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Original Research Article

Prevalence of Frailty Among Patients Undergoing Elective Surgery in Tertiary Care Hospital

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Abstract: *Frailty is an emerging perioperative risk factor associated with adverse postoperativeoutcomes, particularly in the elderly population. Despite global interest in frailty assessment, limited data exist from low-middle income countries like Pakistan regarding the prevalence of frailty and its implications in surgical outcomes.* ***Objective:*** *The aim of the present study was to identify the frequency of frail patient among elderly population admitted for orthopedic and vascular surgeries and to compare outcome of with and without frail patient admitted for orthopedic and vascular surgery.* ***Methods:*** *This crossectional study was conducted at Department of Anaesthesiology, Shaheed Mohtarma Benazir Bhutto Institute of Trauma, Karachi, from 30/NOV/2024 till 31/MAR/2025. All consecutive adults (≥ 18 y) 72 patients scheduled for vascular and orthopaedic surgery were screened at the pre-operative assessment clinic. Emergency Caesarean sections, day-case procedures lasting < 30 min, and patients unable to consent or complete frailty testing (e.g., severe cognitive impairment without a proxy) were excluded.* ***Results:*** *Among the 72 patients analysed (34 frail, 38 non-frail), the two groups were practically identical in age (74.3 ± 1.1 vs 74.6 ± 1.0 years; p = 0.84) and operative profile. Mean total FRAIL scores were low in both cohorts (1.0 ± 0.16 for frail patients and 0.87 ± 0.11 for non-frail; p = 0.61). Surgical duration averaged roughly 2 h (138.5 ± 8.3 min vs 145.2 ± 8.1 min; p = 0.56) with comparable estimated blood loss (474 ± 52 ml vs 510 ± 49 ml; p = 0.61) and crystalloid administration (1.72 ± 0.14 L vs 1.77 ± 0.13 L; p = 0.83). Post-operative ward stay was just over three days in both groups (3.44 ± 0.53 vs 3.11 ± 0.55 days; p = 0.66), while median stays in HDU and ICU remained short and statistically indistinguishable.* ***Conclusion:*** *In this study, mild frailty did not independently worsen early peri-operative outcomes when patients were managed within structured optimisation pathways.*

Keywords: Frailty, outcomes, older age, peri-operative factors

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Introduction

Frailty—a multidimensional syndrome of diminished physiologic reserve—has moved from geriatric medicine to centre-stage in peri-operative care. Although only ~10 % of community-dwelling adults over 65 meet frailty criteria, surgical cohorts are consistently richer in vulnerable patients because advancing age, multimorbidity and urgency all converge in the operating theatre (1, 2). Recent prospective work in UK elective lists found a frailty prevalence of 17 % in patients ≥ 65 y (3), while broader meta-analyses covering emergency and specialty surgery report ranges of 10–37 % (4). Identifying frailty before the scalpel matters: it predicts not only who will survive but who will regain independence, avoid readmission and spare scarce health-care resources.
A 2024 multicentre study of 1,840 older adults showed 30-day mortality of 7.9 % in frail vs 0.9 % in non-frail patients (adjusted OR 8.5) (5). Pooled data in an earlier meta-analysis echoed this gradient—8 % vs 1 % 30-day death (4)—and neurosurgical series demonstrate that frailty triples the odds of dying after a major complication (6).
Complication rates rise proportionally with frailty severity. The same meta-analysis estimated 24 % overall complications in frail patients versus 5 % in robust peers (4), while a 2024 systematic review of emergency operations calculated a two-fold risk increase (7). Specific morbidities follow suit: pre-operative frailty more than doubles the odds of post-operative delirium (pooled OR 2.47; n = 14,441) (8) and is linked to higher rates of pneumonia, acute kidney injury and wound infection across surgical subspecialties.
Beyond clinical outcomes, frailty escalates costs. A 2025 US cohort reported median one-year health-care expenditures of US $247,500 in frail vs $179,000 in prefrail patients (9), mirroring earlier surgical data showing hospital charges nearly doubling in frail colectomy patients (10) and adding an average 11 extra inpatient days and ≈ US $35,000 to admissions. Prolonged length of stay and higher readmission frequencies compound these costs and drive bed shortages.
More than 20 indices—ranging from the 5-item FRAIL Scale to the 70-deficit Electronic Frailty Index—are validated in surgery. The Clinical Frailty Scale (CFS) in particular has shown accurate prediction of 30-day mortality across diverse procedures (11). Yet consensus is lacking on which tool should be standard and how best to integrate frailty optimisation ("pre-habilitation") into fast-track pathways, especially in low- and middle-income countries where data are scarce.
Collectively, contemporary evidence underscores that frailty is common (≈1 in 5 elective and 1 in 3 emergency surgical patients) and portends a step-change in mortality, morbidity and cost. Routine pre-operative frailty screening therefore offers a pragmatic, inexpensive lever to stratify risk, individualise consent and target multidisciplinary interventions that may improve outcomes and curb expenditure. The aim of the present study was to identify the frequency of frail patient among elderly population admitted for orthopedic and vascular surgeries and to compare outcome of with and without frail patient admitted for orthopedic and vascular surgery.

Methodology

This cross-sectional study was conducted at Department of Anaesthesiology, Shaheed Mohtarma Benazir Bhutto Institute of Trauma, Karachi, from 30/NOV/2024 till 31/MAR/2025. All consecutive adults (≥ 18 y) 72 patients scheduled for vascular and orthopaedic surgery were screened at the pre-operative assessment clinic. Emergency Caesarean

sections, day-case procedures lasting < 30 min, and patients unable to consent or complete frailty testing (e.g., severe cognitive impairment without a proxy) were excluded.

Frailty status was determined within two weeks before surgery using the 5-item FRAIL Scale (Fatigue, Resistance, Ambulation, Illnesses, unintentional Weight-loss). Scores 0–2 defined non-frail/prefrail and scores ≥ 3 defined frail. The same researcher administered the tool to minimise inter-rater variability ($\kappa = 0.92$ on pilot testing). Demographics (age, sex, BMI), comorbidities (Charlson index, ASA physical-status), type and urgency of surgery, anaesthetic technique, and intra-operative variables (duration, blood loss, crystalloid and transfusion volumes, complications) were abstracted from electronic medical records.

Primary clinical outcomes were 30-day all-cause mortality, composite major post-operative complications (myocardial infarction, stroke, sepsis, pneumonia, acute kidney injury, surgical-site infection), and discharge disposition (home vs institution). Secondary endpoints included length of post-operative ward, HDU and ICU stay, and 30-day readmission.

Data were double-entered into and analysed with IBM SPSS Statistics 26. Continuous variables were inspected for normality (Shapiro–Wilk) and summarised as mean ± standard error (SE) or median (IQR) as appropriate. Baseline characteristics of frail versus non-frail groups were compared with independent-samples t-tests (or Mann–Whitney U) and χ^2 tests for categorical variables. Statistical significance was set at $p < 0.05$ (two-tailed).

Results

Among the 72 patients analysed (34 frail, 38 non-frail), the two groups were practically identical in age (74.3 ± 1.1 vs 74.6 ± 1.0 years; p = 0.84) and operative profile. Mean total FRAIL scores were low in both cohorts (1.0 ± 0.16 for frail patients and 0.87 ± 0.11 for non-frail; p = 0.61). Surgical duration averaged roughly 2 h (138.5 ± 8.3 min vs 145.2 ± 8.1 min; p = 0.56) with comparable estimated blood loss (474 ± 52 ml vs 510 ± 49 ml; p = 0.61) and crystalloid administration (1.72 ± 0.14 L vs 1.77 ± 0.13 L; p = 0.83). Post-operative ward stay was just over three days in both groups (3.44 ± 0.53 vs 3.11 ± 0.55 days; p = 0.66), while median stays in HDU and ICU remained short and statistically indistinguishable.

Pre-operative characteristics likewise showed no significant differences. Women comprised half of the frail cohort and 63 % of non-frail patients (p = 0.37). Current smoking was more frequent in frail individuals (35 % vs 18 %), but the gap did not reach significance (p = 0.18); alcohol use was uncommon in both groups (≈ 12 %; p = 1.00). Classic cardiovascular and metabolic comorbidities—previous myocardial infarction (26 % vs 24 %), angina (12 % vs 5 %), heart failure (21 % vs 24 %), stroke (18 % vs 32 %), diabetes (21 % vs 24 %) and hypertension (18 % vs 29 %)—were numerically similar with p-values ≥ 0.28. Chronic-lung disease was relatively uncommon overall but tended to be less prevalent in frail than in non-frail patients (12 % vs 32 %; p = 0.08). Functional FRAIL-item symptoms (fatigue, poor resistance, limited ambulation and weight-loss) occurred in roughly one-quarter of both groups without statistical separation.

Intra-operatively, case-mix was virtually identical: orthopaedic procedures accounted for ≈ 71 % and vascular operations for ≈ 29 % of both cohorts (p = 1.00). General and regional anaesthesia were each used in half of the patients irrespective of frailty status. Allogeneic transfusion was required in 47 % of frail versus 50 % of non-frail subjects (p = 0.99). Adverse anaesthetic events were rare: bronchospasm and laryngospasm affected only two to three patients in each group, with no meaningful between-group difference.

Early post-operative complications were modest and distributed evenly. Urinary-tract infection occurred in 14.7 % of frail versus 5.3 % of non-frail patients; wound infection in 11.8 % versus 15.8 %; pneumonia in 23.5 % versus 15.8 %; and sepsis in 14.7 % versus 23.7 %—all p-values ≥ 0.34. Acute kidney injury and myocardial infarction each affected roughly one in eight to one in five patients without significant disparity. Most individuals were managed on the ward post-operatively (70.6 % frail vs 57.9 % non-frail), with small proportions requiring HDU or ICU admission, again without statistical difference (p = 0.35). Thirty-day mortality remained low and comparable (5.9 % frail vs 7.9 % non-frail; p = 0.61), and the vast majority of patients in both groups were discharged home. Overall, despite a clinically observable frailty status, the study cohort exhibited no statistically significant divergence across baseline demographics, intra-operative course or early post-operative outcomes.

Table 1: Descriptive variables

Variables	Frail Yes (n=34)		Frail No (n=38)		P Value
	Mean	SE	Mean	SE	
Age (years)	74.29412	1.107847	74.60526	1.022882	0.837127
Total FRAIL Score	0.970588	0.160688	0.868421	0.114217	0.606173
Surgery Duration (Min)	138.5294	8.294516	145.2368	8.09531	0.564651
Blood Loss (ml)	473.7941	52.35103	510.3684	48.55258	0.610121
IV Fluid (ml)	1724.559	137.6955	1766.895	132.2766	0.825178
PostOp Ward Stay (Days)	3.441176	0.532694	3.105263	0.550171	0.662272
PostOp HDU Stay (Days)	0.470588	0.147681	0.710526	0.184414	0.313421
PostOp ICU Stay (Days)	0.117647	0.117647	0.394737	0.190602	0.220823

Table 2: Pre-operative categorical variables

Variable	Count Frail Yes	% Frail Yes	Count Frail No	% Frail No	P Value
Gender					0.374921
Female	17	50	24	63.15789	
Male	17	50	14	36.84211	
Smoking	12	35.29412	7	18.42105	0.175763
Alcohol	4	11.76471	5	13.15789	1
MI	9	26.47059	9	23.68421	1
Angina	4	11.76471	2	5.263158	0.569075
Heart Failure	7	20.58824	9	23.68421	0.974834
Stroke	6	17.64706	12	31.57895	0.275561
CLD	4	11.76471	12	31.57895	0.082738
Diabetes	7	20.58824	9	23.68421	0.974834

Malignancy	5	14.70588	5	13.15789	1
Arthritis	9	26.47059	8	21.05263	0.792946
Hypertension	6	17.64706	11	28.94737	0.395757
Asthma	5	14.70588	9	23.68421	0.507493
Kidney Disease	6	17.64706	9	23.68421	0.73455
Fatigue	10	29.41176	8	21.05263	0.585635
Resistance	8	23.52941	10	26.31579	1
Ambulation	9	26.47059	9	23.68421	1
Weight Loss	6	17.64706	6	15.78947	1

Table 3: Intraoperative parameters

Variable	Count Frail Yes	% Frail Yes	Count Frail No	% Frail No	P Value
Surgery Type					1
Orthopedic	24	70.58824	27	71.05263	
Vascular	10	29.41176	11	28.94737	
Transfusion	16	47.05882	19	50	0.989532
Intra Op Complication					
Bronchospasm	2	5.882353	2	5.263158	0.838181
Laryngospasm	1	2.941176	3	7.894737	
Other	2	5.882353	2	5.263158	
Anesthesia Type					1
General	17	50	19	50	
Regional	17	50	19	50	

Table 4: Post-operative parameters

Variable	Count Frail Yes	% Frail Yes	Count Frail No	% Frail No	P Value
UTI	5	14.70588	2	5.263158	0.341218
Wound Infection	4	11.76471	6	15.78947	0.879431
AKI	4	11.76471	8	21.05263	0.459903
Pneumonia	8	23.52941	6	15.78947	0.595976
Sepsis	5	14.70588	9	23.68421	0.507493
Cerebrovascular Event	5	14.70588	6	15.78947	1
Myocardial Infarction	4	11.76471	8	21.05263	0.459903
Other Complication	7	20.58824	4	10.52632	0.39164
PostOp Admission					0.349975
Ward	24	70.58824	22	57.89474	
HDU	9	26.47059	12	31.57895	
ICU	1	2.941176	4	10.52632	
Outcome					0.607524
Discharged	31	91.17647	32	84.21053	
Mortality	2	5.882353	3	7.894737	
Re-do surgery	1	2.941176	3	7.894737	

Discussion

In this single-centre cohort of older adults undergoing major non-cardiac surgery, frailty—defined by a mean FRAIL score ≈ 1—did not translate into worse peri-operative trajectories. Age, physiologic insult (operative time, blood loss, fluid requirements) and immediate recovery metrics were virtually superimposable between frail and non-frail patients, and early complications and mortality differed by only 0–3 percentage-points (12). These neutral findings contrast with the bulk of surgical literature, where frailty is consistently associated with two- to eight-fold increases in 30-day mortality, a 20–25 % absolute rise in major complications, and prolonged hospitalisation.

Several factors may explain the discrepancy. First, the severity of frailty in our sample was low: the mean score of one point sits at the "prefrail" threshold in many instruments. Meta-analyses showing strong frailty effects typically include patients with Clinical Frailty Scale ≥ 5 or deficit indices > 0.25—substantially more impaired than the individuals studied here. Second, case mix skewed heavily toward orthopaedic and vascular procedures performed electively, under tight haemodynamic control and by specialist teams experienced in enhanced-recovery pathways; prior studies demonstrating excess risk often involved emergency general or oncologic surgery, where physiologic stressors and sepsis exposures are greater (13, 14).

Third, selection bias may have attenuated differences. Because the same pre-assessment clinic screened all candidates, surgeons could have deferred the most vulnerable frail patients to non-operative management, leaving a resilient subset who tolerate surgery as well as robust peers. Relatedly, the institution employs a multidisciplinary "pre-habilitation" protocol—formal exercise and nutrition optimisation over two to four weeks—that may narrow outcome gaps without necessarily reducing baseline FRAIL scores (15).

Finally, the trial was powered for descriptive rather than inferential endpoints: with 72 participants, it could detect only large effect sizes (e.g., a five-day difference in length of stay or a 25 % mortality swing). Many point estimates trended in the expected direction—higher pneumonia, UTI and sepsis rates among frail individuals, lower bronchospasm and chronic-lung disease—but confidence intervals were wide and p-values non-significant. Larger samples or pooled multicentre data would clarify whether these numerically higher complications are clinically meaningful.

Despite the muted differential, our results still align with contemporary thinking that frailty is not synonymous with inevitable harm; rather, the interaction between patient reserve, surgical stress and peri-operative optimisation dictates outcome. Future research should stratify frailty by severity, incorporate biomarkers of physiologic ageing (e.g., grip strength, epigenetic clocks) and test targeted interventions—pre-habilitation, ketone supplementation, or remote monitoring—to convert frailty from a prognostic label into a modifiable risk factor (16).

Conclusion

In this cohort of predominantly low-severity frail patients, peri-operative outcomes—including operative metrics, complication rates, length of stay and 30-day mortality—were indistinguishable from those of non-frail peers. These findings suggest that mild frailty, when managed within structured pre-assessment and optimisation pathways, may not independently worsen early surgical trajectories. Larger, multicentre studies stratifying frailty severity are needed to confirm whether targeted pre-habilitation can further narrow any residual risk.

Declarations

Data Availability statement
All data generated or analysed during the study are included in the manuscript.

Ethics approval and consent to participate
Approved by the department concerned. (IRBEC-SMBBIT-0843-24)

Consent for publication
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Conflict of interest

The authors declared the absence of a conflict of interest.

Author Contribution

RNK (PG)
Manuscript drafting, Study Design,
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Review of Literature, Data entry, Data analysis, and drafting articles.
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Conception of Study, Development of Research Methodology Design,
JMA (PGT)
Study Design, manuscript review, critical input.
SA (HOD),
Manuscript drafting, Study Design,
All authors reviewed the results and approved the final version of the manuscript. They are also accountable for the integrity of the study.

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