

## Cardiovascular Topics

# Percutaneous coronary intervention facilities in Nigeria

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### Abstract

**Background:** In Nigeria, the incidence of coronary artery disease has doubled over the last three decades. However, there appears to be a lack of adequate heart catheterisation facilities.

**Methods:** A list of percutaneous coronary intervention (PCI)-capable facilities was compiled for each state in Nigeria and the federal capital territory. Population estimates for 2019 were obtained from the National Bureau of Statistics and this was utilised to calculate the number of PCI facilities per person in each state and the country.

**Results:** There are 12 operational PCI facilities in Nigeria, 11 of which are in the private health sector. Overall, there is one PCI facility per 16 761 272 people in Nigeria.

**Conclusions:** There is a distinct lack of PCI-capable facilities in Nigeria. There needs to be an investment from the government and stakeholders in Nigeria to increase the access to PCI, given the paradigm shift from communicable to non-communicable diseases.

**Keywords:** percutaneous coronary intervention, acute coronary syndrome, Nigeria

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There is a paradigm shift from communicable to non-communicable diseases in sub-Saharan Africa.<sup>1-3</sup> Cardiovascular disease is the second most common cause of death in Africa and is responsible for 10% of all deaths.<sup>4</sup> The World Health Organisation estimated that 361 000 deaths were caused by ischaemic heart disease in

Africa and projected that this number will double by 2030.<sup>1</sup> In Nigeria, the incidence of coronary artery disease has doubled over the last three decades, and the incidence of acute coronary syndrome (ACS) was reported to be 45.98 per 100 000 hospitalised adults per year.<sup>3</sup>

The appropriate management of a ST-elevation myocardial infarction (STEMI) requires the prompt identification of the disease process, swift initiation of the pre-hospital system, transport to the appropriate hospital, medication administration, and rapid activation of the heart catheterisation laboratory.<sup>4-6</sup> Management of ACS in Nigeria is limited by a non-existent prehospital emergency medical services system, delays in presentation and limited capabilities for reperfusion.<sup>3</sup> This has led to a high rate of mortality and major adverse cardiac events.<sup>3</sup>

In Nigeria, there is a distinct lack of adequate heart catheterisation laboratory facilities.<sup>7</sup> The coronary angiography rate for ACS in Nigeria was reported to be 42.4% and percutaneous coronary intervention (PCI) was performed on 28.6% of patients in a study by Isezuo *et al.*<sup>3</sup> The goal of this article was to examine the availability of PCI-capable facilities in Nigeria.

### Methods

A complete list of PCI-capable facilities in Nigeria was compiled by visiting some of the PCI facilities, performing multiple internet searches, and discussion with local physicians and cardiologists. The list of facilities was obtained for each state and the federal capital territory. Every PCI-capable facility was then contacted to verify whether their facility was operational. Facilities that were non-operational as of 28 January 2022 were excluded. The final list of PCI-capable facilities was verified by a local and interventional cardiologist in Nigeria.

The population estimate for Nigeria for 2019 was obtained from the National Bureau of Statistics website.<sup>8</sup> The number of PCI facilities per persons living in each state where the facility was available was calculated (Fig. 1). The number of PCI facilities per person for the country was also calculated.

### Results

There was a total of 12 operational PCI-capable facilities identified in Nigeria (Table 1). Only six states had functional PCI facilities, with Lagos and Abuja having four each. The list of these PCI facilities is provided in (Table 2). The concentration of PCI facilities per state was the lowest in Rivers State (0.14/1 000 000 people) and the highest in Abuja (1.48/1 000 000 people) (Fig. 1).

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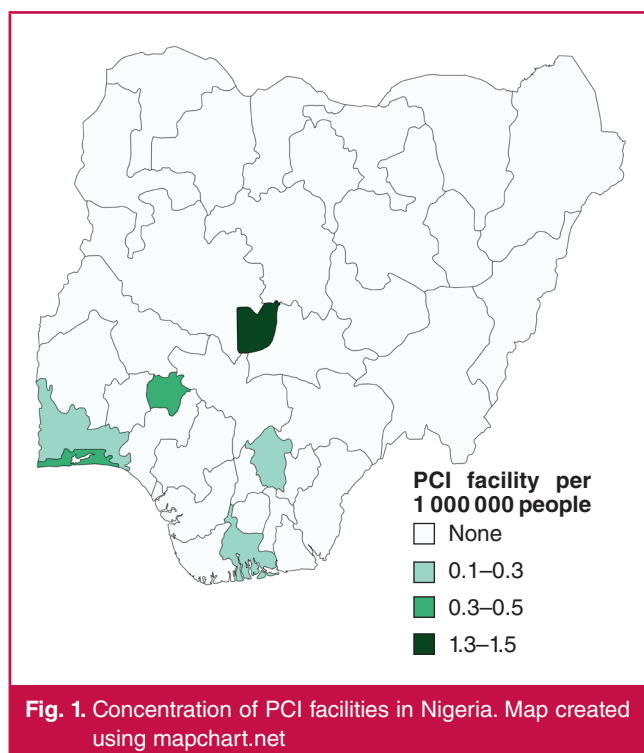
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## Discussion

We found that there were 12 functional PCI facilities in Nigeria with one PCI facility per 16 761 272 people. In a study on 10 countries in sub-Saharan Africa, Kakou-Guikahue *et al.* found that there were only five PCI facilities.<sup>1</sup> In Egypt, there was reported to be one PCI facility per 950 000 people after initiation of the Stent for Life programme.<sup>9</sup> In South Africa, there were 62 PCI-capable facilities with one PCI facility per 887 096 people.<sup>2</sup> Langabeer *et al.* reported that there were 1 571 PCI-capable facilities in the United States of America, which amounts to about one PCI facility per 199 097 people, based on the 2011 population estimate.<sup>10,11</sup>

The geographical distribution of the PCI facilities in Nigeria is concerning as they are all in the big cities. An investment from the government in incentivising equitable development of PCI facilities will go a long way. Of the 12 functional PCI facilities in Nigeria, 11 of them are in the private health sector, creating disproportionate access to them in Nigeria's stark reality of a fee-for-service model.<sup>3,12</sup> This needs to be addressed as part of the broader issue of healthcare access and equity. It will be prudent for the government to invest in the infrastructure and provide more publicly accessible PCI facilities with services that are affordable.

There remains a significant brain drain in Nigeria, not limited to cardiovascular specialists.<sup>13</sup> The economic conditions for physicians in Nigeria and the prospect of an improved quality of life abroad is attractive to local physicians but does come at a cost as it limits the provision of specialised care in Nigeria. There is also a dearth of sub-specialised cardiovascular training programmes in Nigeria, compounding the problem.<sup>12</sup>

There needs to be an investment from the government and the stakeholders in Nigeria in the training of cardiovascular sub-specialists. A success story that can be mirrored is the advent of an interventional cardiology training programme in Babcock University Teaching Hospital, which is the first of its kind.

**Table 1. Number of PCI-capable facilities and 2019 population estimate**

| State/territory | Number of PCI facilities | 2019 population estimate |
|-----------------|--------------------------|--------------------------|
| Abia            | –                        | 3 841 943                |
| Adamawa         | –                        | 4 536 948                |
| Akwa Ibom       | –                        | 4 780 581                |
| Anambra         | –                        | 5 599 910                |
| Bauchi          | –                        | 7 540 663                |
| Bayelsa         | –                        | 2 394 725                |
| Benue           | –                        | 5 787 706                |
| Borno           | –                        | 5 751 590                |
| Cross River     | –                        | 4 175 020                |
| Delta           | –                        | 5 307 543                |
| Ebonyi          | –                        | 3 007 155                |
| Edo             | –                        | 4 461 137                |
| Ekiti           | 1                        | 3 350 401                |
| Enugu           | 1                        | 4 396 098                |
| Gombe           | –                        | 3 623 462                |
| Imo             | –                        | 5 167 722                |
| Jigawa          | –                        | 6 779 080                |
| Kaduna          | –                        | 8 324 285                |
| Kano            | –                        | 14 253 549               |
| Katsina         | –                        | 9 300 382                |
| Kebbi           | –                        | 5 001 610                |
| Kogi            | –                        | 4 153 734                |
| Kwara           | –                        | 3 259 613                |
| Lagos           | 4                        | 12 772 884               |
| Nasarawa        | –                        | 2 632 239                |
| Niger           | –                        | 6 220 617                |
| Ogun            | 1                        | 5 945 275                |
| Ondo            | –                        | 4 969 707                |
| Osun            | –                        | 4 237 396                |
| Oyo             | –                        | 7 512 855                |
| Plateau         | –                        | 4 400 974                |
| Rivers          | 1                        | 7 034 973                |
| Sokoto          | –                        | 5 863 187                |
| Taraba          | –                        | 3 331 885                |
| Yobe            | –                        | 3 398 177                |
| Zamfara         | –                        | 5 317 793                |
| FCT (Abuja)     | 4                        | 2 702 443                |
| Nigeria (Total) | 12                       | 201 135 262              |

There is some good news, with two PCI-capable facilities that opened early in 2022 in Lagos. There are also three cardiac catheterisation laboratories that are not currently functional in Akwa Ibom, Bayelsa and Oyo State, which could be refurbished to help provide more access to patients with ischaemic heart disease.

**Table 2. List of PCI-capable facilities**

- Afe Babalola University Multi-System Hospital, Ado-Ekiti, Ekiti State
- University of Nigeria Teaching Hospital, Enugu
- Reddington Hospital, Victoria Island, Lagos
- Euracare Multi-Specialist Hospital, Victoria Island, Lagos
- First Cardiology Consultants, Ikoyi, Lagos
- Evercare Hospital, Lekki Phase 1, Lagos
- Babcock University Teaching Hospital, Ilishan-Remo, Ogun State
- SaveALife Mission Hospital, Port Harcourt, Rivers
- Cardiocare Multispecialty Hospital, Garki, Abuja
- Foxglove Multispecialty Hospital, Gwarinpa, Abuja
- Nizamiye Hospital, Life Camp, Abuja
- Cedarcrest Hospital, Gudu District, Apo, Abuja

## Conclusion

There is a paucity of PCI-capable facilities in Nigeria, with only 12 operational facilities, mostly in the private health sector. There needs to be a significant investment by the government and other stakeholders in Nigeria to increase the access to cardiac catheterisation, given the increasing burden of ischaemic heart disease and the paradigm shift from communicable to non-communicable diseases.

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## References

1. Kakou-Guikahue M, N'Guetta R, Anzouan-Kacou J, Kramoh E, N'Dori R, Ba S, *et al.* Optimizing the management of acute coronary syndromes in sub-Saharan Africa: A statement from the AFRICARDIO 2015 Consensus Team. *Arch Cardiovasc Dis* 2016; **109**(6–7): 376–383.
2. Stassen W, Wallis L, Lambert C, Castren M, Kurland L. Percutaneous coronary intervention still not accessible for many South Africans. *Afr J Emerg Med* 2017; **7**(3): 105–107.
3. Isezuo S, Sani M, Talle A, Johnson A, Adeoye A, Ulgen M, *et al.* Registry for Acute Coronary Events in Nigeria (RACE-Nigeria): Clinical characterization, management, and outcome. *J Am Heart Assoc* 2022; **11**(1).
4. Stassen W, Wallis L, Castren M, Vincent-Lambert C, Kurland L. A prehospital randomised controlled trial in South Africa: Challenges and lessons learnt. *Afr J Emerg Med* 2019; **9**(3): 145–149.
5. O'Gara P, Kushner F, Ascheim D, Casey D, Chung M, de Lemos J, *et al.* 2013 ACCF/AHA guideline for the management of ST-elevation myocardial infarction. *Circulation* 2013; **127**(4).
6. Kimeu R, Kariuki C. Assessment of the management of acute myocardial infarction patients and their outcomes at the Nairobi Hospital from January 2007 to June 2009. *Cardiovasc J Afr* 2016; **27**(4): 218–221.
7. Johnson A, Falase B, Ajose I, Onabowale Y. A cross-sectional study of stand-alone percutaneous coronary intervention in a Nigerian cardiac catheterization laboratory. *BMC Cardiovasc Disord* 2014; **14**(1).
8. National Bureau of Statistics. Demographic Statistics Bulletin 2020. <https://nigerianstat.gov.ng/elibrary> (accessed 2 February 2022).
9. Magdy A, Shawky A, Mohanad A, Shaheen S. Egypt: coronary and structural heart interventions from 2010 to 2015. *EuroIntervention* 2017; **13**(Z): Z21–Z24.
10. Langabeer J, Henry T, Kereiakes D, DelliFraine J, Emert J, Wang Z, *et al.* Growth in percutaneous coronary intervention capacity relative to population and disease prevalence. *J Am Heart Assoc* 2013; **2**(6).
11. United States Census Bureau. Census Bureau Projects US Population of 312.8 Million on New Year's Day. <https://www.census.gov/newsroom/releases/archives/population/cb11-219.html> (accessed 17 February 2022).
12. Adedinsewo D, Omole O, Oluleye O, Ajuyah I, Kusumoto F. Arrhythmia care in Africa. *J Int Cardiac Electrophysiol* 2018; **56**(2): 127–135.
13. Hagopian A, Thompson M, Fordyce M, Johnson K, Hart L. The migration of physicians from sub-Saharan Africa to the United States of America: measures of the African brain drain. *Human Res Health* 2004; **2**(1).