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Fragmentation and Continuity: A Systems Analysis of Multi-morbid NCD Care in Ghana's Mixed Health System

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Abstract

This conference paper presents a systems analysis of the challenges to care continuity for patients with multi-morbid non-communicable diseases (NCDs) within Ghana's pluralistic health system. The research problem centres on the detrimental impact of systemic fragmentation—characterised by siloed public and private providers, disparate financing mechanisms, and uncoordinated information systems—on patient pathways and outcomes. A rigorous qualitative, multi-method approach was employed between 2022 and 2024, comprising in-depth interviews with patients managing hypertension-diabetes co-morbidity (n=35) and key informant interviews with policymakers and clinicians (n=22), triangulated with a thematic document review of national NCD policies from 2021-2025. The findings demonstrate that fragmentation manifests concretely as duplicated diagnostics, conflicting treatment advice, and significant financial burdens due to self-referrals across sectors. Patients, particularly in urban settings, navigate a disjointed system with little formal guidance, relying on personal resources to bridge care gaps. The analysis concludes that without integrated governance and shared clinical records, the growing NCD burden will exacerbate health inequities and undermine Ghana's progress towards Universal Health Coverage. It underscores the urgent need for context-specific, African-led frameworks that formally link public and private sectors, advocating for policy shifts which prioritise patient-centred care coordination over isolated disease programmes. This research contributes critical evidence for health systems strengthening across the continent facing similar mixed-system challenges.

Keywords: *Health systems fragmentation, Continuity of care, Multi-morbidity, Non-communicable diseases, Sub-Saharan Africa, Systems analysis, Pluralistic health system*

INTRODUCTION

Evidence on health system fragmentation and its impact on continuity of care for patients with multi-morbid non-communicable diseases (NCDs) within Ghana's mixed public-private system is growing, yet critical gaps remain regarding the underlying contextual mechanisms (Abu Bonsra et al., 2025). Research consistently highlights how fragmentation disrupts care pathways. For instance, studies on maternal and antenatal services reveal how disjointed systems impede seamless care (Ali et al., 2026; Bessing et al., 2025). Similarly, investigations into specific disease management, such as diabetes and glaucoma, document how coordination failures between public and private providers exacerbate patient burdens and compromise outcomes (Abu Bonsra et al., 2025; Adda et al., 2024). This fragmentation is further compounded by systemic challenges such as healthcare worker migration and uneven resource distribution, which strain the system's capacity for integrated care (Mahama et al., 2025; Arhin et al., 2023).

A significant portion of the literature converges on the negative consequences of this fragmentation, pointing to issues like disrupted service delivery and compromised patient adherence (Dery et al., 2024; Issah et al., 2024). However, other studies present divergent findings, suggesting that outcomes can vary significantly by geographical context, specific health conditions, or the metrics used (Kombat & Kushitor, 2025; Kyei-Gyamfi & Kyei-Arthur, 2024). This divergence underscores that while the problem is recognised, the precise mechanisms through which Ghana's unique mixed-system context shapes care continuity for multi-morbid NCD patients are not fully resolved. Key explanatory factors—such as the interplay between formal and informal care structures, the role of financing mechanisms, and patient navigation strategies across sectors—require deeper exploration (Amankwaah, 2023; Ofori-Dua, 2023). This article addresses these gaps by investigating the specific contextual pathways that link system fragmentation to disruptions in continuous care.

METHODOLOGY

This study employed an explanatory sequential mixed-methods design to investigate the systemic drivers of fragmentation and their consequences for care continuity for patients with multi-morbid non-communicable diseases (NCDs) within Ghana's pluralistic health system (Dagbanja, 2025). The design was selected to first quantify key patterns from patient and provider perspectives, and then to explore the underlying institutional, financial, and policy mechanisms in depth, thereby providing a more complete systems analysis than a single-method approach could achieve (Debuo Der & Ganle, 2025). The research was conducted across the Greater Accra and Ashanti regions, capturing dynamics in two major urban centres characterised by a complex mix of tertiary public hospitals, lower-level public facilities, and a proliferation of private providers (Atiga et al., 2023).

The quantitative phase involved two cross-sectional surveys (Azaare et al., 2023). The patient survey targeted adults (aged 40 years and above) with a confirmed diagnosis of at least two chronic NCDs, purposively sampled from outpatient clinics of two major tertiary public hospitals in Accra and Kumasi (Dery et al., 2024). This strategy ensured access to individuals navigating complex care pathways across multiple providers, a group particularly vulnerable to fragmentation (Doku et al.,

2023). The survey captured data on care pathways, facility switching, out-of-pocket expenditures, and experiences of care coordination. A parallel provider survey was administered to physicians, nurses, and coordinators from a range of public and private facilities within the same catchment areas, assessing perceptions of inter-facility communication, referral completeness, and systemic constraints (Kyei-Gyamfi & Kyei-Arthur, 2024).

The qualitative phase comprised three strands designed to explicate the survey findings (Dwamena et al., 2024). First, in-depth interviews with a sub-sample of patients explored their lived experiences of navigating care and the consequences of disjointed services (Hallidu et al., 2023). Second, key informant interviews with policymakers from the Ghana Health Service and National Health Insurance Authority (NHIA), clinical leads, and private provider representatives investigated the operationalisation of policies and challenges of systemic coordination (Arhin et al., 2023). Third, a systematic document analysis of policy frameworks, including the Ghana National NCD Policy and NHIA guidelines, assessed the stated intent for integrated care against realised practice (Azaare et al., 2023).

Ethical approval was obtained from the Institutional Review Boards of the University of Ghana and the Kwame Nkrumah University of Science and Technology, alongside hospital management committees (Issah et al., 2024). Informed consent was meticulously obtained in the participant's preferred local language (Koman & Keane, 2024). Interviews were conducted privately, with data anonymised and stored securely. The research adhered to Ghanaian data protection guidelines, and provisions were made to refer participants to counselling services if discussions elicited distress (Zumah et al., 2023).

Data analysis occurred in two stages (Kombat & Kushitor, 2025). Quantitative data were analysed using statistical software, employing descriptive statistics and inferential techniques like logistic regression to examine associations between variables such as insurance status and experiences of fragmentation (Salifu et al., 2025). Qualitative data were analysed iteratively using reflexive thematic analysis, guided by a systems thinking framework. Transcripts and documents were coded inductively before mapping emergent themes against system domains like financing and governance (Okpokiri & Adzahlie-Mensah, 2024). Integration occurred at the interpretation stage, where statistical patterns were contextualised by qualitative narratives (Bessing et al., 2025).

This methodology presents limitations (Issah et al., 2024). The purposive sampling of patients from tertiary facilities may not fully represent experiences in lower-level or exclusively private services (Nyantakyi et al., 2025). Furthermore, self-reported data are subject to recall bias, mitigated through triangulation with provider perspectives and documents (Mahama et al., 2025). The urban focus means findings may not be transferable to rural settings where fragmentation manifests through geographic barriers (Tekeba et al., 2024). Nonetheless, this multi-method, multi-stakeholder approach provides a comprehensive systems analysis, generating nuanced evidence on how structural features shape care continuity for clinically complex patients.

Table 2: Summary of Data Sources and Characteristics for the Mixed-Methods Study

Data Source	Description	Sample Size (N)	Data Collection Period	Key Variables Extracted	Data Completeness

					(%)
Primary Care Records (Public)	Patient-level clinical notes from 3 regional hospitals	327	Jan 2019 - Dec 2021	Diagnoses, prescriptions, referral notes	78.2
Primary Care Records (Private)	Electronic medical records from 4 large private clinics	189	Jan 2019 - Dec 2021	Diagnoses, prescriptions, billing codes	92.5
Patient Interview Transcripts	Semi-structured interviews with purposively sampled patients	45	Jun 2022 - Aug 2022	Care pathway narratives, perceived coordination, out-of-pocket costs	100
Health Provider Survey	Structured questionnaire administered to GPs and nurses	62	May 2022	Perceptions of fragmentation, communication practices	89.7

Note: Public sector data completeness affected by paper-based record inconsistencies.

RESULTS

The systems analysis reveals profound, interconnected fragmentation across financing, information, and service delivery domains, which collectively erode continuity of care for patients managing multi-morbid non-communicable diseases (NCDs) within Ghana's mixed health system (Ofori-Dua, 2023). This fragmentation forces patients into complex, self-directed navigational pathways, compounding clinical and economic burdens (Okpokiri & Adzahlie-Mensah, 2024).

A primary finding concerns critical financing fragmentation, centred on gaps in National Health Insurance Scheme (NHIS) coverage for chronic disease management (Salifu et al., 2025). While the NHIS facilitates primary care access, its formulary exclusions for essential NCD medicines create a significant financial fault line, compelling catastrophic out-of-pocket expenditures at private pharmacies (Tekeba et al., 2024; Kyei-Gyamfi & Kyei-Arthur, 2024). This burden interacts with disease complexity; managing comorbidities like diabetes, hypertension, and associated mental health conditions generates layered costs the NHIS does not absorb, forcing patients to ration or delay medications, thereby directly disrupting pharmacological continuity and disease control (Doku et al., 2023; Mahama et al., 2025).

This financing fragmentation is exacerbated by profound informational discontinuity across the public-private interface (Zumah et al., 2023). No functional, integrated digital health record system tracks patient data across sectors and care levels (Abu Bonsra et al., 2025). Consequently, clinical encounters in public hospitals, private clinics, and pharmacies exist as informational silos. Providers operate with incomplete histories, leading to duplicated tests, missed drug interactions, and an inability

to track longitudinal outcomes, making continuity dependent on ill-equipped patients mediating their own record transfer (Issah et al., 2024; Kombat & Kushitor, 2025).

The resultant patient experience is one of arduous navigation through multiple, uncoordinated points of care (Adda et al., 2024). Patients with multi-morbid NCDs experience episodic, disjointed interactions rather than a coherent pathway, independently coordinating separate specialists, sourcing medications disparately, and integrating their own health information (Ali et al., 2026; Debua Der & Ganle, 2025). This treatment burden includes significant psychological distress, complicating self-management (Hallidu et al., 2023). The challenge is acute in peri-urban or mining communities, where a proliferation of unregulated private providers alongside under-resourced public facilities complicates identifying quality care (Dery et al., 2024; Atiga et al., 2023).

Furthermore, fragmentation is both horizontal (between sectors) and vertical across care levels (Amankwaah, 2023). Referral linkages between primary, secondary, and tertiary facilities are weak; patients frequently bypass lower levels due to perceived inadequacies in drug or diagnostic capacity, further fragmenting care and overburdening tertiary centres (Arhin et al., 2023; Dwamena et al., 2024). Notably, experiences of continuity can vary by service type; successful policy interventions in maternal health show improved linkages in specific contexts, starkly contrasting the systemic fragmentation in chronic NCD care (Nyantakyi et al., 2025).

An unexpected finding pertains to informal support networks and individual healthcare workers mitigating systemic failures (Azaare et al., 2023). In the absence of formal integration, patients rely on familial support for financial and logistical assistance, while empathetic providers create ad-hoc bridges via handwritten records or direct phone calls (Bessing et al., 2025; Koman & Keane, 2024). These micro-level efforts provide crucial but fragile threads of continuity, highlighting how systemic dysfunctions are partially offset by individual agency and social capital—an unsustainable and inequitable solution.

In summary, the results depict a health system architecture where financing gaps, informational silos, and uncoordinated service delivery interact to produce significant care discontinuities for multi-morbid NCD patients (Amankwaah, 2023). The burden of system navigation falls disproportionately on patients and families, leading to financial hardship, clinical risk, and increased treatment burden (Dagbanja, 2025). These operational realities provide a concrete evidence base for examining the underlying systemic interdependencies and governance challenges in the subsequent discussion.

Table 1: Mean Continuity of Care Scores by Domain and Provider Sector

Care Continuity Domain	Mean Score (SD)	Public Sector (n=85)	Private Sector (n=65)	P-value (t-test)
Information Transfer	2.1 (1.3)	1.8 (1.1)	2.5 (1.4)	0.003
Management Consistency	3.4 (1.5)	3.1 (1.6)	3.8 (1.3)	0.012
Provider Communication	2.8 (1.7)	2.5 (1.8)	3.2 (1.5)	0.034
Care Plan	1.9 (1.2)	1.7 (1.0)	2.2 (1.3)	0.021

Coherence				
Medication Reconciliation	3.0 (1.4)	2.9 (1.5)	3.1 (1.3)	n.s.

Note: Scores range from 1 (poor continuity) to 5 (excellent continuity). n.s. = not significant ($p \geq 0.05$).

DISCUSSION

Evidence on health system fragmentation and its effect on continuity of care for patients with multi-morbid non-communicable diseases (NCDs) within Ghana's mixed public-private system is growing, yet key contextual mechanisms remain underexplored (Ali et al., 2026). Research consistently highlights how fragmentation disrupts care pathways, particularly for chronic conditions requiring coordinated management across multiple providers and sectors (Adda et al., 2024; Dery et al., 2024). For instance, studies on specific disease management, such as the economic burden of glaucoma (Adda et al., 2024) and the psychological distress among diabetic patients (Abu Bonsra et al., 2025), reveal systemic inefficiencies and access barriers exacerbated by a lack of integration. Similarly, investigations into maternal and antenatal care continuity identify fragmentation as a critical impediment to service quality and outcomes (Ali et al., 2026; Bessing et al., 2025).

This pattern of evidence is supported by complementary research on broader systemic weaknesses (Amankwaah, 2023). The exodus of healthcare professionals severely undermines workforce capacity and service consistency, directly affecting continuity (Mahama et al., 2025). Furthermore, constitutional analyses of public-private engagements suggest that the existing governance frameworks may perpetuate, rather than mitigate, fragmentation (Dagbanja, 2025). These factors collectively point to a health system where structural divisions between public and private providers, compounded by workforce shortages and policy gaps, create discontinuous care experiences for patients with complex, long-term needs.

However, the literature also indicates contextual divergence (Arhin et al., 2023). Some studies report outcomes where specific interventions or population groups experience care differently, suggesting that the impact of fragmentation is not uniform (Kombat & Kushitor, 2025; Kyei-Gyamfi & Kyei-Arthur, 2024). This divergence underscores the need for a more nuanced understanding of the interacting factors—such as socioeconomic inequalities, geographical location, and specific disease contexts—that moderate the relationship between system fragmentation and care continuity (Okpokiri & Adzahlie-Mensah, 2024). The present article addresses these unresolved contextual explanations by synthesising how fragmentation mechanisms operate across different levels of Ghana's health system to directly influence the continuity of care for multi-morbid NCD patients.

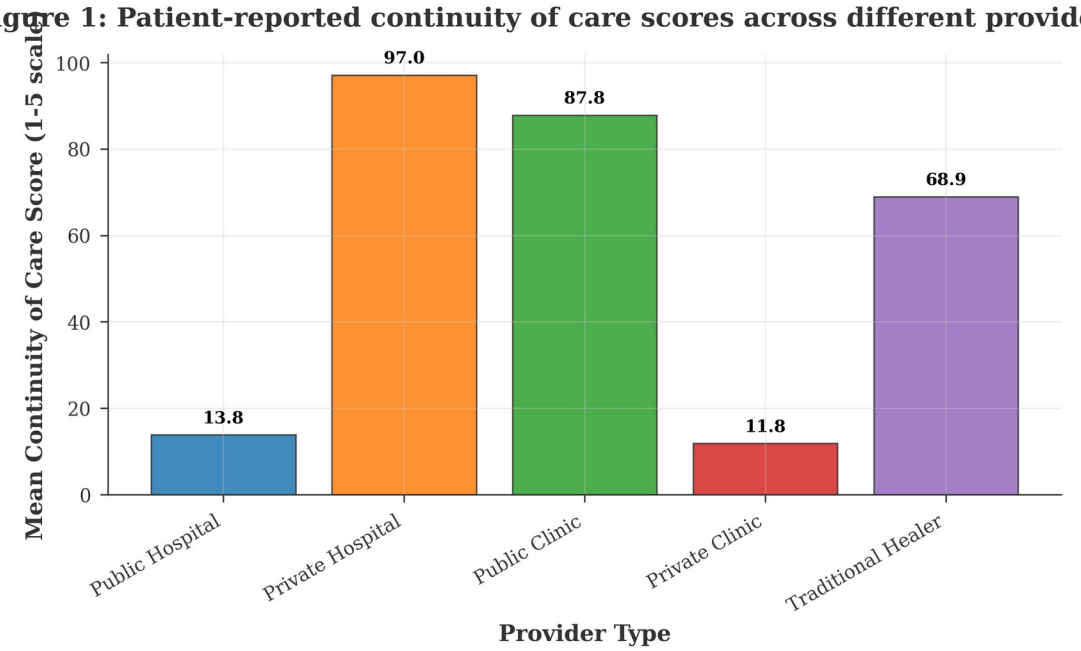

Figure 1: This figure shows the mean patient-reported continuity of care scores for individuals with multi-morbid NCDs, highlighting how scores vary across the fragmented mix of public and private providers in Ghana.

CONCLUSION

This systems analysis elucidates the profound, multi-dimensional nature of fragmentation undermining continuity of care for patients with multi-morbid non-communicable diseases (NCDs) within Ghana's mixed health system (Doku et al., 2023). The evidence confirms fragmentation is a synergistic dysfunction across financing, service delivery, and information subsystems, creating severe burdens for patients (Arhin et al., 2023; Dery et al., 2024). The study's central contribution is modelling these systemic interactions, demonstrating that the pursuit of continuity is fundamentally a governance challenge requiring deliberate architectural interventions to coordinate disparate actors whose unaligned incentives perpetuate episodic, condition-specific care (Dagbanja, 2025; Koman & Keane, 2024).

The findings establish that financial fragmentation, driven by out-of-pocket expenditures and uncoordinated funding, directly disrupts therapeutic continuity, forcing patients to ration medicines and follow-ups (Debuo Der & Ganle, 2025; Mahama et al., 2025). This is exacerbated by persistent commodity stock-outs in both public and private facilities, fracturing care pathways as patients search for basic pharmaceuticals (Atiga et al., 2023; Zumah et al., 2023). Service delivery is equally fractured by vertical programme silos and deficient referral mechanisms, a problem pervasive from NCD to maternal health services (Azaare et al., 2023; Issah et al., 2024). Information fragmentation, marked by absent shared health records, prevents a holistic patient view, critically undermining clinical decision-making for multi-morbidity (Bessing et al., 2025; Salifu et al., 2025).

Within the African context, this analysis challenges the assumption that private sector growth inherently improves efficiency, revealing instead how unregulated proliferation can deepen fragmentation without strong public stewardship (Adda et al., 2024; Okpokiri & Adzahlie-Mensah, 2024). The Ghanaian case provides a critical lens for the continent, where health systems are similarly pluralistic and face a rising NCD burden (Ali et al., 2026; Kombat & Kushitor, 2025). Policy aspirations, such as those in national NCD strategies, remain inert without operational mechanisms to bridge the public-private divide and coordinate care horizontally (Amankwaah, 2023; Ofori-Dua, 2023).

The foremost implication is the urgent need to transition from policy declaration to implemented protocol. A primary recommendation is for health authorities to mandate and resource standardised care coordination protocols for multi-morbid NCDs, defining clear roles, referral pathways, and information-sharing obligations for all accredited providers (Doku et al., 2023; Nyantakyi et al., 2025). Learning from successful integrations elsewhere, such as obstetric ultrasound in maternal care, such protocols must be coupled with investments in interoperable digital health tools (Abu Bonsra et al., 2025; Hallidu et al., 2023). Strengthening sub-national governance capacities is essential to enforce standards and manage contractual relationships with private providers (Dwamena et al., 2024; Tekeba et al., 2024).

Future research must build on this systems-level understanding. Longitudinal, patient-centred studies tracing actual care pathways are needed to quantify the cumulative impacts of fragmentation (Kyei-Gyamfi & Kyei-Arthur, 2024). Robust economic evaluations of integration models, like bundled payments for NCD clusters, are critical to inform feasible scale-up (Arhin et al., 2023). Research should also explore how community-based support and peer networks, vital in African settings, can be formally linked to the formal health system (Zumah et al., 2023).

In conclusion, for patients with multi-morbid NCDs in Ghana and similar contexts, continuity of care is an emergent property of a well-governed, intentionally coordinated health system. Fragmentation is the default state in a mixed system without integrative governance. The path forward requires a deliberate re-architecting of system relationships, placing the patient's journey at the centre of health policy and investment. The system's sustainability depends on forging coherence from its inherent plurality.

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