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“We Just Don’t Take Delirium That Seriously”: A Mixed-Methods Behavioural Analysis of the Determinants and Outcomes of Delirium Recognition and Management among Hospitalized Older Adults in Ghana

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Abstract

Background

Delirium is highly prevalent among hospitalised older adults in sub-Saharan Africa, yet little is known about the determinants that influence its recognition and management by healthcare providers in low- and middle-income settings. We quantified delirium recognition, assessed its correlates and examined its association with mortality and length of stay among hospitalized older Ghanaians, and explored behavioural factors influencing delirium care by physicians in a Ghanaian tertiary hospital.

Methods

Using an explanatory sequential mixed-methods design, we reviewed hospital records of 260 adults aged ≥ 60 years with researcher-confirmed delirium using the Confusion Assessment Method (CAM). Delirium recognition was defined as chart documentation of “delirium” or altered mentation. Demographic, clinical and outcome (inpatient mortality and length of stay) variables were obtained from caregivers or abstracted from hospital records. Predictors of delirium recognition were evaluated correlations with multivariate logistic regression. Chi-square and Student’s T-tests examined the impact of delirium recognition on mortality and length of stay. We then conducted 13 semi-structured interviews with emergency and internal medicine physicians. Transcripts were analysed using the Capability, Opportunity, Motivation and Behaviour (COM-B) Model to characterize determinants of delirium diagnosis and management.

Results

Delirium was recognised in 88/260 (33.8%) adults but formally diagnosed in only one (< 0.4%). Recognition was not associated with decreased mortality or length of stay. Capability (e.g. limited delirium knowledge, clinical skill, and geriatrics exposure), Opportunity (e.g. overcrowding, time pressure, operational inefficiencies, lack of staff sensitization, screening tools and protocols), and Motivation (e.g. low perceived importance, misconceptions) barriers explained both low diagnosis rates and the absence of outcome differences.

Conclusion

Delirium care in this setting is constrained by behavioural barriers across the domains of capability, opportunity, and motivation. Delirium recognition did not improve outcomes as physicians lacked the skills, environmental support, and motivation required to act on it. Behaviourally informed interventions like brief delirium screening tools, workforce training, caregiver engagement, and delirium-friendly

workflows are needed to strengthen delirium detection and management to improve outcomes in resource-constrained settings.

Introduction

Delirium is an acute disturbance in attention and other domains of cognition due to a combination of individual vulnerability (e.g., advanced age, neurodegeneration, cognitive and sensory impairment) and precipitating factors (e.g., trauma, infection, electrolyte abnormalities).[1, 2] It is common among hospitalised older adults,[3] particularly in sub-Saharan Africa (SSA),[4–7] where it affects 20–52% of older adults on medical (non-surgical, non-ICU) units, compared to 19–29%[8] in the rest of the world. Delirium is also associated with worse patient outcomes, including prolonged hospitalisation, subsequent functional and cognitive decline, and increased 1-year mortality.[3, 9, 10]

There is no treatment for delirium, so prevention and early identification are critical to improving patient outcomes.[11, 12] Early identification allows health care providers to address causative factors and implement multicomponent non-pharmacological interventions, such as improving orientation, increasing nutrition/hydration, and implementing early mobilization[13, 14]. Unfortunately, despite its prevalence and known consequences, delirium is historically under-diagnosed and under-documented worldwide. A systematic review of 23 studies from high and upper-middle income countries, reported that 0.1–64.0% of researcher-ascertained cases of delirium were documented in hospital notes.[15] Data from low-income settings is scarce and only one study of delirium recognition has been reported among hospitalized older adults in sub-Saharan Africa.[16] In 2000, physicians in an Urban Teaching Hospital in Nigeria recognized only 10% of delirium cases among non-psychiatric wards patients aged ≥ 60 years.[16]

Available knowledge regarding the barriers to delirium diagnosis and management of delirium originates almost exclusively from high-income countries. A mixed-methods systematic review of these studies identified six barriers to delirium recognition among healthcare providers.[17] These include limited knowledge and understanding of delirium; poor communication between providers, hospital services, and with patients/families; lack of workforce training on delirium; lack of ‘ownership’ of delirium diagnosis and management; difficulty recognizing delirium in the presence of ‘confounders’ like dementia and sensory impairment; and organisational constraints like busy workloads and noise and space challenges.[17] While this systematic review included studies conducted in Europe, North America, and Asia, only two were conducted outside of high-income countries. The lack of data from low- and middle-income countries (LMICs), including sub-Saharan Africa, is particularly problematic. The burden of delirium is expected to grow significantly in these settings due to rapid population aging and data from high-income settings may not be applicable to countries like Ghana due to differences in health systems structures and sociocultural practices that likely impact delirium recognition and management.[18] Characterizing the barriers to delirium recognition and management in LMICs is essential prior to implementing multicomponent, pharmacologic and nonpharmacologic interventions that have been shown to prevent delirium and reduce hospitalization costs in high-income countries.[19]

Thus, the goal of this mixed-methods study was to quantify the proportion of patients with unidentified delirium admitted at one Ghanian tertiary care hospital, identify the correlates of delirium recognition and evaluate the impact of delirium recognition on inpatient mortality and length of hospital stay. We then examined determinants of delirium diagnosis and management using the capability, opportunity, motivation and behaviour (COM-B) framework via qualitative interviews with physicians providing care on these services.[20]

Methods

Mixed Methods Study Design

This study was nested in the KATH-DEL study, conducted between October 2020 and August 2021, which characterized the prevalence, incidence, risk factors, and outcomes of delirium among 483 hospitalized patients aged ≥ 60 years admitted to the medical service at Komfo Anokye Teaching Hospital (KATH) in Kumasi, Ghana.[7] Delirium was assessed using the Confusion Assessment Method, which defines delirium as: (1) the presence of acute and fluctuating change in mental state, (2) inattention; and (3) either disorganized thinking or altered level of consciousness.[21] If present, delirium was defined as prevalent delirium (present within 24 hours of admission) or incident delirium (not present on admission but detected during serial twice-weekly assessments).[21] For the present study, we used an explanatory sequential mixed-methods approach. We first performed a chart review of the electronic medical records of KATH-DEL patients with delirium to determine the proportion of cases recognized. To obtain a deeper contextual understanding of the factors that contributed to delirium recognition and its outcomes, we then conducted semi-structured key informant interviews with physicians providing care on these inpatient services to characterize their perspectives on the determinants of delirium diagnosis and care, their delirium training experiences, attitudes, and care practices. Quantitative and qualitative findings were then integrated to inform conclusions about delirium recognition and management patterns to inform future interventions to improve patient outcomes.

Quantitative Methods

For all KATH-DEL study patients with delirium, demographic data, including age, sex, occupation, marital status, religion, ethnicity, and education were collected from caregivers during the primary study. Additional clinical data, including diagnoses, use of restraints, illness acuity (Triage Early Warning Score, TEWS: scoring 0–17)[22] and comorbidity burden (updated Charlson comorbidity index, uCCI: scoring 0–24),[23, 24] as well as mortality and length of stay were abstracted from hospital records. We then performed a review of admission and discharge notes from which we abstracted whether physicians recognized delirium either on patient admission or by discharge by looking for an explicit mention of ‘delirium’, or terms that indicated altered mentation, level of consciousness or awareness, such as ‘altered mental state’, 'acute confusional state’ or ‘encephalopathy'. Ethical approval for chart abstraction was obtained from the Komfo Anokye Teaching Hospital Institutional Review Board (KATH/IRB

AP/122/20), and informed consent was obtained from participants and/or their caregivers, as appropriate.

Quantitative Analysis

Descriptive statistics are presented as mean (standard deviation) or median (interquartile range) for continuous variables and frequency (%) for categorical variables. Bivariate analyses was conducted to assess predictors of delirium recognition and patient outcomes (i.e. length of stay and mortality) using Student's t-test or Wilcoxon rank-sum tests for continuous variables, and Chi-squared or Fisher's exact tests for categorical variables, as appropriate. Data was analysed using R Statistical Software (version 4.4.3) and a p-value of < 0.05 was considered statistically significant.[25]

To identify independent predictors of delirium recognition, we constructed a multivariable logistic regression model. We selected variables using a hierarchical approach, prioritising clinical relevance and then adding variables that met statistical significance at the 95% confidence level. We evaluated multicollinearity using Variance Inflation Factors and retained clinically or statistically superior variables in cases of high intercorrelation to ensure model parsimony. The final model was validated for discriminative ability using the Area Under the Receiver Operating Characteristic (AUROC) curve. The results are presented as odds ratios (OR) with 95% confidence intervals (95% CI) with p-values and false-discovery rate-adjusted q-values to account for multiple testing across predictors.

Qualitative Methods

We then conducted key informant interviews with emergency and internal medicine physicians. These physicians were purposefully selected based their history of providing clinical care on the hospital services from which the KATH-DEL patients were recruited with efforts to diversify the sample by sex, department, and training level (resident, senior resident/specialist and consultant/senior specialist).

Data Collection and Management

Between February and April 2025, two investigators trained in psychiatry (JPO and KKM), conducted semi-structured interviews using a case-based interview guide (supplementary file), which was designed for this project by a psychiatrist (JPO) and a US board-certified neurologist with clinical experience in SSA (ME). Physicians were given a hypothetical case of an older male patient presenting with acutely altered mental state in the setting of malaria parasites on blood film microscopy. Physicians were asked to describe their clinical approach to the case based on their real-world experiences and to offer their clinical impressions, as they would document in a medical chart. They were then asked to offer their reflections on findings from the KATH-DEL parent study, which found a 52% delirium prevalence with elevated mortality and prolonged length of stay.[7] Probes included perceived barriers/challenges and enablers to delirium recognition. Interviews concluded with the physicians' recommendations for improving of delirium diagnosis and management. Finally, they completed a short survey to ascertain

their demographics, clinical training/experiences, and attitudes and experiences regarding delirium care for hospitalized older adults.

All interviews were conducted in English, recorded with a voice recorder and transcribed into text in a Word document using *Rev*, an automated transcription service.[26] Transcripts were reviewed by at least one physician for accuracy and clarifications were obtained from the interviewers as needed. Structured survey results were summarized and described using frequencies (%). Ethical approval for these interviews was provided by Komfo Anokye Teaching Hospital Institutional Review Board (KATH/IRB/AO/091/24) and all physicians provided written, informed consent for participation.

Qualitative analysis

Qualitative data was analysed using directed qualitative content analysis as described by Assarroudi et al. (2018).[27] This approach guided initial deductive analysis with the capability, opportunity, and motivation behaviour (COM-B) framework [20] and permitted inductive extension, when necessary. Each interview transcript constituted a unit of analysis, and both manifest and latent content were considered during coding. We developed a categorisation matrix with delirium 'diagnosis' and 'management' as the main categories, and 'capability', 'opportunity' and 'motivation' as themes under each category. Physician recommendations for improving delirium diagnosis and care are also presented within the COM-B framework. Two coders (JPO & LN) independently and repeatedly read transcripts to achieve familiarity with the data, documenting preliminary reflections and assumptions in reflexive memos. They subsequently reviewed and refined codes by constant comparison,[28] and resolved discrepancies via consensus.

We performed quantitative content analysis of physicians' clinical impressions of the case study, which were categorised a priori into 'formal diagnosis' (of delirium), 'recognition' (using other terms like 'altered mental state'), and 'delirium ignored'. These additional quantitative strands, along with survey items which are described using frequencies (proportions), supported triangulation of qualitative interview findings. Meaningful member checking[25] with senior physicians at the emergency and internal medicine departments of the study site was then used to establish the validity of the study findings.[29]

Mixed-Methods Integration

Integration occurred at three levels: qualitative study design, analysis, and interpretation. In the study design, quantitative results (recognition rates and outcome associations) informed the development of the qualitative interview guide. At the analysis level, integration was achieved through joint displays and narrative weaving, linking quantitatively observed rates, outcome associations and survey results to qualitatively reported attitudes, behaviours and experiences. At the interpretive level, meta-inferences were developed to summarize the relationship between the quantitative and qualitative strands. The study is reported in accordance with the Good Reporting of a Mixed Methods Study (GRAMMS) guidelines[30].

Results

Quantitative Findings

Participants' Characteristics and Predictors of Delirium Recognition

Of the KATH-DEL patients with delirium, most (247/260, 95.0%, Table 1) were admitted through the Accident and Emergency Unit with delirium present at the time of presentation (250, 96.1%). Patients were most likely to be female (154, 60.0%), widowed (112, 45.0%), and to have no more than primary education (157, 64.0%). A few patients were physically restrained (11, 4.4%) at the time of enrolment. Most had significant comorbidities (175, 68%) as indicated by a uCCI score ≥ 2. The median triage category was orange (TEWS = 5, Interquartile range: 3–6), indicating 'very urgent care'. This category lies between red (emergency/immediate) and yellow (urgent).

Table 1
Characteristics of Study Participants

VARIABLE	N	Overall	DELIRIUM RECOGNIZED		p-value*
		N = 260[a]	No	Yes	
			N = 172[a]	N = 88[a]	
ROUTE OF ADMISSION	260				0.23
A and E		247 (95%)	161 (94%)	86 (98%)	
OPD		13 (5.0%)	11 (6.4%)	2 (2.3%)	
AGE IN YEARS	260				0.025
Mean (SD)		74 (10)	75 (10)	72 (10)	
Median (Q1, Q3)		73 (66, 82)	74 (67, 83)	71 (64, 80)	
Min, Max		60, 98	60, 98	60, 97	
SEX	260				0.16
Male		104 (40%)	74 (43%)	30 (34%)	
Female		156 (60%)	98 (57%)	58 (66%)	
EDUCATION	247				0.17
None		113 (46%)	81 (49%)	32 (40%)	
Any		134 (54%)	85 (51%)	49 (60%)	
Missing Data		13	6	7	
MARITAL STATUS	247				0.24
Not Married		155 (63%)	100 (60%)	55 (68%)	
Married		92 (37%)	66 (40%)	26 (32%)	
Missing Data		13	6	7	
LIVING ALONE	257				0.15
No		243 (95%)	160 (93%)	83 (98%)	
Yes		14 (5.4%)	12 (7.0%)	2 (2.4%)	
Missing Data		3	0	3	
RESTRAINTS AT ENROLLMENT	252				0.51

* Fisher's exact test; Wilcoxon rank sum test; Pearson's Chi-squared test; NA

VARIABLE	N	Overall	DELIRIUM RECOGNIZED		p-value*
		N = 260[a]	No	Yes	
			N = 172[a]	N = 88[a]	
No		241 (96%)	162 (96%)	79 (94%)	
Yes		11 (4.4%)	6 (3.6%)	5 (6.0%)	
Missing Data		8	4	4	
REASONS FOR ADMISSION					
Cerebrovascular accident	260				0.19
No		182 (70%)	125 (73%)	57 (65%)	
Yes		78 (30%)	47 (27%)	31 (35%)	
Diabetes	260				0.93
No		209 (80%)	138 (80%)	71 (81%)	
Yes		51 (20%)	34 (20%)	17 (19%)	
Neurological (non-stroke)	259				0.012
No		232 (90%)	159 (93%)	73 (83%)	
Yes		27 (10%)	12 (7.0%)	15 (17%)	
Missing Data		1	1	0	
Respiratory	260				0.87
No		220 (85%)	146 (85%)	74 (84%)	
Yes		40 (15%)	26 (15%)	14 (16%)	
Infection	260				0.13
No		141 (54%)	99 (58%)	42 (48%)	
Yes		119 (46%)	73 (42%)	46 (52%)	
Reno-urological	259				0.60
No		180 (69%)	117 (68%)	63 (72%)	
Yes		79 (31%)	54 (32%)	25 (28%)	
Missing Data		1	1	0	
Malignancy	260				0.16

* Fisher's exact test; Wilcoxon rank sum test; Pearson's Chi-squared test; NA

VARIABLE	N	Overall	DELIRIUM RECOGNIZED		p-value*
		N = 260[a]	No	Yes	
			N = 172[a]	N = 88[a]	
No		239 (92%)	161 (94%)	78 (89%)	
Yes		21 (8.1%)	11 (6.4%)	10 (11%)	
Hepatobiliary	259				0.045
No		241 (93%)	163 (95%)	78 (89%)	
Yes		18 (6.9%)	8 (4.7%)	10 (11%)	
Missing Data		1	1	0	
Cardiovascular	260				0.66
No		176 (68%)	118 (69%)	58 (66%)	
Yes		84 (32%)	54 (31%)	30 (34%)	
Gastrointestinal (Non-Hepatobiliary)	259				0.44
No		230 (89%)	150 (88%)	80 (91%)	
Yes		29 (11%)	21 (12%)	8 (9.1%)	
Missing Data		1	1	0	
Other	260				0.009
No		194 (75%)	137 (80%)	57 (65%)	
Yes		66 (25%)	35 (20%)	31 (35%)	
Triage Early Warning Score	256				< 0.001
Median (Q1, Q3)		5.00 (3.00, 6.00)	4.00 (3.00, 5.00)	5.00 (4.00, 6.00)	
Min, Max		0.00, 9.00	0.00, 9.00	1.00, 9.00	
Missing Data		4	2	2	
Updated Charlson Comorbidity Index	258				0.027
Median (Q1, Q3)		2.00 (0.00, 2.00)	2.00 (0.00, 2.00)	2.00 (0.00, 3.00)	

* Fisher's exact test; Wilcoxon rank sum test; Pearson's Chi-squared test; NA

VARIABLE	N	Overall	DELIRIUM RECOGNIZED		p-value*
		N = 260[a]	No	Yes	
			N = 172[a]	N = 88[a]	
Min, Max		0.00, 10.00	0.00, 6.00	0.00, 10.00	
Missing Data		2	2	0	
DISCHARGE STATUS	260				0.18
Discharged		210 (81%)	143 (83%)	67 (76%)	
Mortality		50 (19%)	29 (17%)	21 (24%)	
DURATION OF ADMISSION IN DAYS	260				0.86
Mean (SD)		7.8 (6.5)	7.7 (6.1)	7.9 (7.2)	
Median (Q1, Q3)		6.1 (3.8, 9.4)	6.3 (3.8, 9.3)	6.0 (3.4, 10.0)	
Min, Max		0.7, 53.7	0.7, 38.8	0.9, 53.7	
DELIRIUM ONSET	260				0.17
Prevalent Delirium		250 (96%)	163 (95%)	87 (99%)	
Incident Delirium		10 (3.8%)	9 (5.2%)	1 (1.1%)	

[a] Median (IQR) or Frequency (%)

* Fisher's exact test; Wilcoxon rank sum test; Pearson's Chi-squared test; NA

On multivariate analysis with false discovery rate correction for multiple testing (**Supplementary Table 1**), only triage score (TEWS OR = 1.39; 95% CI[1.19–1.65]) and burden of comorbidities (uCCI OR = 1.25; 95% CI[1.07–1.46]) were significantly associated with delirium recognition.

Prevalence of Delirium Recognition and Association with Patient Outcomes

Eighty-eight (33.8%) out of the 260 patients had delirium recognised by their health care team. Among these, only one (< 0.1%) was formally diagnosed. Mortality (Table 1) was 24% (21/88) among recognised and 17% (29/143) among unrecognized cases but this difference was not statistically significant (p = 0.182). Similarly, the median lengths of hospital stay (Table 1) of 6.3 (interquartile range= [3.8–9.3]) days in recognized and 6.0 (interquartile range= [3.5–9.9]) days in unrecognized cases did not differ significantly (p-value = 0.86). The relationships between recognition and mortality (OR = 1.14; 95% CI[0.57–2.32]) and length of stay (Coef= -395; 95% CI[-2.179–1.388]) outcomes remained insignificant even after adjusting for triage score and burden of comorbidities.

Qualitative Findings

Physician Characteristics and Delerium Recognition

Six (46%) emergency medicine and 7 (54%) internal medicine physicians were interviewed, comprising 4 (31%) senior specialists, 3 (23%) specialists/senior residents and 6 (46%) residents, of whom 5 (38%) were female (Table 2). Most had some exposure to delirium instruction in medical school (46%) or during post-graduate training (77%), but none used delirium screening/diagnostic tools in their routine clinical practice. Though there was universal acceptance of the importance of delirium screening among older adults, confidence in their ability to manage delirium was low (46%).

Table 2
Physician' Survey and Diagnostic Practice (Based on Case Study)

Variable	N (%)		
	EMP (n = 6)	IMP (n = 7)	Total (N = 13)
Physicians' Characteristics and Case Study Diagnoses			
Sex			
Female	3 (50)	2 (29)	5 (37)
Male	3 (50)	5 (71)	8 (63)
Grade			
Senior Specialist/Consultant	2 (33)	2 (29)	4 (31)
Specialist/ Senior Resident	1 (17)	2 (29)	3 (23)
Resident	3 (50)	3 (43)	6 (46)
Case Study Diagnoses			
Formal Diagnosis	2 (33)	2 (28)	4 (31)
Recognized	3 (50)	1 (14)	4 (31)
Ignored	1 (17)	4 (58)	5 (38)
Delirium Training, Attitudes and Practice			
Delirium instruction in medical school			
Yes	3 (50)	3 (43)	6 (46)
No	1 (17)	2 (29)	3 (23)
Maybe	2 (33)	2 (29)	4 (31)
Delirium instruction after medical school			
Yes	4 (66)	6 (86)	10 (77)
No	1 (17)	0 (0)	1 (8)
Maybe	1 (17)	1 (14)	2(15)
Confidence in ability to diagnose delirium			
Yes	4 (66)	4 (58)	8 (62)
No	2 (33)	1 (14)	3 (23)
Maybe	0 (0)	2 (29)	2(15)

Variable	N (%)		
	EMP (n = 6)	IMP (n = 7)	Total (N = 13)
Physicians' Characteristics and Case Study Diagnoses			
Can name 1 delirium screening tool			
Yes	1 (17)	1 (14)	2(15)
No	5 (83)	6 (86)	11 (85)
Maybe	0 (0)	0 (0)	0 (0)
Uses a delirium screening tool			
Yes	0 (0)	0 (0)	0
No	6 (100)	7 (100)	13 (100)
Maybe	0 (0)	0 (0)	0 (0)
"Important to routinely screen for delirium"			
Yes	6 (100)	7 (100)	13 (100)
No	0 (0)	0 (0)	0 (0)
Maybe	0 (0)	0 (0)	0 (0)
" a 90 second screen is feasible for routine screening"			
Yes	6 (100)	6 (86)	12 (92)
No	0 (0)	0 (0)	0 (0)
Maybe	0 (0)	1 (14)	1 (8)
Confident in ability to manage delirium			
Yes	2 (33)	5 (71)	7 (54)
No	3 (50)	1 (14)	4 (31)
Maybe	1 (17)	1 (14)	2(15)
Confident in knowledge of potentially inappropriate drugs for delirium			
Yes	1 (17)	1 (14)	2(15)
No	5 (83)	3 (43)	8 (62)
Maybe	0 (0)	3 (43)	3 (23)
Use physical restraints			

Variable	N (%)		
	EMP (n = 6)	IMP (n = 7)	Total (N = 13)
Physicians' Characteristics and Case Study Diagnoses			
Yes	4 (66)	6 (86)	10 (77)
No	2 (33)	1 (14)	3 (23)
Maybe	0 (0)	0 (0)	0 (0)

In the case study, delirium was ignored by 5/13 (38%) physicians (4 internal medicine physicians, 1 emergency physician) in their clinical impression. It was explicitly named or referred to as “altered mental status” by 4/13 (31%).

Delirium Diagnosis

Capability

Physicians described limited delirium knowledge as a barrier to diagnosis. Specifically, they reported little understanding of the diagnostic criteria for delirium or its diverse clinical presentations. Several reported that delirium was only considered when patients were “hyperactive.” Patients with hypoactive presentation of delirium were overlooked or their symptoms were attributed solely to underlying medical conditions such as sepsis or stroke. As one senior specialist explained:

“They [physicians] may recognize that there's some confusion, but maybe they don't even know what the right medical term is… probably they don't recognize it as a diagnosis that can be picked up and made.” Internal Medicine Senior Specialist, Male

Diagnostic capability was further constrained by difficulty distinguishing delirium from conditions with shared symptoms, such as dementia and psychosis. Physicians were largely focused on making the best unifying diagnosis and were often conflicted about diagnosing delirium in the presence of disorders which include delirium features in their diagnostic criteria, such as confusion in the setting of uremic encephalopathy. This highlighted respondents’ unfamiliarity with delirium diagnostic criteria as well as best practices, which recommend diagnosing delirium as well as its underlying contributors.[31] An internal medicine resident noted:

“If someone comes in and the renal function test is not good… you can't say the person has uremic encephalopathy and… delirium. It becomes a challenge.” Internal Medicine Resident, Male

These gaps in diagnostic capability were attributed to limited exposure to geriatric medicine and delirium during medical school and postgraduate training. The few physicians with prior training in geriatrics or delirium had greater diagnostic confidence than those without this training.

Opportunity

Institutional constraints — overcrowding, noise, high patient volumes— made delirium “quite easy to miss” and challenging to assess for. One emergency physician described the emergency unit as:

we have a lot of overcrowding at the emergency and sometimes we are seeing patients in chairs at the triage or in front of Orange [a unit of A&E ward]. You don't have privacy in examining them.

Emergency Medicine Resident, Male

Limited time with patients in a noisy, busy, and understaffed emergency unit were practical constraints to formal cognitive assessment for delirium diagnosis. The absence of screening tools, protocols, or physician awareness campaigns also reduced environmental support for delirium detection. Caregiver factors, including the lack of a relative at bedside who could corroborate the patient’s baseline mental status and provide a timeline of symptom onset and progression, further impeded delirium diagnosis especially in the context of preexisting cognitive impairment.

Motivation

Physician misconceptions regarding delirium aetiology (Table 3) strongly limited physicians’ motivation to diagnose delirium. Many insinuated that delirium was almost always attributable to a single cause, often a primary psychiatric aetiology, making explicit diagnosis unnecessary. As a result, even physicians who thought that an observed cognitive abnormality was due to an underlying medical cause, would “shy away” from stating it. Instead, they would rather simply focus on treating the perceived precipitating condition.

Table 3
Physicians' Misconceptions about Delirium with Rebuttals

Misconception	Quote	Contrary Evidence
Delirium is always transient	*"So, it is important that you find the possible cause of the delirium and… deal with it so that the person will recover because it's just a transient thing and a lot of things can make somebody delirious"* **Internal Medicine Senior Resident, 11**	Delirium may persist till 12 months in 16% of cases[34]
Delirium itself does not affect mortality	*"The mortality is what I'm thinking about. Unless that creates aggression, I'm not sure how it's linked. I think it is mainly* [a result of] *the underlying cause. I'm not sure."* **Internal Medicine Resident, 8**	Delirium is associated with > 2.5 times greater odds of mortality[9]
Delirium is a psychiatric disorder	*"…people shy away from even using the term because most people think it's psychiatry related. For me, I recently got to know that...it's not necessarily a psychiatry issue".* **P8, IM RES**	Delirium is triggered by (a) medical condition (s), substance intoxication/withdrawal, a toxic exposure or multiple aetiologies[31]
Delirium is always caused by a single factor	*"Something may be causing them to be delirious and the possible cause for me will be the actual diagnosis. So, for instance, if I get somebody with uremic encephalopathy who is delirious, I would rather put the uremic encephalopathy as my diagnosis rather than delirium as a diagnosis."* **P11, IM RES**	Multifactorial aetiology of delirium is increasingly recognized. There is an interplay between vulnerability and precipitating factors.[35]
Diagnosing delirium may be superfluous or conflict with other medical diagnoses	*"I think it's good to state it. Just that sometimes the patients who are being seen may have other comorbidities or diagnosis, which will conflict with the delirium… if someone comes in and for instance the person's renal function test is not good, you can't say that the person has uremic encephalopathy and … [also] say that the person has delirium"* **Internal Medicine Resident, 3**	DSM-V encourages coding delirium as well as the specific cause(s) if/when identified. [31]

Misconception	Quote	Contrary Evidence
Delirium is just a 'symptom' of some underlying disorder	*"I don't think it's difficult to identify delirium. I just think… this is just another symptom. We are trained to see it as a symptom."* **Internal Medicine Resident, 8**	Delirium is a diagnosable disorder in its own right, which arises because of some other pathological process(es). [31]
There are no useful interventions besides managing the underlying cause	*"If we can pinpoint what specifically is causing the delirium… then recognising that it's there and treating whatever is contributing to it would help. But if we are not really able to do anything about what is causing the delirium, then I'm not too sure if diagnosing early helps."* **P2, EM RES**	Implementation of delirium screening and real-time feedback from trained "geriatric nurse champions" linked to reduced length of hospital stay, hospital-acquired pressure injury, re-admission and use of restraints.

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One internal medicine resident described a departmental culture in which documenting terms like "delirium" and "altered mental state" was informally discouraged, as it implied diagnostic uncertainty. While emergency physicians would commonly document "altered mental state" and follow on with a list of suspected possible contributors, internists were expected to document the underlying diagnosis and ignore delirium if they had arrived at a unifying diagnosis which explained both the altered cognition and the patient's physical symptoms. They explained that:

So, they [emergency physicians] can even write, "reduced level of consciousness" or "altered mental state" with these differentials. Okay. But we [internal medicine physicians] would rather go with what I think is wrong with the patient… I think some departments are a little, maybe stereotypical when you use those terms. They might make you feel like you don't know what you are saying or what you're doing. So, they refrain from using those terms.

Internal Medicine Resident, Male

While physicians demonstrated varying levels of knowledge of the appropriate use of pharmacological interventions like antipsychotics in the management of delirium, most were unfamiliar with non-pharmacological interventions. This further reduced motivation to identify and explicitly diagnose delirium, as they perceived limited actionable benefit to “spelling out” the diagnosis. To them, the only intervention was to treat “the underlying cause” and identifying this obviated the need for a formal diagnosis of delirium. One emergency medicine resident stated:

If we can pinpoint what specifically is causing the delirium… then recognising that it's there and treating whatever is contributing to it would help. But if we are not really able to do anything about what is causing the delirium, then I'm not too sure if diagnosing early helps.

Emergency Medicine Resident, Female

Delirium Management

Capability

As noted in the previous section, physicians frequently equated treating the patient’s underlying medical condition with delirium management, which reflected a lack of awareness of evidence-based nonpharmacological interventions for delirium management. Some senior physicians, including two emergency medicine residents who previously worked closely with a geriatrician and a psychiatrist, demonstrated knowledge of delirium-appropriate care. This included deprescribing and avoiding potentially deliriogenic medications and minimizing psychotropic use. These examples, though infrequent, illustrate existing pockets of good practice.

Opportunity

Institutional challenges — understaffing, nursing discontinuity, delays in investigations and medication administration, and lack of delirium appropriate spaces — hindered effective delirium management. The provision of ideal delirium care was impeded by high patient-to-physician ratios, which limited providers’ ability to reassure and monitor patients with delirium, and frequent nursing changes, which result in a person with delirium to be cared for by multiple unfamiliar faces across shifts. Delays with laboratory investigations and medication administration due to operational inefficiencies and patient financial constraints hindered prompt identification and management of the underlying causes of delirium. Optimal management of delirium was also limited the systematic lack of environmental ‘delirium precautions. Instead of hospital wards that promote sleep hygiene, reorientation, and mobility, providers described noisy, crowded, and persistently brightly lit rooms. Mobility was also not encouraged among patients with hyperactive delirium and restraints were often described as necessary due to limited staffing and significant concerns regarding the risk of harm to self and others. Ageism and limited public knowledge about delirium also impacted opportunities to appropriately mange delirium. Delayed care seeking by caregivers was associated with worse delirium and frequently limited physicians’ ability to deliver prompt interventions. As one emergency resident noted:

A lot of people come, and the person has actually been ‘altered’ for a week or two… they just thought, ‘they are old.’

Emergency Medicine Senior Specialist, Female

While some physicians highlighted the value of caregiver involvement and environmental delirium precautions, health systems structures limited opportunities to implement these modifications. Daily patient visiting hours were restricted to 1 hour at dawn and 1.5 hours in the evening and, as a result, patients often are left alone. Modifications like lowering the bed height to reduce the risk of falls were not routinely implemented due to non-functioning hospital equipment.

Motivation

Motivation to appropriately manage delirium was low. Physicians frequently underestimated delirium’s prognostic significance, describing it as “just a transient thing”. Many believed that addressing delirium was merely a consideration for improving “quality of life” in the long term and had no significant implications on patient mortality. Instead, mortality was solely attributed to the “underlying illness” and unaffected by delirium. One emergency medicine resident admitted:

“We just don’t take delirium that seriously… there are very few people I know who consider delirium a red flag… It doesn't shift any gears for me, even if I do recognise it.” Emergency Medicine Resident, Female

Physicians’ Recommendations

Physicians offered multiple recommendations to address capability, opportunity, and motivation barriers to delirium diagnosis and management. First, they recommended regular hospital-wide trainings on delirium to improve knowledge and skills of all clinical staff in delirium diagnosis and care. They also suggested a sensitization campaign targeting ancillary clinical staff and caregivers using posters and flowcharts and ‘values-linked’ messaging. Hospital-wide trainings and sensitization trainings were recommended to occur in tandem as it would promote clinical staff and caregivers shared goal of improving patient survival:

If we are talking about EM physicians, we have to approach the path that matters to an EM physician because if you point out the fact that not managing delirium well or appropriately will affect the survivability of my patients, you're more likely to get through to me than telling me that delirium is important because you think it's important.

Emergency Medicine Resident, Mele

To address opportunity barriers posed by limited time to care for individual patients, physicians recommended the integration of clinical decision support instruments, such as screening tools and algorithmic delirium management and prevention protocols, into routine workflows. They suggested monitoring collective performance in delirium detection and management and providing regular

feedback to clinical staff. Physicians also sought help from others invested in patient care. They recognized the value of caregivers and recommended relaxing restrictions on visiting hours for patients with delirium so that relatives could be active partners in delirium prevention and care. Finally, improvements to physical infrastructure (including creation of specialized units for delirium and modern functional beds) and lowering clinical staff: to patient ratios were also identified as potential factors that could improve delirium care.

Mixed-methods Integration and Meta-inference

This behavioural analysis explains how capability (limited knowledge and training) motivational (misconceptions) and opportunity (physical and operational constraints and lack of screening and clinical decision support tools) factors limits diagnosis of delirium and impeded its appropriate management even when recognized in a resource constrained tertiary hospital. Table 4 shows a joint display integrating the quantitative and qualitative strands of this study. The Figure depicts the behavioural pathways to delirium-related outcomes as observe in this population.

Table 4
Joint Display Showing Explanatory Relationship between Qualitative and Quantitative Strands.

Quantitative Finding	Qualitative Explanation	Integrated Explanation
Delirium recognized in only 1/3 of cases	**Capability barriers**: limited knowledge of clinical features and boundaries of delirium **Opportunity barriers**: Overcrowding, noise, high caseloads, lack of screening tools, caregiver history gaps. **Motivation barriers**: Misconceptions ("delirium is just a transient thing"), belief that delirium is psychiatric, low perceived importance.	Physicians often see confusion but lack capability, opportunity, and motivation to confirm and label it as delirium.
Recognition did not reduce mortality (24% vs 17%, p = 0.182) or length of stay (median 6.3 vs 6.0 days, p = 0.86).	**Capability barriers**: Limited awareness of and skill with non-pharmacological interventions; " just treat the underlying medical cause". **Opportunity barriers**: Understaffing, delays in investigations, lack of delirium-appropriate spaces, routine use of restraints, lack of contextualized intervention protocols **Motivation barriers**: Belief that delirium does not influence prognosis ("it doesn't shift any gears for me").	Recognition alone is insufficient because physicians do not change management behaviours. Without capability and motivation and opportunity to intervene, outcomes remain unchanged
Internists (2/7) less likely than Emergency Physician (5/6) to document/acknowledge delirium	**Motivation barriers**: Departmental culture; fear of appearing uncertain; belief that delirium 'belongs' to psychiatry.	Diagnostic behaviour is shaped by local norms, not clinical need — a novel behavioural determinant.

Discussion

Delirium among older Ghanian adults may be recognized as "altered mental state," but was rarely diagnosed as physicians lack the capability, opportunity, and motivation to identify and/or document delirium, and to translate recognition into meaningful clinical action. Thus, in this study, delirium recognition did not improve length of stay or mortality among older hospitalized adults. Urgent interventions are needed to address these critical behavioural gaps to improve patient outcomes.

In this study, while one third of researcher-confirmed delirium cases were recognized by clinical care staff, delirium recognition did not significantly improve clinical outcomes, specifically length of stay or

mortality. It may be that patients with recognized delirium were more critically ill than those with unrecognized delirium and, as a result, were more likely to die. However, adjustment for illness severity, specifically comorbidity burden and triage score, did not change the association between delirium and patient outcome. These findings are consistent with prior literature. In China, a cell-phone application doubled nurse recognition of delirium among critical ill patients, yet there was no change in delirium duration, delirium incidence and severity, or patient length of stay.[32] Thus, solely increasing delirium recognition by health care providers is not sufficient to improve patient outcomes. In contrast, a U.S. quality improvement initiative found that geriatric nurses delivering real-time delirium monitoring and feedback to health care providers followed by clinical recommendations regarding non-pharmacological interventions for delirious patients significantly reduced use of restraints, hospital-acquired pressure ulcers, length of state, and re-admission rates.[33] Interventions such as these increase provider capability (skills) and motivation (beliefs and sense of ownership) while also improving opportunity (resources) to actively and appropriately manage delirium in hospitalized adults.

The present study bolsters the external validity of a prior systematic review of barriers to delirium diagnosis and management in the inpatient setting.[17] Convergent findings include the contributions of limited knowledge and skill (diagnosing delirium and delineating it from similar or 'confounding conditions' and managing it), lack of training and awareness of dementia, organizational constraints, and, finally unclear clinical 'ownership' and responsibility for delirium.[17] Our study also highlights some nuances present in LMICs like Ghana that may significantly impact potential interventions. While knowledge and skill gaps may impact provider capability in a similar manner across settings, our findings of a department-specific culture which effectively discourages the explicit diagnosis of delirium is a novel motivational factor. Further, while providers recommended the use of tools to assess for delirium and standard protocols to guide intervention, the lack of locally valid screening tools and contextually appropriate delirium management protocols provide clear opportunity targets for tailored interventions.

To the best of our knowledge, this is the first behavioural analysis of delirium care in sub-Saharan Africa. It reveals unique LMIC-specific determinants, such as departmental norms shaping diagnostic behaviour and caregiver neglect driven by socioeconomic constraints and- that have not been described in high-income settings. Strengths of this study include the integration of quantitative and qualitative strands using the COM-B framework, the use of validated delirium assessment, and adherence to GRAMMS guidelines. Although quantitative and qualitative data were not collected simultaneously, the entrenched behavioural and institutional patterns observed suggest that this interval did not meaningfully affect explanatory coherence. Further, qualitative findings may not fully encompass all barriers to delirium recognition and management as qualitative interviews did not include nurses, administrators, and patients.

By reframing delirium care as a behavioural problem rather than a purely clinical one, this study illuminates multiple contextually appropriate intervention targets. As proposed by interviewed physicians, capability can be strengthened through delirium-focused training and geriatrics exposure.

Opportunity can be expanded through design/adaptation and validation brief screening tools for routine use in hospital settings, as well as implementation of simple, clear, cost-effective and contextually appropriate intervention protocols and guidelines, which harness the value of caregivers and make specific and achievable recommendations for environmental modification. Motivation can be enhanced through increased awareness of delirium's prognostic significance, value-linked sensitization and reinforcement of delirium as a medical- not psychiatric- priority. There is a pressing need for research to design/adapt and evaluate the clinical- and cost-effectiveness, and implementation potential of multicomponent non-pharmacological interventions, as well as emerging drug therapies for delirium in sub-Saharan Africa and other underrepresented global regions in delirium research.

Conclusion

Delirium care in this Ghanaian tertiary hospital is limited by behavioural barriers across capability, opportunity, and motivation. These barriers explain the low rates of formal diagnosis, the limited impact of recognition on outcomes, and the pervasiveness of suboptimal management. Improving delirium care will require contextually appropriate, behaviourally informed interventions that strengthen physician capability, expand environmental opportunity, and enhance motivation to prioritise delirium. Implementing and evaluating such interventions is essential to improving outcomes for hospitalised older adults in resource-constrained settings.

Declarations

Ethics approval and consent to participate

This study was conducted in accordance with the ethical standards set out in the 1964 Declaration of Helsinki and its subsequent amendments. Ethical approval for the quantitative and Qualitative arms of this study was obtained from Komfo Anokye Teaching Hospital Institutional Review Board (KATH/IRB/AP/122/20 & KATH/ IRB/AO/091/24). Informed consent was obtained from participants and/or their caregivers prior to participation in this study.

Consent for publication

Not Applicable

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Author Contribution

JPO, FSS & ME conceived and designed the study. CO facilitated participant recruitment, JPO supervised the collection of quantitative data while JPO & KKM conducted the qualitative interviews. JPO & SKW managed and analysed quantitative data. ADOB, SSA, SY transcribed and managed quantitative data, including quality control. JPO and LN coded and analysed qualitative data. JU and JPO drafted the manuscript and all authors contributed substantially to its revision. JPO takes responsibility for the paper as a whole.

Data Availability

The datasets used during the current study are available from the corresponding author on reasonable request.

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Figures

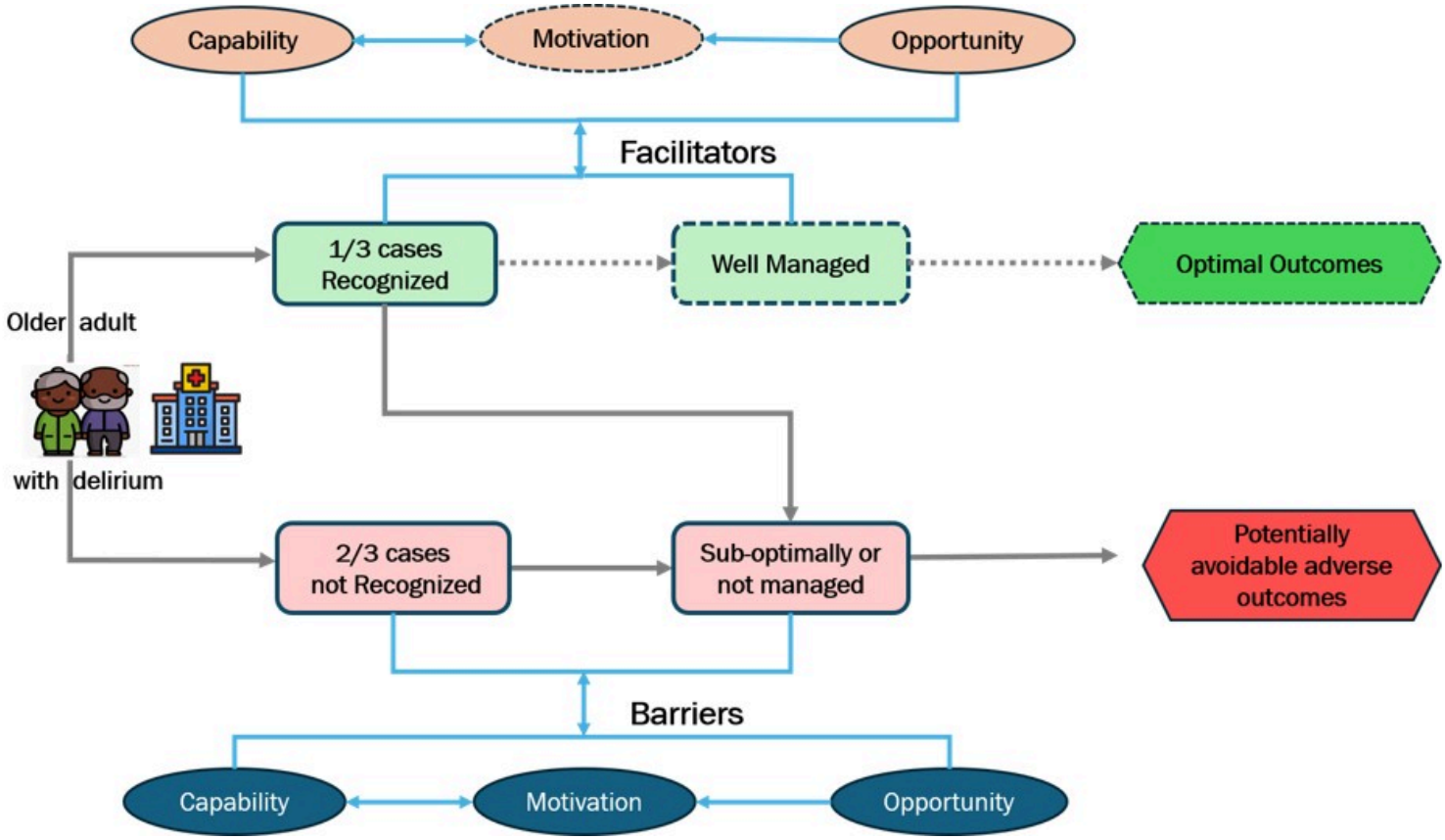


Figure 1

Behavioural Pathways to Delirium-related Outcomes.

The figure shows how older adults with both recognized and unrecognized delirium receive sub-optimal management at KATH, resulting in undifferentiated outcomes (mortality and length of stay). Dotted lines depict ideal, unobserved outcomes/factors.

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- SupplementaryTable1.docx
- SupplementaryfileDeliriumrecognitionInterviewGuidev1.51.docx