PHARMACOVIGILANCE
NEWSLETTER

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The importance of Paediatric Pharmacovigilance in drug regulation

Content

Health professionals and patients are encouraged to **report adverse events** or **quality problems** experienced with the use of **vaccines and medicines** to the nearest NAFDAC office or via pharmacovigilance@nafdac.gov.ng or via eReporting platform available on the NAFDAC website www.nafdac.gov.ng or via Med Safety Application available for download on Android and IOS stores.

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EDITOR'S NOTE...

We wish to thank our numerous stakeholders who have been working tirelessly with the National Pharmacovigilance Centre (NPC) to ensure the safe use of medicines in Nigeria. The NPC is committed to sending out the quarterly newsletter to its stakeholders. The objectives of the Newsletter are to disseminate information on Pharmacovigilance activities nationally and globally, to educate stakeholders on medicine safety issues, to promote rational use of drugs and to promote reporting of Adverse Drugs Reactions (ADRs) and AEFIs. This edition of the newsletter focuses on: **The importance of Paediatric Pharmacovigilance in drug regulation.**

We encourage Health care Professionals and other stakeholders to continue to report all adverse drug reactions and AEFIs. Your valued comments and acknowledgement of receipt of this issue through our email addresses (pharmacovigilance@nafdac.gov.ng, fdic@nafdac.gov.ng) would be most appreciated.

Thank you for your relentless efforts in strengthening Pharmacovigilance System in Nigeria.

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Introduction

The Paediatrics age is categorised according to WHO classification as infants (age 0-2 years), children (2-12 years) and adolescents (12 to 18 years). The WHO Paediatric Regulatory Network is a global paediatric working network providing a platform for exchange of regulatory information on paediatric medical products and to support the availability of quality-assured medical products for children through facilitation of communication, collaboration, training, and regulatory harmonization across the development, registration, marketing authorization and pharmacovigilance of paediatric medical products. All regulatory authorities of WHO Member States are eligible to join the network and contribute to the discussions; NAFDAC is a member of this and currently the co- chair. WHO encourages international cooperation among regulatory authorities in all its forms, including convergence, harmonization, information- and work-sharing, reliance and recognition. Facilitating the regulatory pathway of essential paediatric medicines and formulations is a key step to give access to these products as early as possible.

Pharmacovigilance plays a pivotal role in paediatric care by continuously monitoring and evaluating adverse drug reactions (ADRs) to improve patient safety and treatment outcomes. Children have distinct physiological characteristics compared to adults, making targeted research essential to understand how they respond to medicines.
The field of pharmacovigilance is crucial in ensuring the safety and efficacy of drugs across all populations, including paediatric patients which are the most vulnerable. Children, ranging from neonates to adolescents, represent a particularly challenging demographic for medication management due to their distinct physiological and developmental characteristics. These differences can significantly affect pharmacokinetics and pharmacodynamics, leading to variations in drug absorption, distribution, metabolism, and excretion compared to adults. Therefore, adverse drug reactions (ADRs) in children require careful consideration, monitoring, and research to optimize therapeutic outcomes and minimize harm (Rani et al., 2024). Adverse drug reactions (ADRs) in the paediatric population may vary in types and frequencies relative to other populations (Dubrall et al., 2021). The extrapolation of adult data to children often involves adjustments for body size and maturation, but without fully understanding the implications of developmental pharmacology. Consequently, pharmacovigilance in paediatrics is an area of growing interest and concern, aiming to fill these knowledge gaps and improve drug safety for paediatric patients (Rani et al., 2024).
At the time of authorization, information on the safety of a medicinal product is relatively limited due to many factors including: relatively small numbers of subjects in clinical trials compared with the intended treatment population, restricted population in terms of age, gender and ethnicity, comorbidity, co-medication and conditions of use (NAFDAC Good Pharmacovigilance Guidelines Chapter 3, Section 3.1). A medicinal product is authorized on the basis that in the specified indication(s), at the time of authorization, the benefit-risk ratio is judged to be positive for the target population (NAFDAC Good

Pharmacovigilance Practice Guidelines Chapter 3, Section 3.2). Children and adolescents are often not included in clinical trials, hence, data regarding the efficacy and safety of drug therapy in children and adolescents are lacking. Many medicinal products are used off label in children, i.e. outside their approval conditions (e.g. authorized age). ADRs associated with drugs used in the paediatric population need, specific evaluation as they may substantially differ in terms of frequency, nature and severity - from those occurring in adults. Differences with regard to the pharmacokinetics among other factors may account for this observation

A Descriptive analysis of adverse drug reaction reports on the European ADR database (Eudra Vigilance) in children and adolescents from Germany showed that , 1.7% of children taking medication on an outpatient basis experience at least one ADR, whereas 10.0% of all pediatric inpatients are estimated to develop an ADR. The systematic review showed that regarding drug related ADRs, antiinfectives and antiepileptics were most frequently associated in hospitalized children. In outpatient children, nonsteroidal anti-inflammatory drugs (NSAIDs), besides antiinfectives, were most frequently associated with ADRs. Also, the number of ADR reports was assessed in relation to the number of drug prescriptions to evaluate to what extent drug exposure may impact on the evaluation of the most frequently reported drugs (Dubrall et al., 2021).

Pharmacotherapy during Pregnancy, Childbirth, and Lactation

Drug development for pregnancy-specific or fetal conditions is extremely limited. Regulatory and research efforts are aimed at including pregnant/lactating women in research for balanced risk-benefit decisions. Adverse events of medicines and vaccines occur even in the hands of the most skillful clinicians and contribute greatly to morbidity and mortality. Improvements in medicine regulation arose from historical therapeutic adverse events such as the thalidomide tragedy. Pharmacotherapy is a very powerful approach to truly improve outcomes for pregnant women and their newborns. Only 5% of available medicines have been properly monitored, tested and labeled for use in pregnancy and lactation yet the extent of medical utilization and herbal medicine use in pregnancy has substantially increased. Pregnant or lactating women are usually excluded from clinical trials, and product development for diseases specific to pregnancy or perinatal including fetal indications is very limited. The risks of pharmacotherapy are dual in pregnancy, both for the pregnant woman and her fetus. Pregnancy-related alterations in either pharmacokinetics and/or pharmacodynamics may lead to inadequate therapeutic response or maternal toxicity (and also risks to the fetus), while maternal–fetal transmission may impair fetal organ formation or even cause fetal demise (Allegaert, 2022).

Paediatric Pharmacovigilance in drug regulation

Paediatric pharmacovigilance aims to identify patterns and trends that could inform safer prescribing practices and risk mitigation strategies in

paediatric patients (Rani et al., 2024). Drug Safety and Pharmacovigilance provide the platform for guaranteeing safety of patients and enhancing public health. The National Pharmacovigilance Centre coordinated by NAFDAC collects and analyses reports of adverse drug reactions and adverse events following immunization as well as communicate safety information to healthcare professionals and the public. NAFDAC's collaboration with relevant stakeholders to promote reporting of adverse events associated with the use of medical products is paramount.

On 11th November, 2025, NAFDAC launched 3 Initiatives, Maternal, Newborn, and Child Health + Nutrition (MNCH+N) Initiative, The NAFDAC Office of Women and Children's Health (NOWCH), and the National Action Plan on Prevention, Detection, and Response to Substandard and Falsified Medical Products (2023–2027). The 3 Initiatives are not isolated projects but interconnected pillars that reflect NAFDAC's unwavering commitment to protecting the most vulnerable among us, especially women and children. The MNCH+N Initiative extends this vision by addressing the critical challenges of malnutrition and maternal and child mortality. By regulating life-saving nutrition commodities and enforcing breastfeeding-friendly policies, NAFDAC is ensuring that our children grow healthier and stronger. Partnerships with WHO, UNICEF, and GAIN continue to reinforce these regulatory and production systems for sustainable impact. The NOWCH seeks to champion safe motherhood, promote rational medicine use, encourage breastfeeding, and combat harmful practices such as drug misuse and the use of unsafe cosmetics. It also aims to support the local production of paediatric medicines and menstrual hygiene products, in close collaboration with ministries, NGOs, and private sector partners.

A Descriptive analysis of adverse drug reaction reports in children and adolescents from Germanv

Dubrall et al. conducted a descriptive analysis of adverse drug reaction reports on Eudra Vigilance in children & adolescents from Germany for the period, 1st January, 2000 to 28th February, 2019 and outlined the frequently reported reactions & suspected drugs. All ADR reports from the European Economic Area (EEA) are stored in the European ADR database Eudra Vigilance of the European Medicines Agency (EMA) and EVDAS is the data analysis system of EudraVigilance. 20,854 spontaneous ADR reports were received for patients aged 0–17 years between 1st January, 2000 and 28th February, 2019. The drugs and ADRs reported most frequently were identified. Stratified analyses regarding age, sex and drugs used "off label" were performed and reporting rates (number of ADR reports/number of drug prescriptions) were calculated. Cardiovascular drugs, antineoplastic agents and drugs for the treatment of sensory organs were most often used off label. Concerning drug related ADRs, antiinfectives and antiepileptics were most frequently associated in hospitalized children. In outpatient children, nonsteroidal anti-inflammatory drugs (NSAID), and anti infectives, were most frequently associated with ADRs. Regarding ADRs, these most frequently referred to the system organ classes were "general disorders and administration site conditions" (31%), "skin and subcutaneous tissue disorders" (18%) and "nervous system disorders" (15%) from a Danish ADR database study.

Methylphenidate (5.5%), ibuprofen (2.3%), and palivizumab (2.0%) were most frequently reported as suspect drugs. If related to the number of drug prescriptions, the ranking changed to palivizumab, methylphenidate, ibuprofen. The ADRs reported most frequently were vomiting (5.4%), urticaria (4.6%) and dyspnea (4.2%). For children aged 0–1 year, drugs for the treatment of nervous system disorders and foetal exposure during pregnancy were most reported. In contrast, methylphenidate ranked first in children older than 6 years and referred 3.5 times more often to males compared to females. One major strength of the study is the consideration of the number of ADR reports in context with the number of drug prescriptions. Differences in age and sex-stratified analysis for the drugs and ADRs most frequently reported were observed, especially for methylphenidate. Clearly, more ADR reports for methylphenidate referred to males. However, if drug exposure was considered, reporting rates for females aged 13–17 years were two times higher. The drugs most frequently involved in ADR reports associated with an "off-label use" differed from those reported in the whole dataset. In the analysis, the five System Organ Classes (SOCs) reported most frequently were in line with those observed in other ADR database studies except for the SOC "injury, poisoning and procedural complications".

In a systematic review of other studies performed in ADR databases, skin disorders like rash and urticaria were also most frequently observed. The skin physiology for children is responsible for a higher frequency of cutaneous ADRs compared to adults. Drugs most often reported as suspected in the complete data set were methylphenidate, ibuprofen, palivizumab, atomoxetine and etanercept. However, the ranking varied

depending on age and sex, probably reflecting age- and sex-specific prevalent diseases and prescribing patterns, as also reported in other analyses. Additionally, the ranking changed if drug exposure was considered. Furthermore, the analysis emphasizes that the number of ADR reports should not be interpreted as a self-standing figure but put in context with exposure data. Results in the German study revealed that drugs for the treatment of ADHD were commonly reported. Thus, monitoring of children treated with ADHD drugs with regard to the occurrence of ADRs is recommended. In case of methylphenidate, special attention should be paid to children aged 4–6 years and females aged 13–17 years. Limitations of this study include the missing exact exposure data and the unknown extent of underreporting no incidences can be calculated based on the results of such analyses (Dubrall et al., 2021).

Reports by year retrieved from Vigilyze

Analyzing the reports received by the National Pharmacovigilance Centre to identify patterns or trends for further investigation can sometimes generate vital information about new adverse drug reactions or AEFIs that were previously unknown. Between 2005 and 2025, a total of 7,044 reports were received from paediatric patients and retrieved from Vigilyze for analysis. An overview of the reports received within the study period led to the conclusions below.

The number of reported adverse drug reactions of paediatric patients in Nigeria increased exponentially over the years, with notable fluctuations across reporting periods. There was an exponential increase from the initial year **2005,** which declined in **2014,** before rising again in **2021.** The highest reporting occurred in **2022 (**1980 reports), which is likely due to increased public awareness on the importance of reporting adverse drug reactions and the impact of pharmacovigilance. In **2024,** 1436 reports were received. As of 9th November 2025, a total of 1686 reports have been reported by paediatric subjects in 2025.

The highest number of reports were attributed to children aged **2 to 11 years** old (47.6%), followed by those aged 28 days to 23 months old (35.8%); while the least number of reports (3.4%) were associated with those aged 0 to 27 days. Regarding gender, 53.4% of the reports received were from male children while 44.8% were from female children, and in 1.9% of reports, the gender was not specified. The drug categories reported for these reports showed that majority of the reports (86%) were associated with anti-infectives for systemic use (Figure II).

Table 1: Report by Year

VigiBase initial date	Count	Percentage
2005	3	0.0%
2006	7	0.1%
2007	5	0.1%
2008	6	0.1%
2009	13	0.2%
2010	32	0.5%
2011	59	0.8%
2012	227	3.2%
2013	244	3.5%
2014	47	0.7%

2015	32	0.5%
2016	2	0.0%
2017	42	0.6%
2018	49	0.7%
2019	8	0.1%
2020	71	1.0%
2021	674	9.6%
2022	1,980	28.1%
2023	421	6.0%
2024	1,436	20.4%
2025	1,686	23.9%

Figure I: Patient Age Reported

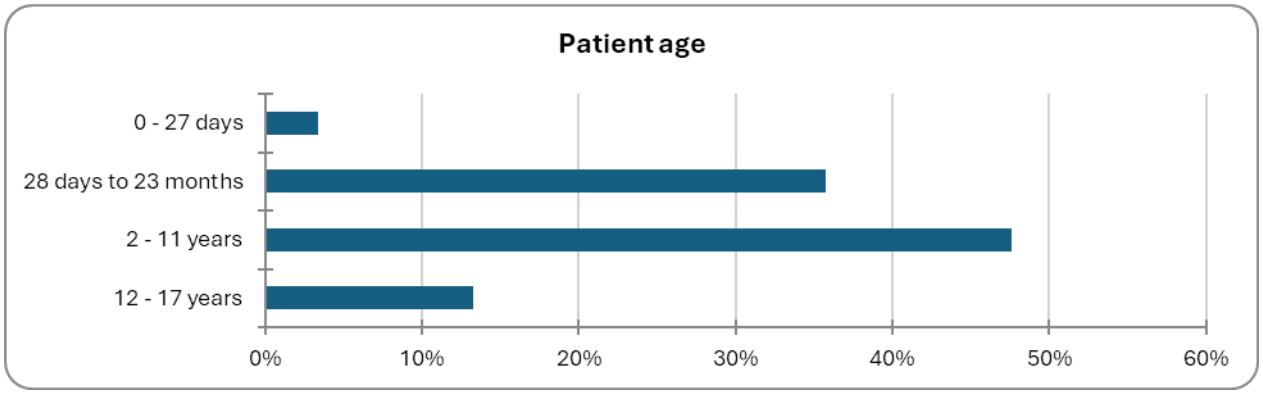


Table 2: Patient sex

Patient sex	Count	Percentage
Female	3,155	44.8%
Male	3,758	53.4%
Unknown	131	1.9%

Figure II: Diagrammatic Presentation for Drug Categories Reported

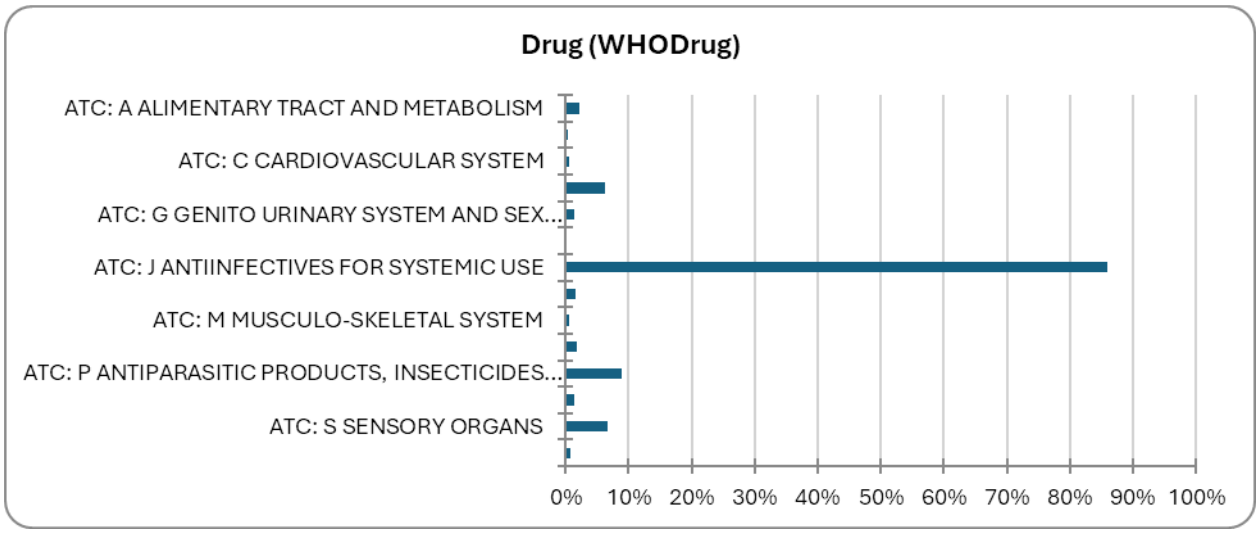
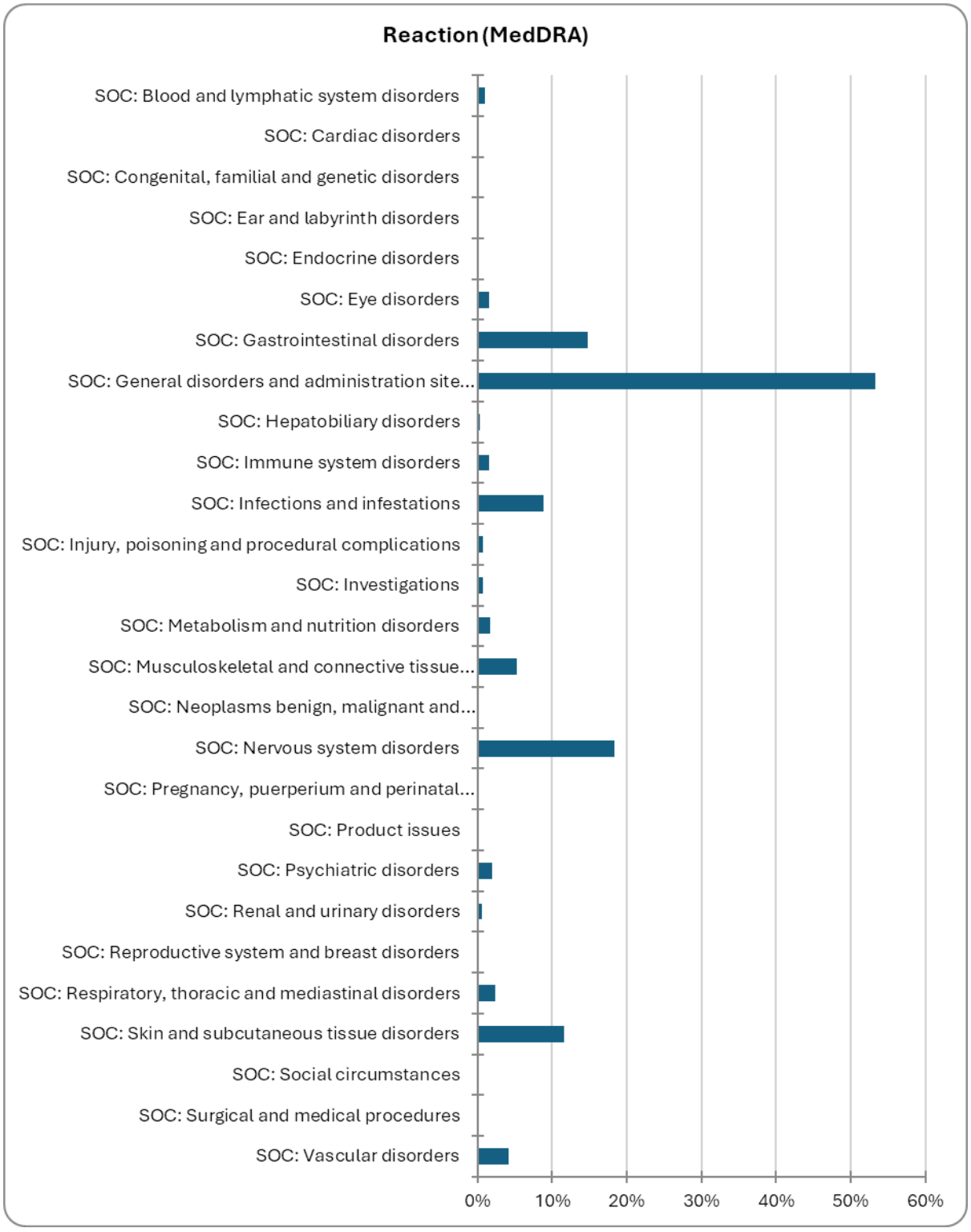


Figure IIMI: Diagrammatic Presentation for Reported Reaction System Organ Classes (SOCs)



Conclusion

Managing paediatric medication therapy is complex and pharmacovigilance is important to ensure drug safety for children. By identifying specific risk factors and drug categories associated with increased ADRs, healthcare providers can adjust their prescribing practices to minimize risks and enhance patient care. Further research and robust pharmacovigilance efforts are essential for continuous improvement of drug safety in paediatrics (Rani et al., 2024). Paediatric pharmacovigilance is crucial for identifying unique drug risks in children who may metabolise drugs differently from adults. Preventing serious adverse drug reactions can be achieved through safety monitoring, early detection and prompt reporting.

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