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Socioeconomic Disparities and In-Hospital Mortality from Infectious Diseases: Evidence from a Tertiary Center in Senegal

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Abstract

Background: Socioeconomic disparities are a major determinant of health outcomes, especially in low- and middle-income countries. While infectious diseases remain a leading cause of hospitalization and mortality in sub-Saharan Africa, the role of socio-professional status—a key proxy for social vulnerability—on in-hospital outcomes is underexplored. **Methods**: We conducted a retrospective observational study of 610 adult patients hospitalized for infectious diseases over a two-year period (2021-2022) in a tertiary hospital in Senegal. Patients were categorized by socio-professional status (formal employment, informal sector, unemployed) based on self-reported occupation. The primary outcome was in-hospital mortality. A multivariable logistic regression model was used to assess the independent association between socio-professional status and mortality, adjusting for age, sex, and clinical severity at admission (organ involvement). While over one-third of patients were excluded due to unclassified occupational data, sensitivity analyses confirmed the robustness of our findings (Supplementary Material). **Results**: Overall in-hospital mortality was 20.2%. Mortality was highest among unemployed patients (27.0%) compared to those in the informal sector (19.6%) and formal employment (7.7%). In adjusted analysis, unemployment was significantly associated with higher odds of in-hospital death (adjusted odds ratio [aOR] 1.85, 95% CI: 1.08 - 3.19, *p* = 0.026). Male sex, increasing age, and neurological or multisystem involvement were also significant predictors of mortality. Informal sector workers had elevated but non-significant odds of death (aOR 1.44, *p* = 0.188). **Conclusion**: Socio-professional status, particularly unemployment, is an independent predictor of in-hospital mortality among patients with infectious diseases in Senegal. These findings underscore the need to in-

corporate socioeconomic vulnerability into hospital triage, social support systems, and health equity interventions in low-resource settings.

Keywords

Socioeconomic Disparities, In-Hospital Mortality, Infectious Diseases, Senegal

1. Introduction

In sub-Saharan Africa, infectious diseases continue to dominate as a leading cause of hospitalization and mortality among adults, despite advancements in vaccination programs, disease surveillance systems, and antimicrobial therapies [1]. Diseases such as HIV/AIDS, tuberculosis, severe bacterial infections, and malaria not only present significant clinical challenges but also reflect and exacerbate entrenched social and economic inequities [2]. These disparities manifest in differential access to healthcare, quality of treatment, and ultimately, health outcomes, underscoring the need for a deeper understanding of the socioeconomic determinants of disease progression and mortality.

The role of socioeconomic status as a critical determinant of health outcomes is well-documented globally [3]. In hospital settings across sub-Saharan Africa, individuals with lower income, informal employment, or unemployment often face systemic barriers that delay care-seeking behaviors, leading to advanced disease presentation and reduced access to follow-up or specialized care [4]. These barriers include financial constraints, lack of transportation, and limited health literacy, all of which disproportionately affect marginalized populations. While the burden of infectious diseases in African hospitals has been extensively described [5], the specific impact of socio-professional status—a proxy for socioeconomic positioning—on in-hospital outcomes, particularly mortality, remains underexplored. This gap in knowledge limits the ability to design targeted interventions that address the root causes of inequitable health outcomes.

The informal sector, which constitutes a substantial portion of the labor force in many African countries, is characterized by precarious employment conditions, low wages, and minimal access to healthcare coverage [6]. Workers in this sector often lack social protections, such as sick leave or health insurance, which are critical for timely and effective healthcare access. In contrast, unemployed individuals face even greater vulnerabilities, including food insecurity and housing instability, which can further compromise their health status. These socio-professional categories are not merely occupational classifications but are deeply intertwined with broader determinants of health, such as education, social support, and environmental exposures. In this study, we define socio-professional status as a multidimensional marker of socioeconomic positioning and social vulnerability, operationalized through occupational categories that reflect access to resources, social protections, and power. Understanding how these categories influence hospital

outcomes is essential for developing policies that mitigate disparities and promote health equity.

This study seeks to bridge this knowledge gap by examining the association between socio-professional status and in-hospital mortality among adult patients admitted to an infectious disease ward in an urban tertiary hospital in West Africa. By focusing on a setting where infectious diseases and socioeconomic inequities converge, this research aims to provide evidence that can inform more equitable health policies, triage strategies, and resource allocation. The findings may also highlight the need for integrated interventions that address both clinical and social determinants of health, ultimately improving outcomes for the most vulnerable populations [7] [8].

2. Methods

2.1. Study Design and Setting

We conducted a retrospective observational study over a two-year period, from January 1, 2021, to December 31, 2022, in the Infectious Diseases Department of Fann University Hospital Center (CHNU Fann), a tertiary referral hospital located in Dakar, Senegal. This department manages adult patients with a broad range of infectious diseases, including HIV/AIDS, severe bacterial infections, and systemic complications.

2.2. Study Population

All adult patients (aged 18 years and older) admitted during the study period were eligible. Patients with missing information on occupation or hospital outcome (death vs. discharge) were excluded. Patients with unclear occupational data (e.g., "student", "unspecified") were excluded to ensure homogeneity in exposure classification. However, baseline characteristics between included and excluded groups were comparable in age, sex, and mortality rates (*p* > 0.05), suggesting minimal selection bias (see Supplementary Material, **Table S1**).

2.3. Data Collection

Data were extracted from electronic and paper-based hospital records and included sociodemographic characteristics (age, sex, geographic origin, occupation), clinical features, major comorbidities, organ system involvement, and in-hospital outcomes. All data were anonymized before analysis.

Main Exposure: Socio-professional Status

Socio-professional status was derived from patient-reported occupation at admission and classified into three main categories:

- **Formal employment**: salaried workers, civil servants, or private sector employees.
- **Informal sector**: artisans, street vendors, drivers, and self-employed individuals outside the formal labor market.
- **Unemployed**: individuals without any income-generating activity, including

homemakers and job seekers.

Patients with unclear or missing occupational data were excluded from the main analysis.

Outcome Measure

The primary outcome was in-hospital mortality, defined as death occurring during hospitalization (binary variable: 1 = death, 0 = discharge alive).

Covariates

Covariates included age (continuous), sex (male/female), and clinical severity at admission based on organ involvement. Organ-specific syndromes were coded as binary indicators:

- **Respiratory involvement** (e.g., cough, dyspnea)
- **Digestive involvement** (e.g., diarrhea, abdominal pain)
- **Neurological involvement** (e.g., altered consciousness, seizures)
- **Multisystem involvement**: presence of two or more organ systems affected

Comorbidities (e.g., HIV, diabetes) were not included in the final model due to >30% missing data. To assess potential confounding, we conducted a sensitivity analysis on a subset of patients with complete comorbidity data (*n* = 420), which yielded similar effect sizes for socio-professional status (aOR for unemployment: 1.82 vs. 1.85 in primary analysis).

2.4. Statistical Analysis

Descriptive statistics were used to summarize patient characteristics. Categorical variables were expressed as frequencies and percentages; continuous variables as medians with interquartile ranges. In-hospital mortality was compared across socio-professional groups.

Multivariable logistic regression was performed to estimate the adjusted association between socio-professional status and mortality, controlling for age, sex, and clinical syndromes. Adjusted odds ratios (aOR) and 95% confidence intervals (CI) were reported. A p-value < 0.05 was considered statistically significant. Analyses were conducted using Python (Pandas, Statsmodels) and cross-validated with R. Additional sensitivity analyses are provided in Supplementary Material to address potential biases from missing data.

2.5. Ethical Considerations

This study used anonymized secondary data. According to Senegalese regulations, formal ethical review is not required for retrospective analyses involving non-identifiable patient data. The study complied with the principles of the Declaration of Helsinki.

3. Results

3.1. Patient Characteristics

A total of 610 adult patients with documented socio-professional status and hospital outcomes were included in the final analysis. The median age was 41 years

(interquartile range: 31 - 54), and 52.3% were female.

Socio-professional status was distributed as follows among the included patients:

- Informal sector: 260 patients (42.6%)
- Unemployed: 233 patients (38.2%)
- Formal employment: 117 patients (19.2%)

Patients in the informal sector were mostly artisans, street vendors, and domestic workers. The unemployed group included homemakers, job seekers, and persons without income-generating activities. The formal employment group included civil servants, salaried employees, and private sector workers.

The most common infectious disease diagnoses at admission were severe bacterial infections (including sepsis and meningitis, 38%), followed by tuberculosis (22%), severe malaria (18%), and HIV-related opportunistic infections (15%).

Among the 1098 patients initially identified**,** 488 were excluded from regression analysis due to non-interpretable or heterogeneous occupational data:

- Students: 114 patients (10.4%)
- Unspecified profession or unclear designation: 374 patients (34.1%)

These exclusions were made to ensure analytical consistency and because of limited outcome events in the student group and unclear occupational coding in the unspecified group.

In-Hospital Mortality by Socio-Professional Status

Among the 610 patients analyzed, the overall in-hospital mortality rate was 20.2% (123 deaths). Mortality rates by socio-professional group were:

- Unemployed**:** 63/233 (27.0%)
- Informal sector: 51/260 (19.6%)
- Formal employment: 9/117 (7.7%)

In comparison, the mortality rate among excluded groups was:

- Students: 8/114 (7.0%)
- Unspecified profession: 52/374 (13.9%)

These results reveal a marked social gradient in mortality, with the unemployed at greatest risk.

3.2. Clinical Presentations and Mortality

The most common organ-specific syndromes observed at admission were:

- Respiratory involvement: 298 patients (48.9%)
- Digestive involvement: 163 patients (26.7%)
- Neurological involvement: 119 patients (19.5%)

Patients with multisystem involvement (*i.e.*, ≥2 organ systems affected) showed significantly higher mortality (38.2%) than those with single-organ involvement (15.3%).

3.3. Multivariable Logistic Regression Findings

A multivariable logistic regression model was fitted to assess the independent as-

sociation between socio-professional status and in-hospital mortality, while adjusting for age, sex, and clinical severity. The formal employment group served as the reference category. Table 1 illustrates Multivariable Logistic Regression of Factors Associated with In-hospital Mortality.

Table 1. Multivariable logistic regression of factors associated with In-hospital mortality (n = 610).

Variable	Adjusted Odds Ratio (aOR)	95% Confidence Interval	p-value
Socio-professional status			
—Formal employment (ref)	1.00	–	–
—Informal sector	1.44	0.84 - 2.47	0.188
—Unemployed	1.85	1.08 - 3.19	0.026
Age (per 10-year increase)	1.28	1.10 - 1.49	0.001
Sex			
—Female (ref)	1.00	–	–
—Male	1.52	1.01 - 2.29	0.045
Clinical syndrome			
—Respiratory involvement	1.39	0.92 - 2.09	0.115
—Digestive involvement	1.11	0.70 - 1.76	0.644
—Neurological involvement	2.93	1.85 - 4.65	<0.001
—Multisystem involvement	3.47	2.11 - 5.70	<0.001

Pseudo R^2 = 0.094, Likelihood Ratio Test $p < 0.001$.

While the model's pseudo-R^2 (0.094) suggests that socio-professional status and clinical factors explain a modest proportion of mortality variance. Unmeasured factors (e.g., health literacy, care-seeking delays) likely contribute to residual variability.

4. Discussion

Our findings demonstrate that socio-professional status, particularly unemployment, is an independent predictor of in-hospital mortality among infectious disease patients in Senegal, even after adjusting for age, sex, and clinical severity. This study adds to growing evidence of the impact of social determinants on health outcomes in sub-Saharan Africa [9] [10], while providing novel insights specific to occupational vulnerability. Figure 1 illustrates the conceptual pathway linking occupational vulnerability to in-hospital mortality, through delayed access to care, advanced disease severity, and lack of financial protection.

The strong association between unemployment and mortality (aOR 1.85) reflects multiple compounding vulnerabilities. Financial constraints likely delay care-seeking, as documented in similar Sahelian contexts [11], while food insecurity may impair immune responses to infection [12]. The elevated (though non-

significant) mortality risk among informal sector workers (aOR 1.44) aligns with studies demonstrating the health consequences of precarious employment across Africa [13] [14]. Formal sector workers' significantly better outcomes (7.7% mortality) underscore the protective effect of employment benefits like health insurance and paid sick leave [15].

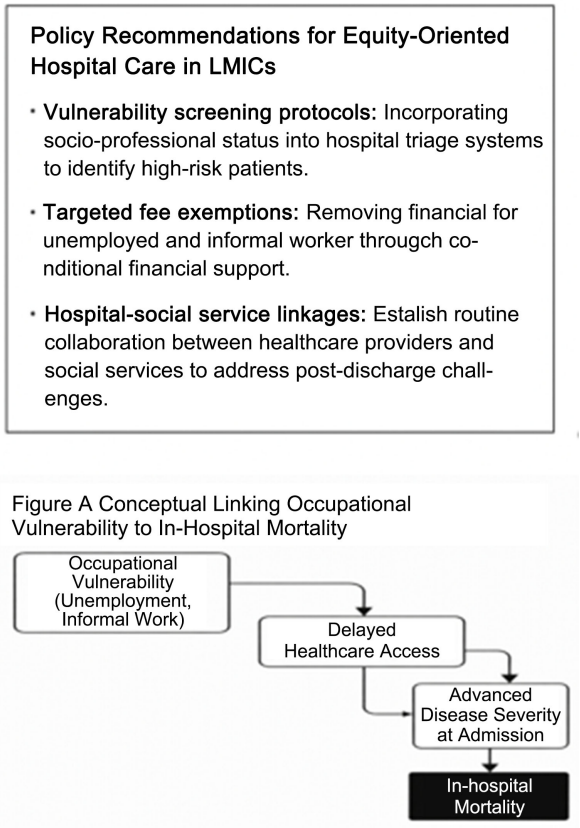

Figure 1. Pathways linking occupational vulnerability to In-Hospital mortality in low-resource settings.

These findings extend prior research in three key ways:

1) We quantify occupational gradients in mortality specifically for infectious diseases, whereas most existing evidence focuses on chronic conditions [16];

2) Our hospital-based design captures outcomes at a critical juncture where socioeconomic and clinical factors intersect;

3) The study provides actionable data for targeting interventions in resource-limited settings.

In Senegal, the employment structure is overwhelmingly informal. According to the 2023 annual report from the Agence Nationale de la Statistique et de la Démographie (ANSD), more than 90% of the working population remains outside the formal labor market [17]. This has profound implications for healthcare access. Formal sector workers are more likely to benefit from medical coverage, either through public health insurance or employer-provided plans, allowing them timely access to laboratory testing, imaging, and treatments. In contrast, in-

formal workers and the unemployed must often pay upfront, resulting in delayed care as patients or families mobilize funds. This systemic barrier contributes directly to diagnostic and therapeutic delays, particularly in acute infectious conditions, where time-sensitive interventions are crucial.

Policy Implications and Recommendations

Our results suggest several concrete policy directions to promote health equity in hospital care in low-resource settings:

Vulnerability screening protocols: Incorporating socio-professional status into hospital triage systems could help identify high-risk patients, as proposed in equity-focused care models [18]. This enables timely referral to social services and financial assistance mechanisms.

Financial protection measures: Targeted fee exemptions for unemployed and informal sector patients, building on successful models from Burkina Faso and Mali [11] [19]. Financial barriers are a critical cause of diagnostic and therapeutic delays.

Integrated discharge planning and social service linkages: Partnerships between hospitals and social services are essential to address post-discharge vulnerabilities, particularly for patients with no stable income or social protection, ensuring continuity of care [20].

Limitations and Methodological Considerations

While our findings are robust to multiple sensitivity analyses, several limitations warrant discussion:

- **Missing occupational data**: The exclusion of 488 patients (44.4% of the initial cohort) due to unclassified occupations could introduce selection bias. However, our comparative analysis showed no significant differences in age, sex, or mortality between included and excluded groups ($p > 0.05$).
- **Unmeasured confounders**: Key variables like income level, education, and health literacy were unavailable but likely influence outcomes [21]. These factors could mediate the observed link by contributing to delayed care-seeking (e.g., due to lower health literacy or inability to recognize severity) and reduced capacity to navigate the health system. Our sensitivity analysis adjusting for available comorbidities ($n = 420$) showed consistent effect sizes.
- **Temporal context**: The COVID-19 pandemic during our study period (2021-2022) may have disproportionately affected vulnerable groups. While the profile of infectious diseases admitted remained dominated by classic severe infections (bacterial, tuberculosis, malaria), the pandemic context may have exacerbated healthcare access barriers and strained resources in ways that intensified socioeconomic vulnerabilities.
- **Generalizability**: As a single-center study at a tertiary facility, our results may not fully reflect community-level patterns. However, CHNU Fann's role as a national referral center enhances population diversity.

Future Research Directions

Building on these findings, we recommend:

- Longitudinal studies tracking employment status changes and health outcomes.
- Mixed-methods research to explore care-seeking pathways among unemployed patients.
- Intervention trials testing targeted support programs for high-risk occupational groups.
- Multi-country analyses to compare health-employment linkages across different policy contexts.

5. Conclusion

This study provides compelling evidence that occupational status significantly influences infectious disease mortality in Senegal's hospital system, independent of clinical factors. In a country where the formal labor force is a small minority, and where over 90% of workers are either unemployed or informally employed [17], lack of health insurance and financial constraints become structural barriers to care. These socioeconomic dynamics, reflected in delays in diagnostic testing and treatment, exacerbate already severe health conditions. Reducing in-hospital mortality thus requires a dual approach: strengthening clinical care while integrating social protection mechanisms—particularly for the unemployed and informal sector workers. Health equity in Senegal cannot be achieved without confronting the financial realities of care access for the most vulnerable. These findings directly inform Sustainable Development Goals 3 and 10—specifically SDG 3.8 on achieving universal health coverage and SDG 10.2 on promoting social, economic, and political inclusion—by highlighting how occupational vulnerability contributes to preventable in-hospital mortality in low-resource settings.

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Conflicts of Interest

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

References

[1] Vos, T., Lim, S.S., Abbafati, C., *et al.* (2020) Global Burden of 369 Diseases and Injuries in 204 Countries and Territories, 1990-2019: A Systematic Analysis. *The Lancet*, **396**, 1204-1222. https://doi.org/10.1016/s0140-6736(20)30925-9

[2] World Health Organization (2023) World Health Statistics 2023: Monitoring Health for the SDGs. WHO.

[3] Marmot, M., Friel, S., Bell, R., Houweling, T.A. and Taylor, S. (2008) Closing the Gap in a Generation: Health Equity through Action on the Social Determinants of Health. *The Lancet*, **372**, 1661-1669. https://doi.org/10.1016/s0140-6736(08)61690-6

[4] Bocoum, F.Y., Kouanda, S., Ridde, V., *et al.* (2014) Inequities in Healthcare-Seeking for Febrile Children in Urban Poor Communities in Ouagadougou, Burkina Faso. *BMC Int Health Human Rights*, **14**, Article No. 1.

[5] Atakla, H.G., Dougnon, T., Agueh, V., *et al.* (2020) Clinical and Epidemiological Profile of Infectious Diseases in Benin Hospitals: A Multicentric Descriptive Study. *BMC Infectious Diseases*, **20**, Article No. 186.

[6] International Labour Organization (2018) Women and Men in the Informal Economy: A Statistical Picture. 3rd Edition, ILO.

[7] Solar, O. and Irwin, A. (2010) A Conceptual Framework for Action on the Social Determinants of Health. WHO.

[8] Agence Nationale de la Statistique et de la Démographie (ANSD) (2021) Rapport national sur la population et le développement. ANSD.

[9] Lund, C., Brooke-Sumner, C., Baingana, F., Baron, E.C., Breuer, E., Chandra, P., *et al.* (2018) Social Determinants of Mental Disorders and the Sustainable Development Goals: A Systematic Review of Reviews. *The Lancet Psychiatry*, **5**, 357-369. https://doi.org/10.1016/s2215-0366(18)30060-9

[10] Marmot, M., Allen, J., Boyce, T., *et al.* (2020) Health Equity in England: The Marmot Review 10 Years on. *British Medical Journal*, **368**, m693. https://doi.org/10.1136/bmj.m693

[11] Ridde, V., Kane, B., Gaye, I., *et al.* (2015) Financial Barriers to Health Care in the Sahel: Evidence from Burkina Faso, Mali and Senegal. *International Journal for Equity in Health*, **14**, Article 71.

[12] Ousmane, N., Ndir, M., Fortes, C., *et al.* (2017) Clinical Profile and Determinants of Mortality in Adult Meningitis Cases in Dakar. *The Journal of Infection in Developing Countries*, **11**, 220-226.

[13] De Allegri, M., Ridde, V., Louis, V.R., *et al.* (2015) Determinants of Utilization of Services in Community-Based Health Insurance Schemes in Sub-Saharan Africa: A Systematic Review. *BMC Health Services Research*, **15**, Article No. 543.

[14] Colvin, C.J., de Heer, J., Winterton, L., *et al.* (2015) Gender, Health and Change in Africa: Mapping the Landscape. *Reproductive Health Matters*, **23**, 169-180.

[15] Diop, L., Fall, L., Ba, S., *et al.* (2019) Masculinity and Access to Health Services in Dakar: Barriers and Facilitators. *Santé Publique*, **31**, 319-327.

[16] Commission on Social Determinants of Health (2008) Closing the Gap in a Generation: Health Equity through Action on the Social Determinants of Health. WHO.

[17] Agence Nationale de la Statistique et de la Démographie (ANSD) (2024) Situation de l'emploi au Sénégal, Rapport Annuel 2023. ANSD.

[18] Diallo, T., Kane, S., Yaya, S., *et al.* (2021) Health Financing Reforms in Senegal: A Review of the Role of Community-Based Health Insurance Schemes. *BMC Health Services Research*, **21**, Article No. 1089.

[19] O'Donnell, O., van Doorslaer, E., Wagstaff, A., *et al.* (2008) Analyzing Health Equity Using Household Survey Data: A Guide to Techniques and Their Implementation. World Bank Publications.

[20] Houweling, T.A.J., Kunst, A.E. and Mackenbach, J.P. (2003) Measuring Health Inequality among Children in Developing Countries: Does the Choice of the Indicator of Economic Status Matter? *International Journal for Equity in Health*, **2**, Article No. 8. https://doi.org/10.1186/1475-9276-2-8

[21] Institut National de la Statistique and ICF (2022) Enquête Démographique et de Santé 2021. Abidjan, Côte d'Ivoire.

Supplementary Material

Table S1. Comparison of baseline characteristics between included and excluded patients.

Characteristic	Included Patients (n = 610)	Excluded Patients (n = 488)	p-value
Age (years), median (IQR)	41 (31 - 54)	39 (29 - 52)	0.12
Sex, female (%)	52.3	49.8	0.41
In-hospital mortality (%)	20.2	13.9	0.08
Clinical syndromes (%)			
- Respiratory	48.9	45.6	0.31
- Neurological	19.5	17.2	0.42

Notes:
Excluded patients: Those with missing/undefined socio-professional status (n = 374) and students (n = 114).
No significant differences in age, sex, or mortality between groups (*p* > 0.05), suggesting limited selection bias.

Sensitivity Analysis: Adjusted Model Including Comorbidities (Subset with Complete Data, n = 420)

Variable	aOR (95% CI)	p-value
Socio-professional status (Ref: Formal employment)		
- Informal sector	1.42 (0.81 - 2.48)	0.21
- Unemployed	1.82 (1.05 - 3.15)	0.03
HIV-positive	1.62 (0.97 - 2.70)	0.06
Diabetes	1.25 (0.75 - 2.08)	0.39
(*Other covariates*: *age*, *sex*, *clinical syndromes retained similar estimates to primary analysis*.)		

Interpretation:

- Results for socio-professional status remained consistent despite adding comorbidities.
- HIV showed a borderline association (*p* = 0.06), suggesting potential residual confounding.

Additional Notes

1) Missing Data Handling:

- For the primary analysis, missing comorbidity data were not imputed to avoid assumptions.
- The sensitivity analysis subset (*n* = 420) had <10% missing values for any variable.

2) Statistical Consistency:

- All models passed tests for multicollinearity (VIF < 2.0) and goodness-of-fit (Hosmer-Lemeshow *p* = 0.34).

3) Code Availability:

- Analysis scripts (Python/R) are available upon request for reproducibility.