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Mapping the Unseen Burden: Comprehensive Geriatric Assessment of Vulnerabilities and Unmet Health Needs in Hospitalised Older Adults and Their 30-Day Post-Discharge Outcomes at a Tertiary Teaching Hospital with a Linked Rural Health Training Centre, Karimnagar, Telangana, India

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ABSTRACT :

Background: Acute hospital care in India remains largely organ-specific, and multidomain geriatric syndromes are frequently unrecognised. We quantified the burden of frailty, functional dependence, malnutrition, cognitive impairment, depressive symptoms and polypharmacy among hospitalised older adults, compared screen-detected cognitive and affective impairment with discharge documentation, and examined predictors of adverse 30-day outcomes.

Methods: In this single-centre prospective observational study (July 2023–January 2024), 450 consecutive adults aged ≥60 years admitted to General Medicine, Orthopaedics and Geriatric wards of a tertiary teaching hospital in Karimnagar, Telangana, underwent comprehensive geriatric assessment (CGA) within 24–48 h using validated Telugu-translated instruments (Katz ADL, Lawton IADL, MNA-SF, Mini-Cog, GDS-15, FRAIL). Participants were followed for 30 days after discharge. The composite outcome was emergency readmission or loss of ≥1 Katz point. Predictors were examined by multivariable logistic regression; robustness to unmeasured confounding was explored with E-values.

Results: Mean age was 68.4 ± 6.2 years; 52.2% were male and 69.3% rural residents. Polypharmacy affected 62.4% (95% CI 57.9–66.8), frailty or pre-frailty 58.7% (54.1–63.1), IADL dependence 50.7%, depressive symptoms 38.9%, ADL dependence 36.4%, cognitive impairment 34.2% (30.0–38.7), and malnutrition or nutritional risk 41.3% (16.0% malnourished). Only 6.2% and 4.1% of discharge summaries recorded cognitive symptoms and depression, respectively, a 5.5-fold and 9.5-fold shortfall relative to screening. Among 432 participants followed up (96.0%), 108 (25.0%; 95% CI 21.1–29.3) had the composite outcome. Frailty (aOR 2.84; 95% CI 1.62–4.98), cognitive impairment (2.15; 1.28–3.61), polypharmacy (1.92; 1.15–3.20) and malnutrition (1.81; 1.04–3.15) were independently associated with the outcome.

Conclusions: Multidomain geriatric vulnerabilities are common and largely undocumented in routine inpatient care in this setting, and four of them independently predict early post-discharge deterioration. Structured CGA at admission, linked to a defined action pathway, is a feasible priority for Indian teaching hospitals.

Keywords: comprehensive geriatric assessment; frailty; hospitalised older adults; unmet health needs; cognitive impairment; polypharmacy; 30-day readmission; Telangana; India

What is already known

Frailty and polypharmacy are common in older Indians, and early readmission after discharge is a recognised problem in older patients. Systematic CGA in rural-linked Indian teaching hospitals is rarely reported.

What this study adds

Over half of admitted older adults were frail or pre-frail, yet cognitive impairment and depression were recorded in under one in ten of screen-detected cases. Frailty, cognitive impairment, polypharmacy and malnutrition independently predicted 30-day adverse outcomes.

1. INTRODUCTION

India is undergoing an unprecedented demographic transition. The proportion of people aged 60 years and above is projected to reach 14.9% of the population by 2036, exceeding 227 million individuals [1]. The Longitudinal Ageing Study in India (LASI) documents the accompanying burden of chronic disease, functional limitation and health-care use [2]. In Telangana, rapid urban–rural socioeconomic restructuring has altered traditional family support, leaving rural and semi-urban older adults particularly exposed. Despite this, acute hospital care remains largely disease-centred, concentrating on organ-specific diagnoses while overlooking geriatric syndromes such as frailty, subtle cognitive decline, nutritional deficits and subclinical depression.

Frailty illustrates the scale of the problem, but its estimated prevalence depends heavily on the instrument and setting. Nationally representative LASI-DAD data estimated frailty in 42.3% of Indians aged ≥60 years [3]; a recent meta-analysis of community-based Indian studies pooled frailty at 36% and pre-frailty at 48%, with very high heterogeneity by assessment tool [4]; and LASI Wave 1 reported frailty in 30% of adults aged ≥45 years, with women at roughly twice the risk of men after adjustment [5]. Among inpatients of a tertiary hospital in North-East India, half of those aged >60 years were frail by the Fried phenotype [6]. Other domains are similarly burdensome: a recent North Indian hospital study found cognitive impairment (MMSE <24) in 45% of geriatric patients [7], and a meta-analysis estimated that polypharmacy affects about half of older Indians [8]. Frailty reflects diminished physiological reserve and heightened vulnerability to stressors such as acute illness and hospitalisation [9].

Comprehensive geriatric assessment (CGA) is a multidimensional, interdisciplinary process that determines an older person's medical, psychosocial and functional capabilities and links findings to a coordinated plan. A Cochrane review of randomised trials, conducted largely in high-income settings, found that CGA delivered on hospital admission increased the likelihood that patients were alive and living at home at follow-up [10]. The World Health Organization's Integrated Care for Older People (ICOPE) approach likewise places intrinsic capacity and person-centred assessment at the centre of care [11]. Unrecognised cognitive impairment is particularly consequential in hospital, where it predisposes to delirium and poor recovery [12].

Early readmission is a major health, social and financial problem in older patients, and a systematic review has catalogued its sociodemographic, clinical and health-care-use determinants [13]. Frailty has been linked to 30-day readmission after hip-fracture surgery [14], but evidence from medical and orthopaedic inpatients in rural-linked Indian teaching hospitals is lacking. Moreover, a screening-positive result is not automatically a met need: what matters clinically is whether the vulnerability was recognised, recorded and acted upon. We therefore aimed to (i) map the multidimensional vulnerability spectrum among hospitalised older adults in Karimnagar, Telangana; (ii) compare screen-detected cognitive and affective impairment with discharge documentation; and (iii) quantify the association between baseline CGA deficits and 30-day post-discharge outcomes. We hypothesised that frailty and cognitive impairment would be independently associated with early adverse outcomes and that recorded prevalence would fall well short of screened prevalence.

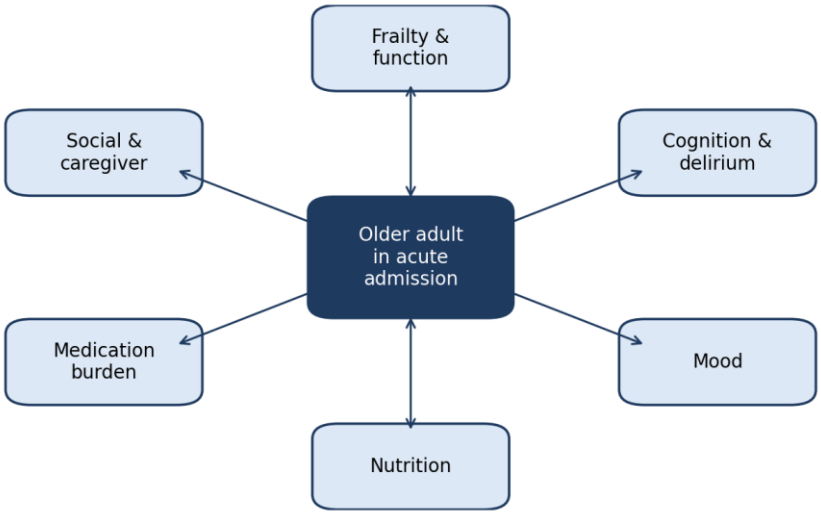


Figure 1. Conceptual multidomain CGA framework. Frailty/function, cognition, mood, nutrition, medication burden and social context interact in the acutely ill older adult; assessment should lead to an individualised care plan rather than a score alone.

2. MATERIALS AND METHODS

2.1 Study design and setting

This single-centre prospective observational study comprised a cross-sectional baseline CGA with a 30-day post-discharge follow-up (Figure 2). It was conducted between July 2023 and January 2024 at a tertiary care teaching hospital affiliated with the Rural Health Training Centre (RHTC) in Karimnagar district, Telangana. Reporting follows the STROBE guideline for observational studies [15] (Supplementary Table S1).

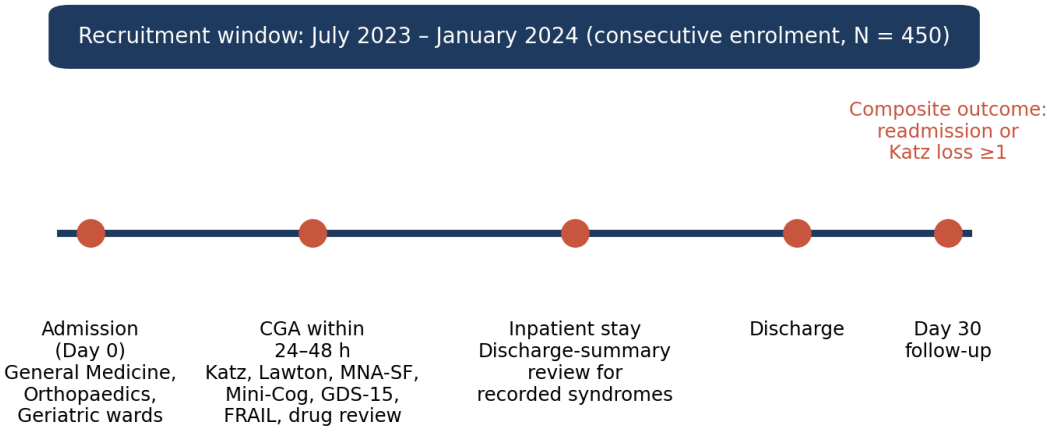


Figure 2. Study timeline and patient journey from admission to the day-30 outcome assessment.

2.2 Ethics

The Institutional Ethics Committee granted clearance. Written informed consent was obtained from all participants or their legally authorised representatives, in accordance with the Declaration of Helsinki.

2.3 Participants and eligibility

Consecutive patients meeting the criteria in Table 1 were enrolled. Consecutive sampling limits selection bias because every eligible admission is approached irrespective of perceived severity or cooperativeness.

Table 1. Eligibility criteria.

	Criteria
Inclusion	Hospitalised patients aged ≥60 years admitted to General Medicine, Orthopaedics or Geriatric Care wards and assessed within 48 h of admission
Exclusion	(i) Direct admission to an intensive care unit; (ii) terminal delirium or severe acute encephalopathy precluding assessment; (iii) unwillingness to consent

2.4 Sample size

The sample size was derived for a single prevalence estimate with a design effect: $n = Z^2 \cdot p(1-p)/d^2 \times DEFF$. Assuming a 40% baseline prevalence of frailty or malnutrition in rural hospitalised older adults (regional pilot data), 5% absolute precision, 95% confidence and a design effect of 1.15, the minimum sample was 424 (Table 2). To allow for 30-day attrition, 450 participants were enrolled (a 6.1% buffer above the minimum). Because 432 participants completed follow-up, the minimum requirement was still met after attrition.

Table 2. Sample size derivation.

Parameter	Value	Calculation / comment
Confidence level (Z)	1.96	Two-sided 95%
Anticipated prevalence (p)	0.40	Regional pilot data
Absolute precision (d)	0.05	±5 percentage points
Simple random sampling n_0	368.8	$1.96^2 \times 0.40 \times 0.60 / 0.05^2$
Design effect (DEFF)	1.15	Assumed
Minimum sample size	424	368.8 × 1.15 = 424.1
Enrolled	450	424 + attrition allowance
Followed up at 30 days	432	≥ 424 (minimum met)

2.5 Comprehensive geriatric assessment

Trained medical personnel administered standardised, validated Telugu-translated instruments within 24–48 hours of admission (Table 3). The Katz Index [16] and Lawton scale [17] capture basic and instrumental function; the MNA-SF [18] screens nutritional status; the Mini-Cog [19] is a brief cognitive screen; the GDS-15 [20] screens for depressive symptoms; and the FRAIL scale [21] captures fatigue, resistance, ambulation, illnesses and weight loss. Polypharmacy was defined as routine intake of ≥5 prescription medicines [8]. Socioeconomic class was classified using the modified BG Prasad scale (2023), and comorbidity using the Charlson Comorbidity Index [22].

Table 3. Instruments and operational cut-offs used in the multidomain CGA.

Domain	Instrument	Positive criterion	Interpretation
Basic function	Katz Index of ADL [16]	Score <6	Dependency in ≥1 basic ADL
Instrumental function	Lawton IADL scale [17]	Score <8	Dependency in instrumental tasks
Nutrition	MNA-SF [18]	<8; 8–11	Malnourished; at risk
Cognition	Mini-Cog [19]	Score <3	Positive cognitive screen
Mood	GDS-15 [20]	Score ≥5	Depressive symptoms
Frailty	FRAIL scale [21]	≥3; 1–2	Frail; pre-frail
Medication	Chart review	≥5 regular drugs	Polypharmacy
Comorbidity	Charlson Index [22]	Continuous	Adjustment covariate
Socioeconomic	Modified BG Prasad (2023)	Class IV–V	Lower strata

2.6 Documentation audit and outcome definition

To estimate the diagnostic gap, cognitive symptoms and depression recorded in the hospital discharge summary were compared with CGA screening results. At 30 days after discharge, participants were followed for the composite adverse outcome, defined as emergency readmission or functional decline of ≥1 Katz point. Analyses of the outcome used participants with completed follow-up (complete-case analysis).

2.7 Bias control

Selection bias was addressed by consecutive enrolment and prespecified eligibility; information bias by use of standardised, validated instruments administered by trained personnel within a fixed time window; and confounding by multivariable adjustment. Loss to follow-up was recorded and reported.

2.8 Statistical analysis

Data were compiled in Microsoft Excel and analysed in SPSS v28.0 and R v4.3.1. Continuous variables are presented as mean ± SD and categorical variables as n (%), with Wilson 95% CIs for proportions. Chi-square tests compared proportions. Predictors of the composite outcome were examined by univariable and multivariable binary logistic regression, adjusted for age, sex, rural residence, Charlson Comorbidity Index and length of stay, and reported as adjusted odds ratios (aOR) with 95% CI. Two-sided $p<0.05$ was significant. As an exploratory sensitivity analysis computed from the reported estimates, we calculated E-values, the minimum strength of association that an unmeasured confounder would need with both exposure and outcome to explain away an observed association [23]; because the outcome was common (25%), risk ratios were approximated as the square root of the odds ratio.

3. RESULTS

3.1 Participant flow and characteristics

Of 450 enrolled participants, 432 (96.0%) completed 30-day follow-up and 18 (4.0%; 95% CI 2.5–6.2) were lost (Figure 3). Mean age was 68.4 ± 6.2 years (range 60–89). There were 235 men (52.2%) and 215 women (47.8%); 312 (69.3%) lived in rural villages linked to the RHTC network and 284 (63.1%) belonged to lower socioeconomic strata (Table 4).

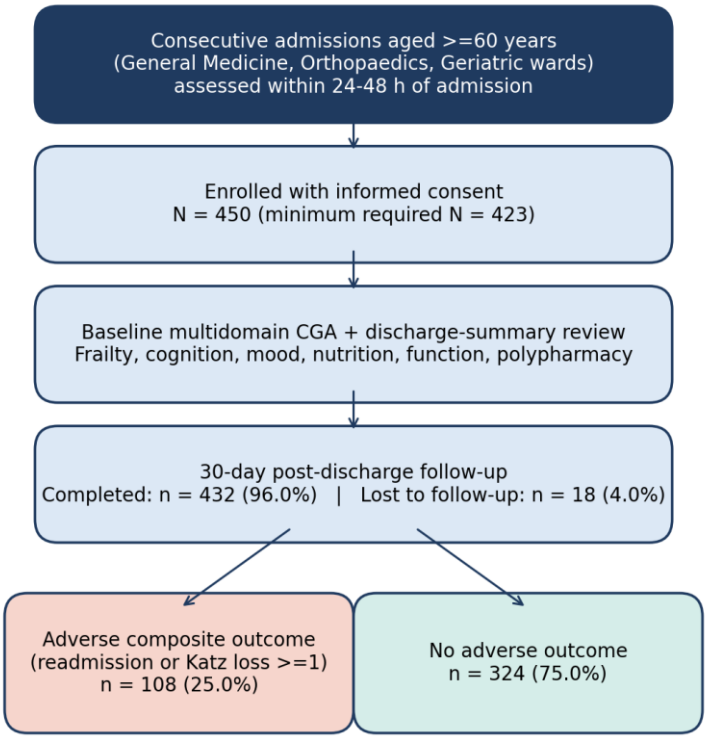


Figure 3. Participant flow (STROBE-style). Numbers are those reported for this cohort.

Table 4. Sociodemographic characteristics of the study population (N = 450).

Characteristic	n (%)	95% CI
Age group, years		
60–69	268 (59.6%)	55.0–64.0
70–79	142 (31.6%)	27.4–36.0
≥80	40 (8.9%)	6.6–11.9
Sex		
Male	235 (52.2%)	47.6–56.8
Female	215 (47.8%)	43.2–52.4
Residence and socioeconomic status		
Rural village residence	312 (69.3%)	64.9–73.4
Lower strata (BG Prasad IV–V)	284 (63.1%)	58.6–67.4

Mean age 68.4 ± 6.2 years. The three age groups sum to 450 (268 + 142 + 40). CI, Wilson 95% confidence interval.

3.2 Prevalence of geriatric vulnerabilities

Polypharmacy (62.4%; 95% CI 57.9–66.8) and frailty or pre-frailty (58.7%; 54.1–63.1) were the most prevalent findings, followed by IADL dependence (50.7%), depressive symptoms (38.9%), ADL dependence (36.4%) and cognitive impairment (34.2%) (Table 5; Figures 4 and 5). Pre-frailty and frailty accounted for 36.2% and 22.5% of participants, leaving 41.3% robust. Nutritionally, 16.0% were malnourished and 25.3% were at risk, so that 41.3% (186/450) had malnutrition or nutritional risk and 58.7% (264/450) had a normal MNA-SF classification. Polypharmacy exceeded the pooled national estimate of 49% (95% CI 42–56) from a meta-analysis of Indian studies [8], consistent with an inpatient population.

Table 5. Multidimensional CGA findings among hospitalised older adults (N = 450).

Domain	Category (cut-off)	n (%)	95% CI
Functional status	ADL dependency (Katz <6)	164 (36.4%)	32.1–41.0
	IADL dependency (Lawton <8)	228 (50.7%)	46.1–55.3
Nutrition	Malnourished (MNA-SF <8)	72 (16.0%)	12.9–19.7
	At risk (MNA-SF 8–11)	114 (25.3%)	21.5–29.5
	Malnourished or at risk	186 (41.3%)	36.9–45.9
Cognition	Impairment (Mini-Cog <3)	154 (34.2%)	30.0–38.7
Mood	Depressive symptoms (GDS-15 ≥5)	175 (38.9%)	34.5–43.5
Frailty spectrum	Frail or pre-frail (FRAIL ≥1)	264 (58.7%)	54.1–63.1
	Pre-frail (FRAIL 1–2)	36.2%	—
	Frail (FRAIL ≥3)	22.5%	—
Medication burden	Polypharmacy (≥5 drugs)	281 (62.4%)	57.9–66.8

Percentages for pre-frail and frail are as reported; counts and CIs are given for the combined frail or pre-frail category. The robust (41.3%) and normal-nutrition (58.7%) groups are derived by subtraction.

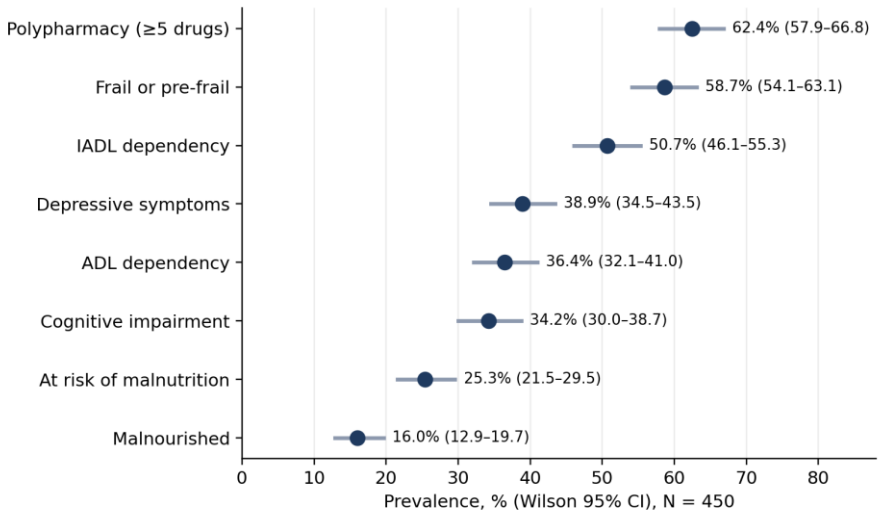


Figure 4. Prevalence of geriatric vulnerabilities with Wilson 95% confidence intervals (N = 450).

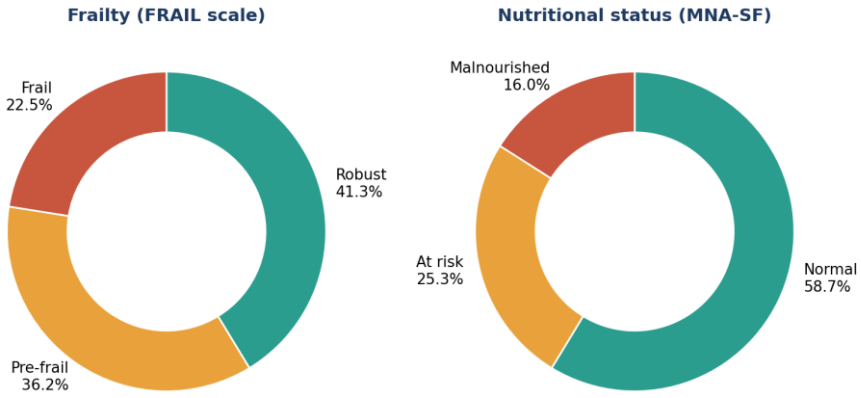


Figure 5. Frailty spectrum (left) and nutritional status (right). Robust and normal-nutrition proportions are derived by subtraction from the reported categories.

3.3 Detected versus documented vulnerabilities

A striking diagnostic gap separated CGA-screened syndromes from clinical documentation (Table 6; Figure 6). Cognitive impairment was identified in 34.2% of patients by CGA but cognitive symptoms were recorded in only 6.2% of discharge notes; depression was recorded in 4.1% of charts despite a screening prevalence of 38.9%. Detected prevalence thus exceeded recorded prevalence by 28.0 percentage points (5.5-fold) for cognition and 34.8 percentage points (9.5-fold) for depression. Because screening is not diagnosis, part of this gap may reflect false-positive screens; nonetheless, a gap of this size indicates that most positive screens had no recorded clinical recognition.

Table 6. Screen-detected versus documented prevalence.

Domain	Detected by CGA, % (95% CI)	Documented, % (≈n)	Absolute gap	Detected : documented
Cognitive impairment	34.2 (30.0–38.7)	6.2 (≈28; 4.3–8.8)	28.0 pp	5.5 : 1
Depressive symptoms	38.9 (34.5–43.5)	4.1 (≈18; 2.5–6.2)	34.8 pp	9.5 : 1

Documented counts are back-calculated from the reported percentages (6.2% and 4.1% of 450) and are approximate. pp, percentage points.

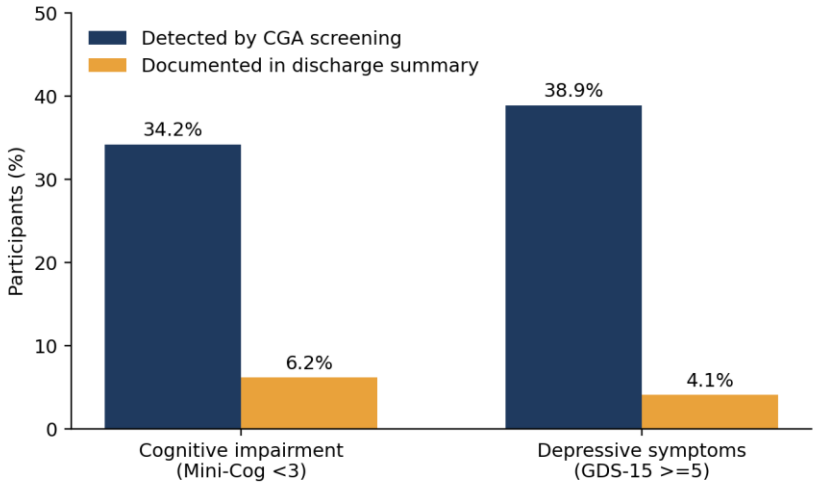


Figure 6. Screen-detected prevalence versus prevalence documented in discharge summaries.

3.4 Thirty-day outcomes and independent predictors

At 30 days, 108 of 432 participants (25.0%; 95% CI 21.1–29.3) had experienced emergency readmission or functional decline of ≥1 Katz point, and 324 (75.0%) had not. In multivariable analysis (Table 7; Figure 7), frailty (aOR 2.84; 95% CI 1.62–4.98; p<0.001), cognitive impairment (aOR 2.15; 1.28–3.61; p=0.004), polypharmacy (aOR 1.92; 1.15–3.20; p=0.012) and malnutrition (aOR 1.81; 1.04–3.15; p=0.036) remained independently associated with the outcome. ADL dependency at discharge, depressive symptoms and age ≥75 years were associated with the outcome in unadjusted analysis but not after adjustment, with confidence intervals that included 1. In every case the adjusted estimate was smaller than the unadjusted one, indicating that part of the crude association was explained by age, comorbidity, residence, sex and length of stay.

Table 7. Univariable and multivariable logistic regression for 30-day adverse outcomes (n = 432; events = 108).

Predictor	Unadjusted OR (95% CI)	aOR*	95% CI	p-value
Frailty (FRAIL ≥3)	3.45 (2.12–5.62)	**2.84**	1.62–4.98	<0.001
Cognitive impairment (Mini-Cog <3)	2.68 (1.68–4.28)	**2.15**	1.28–3.61	0.004
Malnutrition (MNA-SF <8)	2.31 (1.38–3.87)	**1.81**	1.04–3.15	0.036
Polypharmacy (≥5 drugs)	2.14 (1.35–3.39)	**1.92**	1.15–3.20	0.012
ADL dependency at discharge	1.95 (1.21–3.14)	1.48	0.88–2.48	0.141
Depressive symptoms (GDS-15 ≥5)	1.78 (1.12–2.83)	1.32	0.79–2.21	0.285
Age ≥75 years	1.62 (1.02–2.57)	1.21	0.72–2.03	0.472

*Adjusted for age, sex, rural residence, Charlson Comorbidity Index and length of stay. Bold = statistically significant. All reported odds ratios lie at the geometric mean of their confidence limits and the p-values agree with the confidence intervals on recalculation (Wald approximation).

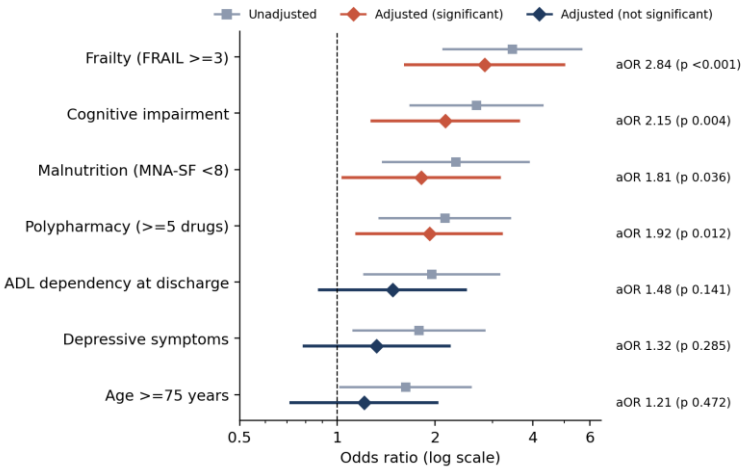


Figure 7. Forest plot of unadjusted and adjusted odds ratios for 30-day readmission or functional decline (log scale; dashed line = no association).

3.5 Sensitivity to unmeasured confounding

E-values for the four significant associations are given in Table 8. An unmeasured confounder would need to be associated with both frailty and the outcome by a risk ratio of about 2.8 each (above and beyond measured covariates) to fully explain the frailty association, and by about 1.9 to move its confidence limit to the null. The malnutrition association was the most fragile (E-value for the confidence limit 1.16), so it should be interpreted most cautiously.

Table 8. E-values for statistically significant adjusted associations (exploratory).

Exposure	aOR	≈RR (√aOR)	E-value (estimate)	E-value (CI limit)
Frailty	2.84	1.69	2.76	1.86
Cognitive impairment	2.15	1.47	2.29	1.52
Polypharmacy	1.92	1.39	2.12	1.35
Malnutrition	1.81	1.35	2.03	1.16

Computed post hoc from the reported estimates; RR approximated by the square root of the OR because the outcome was common [23].

4. DISCUSSION

4.1 Principal findings

In this prospective study of 450 hospitalised older adults in Telangana, more than half were frail or pre-frail, more than one-third had cognitive or affective impairment, and nearly two-thirds were exposed to polypharmacy. Cognitive impairment and depression were recorded in routine documentation for only a small fraction of screen-detected cases. One in four participants experienced early readmission or functional decline, and frailty, cognitive impairment, polypharmacy and malnutrition were independent predictors.

4.2 Comparison with existing literature

Frailty prevalence differs materially by instrument and setting (Table 9; Figure 8). Community-based Indian meta-analytic estimates were 36% for frailty and 48% for pre-frailty, with higher frailty by frailty index than by Fried phenotype [4], and LASI-DAD estimated 42.3% [3]. Half of inpatients in a North-East Indian tertiary hospital were frail by the Fried phenotype [6]. Our lower frank-frailty proportion (22.5%) alongside a high combined frail or pre-frail proportion (58.7%) is compatible with the screening nature of the FRAIL scale and with differences in case-mix, and should not be read as contradicting these estimates because Fried-phenotype, frailty-index and FRAIL-based figures are not interchangeable [21,24].

Table 9. Selected Indian studies for context (differences in setting and instrument limit direct comparison).

Study	Population / setting	Instrument	Key estimate
Gupta 2025 [4]	Community-dwelling adults, meta-analysis (n = 330,007)	Mixed tools	Frailty 36% (29–44); pre-frailty 48%
Singhal 2023 [3]	LASI-DAD, ≥60 y (n = 3953)	Frailty index	Frailty 42.3% (men 35.0%, women 49.4%)
Ghosh 2023 [5]	LASI Wave 1, ≥45 y	Frailty index	Frailty 30%
Modi 2024 [6]	Inpatients >60 y, NE India (n = 200)	Fried phenotype	Frail 50% (42.9–57.1)
Sharma 2026 [7]	Geriatric OPD patients, N India (n = 100)	MMSE <24	Cognitive impairment 45%
Bhagavathula 2021 [8]	Older Indians, meta-analysis	Drug count	Polypharmacy 49% (42–56)
Present study	**Inpatients ≥60 y, Karimnagar (n = 450)**	**FRAIL; Mini-Cog; drug count**	**Frail 22.5%; frail or pre-frail 58.7%; cognitive impairment 34.2%; polypharmacy 62.4%**

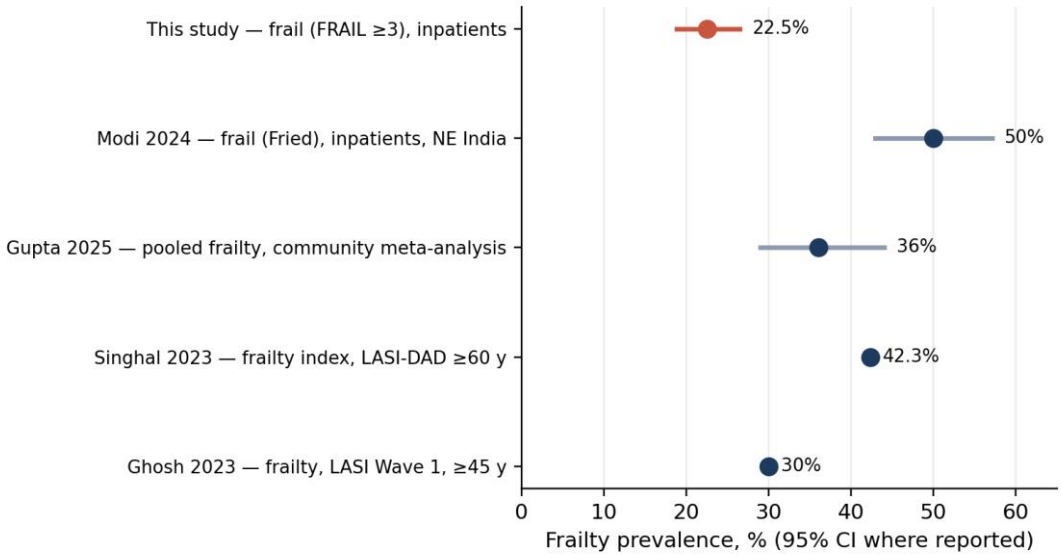


Figure 8. Frailty prevalence in the present cohort compared with published Indian estimates. Instruments and populations differ; 95% CIs shown where reported.

The association between frailty and early adverse outcomes is consistent with the broader literature: frailty has been associated with higher 30-day readmission after hip-fracture surgery (RR 1.75) [14]. Our estimate (aOR 2.84) is larger but not directly comparable, since our outcome was a composite of readmission or functional decline, our population was predominantly medical and orthopaedic, and our effect measure is an odds ratio from a single-centre sample. A systematic review also identifies sociodemographic, clinical and health-care-use factors as determinants of early readmission [13], supporting a multidomain rather than single-syndrome approach.

4.3 Interpreting the findings

Several mechanisms plausibly link these four exposures to early deterioration. Frailty denotes reduced physiological reserve, so that a given acute insult produces disproportionate functional loss [9]. Cognitive impairment predisposes to delirium, complicates medication adherence and discharge instructions, and reduces the patient's ability to report symptoms [12]. Polypharmacy increases the risk of adverse drug events and interactions, and malnutrition impairs recovery and muscle strength. These exposures are interrelated, which is why adjusted estimates were smaller than crude ones and why a multidomain approach is warranted. The E-value analysis suggests that the frailty, cognition and polypharmacy associations are reasonably robust to moderate unmeasured confounding, whereas the malnutrition association is more fragile.

The documentation gap is clinically important. Unrecognised cognitive impairment complicates consent, medication safety and discharge planning [12], and unrecognised depression forfeits treatable morbidity. Polypharmacy and malnutrition are modifiable contributors that rarely appear in disease-centred discharge summaries, yet both were independently associated with adverse outcomes here.

4.4 Implications for practice

Because frailty is potentially modifiable through multicomponent management [25] and because CGA at admission improves the likelihood of remaining at home in trials [10], we propose a minimal CGA-to-care pathway for teaching hospitals (Figure 9; Table 10). Each positive screen should be tied to a defined minimum action, a responsible team and a documentation field in the discharge summary, and high-risk patients (frailty, cognitive impairment, polypharmacy or malnutrition) should be flagged for community linkage through the RHTC.

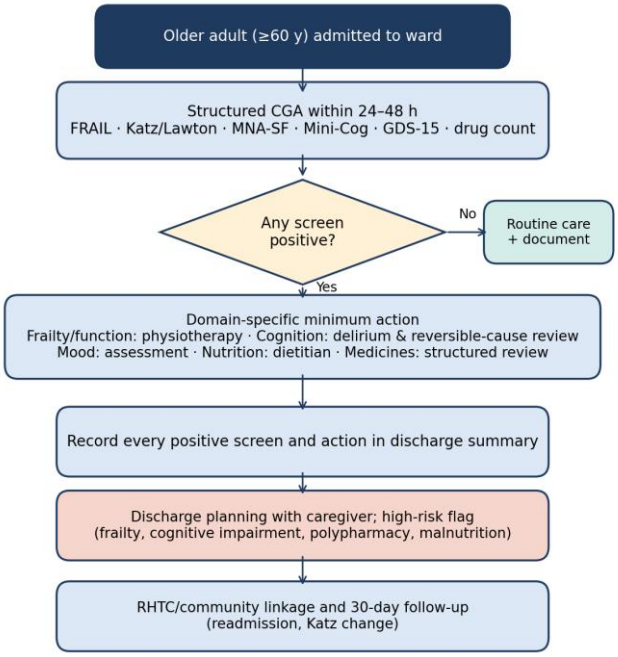


Figure 9. Proposed CGA-to-care pathway for rural-linked teaching hospitals (a recommendation derived from these findings, not a tested intervention).

Table 10. Proposed minimum actions by CGA domain.

Domain	Trigger	Minimum action
Frailty / function	FRAIL ≥3; Katz <6	Physiotherapy review, early mobilisation, assistive-device assessment, discharge function plan
Cognition	Mini-Cog <3	Clinical review for delirium and reversible causes, caregiver communication, record in discharge summary
Mood	GDS-15 ≥5	Clinical assessment, supportive plan, referral where indicated
Nutrition	MNA-SF <8 or 8–11	Dietitian input, supplementation plan, weight follow-up
Medication	≥5 regular drugs	Structured medication review and reconciliation before discharge
Social / caregiver	Unsafe discharge context	Social-work or community (RHTC) linkage and follow-up visit

4.5 Strengths and limitations

Strengths include consecutive enrolment of a sample exceeding the calculated minimum, multidomain assessment with validated, locally translated instruments, high follow-up (96.0%), adjusted effect estimates with sensitivity analysis, and a direct comparison of detected needs with clinical documentation. Limitations should be acknowledged. First, this was a single-centre study in a tertiary teaching hospital linked to an RHTC, which may reflect greater severity of illness than peripheral facilities; ICU admissions were excluded, limiting generalisability. Second, instruments are screening tools rather than diagnostic standards, and frailty measured during acute illness may overestimate baseline frailty. Third, the documentation audit was restricted to discharge summaries and the detected-versus-documented comparison was available only for cognition and depression. Fourth, the composite outcome combines readmission and functional decline, complete-case analysis excluded 18 participants, and residual confounding cannot be excluded despite adjustment. Fifth, follow-up ended at 30 days; longer-term outcomes and intervention effects require multicentre cohort studies and pragmatic trials.

4.6 Future research

Future work should test whether an admission CGA with the pathway above reduces 30-day readmission and functional decline in a pragmatic comparative design, extend follow-up to 90 days and one year, and evaluate the cost and workforce requirements of delivering CGA in rural-linked Indian teaching hospitals.

5. CONCLUSIONS

Geriatric vulnerabilities are highly prevalent among hospitalised older adults in Karimnagar and are substantially under-documented in routine care. Frailty, cognitive impairment, polypharmacy and malnutrition independently predict early post-discharge deterioration. Embedding a brief structured CGA with a defined action pathway at admission is a feasible, high-yield step toward person-centred geriatric care in India's teaching hospitals.

DECLARATIONS

Ethics approval and consent: Ethics approval was obtained from Institutional Ethics committee before commencement of the study. Written informed consent was obtained from all participants or their legally authorised representatives.

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Conflicts of interest: None

Author contributions: AGA: conceptualisation, study design, supervision, data analysis, manuscript drafting. AA: data interpretation, literature review, manuscript revision. Both authors approved the final manuscript.

Data availability: De-identified data are available from the corresponding author on reasonable request.

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