Fregene C.E., Mahmood S.F.T., Ojji D.B., Adegboye A.O., Ubiaru M.E. 2025. "Intake assessment of saturated fat in palm olein and soya oil for pregnant and lactating women in Nigeria." *World Nutrition*, *16*(2), June, 95–99. https://doi.org/10.26596/wn.202516295-99

Review

Intake assessment of saturated fat in palm olein and soya oil for pregnant and lactating women in Nigeria

Christopher Enasor Fregene[1,*], Sugra Fatima Tabi'a Mahmood[2], Dike Bevis Ojji[3], Abimbola Opeyemi Adegboye[4], Maduka Ephraim Ubiaru[5]

[1] Department of Medical Biochemistry – University of Abuja; [2]Career Management Office–Office of the Head of Civil Service of the Federation, Abuja, Nigeria; [3] Department of Internal Medicine–University of Abuja, Abuja, Nigeria; [4]National Agency for Food and Drug Administration and Control, Nigeria; [5]Food Registration & Regulatory Affairs, National Agency for Food and Drug Administration and Control, Nigeria

Keywords: intake assessment, saturated fatty acids, palm olein, soya oil, nutrient reference value – non-communicable diseases

https://doi.org/10.26596/wn.202516295-99

World Nutrition 2025;16(2):95-99

Background

The Global Nutrition Report shows a steady rise in obesity and diet-related NCDs among women in Nigeria. Unhealthy dietary patterns such as high consumption of saturated oils (e.g. palm olein) have been shown to be key risk factors for NCDs. It has been observed that there is no implemented national policy to advise about saturated fatty acid intake in Nigeria. Thus, the need for dietary intake assessment of commonly consumed vegetable oils (palm olein and soya oil) not only to inform risk management policies and consumer choice on healthier oils but also to provide a dietary rationale for the potential risk associated with the consumption of palm olein to the health of pregnant and lactating women in Nigeria.

Methods

The level of saturated fat in palm olein and soya oil was estimated by this study from on-pack nutrition labels of brands most commonly available in the open markets and supermarkets in Nigeria and daily vegetable oil consumption data from the National Food Fortification and Micronutrient Survey. The assessment was done to evaluate dietary saturated fat intakes and calculate the risk from palm olein and soya oil consumption using the recommended methods in the Codex Food Safety Risk Analysis Manual and FAO Dietary Risk – Pesticide Registration Toolkit. Comparison of the estimated dietary intake was made with the Nutrient Reference Value – Noncommunicable Disease for Saturated fatty acids from Codex Guidelines on Nutrition Labelling.

Results

The estimated dietary intakes of saturated fatty acids from palm olein for pregnant and lactating women were approximately 13.5 g and 15 g per day, which are 67.5% and 75% of the Nutrient Reference Values - Noncommunicable Disease (NRV-NCD), which refers to levels not to be exceeded, for saturated fatty acids respectively. The estimated dietary intakes of saturated fatty acids from soya oil were approximately 4.0 g and 4.4 g per day, which are 20% and 22% of the NRV-NCD for saturated fatty acids respectively. The relative intake/risk and its reduction (this compares the estimated intakes/risks and their resultant reductions) were estimated to be approximately 3.4 and 71% respectively.

Conclusions

Soya oil is a healthier option than palm olein, and the government-led establishment of a saturated fatty acid benchmark for oils might significantly lead to incremental reduction in the risks of excessive intake and cardiovascular disease by driving product reformulation. Consumption of palm olein might be a major reason behind the high prevalence and growing burden of diet-related hypertension among pregnant and lactating women in Nigeria.

* Corresponding author: chrisfregene@gmail.com

INTRODUCTION

Diet-related non-communicable diseases (NCDs) threaten Nigeria's vision of developing healthy, educated and productive Nigerians for a globally competitive nation by 2030 (World Tourism Forum Institute, 2023). Creating a conductive policy and institutional environment through promotion and implementation of a food reformulation policy to reduce the saturated fatty acid content of foods high in saturated fatty acids such as palm olein and foods containing large quantities of it could be a key step towards progress in addressing high prevalence of cardiovascular disease, which is a major NCD, in Nigeria. According to global nutrition reports and country profiles (WHO, 2022), Nigeria has shown limited progress towards achieving its diet-related NCD global targets. One report (WHO, 2022) shows a steady rise in obesity among adult women with over 24.6% living with hypertension, a public health problem in Nigeria. A major cause of cardiovascular disease may be the consumption of unhealthy foods such as those high in saturated fatty acids. The Global Health Observatory Data Repository reveals that Nigeria has no policy to limit saturated fatty acid intake (WHO, 2022). This is further revealed in the Nigerian National Policy on Food Safety and Quality Goal 5 of which states: 'Promote the consumption of healthy and nutritious foods' with its objective 5.1: 'Ensure prioritization for healthy and nutritious foods'. This policy document includes nothing about developing and implementing a national strategic plan/guideline for saturated fatty acid reduction (FMHSW, 2023). Thus, the need for dietary intake assessment of the main sources of saturated fat in the Nigerian diet, palm olein and soya.

This study compiles dietary saturated fat intake estimates from palm olein and soya and estimates risk to health associated with their consumption for one of the vulnerable groups in Nigeria, pregnant and lactating women.

METHODS

Data on saturated fatty acid content were estimated from on-pack nutrition labels of randomly selected and most commonly available brands of palm olein and soya oil in open markets and supermarkets in Lagos and Abuja, Nigeria (as shown in Table 1 and Table 2). A total of sixteen (16) brands, commonly available in almost all the States of the Federation, were included.

Table 1. Saturated fatty acids content of refined palm olein oils in Nigeria

S/N	Brand name	Saturated fatty acids content (g per 100 g)
1	Devon King's oil (refined palm olein)	50g (max)
2	Power oil (refined palm olein)	42.8
3	Mamador oil (refined palm olein)	50g (max)
4	Activa palm olein	50g
5	Dabel palm olein	21g
6	La perla	40g
	Mean content	46.6g

Data on consumption were estimated from the National Food Consumption and Micronutrient Survey 2021 Final Report (as shown in Table 3) (FGoN, 2024).

Using the information on saturated fatty acid content and consumption level, dietary saturated fatty acid intakes from palm olein and soya oils were estimated according to a methodology developed by Joint Expert Committee on Food Additives as stated below (FAO and WHO, 1993 and 2006). Outlier values were not used, as they are considered not to represent the amounts of saturated fatty acids that are likely to be in the oils.

Table 2. Saturated fatty acids content of refined soya oils in Nigeria

S/N	Brand name	Saturated fatty acids content (g per 100 g)
1	Golden Terra pure soya oil	14g
2	Laziz pure soya oil	13g
3	Grand pure soya oil	13g
4	Golden penny pure soya oil	15g
5	Golden Glow soya oil	13g
6	Winner soya oil	13g
7	BTF soya bean oil	15g
8	Power oil lite soya oil	15g
9	Sunola soya oil	5g
10	Bow soya oil	13g
	Mean content	13.8g

Here are explanations of some of the terms and methods used in this paper:

- The Nutrient Reference Value – Noncommunicable Disease for Saturated fatty acids was obtained from the Codex Guidelines on Nutrition Labelling (as shown in Table 4) (FAO/WHO, 1993).
- The risk was characterized by expressing the estimated dietary intake as a percentage of the NRV-NCD for saturated fatty acid.
- Relative Intake Reduction formula (proposed) = (Dietary Intake when palm olein is consumed – Dietary Intake when soya oil is consumed / Dietary Intake when palm olein is consumed) x 100.
- Dietary risk is expressed as a percentage of the NRV-NCD for saturated fatty acid.
- Relative Risk formula (proposed) = Dietary risk when palm olein is consumed / Dietary risk when soya oil is consumed.
- Relative Risk Reduction formula (proposed) = (Dietary risk when palm olein is consumed – Dietary risk when soya oil is consumed / Dietary risk when palm olein is consumed) x 100.

Table 4. Nutrient Reference Value – Noncommunicable Disease for Saturated fatty acids

Nutrient	Levels not to exceed	Levels to achieve
Saturated fatty acids	20 g	
Sodium	2 g	
Potassium		3.5 g

Source: FAO and WHO, 1993. 'The Codex Guidelines on Nutrition Labelling'.

Table 5. Nutrient profile model for the WHO African region

Food category	Examples of food items	Codex Food Category code	Total fat (g)	Saturated fat (g)	Total sugars (g)	Added sugars (g)	Sodium (g)	Energy (kcal)
Butter and other fats and oils, and fat emulsions	Vegetable oils and fats, lard, ghee, fish oils and other animal fats, butter, margarine and similar products. Examples: cooking oils from plant and animal sources, fat blends, nuts spread (e.g. peanut butter)	2.1, 2.2	No threshold provided	35	No threshold provided	0.0	0.10	No threshold provided

RESULTS AND DISCUSSION

Tables 1 and 2 show the saturated fatty acids content of palm olein and soya oils in Nigeria. The saturated fatty acid content ranged from 21 g to 50 g per 100 g palm olein, and from 13 g to 15 g per 100 g soya oil. The mean content of saturated fat in palm olein (46.6g/100g), but not soya oil, exceeds the maximum saturated fatty acid threshold set (WHO nutrient profile model for the Africa Region, 2019). As shown in Table 3 palm olein is classified as excessive in saturated fat, whereas soya oil is not (WHO, 2018). Thus, marketing restriction actually ought to apply to palm olein (or at least some brands of it, including three in Table 1). Hence, the consumption of palm olein makes it more likely for the diet of pregnant and lactating women in Nigeria to exceed the WHO recommended saturated fat maximum intake of 10% of total energy intake, the Codex NRV-NCD for saturated fat (WHO, 2023).

Table 3. Usual intake of vegetable oil (raw weight, grams) of women in Nigeria

	N	Mean (95% CI)	SE
Lactating women	697	32.1 (29.0, 35.2)	1.6
Pregnant women	999	29.0 (25.7, 32.2)	1.6

Source: Federal Government of Nigeria, 2024. 'National Food Consumption and Micronutrient Survey 2021. Final Report. Abuja and Ibadan, Nigeria'.

The Nigeria National Food Consumption and Micronutrient Survey shows that the mean intakes of vegetable oil by pregnant and lactating women are 29.0 g and 32.1 g per day respectively. Using these values, the estimated dietary intakes of saturated fatty acids from palm olein are approximately 13.5 g and 15 g per day respectively, which provide 67.5% and 75% of the NRV-NCD for saturated fatty acids respectively. The dietary intakes of saturated fatty acids from soya oil are approximately 4.0 g and 4.4 g per day respectively, which are 20% and 22% of the NRV-NCD for saturated fatty acids respectively. Studies have shown that palm oil consumption is associated with cardiovascular diseases (Abdulwaliyu et al., 2023).

If the NRV-NCD value from WHO nutrient profile model for the African Region is applied as a target level and palm olein is reformulated to contain no more than 35 g saturated fat per 100 g, the estimated dietary intakes of saturated fat from palm olein would be 10.2 g and 11.2 g per day for pregnant and lactating women respectively. This indicates a relative intake reduction and relative risk reduction of 26% and 26.7% might be achieved if this benchmark is established. Studies have shown that a 1% reduction in saturated fat intake can be expected to produce a 2% reduction in blood LDL cholesterol and thus a 2% reduction in heart disease risk. Intervention that focuses on dietary intake of saturated fat often reduces heart disease risk (National Heart, Lung and Blood Institute, 2002).

The relative intake risk is estimated to be approximately 3.4. This indicates that pregnant and lactating women who consume palm olein palm olein are 3.4 times more likely to consume excessive saturated fat daily than if they consumed only soya oil.

The dietary risks are estimated to be 67.5% and 20% of the NRV-NCD for palm olein and soya oils respectively for pregnant women, while the estimated risks are 75% and 22% of the NRV-NCD for palm olein and soya oils respectively for lactating women. This indicates very high risk for palm olein but low risk for soya oils. The replacement of palm olein with soya oil might significantly reduce the risk of cardiovascular diseases for pregnant and lactating women and thus, contribute significantly to national efforts in reducing population burden of cardiovascular diseases and achieving WHO global diet-related non-communicable disease targets. The relative intake/risk reduction is estimated to be approximately 70%. This implies that the risk of developing CVD is 70% lower with soya oil consumption compared to palm olein consumption.

CONCLUSION AND RECOMMENDATIONS

This study concludes that soya oil is a healthier option than palm olein, and the establishment of a saturated fatty acid benchmark for oils might significantly reduce the risks of excessive intake and cardiovascular disease. Consumption of palm olein might be a major reason behind the high prevalence and growing burden of diet-related hypertension among pregnant and lactating women in Nigeria.

We recommend the adaptation of the benchmark value of 35 g saturated fat per 100 g vegetable oil from the WHO nutrient profile model for African Region. This might contribute significantly to preventing the apparent rise in hypertension among pregnant and lactating women in Nigeria.

ASSUMPTIONS

1. The on-pack saturated fat content data reflect correct analytical data.
2. No significant difference in Calorie content of 100 g of both palm olein and soya oils.

3. Vegetable oil consumed is either palm olein or soya oil. In reality, other single or mixed oils are present in the diet.

AUTHOR CONTRIBUTIONS
SFTM: Project Administration, DBO: Project Administration, AOA: Methodology. MEU: Formal Analysis. All the authors approved the final revised version and consent for publication.

CONFLICT OF INTEREST
The authors declare that they have no other potential conflicts of interest.

DECLARATION OF GENERATIVE AI AND AI-ASSISTED TECHNOLOGIES IN SCIENTIFIC WRITING
Nothing to disclose.

ACKNOWLEDGEMENTS
Prof. Dan Ramdath for paper review.

FUNDING
None

Received: March 15, 2025; **Revised:** June 03, 2025; **Accepted:** June 24, 2025; **Published:** June 30, 2025

This is an open-access article distributed under the terms of the Creative Commons Attribution 4.0 International License (CCBY-4.0). View this license's legal deed at http://creativecommons.org/licenses/by/4.0 and legal code at http://creativecommons.org/licenses/by/4.0/legalcode for more information.

REFERENCES

Abdulwaliya I., Okoduwa S.I.R., Sangodare R., Arekemase S.O., Muhammed A. 2023. "Review of studies on palm-oil consumption in relation to risk of cardiovascular diseases". *Journal of Nutrition and Food Security* 8(1). https://doi.org/10.18502/jnfs.v8i1.11779

FAO and WHO. 1993. "The Codex Guidelines on Nutrition Labelling". *CAC*/GL-2-1985 (Rev. 1-1993). https://www.fao.org/4/y2770e/y2770e06.htm

FAO and WHO. 2006. 'Codex Alimentarius Commission – Food Safety Risk Analysis Manual: Dietary Risks: Pesticide Registration Toolkit'. *FAO*. **Full text here**

FGoN, Federal Government of Nigeria and the International Institute of Tropical Agriculture (IITA). 2024. 'National Food Consumption and Micronutrient Survey 2021. Final Report. Abuja and Ibadan, Nigeria'. *FGoN and IITA*. 550 pp. **Full text here**

FMHSW (Federal Ministry of Health and Social Welfare). 2023. 'National Policy on Food Safety and Quality and its Implementation Plan'. *Federal Ministry of Health and Social Welfare*. **Full text here**

Global Burden of Disease Study. 2019. 'Diet Collaborators. Health effects of dietary risks in 195 countries, 1990-2017: a systematic analysis for the Global Burden of Disease Study'. *Lancet* 393(10184):1958–72. **Full text here**

National Heart, Lung and Blood Institute. 2002. 'Third Report of the National Cholesterol Education Program (NCEP) Expert Panel on Detection, Evaluation and Treatment of High Blood Cholesterol in Adults (Adult Treatment Panel III)'. *NIH* publication no. 02-5215; V-8 and II-4. https://pubmed.ncbi.nlm.nih.gov/12485966

WHO Nutrient Profile Model for the WHO African Region. 2018. *WHO Brazzaville*: WHO Regional Office for Africa.

WHO. 2022. 'Global Nutrition Report: Country Nutrition Profiles – Nigeria'. *WHO* Geneva. **Full text here**

WHO. 2022. 'WHO global health observatory data repository'. *WHO* Geneva. https://www.who.int/publications/i/item/9789290234401

WHO. 2023. 'Saturated fatty acid and trans-fatty acid intake for adults and children: WHO guideline'. *WHO*. **Full text here**

World Tourism Forum Institute. 2023. 'Nigeria Vision 2030: Driving Growth and Prosperity Forward'. Global Tourism Forum. **Full text here**