

Emergency Nursing Services, Continuity of Care, and Referral Completion Outcomes in Uganda

Sarah N. Namusoke, Daniel M. Kato

Department of Computer Science, Makerere University, Kampala, Uganda

ABSTRACT

Referral completion is a decisive junction in Ugandan emergency care, yet the causal pathways through which emergency nursing service continuity influences whether a referred patient actually reaches the receiving facility remain under-theorised. The framework proposes that service continuity is not a single exposure but a multidimensional mechanism comprising relational, informational and management continuity, and that its effects on referral completion are mediated by patient-level processes such as referral readiness, decisional clearance and handover documentation. Because patients are nested within facilities and because facility-level staffing and referral protocols shape the conditions under which continuity is created, the design specifies a two-level structural equation model with within- and between-facility components. The article sets out the required temporal ordering, measurement domains, centring decisions, identification assumptions and analytic strategy. The contribution is a causal architecture rather than an estimate: it specifies precisely what a future empirical study in Uganda would need to measure, model and defend.

Keywords: *emergency nursing, service continuity, referral completion, multilevel mediation, causal pathways, Uganda*

Referral completion as a clinical and organisational threshold

In Ugandan Emergency Practice A Referral Is Not An End

In Ugandan emergency practice, a referral is not an end point but a handover into a new system of care. The referring team's judgement that a patient needs a higher level of care is expressed in an ambulance request, a transfer letter or an instructional conversation, and what happens next is often beyond that team's direct control. This is why referral completion, defined as the patient's physical arrival and clinical acceptance at the receiving facility within the time window intended by the referring clinical team, is a meaningful quality indicator.

It combines the clinical decision to refer, the patient's capacity to act on that decision, and the receiving facility's capacity to accept the patient. In the language of emergency care systems, the referral is a point where continuity becomes a test of system performance rather than a matter of individual responsibility (Hirshon et al., 2013; World Health Organization, 2018). Emergency nursing occupies this threshold in a particular way.

The nurse who has performed triage, observed deterioration, communicated urgency, documented vital signs and prepared the handover is the person who has the most complete picture of the patient's emergency trajectory. If the handover to the receiving facility is incomplete, the patient may be re-triaged and experience

delay; if the instruction to the patient or family is unclear, the referral may simply be abandoned. A systematic review of emergency care in sub-Saharan Africa found that emergency conditions are common and that care is often constrained by transport and communication gaps (Chang et al., 2017).

In The Language Of Emergency Care Systems The Referral Is

In settings where formal prehospital systems are variable and where family members are central to transport and decision-making, these nursing tasks carry an unusual weight (Calvello et al., 2013; Hirshon et al., 2013). Yet the discipline has not usually treated nursing continuity as a causal pathway, with its own mediators and boundary conditions. The aim of the present analysis is not to add another correlation to the emergency nursing literature.

It is to propose a design that would allow the causal pathways between emergency nursing service continuity and referral completion to be examined in a disciplined way. The article therefore has three tasks: to define service continuity in emergency nursing terms, to specify a multilevel mediation architecture, and to expose the assumptions that would have to be defended in a Ugandan study. It is not an empirical report; no data were collected for the present analysis.

Rather, it is a methodological argument about what a study of referral completion in Uganda should be able to say.

Continuity as a mechanism rather than a courtesy

Haggerty Et Al

Haggerty et al. (2003) distinguish relational, informational and management continuity, and their taxonomy is useful for emergency nursing if it is tightened. Relational continuity in an emergency department is not long-term familiarity; it is the patient's experience of being held by a known clinical gaze during an acute episode.

Informational continuity is the transfer of meaning, not just data: the receiving clinician must understand not only what was done but what was feared. Management continuity is the organisational work of aligning referral protocols, routes, ambulances and receiving bed availability. In Uganda, all three dimensions can fail in the same referral: a nurse may know a patient well, write a referral letter and still have no way of ensuring that the receiving facility will accept the transfer.

A necessary innovation is to distinguish the exposure from its consequences. Emergency nursing service continuity is not the same as referral readiness, and misunderstanding occurs when studies measure one and infer the other. A patient can be fully informed and still not complete a referral because of transport cost or family disagreement.

Management Continuity Is The Organisational Work Of Aligning Referral Protocols

Conversely, a patient can complete a referral without having understood the clinical reason, especially when family members have not conveyed the urgency. The proposed design therefore treats service continuity as the upstream exposure and referral readiness, decisional clearance and handover documentation as parallel mediators. Service continuity also varies at a level above the individual patient.

A facility that has a dedicated emergency nursing team on a morning shift and a different agency nurse on a night shift produces a different continuity environment. A facility with a referral coordinator may have management continuity encoded in the system itself. The causal relationship between continuity and referral completion is thus itself multilevel: it arises in individual encounters, but its conditions are established at facility level.

The question is not whether continuity causes completion globally; it is which components of continuity matter for which patients, under which facility conditions.

A multilevel mediation design for referral completion

The Design Is Built Around A Two-Level Structure With The

The design is built around a two-level structure, with the patient encounter as Level 1 and the emergency clinical unit as Level 2. The Level 1 exposure C subscript ij is emergency nursing service continuity, measured after the decision to refer and before the patient leaves the index facility. The Level 1 mediators are M subscript $1ij$ (referral readiness: the patient or care-giver knows where to go, why, and within what time), M subscript $2ij$ (decisional clearance: the patient and family have agreed on a transport plan and have the resources to execute it) and M subscript $3ij$ (documented handover completion: the referral summary includes the clinical indication, vital signs, treatments and a point of contact). Level 2 variables include staffing ratios, shift stability, presence of a referral protocol and geographical or administrative distance to the receiving facility.

$$M_{1ij} = \alpha_{0j} + \alpha_1 C_{ij} + \alpha_2 W_{ij} + e_{1ij} \quad (1)$$

The Outcome Equation Expresses Referral Completion As A Function Of

The outcome equation expresses referral completion as a function of the direct exposure, each mediator and patient-level covariates, with a facility-level random intercept and additional facility-level predictors. Because both mediators and outcomes are measured within facilities, the design must separate within-facility and between-facility covariance. A conventional mediation test begins with Baron and Kenny (1986), but their causal steps procedure is no longer adequate for a design in which the mediator is measured with error and the cluster structure is meaningful (MacKinnon et al., 2007). A multilevel SEM can estimate latent

constructs, decompose covariation into within- and between-facility parts, and test indirect effects by bootstrapping (Preacher & Hayes, 2008; Preacher, Zyphur, & Zhang, 2010; Kline, 2016).

Identification, measurement and defensible inference

The Design Assumes That The Temporal Order Is Known The

The design assumes that the temporal order is known: the continuity exposure occurs before the mediators and the mediators before referral completion. In a real Ugandan study, this would require either a prospective enrolment of emergency patients at the point of referral or a structured chart review that can establish the sequence. The more dangerous assumption is that no unmeasured confounder affects both service continuity and referral completion.

At patient level, severity of illness is an obvious confounder; sicker patients may receive different nursing attention and may be more likely to complete a referral. The design therefore includes a case-mix variable derived from triage score and a measure of physiological instability. At facility level, referral volume and bed availability are confounders.

Because the exposure is not randomly assigned, causal language should be calibrated. A mediation design of this kind can distinguish between patterns that are consistent with a causal pathway and patterns that are not, but it cannot rule out omitted variables. In particular, the causal steps framework of Baron and Kenny (1986) can overstate the presence of a mediated effect when a confounded direct effect is present.

The Design Therefore Includes A Case-Mix Variable Derived From Triage

Current practice therefore estimates the product of coefficients directly and uses confidence intervals that do not require a normal sampling distribution (MacKinnon et al., 2007; Preacher & Hayes, 2008). This is a modest but important improvement: it changes the question from whether there is a significant step to what is the plausible range of a specific indirect pathway. Measurement should be treated as a research task in itself.

Service continuity has to be measured either by patient report at the point of referral or by observer assessment of the emergency nursing encounter. Patient-reported measures may capture perceived communication but not clinical accuracy; observer methods may capture documentation but not the patient's experience. The design requires both, and the two measures should be allowed to load on one latent construct only if the internal consistency supports their combination (Cronbach, 1951).

Construct validity in the Ugandan context cannot simply be assumed from tools developed elsewhere; translation, cultural relevance and the role of family decision-makers must be tested before the model is estimated (Kline, 2016).

Analytic strategy and model justification

Analytically The Design Has Three Phases

Analytically, the design has three phases. First, the measurement model would be tested at both levels, including factor loadings, reliability and measurement invariance across facilities. Second, unconditional random-intercept models would be estimated for each mediator and the outcome to establish whether significant between-facility variance exists.

Third, the mediated pathways would be estimated using random-intercept and random-slope models where the slopes of service continuity on mediators and referral completion are allowed to vary across facilities. The random-slope component is important because the mechanism may be stronger in facilities with a reliable referral protocol and weaker in facilities where transport is uncoordinated. Krull and MacKinnon (2001) provide a useful framework for tracing mediated effects in clustered data, but their two-step approach should be complemented by the latent-variable decomposition of Preacher, Zyphur, and Zhang (2010).

The Random-Slope Component Is Important Because The Mechanism May Be

Centring decisions are not neutral. Group-mean centring yields within-cluster effects, whereas grand-mean centring conflates within- and between-cluster effects (Enders & Tofighi, 2007; Raudenbush & Bryk, 2002). The proposed model therefore group-centres the patient-level exposure and mediators in the within-facility portion and includes facility means as separate between-level constructs.

The mediator and outcome equations should allow the residual terms of the mediators to correlate, because referral readiness, decisional clearance and documentation are conceptually related but distinct. No empirical application is attempted here; the equations are a design, not a result. The analytic plan is therefore prospective, and any future execution would need to report the model-fitting process, cluster-level variance components and indirect-effect estimates.

What the design can and cannot establish

A Multilevel Mediation Design Is Not A Substitute For Randomisation

A multilevel mediation design is not a substitute for randomisation. In the absence of an instrument or a natural experiment, any estimated effect of service continuity on referral completion could be biased by facility-level unobserved characteristics such as leadership quality, staff morale or management culture. The design can adjust for observed covariates and can separate within- and between-facility variation, but it cannot eliminate this residual cluster-level confounding.

The most honest claim that a future study could make is that the observed pattern of indirect pathways is compatible with the proposed mechanism and incompatible with at least one alternative explanation. Another limitation concerns the outcome. Completion is a binary event, and the timing of arrival may be censored if a patient arrives after the intended window.

Another Limitation Concerns The Outcome

The design would need a survival model for the outcome or a sensitivity analysis for the choice of time window. It would also need to distinguish between completion and clinical benefit; a patient can complete a referral and still suffer harm. The distinction is important for Ugandan emergency nursing, where the referral system is expected to do more than move patients; it is expected to preserve life and function (World Health Organization, 2018).

A conditional process model can be extended to test whether the strength of the mediated pathway depends on facility-level moderators such as distance, receiving capacity and referral communication (Hayes, 2013). This is not a peripheral extension; it is central to the Ugandan context. The effect of nursing continuity on referral completion may be small in a facility located one kilometre from the receiving hospital and large in a facility served by a long and uncertain ambulance route.

A design that estimates only a single global mediation effect would obscure exactly the heterogeneity that policy needs to understand.

Conclusion: the value of a causal architecture

Referral Completion Is An Outcome That Emergency Nursing Claims But

Referral completion is an outcome that emergency nursing claims but cannot guarantee. A study in Uganda should not rest on the assumption that referral completion is a transport issue or that service continuity is a courtesy. The manuscript has argued that service continuity should be modelled as a mechanism with at least three distinct sub-pathways, and that the appropriate analytic instrument is a multilevel structural equation model that respects the nesting of patients within facilities.

It Requires Us To Specify Which Type Of Continuity Matters

This design does not provide a shortcut to causal certainty, but it provides something rarer: a precise statement of what the causal question is. It requires us to specify which type of continuity matters, through which patient-level processes it operates, under which facility conditions, and by how much. In this sense, the method is also a theory of emergency nursing practice in Uganda.

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