

# Analysis of the Factors Influencing the Delay in Patient Referral to the Cardiology Department at CHU Ignace Deen in 2025

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## Abstract

**Introduction:** Cardiovascular diseases (CVDs) remain the leading cause of mortality worldwide, accounting for 17.9 million deaths in 2019, with 85% due to myocardial infarction and stroke [1]. In sub-Saharan Africa, the prevalence of hypertension reaches 30% - 40% among adults, compared to 22% in developed countries [2]. In Guinea, limited health infrastructure and a low density of medical staff contribute to delays in patient referral to specialized cardiology services. The objective of this study was to analyze the factors influencing referral delays to the cardiology department of Ignace Deen University Hospital in Conakry. **Material and Methods:** This was a cross-sectional analytical study conducted over 6 months, involving newly referred patients to the cardiology department and healthcare professionals responsible for referrals. Data were collected using structured questionnaires and interviews. Variables studied included socio-demographic characteristics, socio-economic barriers, logistical constraints, and institutional factors. Statistical analyses included descriptive statistics, Chi-square tests, Pearson correlations, ANOVA, and multivariate logistic regression, with a significance threshold of  $p < 0.05$ . **Results:** A total of 111 patients were included, with a slight female predominance (52%). The majority were aged over 45 years (74%) and 35% were non-schooled. Financial constraints (53%) and lack of awareness (52%) were the main reasons for delayed consultation. Distance to the hospital was significantly associated with cardiovascular complications ( $p < 0.001$ ), while the

availability of medical staff influenced health outcomes ( $p = 0.006$ ). Multivariate analysis confirmed that socio-economic status, distance, and institutional barriers were predictive factors of referral delay. **Conclusion:** Referral delays in cardiology at Ignace Deen are multifactorial, driven by socio-economic, cultural, logistical, and institutional barriers. These delays contribute to worsening health outcomes and increased complications. Strengthening community awareness, reducing financial barriers, decentralizing cardiology services, and standardizing referral protocols are essential strategies to improve timely access to specialized care in Guinea.

## Keywords

Referral Delay, Cardiovascular Diseases, Ignace Deen University Hospital, Guinea, Sub-Saharan Africa

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## 1. Introduction

Cardiovascular disease (CVD) is the leading cause of mortality worldwide, with approximately 17.9 million deaths recorded in 2019, or 32% of all global deaths [1]. Among these deaths, 85% are due to myocardial infarction and stroke. The majority occur in low- and middle-income countries, where access to specialized care remains insufficient due to an underfunded health system and a lack of qualified personnel.

In sub-Saharan Africa, the prevalence of high blood pressure reaches 30% to 40% among adults, compared with an average of 22% in developed countries [2]. This epidemiological transition is linked to demographic, urban and nutritional changes, as well as socio-economic factors such as level of education and income [3].

In Guinea, although data on the exact prevalence of CVD are limited, trends show an increase in hospital admissions for cardiovascular conditions. The Guinean health system faces a low medical density (0.075 doctors per 1000 inhabitants) and limited infrastructure [4]. These shortcomings directly impact the speed and efficiency of the management of referred patients.

The delay in patient referrals in cardiology constitutes a major public health issue, as it can affect the evolution of cardiovascular pathologies and increase mortality and complications [5]. The objective of this study is to analyze the factors contributing to patient referral delays to specialized cardiology services, highlighting institutional, economic and logistical barriers, in order to propose improvement strategies adapted to the Guinean context.

## 2. Methodology

### 2.1. Type and Framework of the Study

It is a quantitative analytical cross-sectional study conducted in the cardiology department of the Ignace Deen Hospital, Conakry.

## 2.2. Study Population

New patients referred to cardiology during the study period (6 months).

## 2.3. Inclusion Criteria

Patients officially referred to cardiology and having given their informed consent.

## 2.4. Exclusion Criteria

Patients not officially referred or refusing to participate.

## 2.5. Sampling

A consecutive sampling was used, including all newly referred patients. This method ensures a better representativeness of the observed cases.

The sample size was not calculated *a priori* because of the exploratory nature of the study. All patients meeting the inclusion criteria during the study period were consecutively recruited.

## 2.6. Variables Studied

The primary endpoint, referral delay, was defined as the time elapsed between the first consultation in a peripheral service and arrival at the cardiology department of CHU Ignace Deen. The level of knowledge was measured using a standardized score based on ten questions; the aggravation of health status was assessed by the presence of cardiovascular complications reported at admission; and institutional barriers were identified through the absence of referral protocols or qualified personnel.

Variable operationalization concerned patients, with dependent variables including distance to the medical center (km), patient income (GNF), waiting time after referral (days/hours), and satisfaction (Likert 1 - 5), while independent variables covered socio-economic factors (income, education), accessibility (km traveled), medical staff availability (staff/patient ratio), and referral protocol (yes/no).

After the bivariate analysis, all variables with a significance threshold less than or equal to 20% were automatically included in the multivariate analysis, with adjusted estimates presented alongside their 95% confidence intervals.

- **dependent variables:** reference delay, waiting time after reference, patient satisfaction.
- **independent variables:** socio-economic factors (income, level of education), accessibility to care (distance, transport), availability of medical staff, existence of reference protocols.

The home-to-hospital distance was categorized into  $\leq 10$  km and  $> 10$  km in order to assess the impact of geographical accessibility on referral delay. The 10 km threshold was chosen because distances beyond this limit are associated with transportation difficulties, travel costs, and traffic congestion in the urban context of Conakry.

The national average monthly income used as a reference corresponded to the minimum interprofessional guaranteed wage (SMIG), estimated at approximately 980,000 Guinean Francs (GNF) at the time of the study.

## 2.7. Data Collection

The data were collected using standardized questionnaires and semi-structured interviews with patients and healthcare staff.

## 2.8. Statistical Analysis

- **Descriptive analysis:** frequencies, percentages, means and standard deviations.
- **Bivariate analysis:** tests of Chi 2, Pearson correlation and ANOVA according to the nature of the variables.
- **Multivariate analysis:** logistic and linear regression to identify predictive factors of reference delay. A significance threshold of  $p < 0.05$  was chosen.

## 3. Results

### 3.1. Univariate Analysis

Socio-demographic and economic characteristics (**Table 1**).

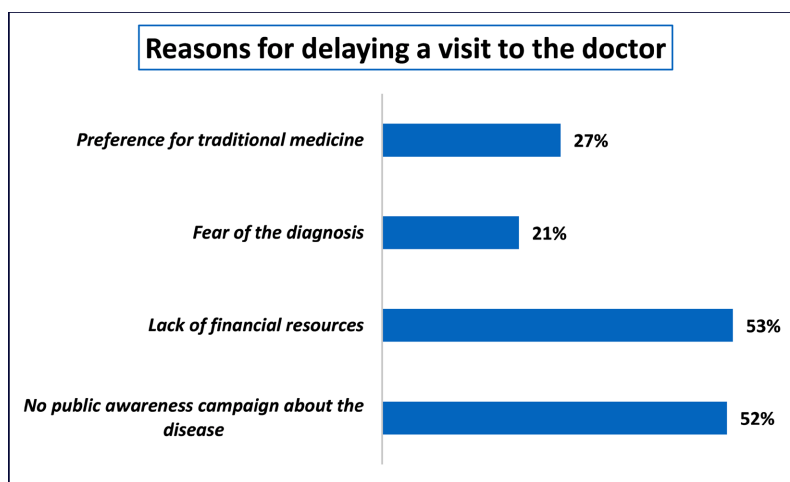
**Table 1.** Socio-demographic and economic situation of the patients.

| Variable                                      | Number     | Frequence% |
|-----------------------------------------------|------------|------------|
| <b>Gender</b>                                 |            |            |
| Female                                        | 58         | 52         |
| Male                                          | 53         | 48         |
| <b>marital situation</b>                      |            |            |
| single                                        | 13         | 12         |
| Divorced                                      | 3          | 3          |
| Married                                       | 69         | 62         |
| Widow/Widower                                 | 26         | 23         |
| <b>Educational level</b>                      |            |            |
| Unschoolled                                   | 39         | 35         |
| Elementary school                             | 22         | 20         |
| High school                                   | 28         | 25         |
| University                                    | 22         | 20         |
| <b>Estimated monthly income (980.000 GNF)</b> |            |            |
| < national average                            | 31         | 28         |
| > national average                            | 39         | 35         |
| national average                              | 41         | 37         |
| <b>Age group (years)</b>                      |            |            |
| 15 à 45                                       | 29         | 26         |
| 45 et plus                                    | 82         | 74         |
| <b>Total</b>                                  | <b>111</b> | <b>100</b> |

**Commentary:**

- Gender: The distribution is relatively balanced between the sexes, with a slight predominance of women (52.3% against 47.7% of men).
- Marital status: The majority of patients are married (62.2%), followed by widows/widowers (23.4%). Singles and divorcees represent a small proportion (11.7% and 2.7%).
- Level of education: More than a third of patients are out of school (35.1%), while the primary, secondary and university levels are fairly homogeneous (19.8%, 25.2% and 19.8%).
- Monthly income: The distribution is balanced: 27.9% have incomes below the national average, 36.9% equivalent, and 35.1% higher.
- Age range: Patients aged 45 and over are largely majority (74%), compared to 26% for the 15 - 45 years old.

Commentary: Each patient underwent an individual interview, including specific questions aimed at identifying the possible reasons for delayed consultation with a healthcare professional. Among the 111 patients interviewed, 59 (53%) reported lack of financial resources as the main reason for delaying consultation with healthcare personnel. In addition, 58 patients (52%) mentioned the absence of public awareness campaigns on cardiovascular diseases. Preference for traditional medicine and fear of the diagnosis were also identified as contributing factors, reported respectively by 30 patients (27%) and 23 patients (21%) (**Figure 1** & **Table 2**).



**Figure 1.** Reasons for delaying a visit to the doctor.

**Table 2.** Level of knowledge of patients on cardiovascular diseases.

| Variable          | number     | Frequence % |
|-------------------|------------|-------------|
| poor knowledge    | 25         | 23          |
| average knowledge | 62         | 56          |
| Good knowledge    | 24         | 22          |
| <b>Total</b>      | <b>111</b> | <b>100</b>  |

Commentary: 56% of the patients referred to the department have average knowledge about cardiovascular diseases.

### 3.2. Multivariate Analysis (Table 3)

**Table 3.** Multivariate analysis of associations between socio-economic, geographical and organizational factors.

| Factor                           | Modality                      | OR (95% CI)        | p-value |
|----------------------------------|-------------------------------|--------------------|---------|
| <b>Level of education</b>        | Unschooling                   | 2.10 (1.20 - 3.70) | 0.008   |
|                                  | Elementary school             | 1.60 (0.90 - 2.80) | 0.095   |
|                                  | High school                   | 1.20 (0.70 - 2.10) | 0.310   |
|                                  | Academic (ref.)               | 1.00               | —       |
| <b>Monthly income</b>            | Below national average        | 2.40 (1.30 - 4.50) | 0.006   |
|                                  | Equal to national average     | 1.50 (0.80 - 2.70) | 0.180   |
|                                  | Above national average (ref.) | 1.00               | —       |
| <b>Distance home–center</b>      | >10 km                        | 3.20 (1.80 - 5.60) | <0.001  |
|                                  | ≤10 km (ref.)                 | 1.00               | —       |
| <b>Presence of medical staff</b> | Insufficient                  | 2.70 (1.40 - 5.10) | 0.003   |
|                                  | Adequate (ref.)               | 1.00               | —       |

#### Comments and interpretation

- **Level of education:** Unschooled patients had a significantly higher risk of referral delay (OR = 2.10; 95% CI: 1.20 - 3.70;  $p = 0.008$ ). Elementary school level showed a borderline effect ( $p = 0.095$ ), while high school was not significant. This highlights the role of education in timely access to cardiology services.
- **Monthly income:** Patients with income below the national average were more likely to experience referral delays (OR = 2.40; 95% CI: 1.30 - 4.50;  $p = 0.006$ ). Those with average income showed a non-significant trend ( $p = 0.180$ ). Financial constraints remain a major barrier to specialized care.
- **Distance home–center:** Living more than 10 km from the hospital was strongly associated with referral delay and complications (OR = 3.20; 95% CI: 1.80 - 5.60;  $p < 0.001$ ). Geographical accessibility is therefore a critical determinant of patient outcomes.
- **Presence of medical staff:** Insufficient availability of medical personnel significantly increased the risk of worsening health status (OR = 2.70; 95% CI: 1.40 - 5.10;  $p = 0.003$ ). Adequate staffing appears protective against delays and complications.

## 4. Discussion

### 4.1. Socio-Demographic and Economic Profile of Patients

The study showed that the majority of patients referred to cardiology were over

45 years old (74%), confirming that cardiovascular diseases mainly affect older adults. This finding is consistent with WHO data which indicates that the prevalence of cardiovascular conditions increases with age [9]. Furthermore, more than one third of patients were out of school (35%), which reflects an increased vulnerability to awareness and understanding of cardiovascular risks. This weak instruction can limit the recognition of symptoms and delay the decision to consult, as shown by Gesase *et al.* [5]. Finally, nearly 28% of patients had incomes below the national average, which constitutes a major obstacle to access to specialized care. These results confirm that socio-economic factors play a determining role in the first delay.

#### 4.2. Reasons for the Delay in Consulting a Doctor

The main causes identified were lack of financial resources (53%) and insufficient awareness about cardiovascular diseases (52%). Fear of diagnosis (20%) and preference for traditional medicine (27%) also contributed to delayed consultation. These findings are consistent with those reported by Sory *et al.* [6], who emphasized that low awareness and cultural beliefs negatively influence medical decision-making. Similarly, Conboy *et al.* [7] showed that financial insecurity and limited access to healthcare services are major factors contributing to delays in seeking medical care in West Africa. Preference for traditional medicine reflects an important sociocultural dimension that should be considered in awareness and healthcare access strategies, as also recommended by Barry *et al.* [8]. Financial barriers therefore remain a major obstacle to early access to specialized healthcare services in low-resource settings.

#### 4.3. Level of Patient Knowledge

More than half of the patients had average knowledge of cardiovascular diseases (56%), but 23% had low knowledge. This lack of knowledge directly contributes to the delay in referral, as patients do not recognize symptoms or measure their severity. This observation is similar to that of [2] [3], which showed that health education is a key factor in the prevention and management of chronic diseases.

#### 4.4. Logistical and Institutional Factors

The multivariate analysis showed that unschooled patients had a significantly higher risk of referral delay (OR = 2.10; 95% CI: 1.20 - 3.70;  $p = 0.008$ ). Low income and living more than 10 km from the hospital were also strongly associated with delays and complications. Insufficient medical staff availability increased the risk of worsening health status (OR = 2.70; 95% CI: 1.40 - 5.10;  $p = 0.003$ ). These findings confirm that both socio-economic and organizational factors are critical determinants of timely cardiology referral.

#### 4.5. Consequences of Delay

Delays were statistically related to patients' income and distance from the hospital.

Cardiovascular complications were more frequent among patients living farther away. Although these associations are strong, the cross-sectional design does not allow causal inference, but highlights important patterns that warrant further investigation.

In addition, the absence of a priori sample size calculation represents another limitation of this study. The sample was based on the consecutive recruitment of all eligible patients over a six-month period, which may limit the statistical power and generalizability of the findings.

#### 4.6. Limitations of the Study

This study has several limitations that should be acknowledged. First, its monocentric design limits the generalizability of the findings to other contexts. The consecutive sampling method, although ensuring representativeness of observed cases, may introduce selection bias. The reasons for referral delay reported by patients relied on self-declarations, exposing the analysis to recall bias. In addition, the sample size was not formally calculated but was based on the inclusion of all eligible cases during the study period. Finally, the cross-sectional nature of the study does not allow causal inference between referral delay and worsening health status, but only statistical associations. These limitations should be considered when interpreting the results and highlight the need for multicentric and longitudinal studies to confirm these observations.

### 5. Conclusions

This study identified several factors associated with delayed referral of patients to the cardiology department at Ignace Deen Hospital. The results suggest that referral delay is multifactorial, involving socio-economic dimensions (low income, low level of education), cultural aspects (preference for traditional medicine, fear of diagnosis), logistical barriers (distance, cost and accessibility of transport), as well as institutional constraints (lack of specialized staff, absence of clear protocols).

Although the associations observed between referral delay and worsening health status are strong, the cross-sectional design of the study does not allow causal inference. These findings should therefore be interpreted with caution.

The analysis highlights the urgency of an integrated approach to reduce these delays:

- **Strengthen community awareness** to improve recognition of cardiovascular symptoms.
- **Reduce financial barriers** through solidarity and health insurance mechanisms.
- **Improve geographical accessibility** by decentralizing cardiology services and organizing mobile clinics.
- **Standardize referral protocols** and train peripheral health personnel.
- **Increase specialized human resources** to reduce overload and improve the quality of care.

In conclusion, referral delay in cardiology appears to be an important public

health concern in Guinea. Its reduction may require coordinated interventions combining health education, economic accessibility, institutional strengthening and organizational innovations. Despite its limitations, this study provides preliminary evidence that may help guide health policies and improve the management of cardiovascular diseases in Guinea and more broadly in sub-Saharan Africa.

## Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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