counterfeiting. They stated that stakeholders’ collaboration is essential in regulating and fighting counterfeiting since NAFDAC cannot do it alone. They also emphasised the need for self-regulation on the part of stakeholders, and they suggested that stakeholders should appoint

qualified persons for pharmacovigilance to handle all matters related to drugs and drug distribution. They also recommended that every stakeholder have a post-marketing unit responsible for monitoring their product to avoid counterfeiting, adulteration, and other fraudulent practices.

What do you think of implementing the various anti-counterfeiting strategies by NAFDAC? What is the best way to implement anti-counterfeiting strategies? What effort is put in place to ensure the strategies are properly implemented?

The policymakers had varying opinions on the implementation of the anti-counterfeiting strategies by NAFDAC. One of the policymakers commended the agency for the difference in financing and counterfeiting strategies implemented but suggested that more hands are needed to carry out these strategies effectively. *“Many locations are known for selling counterfeited and substandard drugs. NAFDAC staff are not able to reach there because we don’t have enough hands in post-marketing surveillance, so if resources are made available in terms of human and financial resources, we will be able to implement these strategies better and be able to get the benefits of it,”* the policymaker said.

Another policymaker believed that implementing the anti-counterfeiting strategies was still not strong enough as stakeholders were not cooperating with NAFDAC. *“The challenge we are having is to organise workshops and training for all these categories or drug distributors; this will go a long way. Also, having interviews should be one of the intervening methods NAFDAC adopt that will help. And then these strategies, again, as I said, still boils back to workshop sensitisation, stakeholders’ engagement with all the drug distributors, a lot of them, if you look at it, we have let loose our regulatory functions to no regulators. Thus, for us to fight this battle, we cannot fight it alone. We must engage; that is very important,”* the policymaker explained.

One of the policymakers suggested that collaboration and sensitisation were key regarding the best way to implement the anti-counterfeiting strategies. *“Um, like I said, sensitisation, collaboration is key, and you know when we collaborate, and then we organise workshop training for them from time to time,” the policymaker said.* Another policymaker believed that traceability features in every medicine would go a long way in helping to implement anti-counterfeiting strategies. *“With traceability features in every medicine, it will go a long way to help the various anti-counterfeiting strategies implemented by the agency,”* the policymaker said.

In terms of efforts to ensure proper implementation of the anti-counterfeiting strategies, one of the policymakers said NAFDAC had deployed cutting-edge technology such as TruScan and other scanners for surveillance. *“You know where we use TruScan; we use another scanner (RS scanner). And you know, the devices that we could use, you know, on surveillance and you can test the product there and then and products that are failing., you know you take note of them and probably place them on hold and continue and take samples to the laboratory for confirmation,”* the policymaker said. The same policymaker suggested that products found to be counterfeit should be recalled or moved out of circulation.

Do you have any comments for or against NAFDAC anti-counterfeit interventions? State them.

The policymakers were asked for their comments on the agency’s anti-counterfeit interventions, and their responses highlighted some of the challenges and successes of these efforts. One of the main challenges mentioned was the lack of sustainability of these interventions, with some policies not being continued by new management or lacking funding. Additionally, the loss of experienced personnel without a succession plan was noted as a hindrance to anti-counterfeit efforts.

Despite these challenges, the policymakers did not have any negative comments on any of the specific interventions implemented by NAFDAC. They emphasised the need for various measures to address counterfeit products, including awareness creation, consumer reporting of therapeutic failures, and traceability of products along the distribution chain. The mobile authentication system and traceability efforts were highlighted as effective measures for combating counterfeit products.

Generally, assess the effectiveness of the strategies NAFDAC is using to fight fake drugs in Nigeria.

The policymakers acknowledged the effectiveness of the strategies in place but highlighted the need for better implementation and collaboration from all stakeholders to achieve better results. When asked to assess the effectiveness of the strategies used to fight fake drugs in Nigeria, the policymakers agreed that the measures put in place by NAFDAC were laudable. However, they emphasised the need for better implementation to achieve better results.

One of the policymakers said, *“we have achieved a lot but still have a lot to do.”* He highlighted the need for practitioners, especially those in the pharmaceutical industry, to be more proactive in combating fake drugs by learning to say no to products that have not undergone proper checking before being displayed on shelves. He suggested that practitioners should be more involved in the fight against fake drugs by ensuring that they are sure of the products they accept and that they have a certificate of analysis.

Another policymaker noted that the GS1 track and trace or traceability program, which involves scanning products for authentication before they are put on the shelf, could save much time and effort in the fight against fake drugs. He highlighted the importance of collaboration between NAFDAC, practitioners, and consumers, noting that everyone must work together to defeat the menace of fake drugs.

The policymakers also discussed the risk categorisation of certain products, such as anti-malaria drugs, antibiotics, and infusions. They explained that the survey results on these products showed the percentage of counterfeits in circulation. The policymakers noted that the percentage of counterfeits was under 10% in the last survey, and they hoped to reduce it even further.

Overall, the policymakers agreed that the strategies being used by NAFDAC to combat fake drugs in Nigeria were effective. However, they emphasised the need for better implementation and stakeholder collaboration to achieve better results. They called for practitioners to be more proactive in checking the products they accept, for consumers to be more vigilant in purchasing drugs, and for everyone to work together to defeat the menace of fake drugs in Nigeria.

How do you think the agency can evaluate the interventions? What should be the method of evaluating them?

In this section, policymakers were asked how NAFDAC can evaluate its interventions and what method should be used. The responses provide insight into the agency's approach to evaluating interventions and highlight improvement areas.

One of the key responses was the need to survey to determine the effectiveness of the interventions. The policymakers acknowledged that NAFDAC has not been carrying out surveys to evaluate its interventions, making it difficult to determine the impact of the interventions. They suggested that surveys could generate data to help re-strategize and determine whether the interventions work. The policymakers also highlighted the importance of having key performance indicators (KPIs) to evaluate the effectiveness of the interventions. They noted that NAFDAC had outlined KPIs for itself, which can be used to determine whether the agency is achieving its objectives. They also suggested that collaborating with other organisations, such as the World Health

Organization (WHO), could help to develop more effective evaluation methods.

Regarding the evaluation method, the policymakers suggested that NAFDAC should look at all the measures in place and assess how well they are being implemented. They emphasised the need to evaluate measures periodically and objectively to determine whether the agency is getting it right or needs to improve. Overall, the responses from the policymakers suggest that while NAFDAC has implemented interventions to combat counterfeit drugs, it is necessary to evaluate their effectiveness systematically. This will require the agency to carry out surveys and develop KPIs to assess the impact of the interventions. The policymakers also emphasised the need for collaboration with other organisations to develop more effective evaluation methods.

### **Consumers' Qualitative Interview**

As a consumer, what do you think of accessibility to good quality medicines in Nigeria? How can you describe good quality medicine?

The consumers' responses in the interview indicate that the accessibility to good quality medicines in Nigeria is a major concern. They noted that they are used to purchasing drugs from local chemists, which often results in them obtaining substandard drugs. This suggests a lack of regulation and quality control in the local chemists, which risks consumers' health. The participants further stated that good quality medicine meets all the applicable quality standards of how a drug or medication should be. This response highlights the need for quality control in the production and distribution of medicines in Nigeria. Medicines must meet the required quality standards before making them available to the public.

One of the participants also expressed a fear of fake and counterfeit drugs, a common problem in Nigeria. The participant only buys drugs from pharmacies, not chemists, to address this problem. This suggests a lack of trust in the



local chemists, possibly due to the prevalence of substandard and counterfeit drugs.

Some of the quotes from the responses are: *"We are only used to the local chemists around us, and I would say we do not sometimes get substandard drugs."* *"I will describe good quality medicine as one that meets all the applicable quality standards of how a drug or medication should be."* *"And because I fear fake and counterfeit drugs, I only buy from pharmacies."* *"Pharmacies, not chemists. Not patents. Drop it for me."*

Have you heard of fake/Counterfeit drugs before? (a) Do you think that this is a problem in Nigeria? (b) Do you think the problem is worse or better than in the past? .... Why do you think so?

In this section, drug/medicine consumers were asked about their awareness of counterfeit drugs and their opinions on whether Nigeria's problem has worsened or improved. All participants in the study were aware of the existence of counterfeit drugs in Nigeria, with most of them considering it to be a significant problem. One participant said, *"It's a big problem in Nigeria getting counterfeit drugs,"* while another said, *"Yes, I've heard of fake drugs, and it's a problem in Nigeria because millions of people are at risk of illnesses or even death from poor quality medications."* The respondents unanimously agreed that the Nigerian government needs to take strong measures to tackle the issue.

The responses were mixed when asked whether the problem of counterfeit drugs has worsened or improved over time. One participant said the problem is getting worse every day, while another said it is slightly better in Nigeria due to the stiff scrutiny of the qualifications and conformity of dealers. One respondent mentioned that the problem is worse now because some pharmacies sell inactive drugs, especially malaria drugs. Another respondent stated that the problem is better now than before, thanks to standard practices that help curb unsafe practices.

Some of the responses quoted in the report include: *"It is a big problem in Nigeria getting counterfeit drugs."* *"Yes, I've heard of fake drugs, and it's a problem in Nigeria because millions of people are at risk of illnesses or even death from poor-quality medications."* *"The problem is getting worse every day."* *"The problem is slightly better in Nigeria due to the stiff scrutiny of the qualifications and conformity of dealers."* *"Sometimes you go to pharmacies to buy drugs, and you find them inactive, especially malaria drugs."* *"With standard practice, this helps Nigerians to attempt at curbing unsafe practices."*

How can you know that medicine is of good quality? ..... Before taking .....after taking it ...are you concerned about the quality of your medicines?

When respondents were asked about their concerns regarding the quality of medicines they take and how they ensure they are good quality, the responses revealed several ways to determine the quality of their medicines. The first way is by inspecting the medicine before taking it. This involves checking if the seal is broken or tampered with. One interviewee mentioned that they do a visual inspection of the medicine. They also check the medicine's price, with some noting that more expensive medicines are usually of better quality.

The respondents also mentioned that they check the authenticity of the medicine by scratching off a code on the pack and sending it by SMS. This helps to confirm that the medicine is not counterfeit. One interviewee noted that Nigeria is a *"huge crime scene,"* It is challenging to know if the medicine is of good quality, even with the scratch code.

After taking medicine, the interviewees mentioned checking for unexpected side effects. They also look out for the effectiveness of the medicine and if it yields the expected results. One interviewee mentioned that they prefer to buy medicines made in Nigeria, believing they are good quality.



Some responses include: *“Most drug-producing companies these days do put some tags at the back...that makes us know every drug is substandard if it’s counterfeit or original.” “I try to check if the seal is broken or has been tampered with.” “I usually scratch off a code or a number on the pack; I scratch it off and then send the code by SMS.” “There is no way to know that one is taking good quality drugs except...drugs that you import yourself or that you maybe you travelled and come back with it?” “I also prefer to buy made-in-Nigeria drugs...believe those people.”*

Do you try to know if your medicines are fake or original? (If so, what do you do?)

In this question, the participants were asked if they made any effort to know if their medicines were fake or original. Most participants answered in the affirmative, indicating that they try to ensure the authenticity of their medicines. One participant said they check the drug’s manufacturer to ensure it is from the right source. Another participant mentioned that they checked for the expiry date of the drugs before consuming them. This is a common practice amongst drug consumers, as expired drugs can harm health.

Some participants also mentioned checking for unusual things, such as broken seals, which could indicate tampering. One participant mentioned using a scratch card to verify the drug’s authenticity. Interestingly, one participant stated that they prefer to buy drugs made in Nigeria, as they believe those produced in the country maintain standards like electrical cables. This shows that the perception of the quality of locally made drugs is increasing, and consumers are willing to trust products made in Nigeria.

Some responses include: *“To check if it is from the right drug manufacturer.” “I usually check for expiry dates.” “I also check for unusual things, like maybe if the seal has been broken.” “I prefer to buy drugs that are made in Nigeria.” “Nigeria has the best quality cables for electrical application.”*

What determines the brand/type of medicine that you purchase? ...on prescription ...Recommendation (who) ...Cost ...Brand/generic. country of manufacture (any preference of where your medicines should come from?) ...others

This section presents a thematic analysis of the responses on the factors determining the brand/type of medicine consumers purchase.

When asked what determines the brand/type of medicine they purchase, the participants mentioned several factors. Most participants stated that they relied on recommendations from either the doctor who prescribed the medicine or the pharmacist at the point of purchase. One participant said, *“Mainly, it’s recommendations. I maybe ask the doctor Who prescribed the better medicine. Alternatively, I can ask the pharmacist to recommend a better brand when I get to the pharmacy. So mainly based on recommendations for me.”* This suggests that the opinion of medical professionals is crucial in determining the brand/type of medicine the participants purchase.

Another factor mentioned by the participants was the country of manufacture. One participant said, *“One of them is where it is manufactured. If it is made in Nigeria, I will go for it.”* This suggests that some participants preferred medicines manufactured in their home country, possibly due to a perception of better quality or patriotism. Additionally, one participant said they avoided medicines manufactured in certain countries, saying, *“It is not India, China, I mean.”* This suggests that some participants had reservations about the quality of medicines from certain countries. The cost was another factor mentioned by the participants. One participant said that cost is also a factor. I might go for a cheaper alternative if it is too expensive.” This suggests that the medicine’s price influences some participants’ purchasing decisions.

Finally, some participants mentioned the brand/generic of the medicine as a determining factor. One participant said, *“Like some brands? I believe that cannot easily be fixed, so the*

country of origin is also important.” This suggests that some participants preferred certain brands of medicine.

Are you aware of any initiative by NAFDAC against fake medicines?

The responses from the participants revealed that there is a low level of awareness of any initiatives by NAFDAC against fake medicines. Some participants stated they were unaware of any initiatives, while others mentioned that they had seen or heard something about NAFDAC’s efforts to track down warehouses where fake drugs are kept. However, they were not sure of the effectiveness of these initiatives.

One participant said NAFDAC is not doing much publicity to enlighten consumers about their efforts to combat fake drugs. The lack of awareness of these initiatives may be attributed to NAFDAC’s inadequate dissemination of information. Participants who were aware of NAFDAC’s efforts expressed uncertainty about the effectiveness of these initiatives in curbing the menace of fake drugs in the country.

Some of the responses from the participants are presented here: *“Not really. They are not doing much in publicity to enlighten consumers.” “I’m not aware of any.” “But I think I have seen something like that on TV.” “Well, I don’t know if they have a new initiative against fake drugs, unlike what we know that they check drugs and food and whatever.”*

Among all these initiatives, which ones do you know? List some. ...would you be prepared to pay more for your medicines if their cost increases as a result? ... Overall, how satisfied are you with the service by NAFDAC? (For only those you have used).

This section analyses the responses obtained from the participants and provides insights into their knowledge of NAFDAC’s initiatives and their perception of the agency’s service delivery.

### **Knowledge of NAFDAC’s Initiatives**

The respondents’ knowledge of NAFDAC’s initiatives was limited, with only one participant mentioning the tracking initiative. Another

respondent referenced a mapping initiative that ensured the quality of medicines in the country. However, this response was not clear, and it is unclear whether this initiative is directly linked to NAFDAC. Overall, the participants had limited knowledge of NAFDAC’s initiatives, suggesting the agency needed to engage in more public education and awareness campaigns to inform the public of its various initiatives.

### **Willingness to Pay More for Medicines**

Most participants expressed a willingness to pay more for their medicines if the costs increased due to NAFDAC’s efforts to safeguard the drug industry. One participant stated, *“I would love to pay more,” while another said, “if we are sure that the drugs are effective, it does not matter the cost for me.”* These responses indicate that consumers are willing to pay a premium for quality medicines and support NAFDAC’s efforts to ensure that only safe and effective drugs are available.

### **Satisfaction with NAFDAC’s Service Delivery**

The researcher also asked the participants to rate their satisfaction with the service provided by NAFDAC. However, the responses obtained were limited to only those who had used the agency’s services, making it difficult to draw general conclusions about the overall satisfaction level of the public with NAFDAC’s service delivery. One participant mentioned that NAFDAC raids shops and publishes information about suicidal drugs, indicating that some public members will receive the agency’s efforts to safeguard the drug industry.

### **What are the Major Challenges to Fighting Fake Medicines in Nigeria?**

The responses from the drug/medicine consumers shed light on the challenges facing the fight against fake medicines in Nigeria. One major challenge the respondents highlighted is the lack of community sensitisation. They noted a need to sensitise the local communities to the dangers of fake medicines. One respondent said,

*“Community sensitising you to sensitise them in their local community.”* Another challenge identified is local sellers’ prevalence of bad or counterfeit drugs. The respondents noted that the risk of getting such drugs is high, posing a significant challenge to fighting fake medicines in Nigeria. One respondent said, *“The operational risk of getting bad drugs. Or counterfeit drugs from the local sellers.”*

Corruption was also a significant challenge to fighting fake medicines in Nigeria. The respondents noted that many people are corrupt, greedy, and want to line their pockets. They believe corruption is the major issue in the fight against fake drugs. One respondent said, *“So basically, corruption is the major challenge in fighting this drug issue. Many people are corrupt, want to line their pockets, and are greedy. So, I think that is our major issue with this fight against fake drugs.”*

The respondents also noted that the people fighting fake medicines are compromised. They explained that some people collect money and close their eyes to the issue. This poses a significant challenge to the fight against fake medicines. One respondent said, *“Most people are compromised. Most have that. They will collect money and close their eyes. That is the truth.”* Lastly, one of the respondents expressed uncertainty about the effectiveness of the fight against fake medicines in Nigeria. They noted that the fight was effective in the past, but they are unsure about the current situation. One respondent said, *“Overall, not before; this time, it was effective. I don’t know about now.”*

### **How do you Think this can be Tackled (Your Suggestions)**

From the responses, it is clear that the participants have different ideas on tackling the issue of fake, adulterated, and counterfeit medicine in circulation. One participant suggested organising health talks in the community to educate people about the negative effects of taking bad drugs. This can be an effective way to raise awareness about the

dangers of using counterfeit medicines and could potentially discourage people from buying them. Another participant recommended implementing strict policies and monitoring to curb the menace. This would involve having trustworthy people in the right offices to ensure everything is done correctly.

However, a third participant highlighted that people often do not do what is expected of them, especially staff who work in drug inspection and checking. They suggested that there should be stricter inspections and checks on the staff to ensure that they are doing their jobs properly. They also mentioned that some staff members are only interested in the money that comes into their pockets and may look the other way when fake drugs are sold.

It is clear from the responses that the issue of fake drugs in circulation is complex and requires a multifaceted approach. Education campaigns can help raise awareness among the general public about the dangers of using counterfeit medicines. However, strict policies and monitoring are also necessary to ensure that fake drugs are not being produced and sold. Additionally, there needs to be greater accountability among drug inspection and checking staff to ensure that they are doing their jobs properly and not contributing to the problem.

One participant said, *“Most people are after money, and for that reason, we have a lot of fake, adulterated and counterfeit medicine in circulation.”* This highlights that profit motives often drive the issue of fake drugs and that addressing this problem will require a fundamental shift in how drugs are produced, distributed, and regulated.

## **Discussion**

### **Stakeholders’ Perception of NAFDAC Interventions, Challenges, Roles, and Anti-Counterfeit Technologies**

Based on this study’s findings, stakeholders believe NAFDAC should have anti-counterfeiting strategies and approaches to fight

counterfeit medicine. The entire public should work with the agency to prevent counterfeit medicines. They consider quality and socioeconomic class before selling or recommending medicines to clients. Although some stakeholders do not only sell/distribute medicines with NAFDAC numbers, but others do also so because it indicates that the medicines are of good quality. To identify good quality medicines, stakeholders suggested that buyers verify their products, especially when in doubt. The stakeholders' opinions gathered through the qualitative analysis highlight the importance of anti-counterfeiting strategies, a collaboration between NAFDAC and the public, consideration of quality and socioeconomic factors when selling or recommending medicines, and the use of NAFDAC numbers as an indicator of good quality [16], [17], [18]. The stakeholders' perspectives provide valuable insights for NAFDAC in formulating effective measures to prevent counterfeit medicines in Nigeria.

This study's findings reveal that stakeholders acknowledged stakeholders' roles in developing anti-counterfeiting strategies and recognised NAFDAC's initiatives against substandard and falsified drugs. They suggested that the effectiveness of the strategies needs to be measured through research, and the entire distribution network needs to be checked to plug the leakages. Finally, stakeholders suggested that companies producing the products should be carried along in developing strategies to protect their products. The stakeholders' insights provide valuable perspectives on the roles of stakeholders, NAFDAC's initiatives, and the need for research to evaluate the effectiveness of anti-counterfeiting strategies. These findings demonstrate the stakeholders' commitment to combatting counterfeit medicines and their recognition of the multi-faceted nature of the issue. By considering stakeholders' suggestions, NAFDAC can strengthen its efforts to protect public health and safety, enhance the effectiveness of anti-counterfeiting strategies,

and foster collaboration among all relevant stakeholders.

This study's findings show that stakeholders support NAFDAC's efforts and recognise the importance of their active involvement in combatting the use of fake drugs. One of the key expectations expressed by the stakeholders is the need for proper documentation throughout the supply chain, including drug disposal, purchases, and sales. This documentation is crucial for effective traceability of products, especially in the event of counterfeit drug detection. The stakeholders specifically highlighted the responsibility of community pharmacies to report any suspicions or issues related to counterfeit drugs to NAFDAC. This highlights the importance of their vigilance and contribution to the fight against counterfeit medicines [16].

However, the stakeholders also acknowledged several challenges in implementing these interventions. The business environment in the country was identified as a hindrance, with stakeholders often being too focused on their business operations to pay attention to small details that could help identify counterfeit drugs. Regular stakeholder meetings were suggested as a means to create awareness, educate stakeholders, and reinforce their responsibilities in combating counterfeit drugs. This highlights the need for ongoing communication and collaboration among stakeholders to address the challenges effectively. Advocacy and awareness creation was essential strategies to improve stakeholders' roles in fighting counterfeit drugs. By raising awareness about the prevalence and dangers of counterfeit drugs, stakeholders may become more proactive in reporting suspicious activities to NAFDAC. Social media was mentioned as a useful tool for reaching a wider audience and disseminating information effectively. The stakeholders recognised NAFDAC's primary role in receiving reports of counterfeit drugs and emphasised the need for a steady flow of information to the agency. They also

acknowledged the challenges posed by the innovative tactics of counterfeiters, who continually adapt to evade detection. In light of this, the stakeholders called for support from law enforcement agencies to address reported cases of counterfeit drugs, emphasising the collaborative effort required to combat the problem effectively.

Furthermore, the stakeholders' responses in this interview highlighted the importance of collaboration and communication among stakeholders in the fight against counterfeit drugs. There is a need for regular stakeholder meetings and advocacy to create awareness and educate stakeholders on their responsibilities in the fight against counterfeit drugs [6]. The challenges of counterfeit drug intervention require constant vigilance and innovation in tackling the problem. By addressing the challenges identified and implementing the suggested strategies, stakeholders can enhance their roles and contribute to more robust anti-counterfeiting interventions.

This study highlights pharmacists and healthcare providers' important roles in anti-counterfeiting interventions. The stakeholders emphasised the need for effective communication strategies and interventions to ensure that the right medicines are dispensed and that patients can access the right medicines that are not counterfeit or falsified. They suggested that NAFDAC needs to do more to involve other healthcare providers in their strategy and organise workshops and symposia to educate and engage pharmacists and healthcare professionals. By fostering effective communication, providing necessary training and support, and involving these stakeholders in workshops and symposia, NAFDAC can enhance their roles and leverage their expertise to combat the circulation of counterfeit medicines more effectively [18, 19].

In response to the effectiveness of NAFDAC's strategies to combat fake drugs in Nigeria, stakeholders expressed appreciation for NAFDAC's efforts, acknowledging the severity

of the problem in the past; others had reservations about the current state of affairs. The mixed opinions expressed by the stakeholders reflect the problem's complexity and the challenges NAFDAC faces in combating fake drugs. While some stakeholders acknowledged the agency's efforts, others called for more proactive measures and greater engagement. The stakeholders' perspectives underscore the importance of continuous evaluation, improvement, and increased collaboration among stakeholders to address the issue effectively [6]. Also, the stakeholders' suggestions that all hands must be on deck and that the fight against fake drugs should be fully engaged are particularly noteworthy. NAFDAC should take note of these suggestions and continue to work towards eradicating the problem of fake drugs in Nigeria.

In responses regarding how NAFDAC can evaluate interventions and what methods should be used, highlight the importance of data and research in assessing the effectiveness of strategies. The stakeholders provided valuable insights into the evaluation process. The stakeholders unanimously agree on the importance of data and evaluation in assessing intervention strategies. They suggest conducting research, keeping records of ongoing interventions, and evaluating both successful and unsuccessful interventions. These recommendations underscore the stakeholders' recognition of the significance of evidence-based evaluation in refining and improving NAFDAC's efforts to combat counterfeit drugs in Nigeria [7]. These insights will also help NAFDAC to evaluate its interventions and improve its strategies.

Based on the findings from this study, the stakeholders expressed concerns about the current state of the economy in Nigeria and how it has affected the fight against counterfeit pharmaceuticals. The stakeholders from NAFDAC emphasised the need for increased vigilance and stepped-up efforts to curb the activities of counterfeiters. These suggestions

are similar to the recommendations made by [6] on the factors associated with drug counterfeiting in Nigeria. They suggested implementing a system where individual companies must bring up their codes to be added to the NAFDAC number and called for more private sector participation in the fight against counterfeiting. The stakeholders' suggestions highlight the need for innovative approaches and partnerships to address the challenges posed by counterfeit pharmaceuticals in Nigeria. Implementing a system that includes individual company codes and fosters greater private-sector participation can contribute to more effective and sustained efforts to combat counterfeit drugs. Combining these strategies with NAFDAC's existing initiatives can strengthen the fight against counterfeiting and protect the population from the risks associated with fake pharmaceutical products.

### **Policy maker's Perception of NAFDAC Interventions, Challenges, Roles, and Anti-Counterfeit Technologies**

The responses from policymakers in this study shed light on their perception of the accessibility of good quality medicines in Nigeria and NAFDAC's efforts in combating counterfeit, substandard, adulterated, and degraded medicines. The policymakers of NAFDAC believe that accessibility to good quality medicines in Nigeria has greatly improved due to the agency's efforts in combating substandard and falsified medicines in the country. They defined good quality medicines as fit for the intended use and safe for patients. They admitted that counterfeit, substandard, adulterated, and degraded medicines exist in Nigeria and that the agency has worked greatly to combat this menace to a greater level. While progress has been made, there are still challenges to overcome. Policymakers recognise the importance of ensuring patient safety and the need for continued efforts to address the issues associated with poor-quality medicines. Further research

and collaboration with relevant stakeholders will be crucial in developing effective strategies to combat the menace of counterfeit medicines in Nigeria. This aligns with the World Health Organization's definition of quality medicines that meet established quality, safety, and efficacy standards [20].

The challenges to fighting fake medicines in Nigeria, as identified by the respondents, revolve around the lack of government support, the chaotic distribution chain, the need for sensitisation, and the necessity of implementing punitive measures. These challenges were also evidenced in a study by Ojonugwa et al. [21] on the role and challenges of the national agency for food and drug administration and regulation of alternative medicine in Nigeria. The suggestions provided by the interviewees on how to tackle these challenges include the implementation of guidelines, sensitisation, and punitive measures. It is recommended that policymakers consider these suggestions in the fight against fake medicines in Nigeria. By addressing these challenges and implementing the suggested strategies, Nigeria can significantly progress in fighting fake medicines. However, it is important to continuously evaluate and adapt these strategies to stay ahead of evolving counterfeit tactics and emerging challenges in the pharmaceutical landscape. A comprehensive and multi-faceted approach involving government commitment, regulatory enforcement, public awareness, and international cooperation is necessary to safeguard the health and well-being of the Nigerian population.

As identified by the policymakers, the NAFDAC initiatives against substandard and falsified drugs demonstrate a multi-faceted approach to preventing, detecting, and responding to these dangerous products. The use of technologies such as TruScan, mini-labs, and MAS for on-the-spot checks, testing, and identification of medicines is a commendable step towards ensuring product quality and authenticity [16]. Additionally, implementing a



pharmaceutical traceability strategy can help track and monitor the movement of medicines throughout the supply chain, making it easier to identify and address potential issues [16]. To further enhance the effectiveness of these initiatives and make them even better, the policymakers recognised the seriousness of the substandard and falsified drug problem. They also emphasised the need for more post-marketing surveillance activities and stronger punitive measures on defaulters. By incorporating these suggestions, NAFDAC can strengthen its initiatives against substandard and falsified drugs, ensuring the protection of public health and the integrity of the pharmaceutical supply chain in Nigeria.

Furthermore, based on this study's findings, the policymakers highlighted several important factors that should be involved in developing interventions to address the challenges of counterfeiting and substandard medicines. These include a thorough assessment of the challenges, engagement of all relevant stakeholders, sensitisation, rewards for whistleblowers, and stiffening of laws. These factors were similar to the recommendations provided by Ubajaka et al. and Okereke et al. [6, 18]. All stakeholders can help curb the production and distribution of fake drugs, ensuring that safe and effective medicines are available to all. By adopting these strategies, policymakers can create a more robust and collaborative framework that addresses the challenges at various levels, leading to improved public health and the protection of consumers from the dangers of fake drugs.

The policymakers with NAFDAC in this study identified the roles of stakeholders in implementing anti-counterfeiting interventions and suggested ways to improve stakeholders' participation. They emphasised the importance of stakeholder engagement, sensitisation, education, and collaboration in NAFDAC's policies and decision-making. They also recommended that stakeholders appoint qualified persons for pharmacovigilance and have post-marketing units responsible for

monitoring their products. These recommendations can help NAFDAC fight against counterfeiting, ensuring the safety and efficacy of drugs in Nigeria. By involving stakeholders, providing them with the necessary support and information, and fostering a sense of shared responsibility, NAFDAC can enhance its effectiveness in regulating and fighting counterfeit drugs in collaboration with the various stakeholders involved in the pharmaceutical industry.

The policymakers in this study expressed diverse perspectives on implementing NAFDAC's anti-counterfeiting strategies, the best way to implement these strategies, and the efforts to ensure proper implementation. However, they all agreed that more human and financial resources were needed to implement the strategies effectively. They also emphasised the importance of collaboration, sensitisation, and the adoption of advanced technologies to implement anti-counterfeiting strategies successfully. By addressing these key areas, NAFDAC can strengthen its approach and enhance its effectiveness in combating the issue of counterfeit and substandard drugs.

According to this study's findings, the policymakers at NAFDAC recognise the importance of implementing various measures to address the issue of counterfeit products and acknowledge the successes and challenges of current interventions. The need for sustainability and succession planning for experienced personnel was emphasised as an area for improvement. While acknowledging the successes of NAFDAC's interventions, addressing sustainability and personnel turnover challenges will be crucial for the agency to continue progressing in the fight against counterfeit medicines in Nigeria.

The policymakers from NAFDAC acknowledged the effectiveness of the strategies used to fight fake drugs in Nigeria. They called for better implementation and stakeholder collaboration to achieve even better results. The policymakers highlighted the importance of

practitioners being more proactive in checking the products they accept, consumers being more vigilant in purchasing drugs, and everyone working together to defeat the menace of fake drugs in Nigeria. NAFDAC must continue to work rigorously to reduce the percentage of counterfeits in circulation and ensure that only quality medicines are found in the country. Addressing these recommendations will contribute to more effective anti-counterfeit efforts and protect the population from the risks associated with counterfeit drugs.

The policymakers' responses regarding the evaluation of interventions implemented by NAFDAC shed light on the agency's current approach to evaluation and highlight areas for improvement. The policymakers' responses indicate the need for NAFDAC to evaluate its interventions systematically. Conducting surveys, establishing KPIs, and collaborating with external organisations were highlighted as key components of an effective evaluation process. By incorporating these suggestions, NAFDAC can gain valuable insights into the impact and success of its interventions, allowing for continuous improvement and the development of more targeted and efficient strategies to combat counterfeit drugs.

### **Consumers' Perception of NAFDAC Interventions, Challenges, Roles, and Anti-Counterfeit Technologies**

The consumers' perspectives on the accessibility to good quality medicines in Nigeria shed light on their challenges and expectations for medication quality. The consumer's responses in the qualitative interview highlight the need for increased regulation and quality control in the production and distribution of medicines in Nigeria. The participants' concerns about the accessibility to good quality medicines and the prevalence of substandard and counterfeit drugs should be taken seriously by the relevant authorities. To ensure the safety and well-being of the consumers, measures must be implemented to ensure that all medicines meet

the required quality standards. Building consumer trust through reliable sources, such as reputable pharmacies, is crucial in combating the issue of substandard and counterfeit drugs. Additionally, raising awareness among consumers about the importance of purchasing medicines from trusted sources and the potential risks associated with substandard drugs can empower them to make informed decisions about their health [22, 23]. Addressing the accessibility and quality of medicines in Nigeria requires a collaborative effort involving regulatory agencies, healthcare providers, pharmacists, and consumers themselves. Implementing stricter regulations, enhancing quality control measures, and promoting consumer education can improve the accessibility and availability of good quality medicines, ultimately safeguarding public health.

Also, responses from this study revealed that counterfeit drugs are a significant problem in Nigeria, and most drug consumers know their existence. The Nigerian government needs to take strong measures to curb the availability of counterfeit drugs to protect the health of its citizens. Additionally, standard practices and strict scrutiny of drug dealers can play a crucial role in reducing the availability of fake drugs in the Nigerian market. The study recommends further research to identify the root causes of counterfeit drug production and distribution in Nigeria and effective design interventions to address the issue.

In response to the quality of medicines they take and how they ensure they are good quality; the responses revealed several ways to determine the quality of the medicines they take. Consumers stated that they inspect the medicine before taking it, check the authenticity of the medicine, and check for side effects and effectiveness after taking it. The findings suggest that there is a need for stringent measures to ensure that all medicines in the market are of good quality, especially in countries where counterfeit medicines are

rampant. Further research is necessary to explore more ways of determining the quality of medicines and how consumers can be better informed about the quality of their medicines.

In response to policymakers' efforts to know if their medicines were fake or original, most of the consumers stated that they try to ensure the authenticity of their medicines. The responses from the participants indicate that drug consumers are aware of the dangers of consuming fake drugs and are taking measures to ensure that the drugs they consume are authentic. Their efforts, such as checking the manufacturer, expiry date, packaging integrity, and even utilising specific verification methods, reflect a desire for safe and genuine medications. Enhancing consumer awareness and education about identifying counterfeit drugs, verifying authenticity, and understanding quality indicators can empower individuals to make informed decisions and protect their health when purchasing medicines. Regulatory bodies must continue educating the public on the dangers of fake drugs and enforce laws that penalise those producing and distributing counterfeit drugs. The perception of the quality of locally made drugs is also increasing, which is a positive development for the Nigerian pharmaceutical industry.

The result from this study also reveals the factors determining the brand/type of medicine consumers purchase, which are multifaceted. Recommendations from medical professionals, the country of manufacture, cost, and brand/generic were identified as the main factors. The findings of this study could be useful for pharmaceutical companies in developing their marketing strategies and for policymakers in ensuring the quality of medicines manufactured and sold in their respective countries.

Understanding these factors can help healthcare providers, pharmaceutical companies, and policymakers better address consumer preferences and concerns regarding medication choices. By considering these factors

and providing accurate information, healthcare professionals can guide patients towards suitable treatment options, and pharmaceutical companies can align their marketing strategies and quality control measures to meet consumer expectations.

This study's findings suggest low awareness among drug/medicine consumers about initiatives by NAFDAC against fake medicines. This may be attributed to the inadequate dissemination of information by NAFDAC. It is recommended that NAFDAC intensifies its efforts to create awareness among consumers about its initiatives to combat fake drugs in the country. This can be achieved through effective communication such as mass media campaigns and public enlightenment programs. NAFDAC can also collaborate with healthcare professionals and pharmaceutical companies to disseminate information about the dangers of fake drugs and the agency's efforts to combat them.

Also, the responses obtained from the participants suggest a need for NAFDAC to engage in more public education and awareness campaigns to inform the public about NAFDAC's various initiatives. The finding behaviour highlights the willingness of consumers to pay more for quality medicines and support the efforts of NAFDAC to ensure that only safe and effective drugs are available in the market. Overall, the responses obtained from the participants provide valuable insights into the public's perception of NAFDAC's service delivery and their willingness to support the agency's efforts to safeguard the drug industry.

The findings from this study highlight several key challenges facing the fight against fake medicines in Nigeria. These challenges include a lack of community sensitisation, the prevalence of bad or counterfeit drugs sold by local sellers, corruption, compromised individuals involved in inquiry issues regarding fake medicines, and uncertainty about the current effectiveness of the fight. The project's objectives regarding drug/medicine consumers

reflect states: multifaceted nature of the fight against fake medicines in Nigeria. Addressing these challenges requires comprehensive strategies, including community sensitisation, improved regulation and quality control, anti-corruption measures, strengthening of regulatory bodies, and regular evaluation of interventions. By addressing these challenges, Nigeria can make significant progress in safeguarding public health and ensuring access to genuine and safe medicines for its population.

The findings from this study reflect a diversity of ideas on addressing the issue of fake, adulterated, and counterfeit medicines in circulation. The participants' responses suggest that tackling fake drugs in circulation will require a coordinated effort involving education, strict policies and monitoring, and greater accountability among drug inspection and checking staff.

Additionally, addressing profit motives and fostering a culture of integrity and ethical conduct within the pharmaceutical industry is crucial for achieving long-term solutions to combat the circulation of counterfeit medicines. This is a complex and challenging problem, but with the right approach, it is possible to reduce the circulation of counterfeit medicines and protect public health.

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## Conclusion

The findings from this study highlight the importance of NAFDAC having a comprehensive anti-counterfeiting strategy and implementing measures. This study's findings show that collaboration and communication among stakeholders are crucial in the fight against counterfeit drugs. This study's outcome suggests the need for implementing anti-counterfeiting interventions to cut down on fake drugs in Nigeria. This study also highlights the importance of post-marketing surveillance, stronger punitive measures on defaulters, and the involvement of the private sector in the fight against counterfeiting. Additionally, this study emphasises the need for increased regulation, quality control, and public education. The findings underscore the importance of continuous efforts to raise awareness and implement effective anti-counterfeiting strategies to safeguard public health and combat the growing threat of fake drugs.

## Conflict of Interest

The author declares no conflict of interest.

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