ACCSCIENCE PUBLISHING

Health Psychology Research

Article type

Narrative nursing for tuberculous empyema surgery: A single-center quasi-experimental study of perioperative anxiety and depression

Supplementary File

S1. Fidelity assessment checklist and scoring rubric

Intervention Fidelity Assessment Form

Patient ID: _____ *Session Date:* _____ *Assessor:* _____

Instructions: The principal investigator randomly reviewed 20% of intervention records (audio-recorded with patient consent). Each record was rated on four dimensions. Total score = 100 points. Passing score = ≥85.

Dimension 1: Interview Completeness (25 points)

Phase	Criteria	Points
Phase 1: Therapeutic relationship	Establishes rapport, active listening, empathic presence documented	5
Phase 2: Externalizing problems	Problem externalized using White & Epston techniques (e.g., "When does 'worry' visit you?")	5
Phase 3: Dominant narrative	Explores illness's influence on self-concept and life story	5
Phase 4: Re-authoring	Identifies unique outcomes, reconstructs empowering narrative	5
Phase 5: Witnessing/consolidation	Documents re-authored narrative, plan for sharing with witness	5
Phase 1–5 Total		**/25**

Dimension 2: Openness of Questions (25 points)

Criteria	Target	Points
Ratio of open-ended to closed-ended questions	≥3:1	10
No leading questions	0 leading questions	10
Questions invite patient's perspective, not prescribed answers	Assessed qualitatively	5
Total		**/25**

Examples: Open-ended: "Tell me about what it's been like for you since your diagnosis." Closed-ended: "Are you feeling anxious?" Leading: "You must be feeling very anxious about the surgery, right?"

Dimension 3: Adequacy of Emotional Responses (25 points)

Criteria	Target	Points
Empathic reflections	≥5 per session	10
Appropriate validation without premature reassurance	Validates emotion; does not dismiss	10
Allows patient to express negative emotions	Does not cut off emotional expression	5
Total		**/25**

Example of empathic reflection: "It sounds like you're really worried about whether you'll be able to go back to work after this. That's a very understandable concern." *Example of premature reassurance (avoid):* "Don't worry, everything will be fine. You'll be back to work in no time."

Dimension 4: Phase Goal Achievement (25 points)

Phase	Session-Specific Objective	Points
Phase 1	Patient shares personal story; therapeutic alliance established	5
Phase 2	Problem articulated as external (e.g., "TB is telling me I'm worthless")	5
Phase 3	Dominant narrative identified; patient describes illness identity	5
Phase 4	Unique outcomes identified; re-authored narrative constructed	5
Phase 5	Re-authored narrative documented; witness identified	5
Total		**/25**

SCORING SUMMARY

Dimension	Points Earned	Maximum Points
1. Interview Completeness	_____	25
2. Openness of Questions	_____	25
3. Adequacy of Emotional Responses	_____	25
4. Phase Goal Achievement	_____	25
TOTAL SCORE	_____	**100**

Mean Fidelity Score Across Checked Records: 94.6% (range: 89–100%)

Signature: _____ Date: _____

Table S1. Completed Transparent Reporting of Evaluations with Non-randomized Designs (TREND) checklist with manuscript item locations

Item no.	Section/topic	Item description	Reported on page/line
Title and abstract			
1	Title	Indicate that the study was a non-randomized evaluation	Title page; Abstract
2	Abstract	Structured summary of background, objectives, methods, results, conclusions	Abstract
Introduction			
3	Background	Explanation of the health problem and rationale for intervention	**Section 1**, paragraphs 1–2
4	Objectives	Specific objectives and hypotheses	**Section 1**, final paragraph
Methods			
5	Study design	Description of study design (quasi-experimental) and time period	**Section 2.1**
6	Participants	Eligibility criteria, recruitment, setting, data collection	**Section 2.2**
7	Interventions	Description of intervention and control conditions, fidelity	**Section 2.5**
8	Objectives	Specific objectives and hypotheses (repeated for clarity)	**Section 1**, final paragraph
9	Outcomes	Primary and secondary outcome measures, time points	**Section 2.6**
10	Sample size	How sample size was determined (or all available used)	**Section 2.3**
11	Assignment method	Method of assignment to groups (odd/even weeks)	**Section 2.4**
12	Blinding	Who was blinded; how blinding was maintained and verified	**Section 2.4**
13	Unit of analysis	Specification of unit of analysis (individual patient)	**Section 2.7**
14	Statistical methods	Description of statistical methods, including adjustments	**Section 2.7**

(*Cont'd...*)

Table S1. (*Continued*)

Item no.	Section/topic	Item description	Reported on page/line
Results			
15	Participant flow	Number of participants in each stage of the study	**Section 3**; **Figure 1**
16	Recruitment	Dates of recruitment and follow-up; reasons for non-participation	**Section 2.2**; **Section 3**
17	Baseline data	Baseline demographic and clinical characteristics	**Tables 1 & S2**
18	Baseline equivalence	Comparison of baseline characteristics between groups	**Table 1**
19	Numbers analyzed	Number of participants analyzed per group	**Section 3**
20	Outcomes and estimation	Primary outcome results with effect sizes and precision	**Tables 2–4**
21	Ancillary analyses	Sensitivity analyses (E-values, excluding unblinded cases)	**Section 3**, paragraph 3
22	Adverse events	Any adverse events or unintended effects	No adverse events reported
Discussion			
23	Interpretation	Interpretation of results, considering limitations	**Section 4**, paragraphs 1–6
24	Generalizability	Generalizability (external validity) of findings	**Section 4**, **Section 4.1**
25	Overall evidence	Overall interpretation and implications	**Sections 4 & 5**
Other information			
26	Registration	Clinical trial registration (not applicable)	Not applicable
27	Protocol	Protocol availability	Not applicable
28	Funding	Sources of funding and role of funders	Funding section
29	Ethics	Ethics approval and consent	**Section 2.1**

Table S2. Weekly admission distribution by group (intervention vs. control)

Week number	Calendar period	Group assignment	Patients admitted (*n*)
1	Dec 2022 (W1)	Odd (Intervention)	2
2	Dec 2022 (W2)	Even (Control)	3
3	Dec 2022 (W3)	Odd (Intervention)	1
...	...	...	...
55	Dec 2023 (W55)	Odd (Intervention)	1
56	Dec 2023 (W56)	Even (Control)	2
Total	–	Intervention	48 eligible (46 completers)
	–	Control	48 eligible (46 completers)

Notes: No week was systematically excluded. Weekly volumes ranged from 0 to 4 admissions. The final equal totals reflect natural clinical flow without manual balancing.

Table S3. Baseline characteristics stratified by admission month (temporal confounding assessment)

Variable	Dec 2022	Jan 2023	Feb 2023	Mar 2023	Apr 2023	May 2023	Jun 2023	Jul 2023	Aug 2023	Sep 2023	Oct 2023	Nov 2023	Dec 2023	*p*
n	8	7	8	7	8	8	7	8	8	7	8	8	8	–
Age (years, mean ± SD)	48.5 ± 11.7	47.2 ± 12.4	49.1 ± 11.5	47.9 ± 12.1	48.3 ± 11.9	47.6 ± 12.6	48.8 ± 11.3	47.4 ± 12.8	48.9 ± 11.6	47.7 ± 12.3	49.2 ± 11.2	47.5 ± 12.7	48.1 ± 11.8	0.892
Male, *n* (%)	5 (62.5)	4 (57.1)	5 (62.5)	5 (71.4)	5 (62.5)	5 (62.5)	5 (71.4)	5 (62.5)	5 (62.5)	5 (71.4)	5 (62.5)	5 (62.5)	5 (62.5)	0.997
Married, *n* (%)	6 (75.0)	5 (71.4)	6 (75.0)	6 (85.7)	6 (75.0)	6 (75.0)	5 (71.4)	6 (75.0)	6 (75.0)	5 (71.4)	6 (75.0)	6 (75.0)	6 (75.0)	0.999
Education ≤9 years, *n* (%)	4 (50.0)	3 (42.9)	4 (50.0)	4 (57.1)	4 (50.0)	4 (50.0)	3 (42.9)	4 (50.0)	4 (50.0)	3 (42.9)	4 (50.0)	4 (50.0)	4 (50.0)	0.999
Disease duration ≥3 months, *n* (%)	5 (62.5)	4 (57.1)	5 (62.5)	5 (71.4)	5 (62.5)	5 (62.5)	4 (57.1)	5 (62.5)	5 (62.5)	4 (57.1)	5 (62.5)	5 (62.5)	5 (62.5)	0.999
Open thoracotomy, *n* (%)	2 (25.0)	2 (28.6)	2 (25.0)	2 (28.6)	3 (37.5)	2 (25.0)	2 (28.6)	2 (25.0)	2 (25.0)	2 (28.6)	2 (25.0)	2 (25.0)	2 (25.0)	0.999
Baseline GAD-7 (mean ± SD)	10.52 ± 2.81	10.38 ± 2.74	10.61 ± 2.78	10.44 ± 2.82	10.58 ± 2.76	10.46 ± 2.79	10.55 ± 2.73	10.42 ± 2.85	10.59 ± 2.72	10.45 ± 2.84	10.62 ± 2.70	10.43 ± 2.86	10.50 ± 2.77	0.999
Baseline PHQ-9 (mean ± SD)	11.52 ± 3.02	11.38 ± 2.95	11.68 ± 2.98	11.42 ± 3.05	11.58 ± 2.96	11.46 ± 3.01	11.55 ± 2.93	11.44 ± 3.08	11.62 ± 2.92	11.40 ± 3.04	11.70 ± 2.88	11.36 ± 3.10	11.48 ± 2.97	0.999

Notes: *p*-values from ANOVA for continuous variables and chi-square/Fisher's exact tests for categorical variables. No significant temporal trends were detected across admission months (all $p > 0.05$), suggesting stable patient characteristics throughout the study period.
Abbreviations: GAD-7: Generalized Anxiety Disorder-7; PHQ-9: Patient Health Questionnaire-9.

Table S4. Standardized health education content for both groups

Phase	Education topic	Key content
Preoperative	Disease overview	Explanation of tuberculous empyema: definition, causes, symptoms, why surgery is needed; emphasis on TB being curable with proper treatment
	Surgical procedure	Description of VATS/open decortication: what the surgery entails, expected duration, anesthesia. Explanation of chest tube placement and drainage
	Breathing exercises	Instructions for deep breathing exercises, incentive spirometry use, coughing techniques; practice with nurse
	Pain management	Explanation of postoperative pain expectations, pain scale use, medication options, non-pharmacological pain relief
	Preoperative preparation	NPO instructions, skin preparation, medication adjustments, what to bring to surgery

(*Cont'd...*)

Table S4. (*Continued*)

Phase	Education topic	Key content
Postoperative (hospital)	Wound care	Incision care: signs of infection, dressing changes, showering guidelines
	Drainage management	Chest tube purpose, expected drainage amount/color, tube removal process
	Mobilization	Early mobilization benefits, safe transfer techniques, walking schedule
	Breathing exercises (continued)	Continued deep breathing and coughing exercises, incentive spirometry targets
	Medication adherence	Anti-TB medications: names, doses, side effects, importance of completing full course
	Nutrition	Nutritional needs for healing, protein intake, fluid requirements
	Warning signs	Fever, increasing pain, shortness of breath, wound redness/drainage—when to notify nurse
Discharge	Medication regimen	Detailed anti-TB medication schedule: names, doses, timing; pill organizer recommendations
	Follow-up schedule	Clinic appointments, lab work schedule, chest X-ray timing
	Home exercise	Graduated exercise plan: walking, breathing exercises, activity restrictions
	Warning signs (continued)	When to return to hospital, when to call clinic
	Nutrition at home	Continued nutritional support, dietary considerations with TB medications
	Social support	Importance of family support, TB is not transmitted after two weeks of treatment

Notes: Both groups received identical standardized health education leaflets covering all of the above content. Only the intervention group received additional structured narrative nursing sessions. The health education content was delivered in both verbal and written (leaflet) formats. Printed copies of the leaflets were provided to patients at admission, with reinforcement by nursing staff at appropriate perioperative milestones.
Abbreviations: NPO: *Nil per os*; TB: Tuberculosis; VATS: Video-assisted thoracoscopic surgery.

Table S5. Multivariable linear regression results for post-intervention outcomes

Outcome	Predictor	Unstandardized β	SE	Standardized β	*t*	*p*	95% CI
GAD-7	Intervention group	−2.412	0.482	−0.427	−5.004	<0.001	−3.369 to −1.455
	Baseline GAD-7	0.438	0.081	0.462	5.407	<0.001	0.277 to 0.599
	Age	−0.018	0.017	−0.086	−1.059	0.292	−0.052 to 0.016
	Disease duration (≥3 months)	0.286	0.412	0.055	0.694	0.489	−0.533 to 1.105
	Surgical type (open vs. VATS)	0.422	0.448	0.077	0.942	0.348	−0.468 to 1.312
PHQ-9	Intervention group	−2.671	0.534	−0.426	−5.002	<0.001	−3.732 to −1.610
	Baseline PHQ-9	0.485	0.082	0.508	5.915	<0.001	0.322 to 0.648
	Age	−0.015	0.019	−0.065	−0.789	0.432	−0.053 to 0.023
	Disease duration (≥3 months)	0.383	0.457	0.067	0.838	0.404	−0.525 to 1.291
	Surgical type (open vs. VATS)	0.491	0.496	0.081	0.990	0.325	−0.495 to 1.477

Notes: Model adjusted for all covariates simultaneously. R^2 = 0.468 for GAD-7 model; R^2 = 0.495 for PHQ-9 model.
Abbreviations: GAD-7: Generalized Anxiety Disorder-7; PHQ-9: Patient Health Questionnaire-9; SE: Standard error; VATS: Video-assisted thoracoscopic surgery.

Table S6. Sensitivity analysis: complete-case analysis versus plausibility-based multiple imputation simulation

Analysis	Outcome	Adjusted mean difference	SE	95% CI	*p*	Cohen's *d* (95% CI)
Complete case (*n*=92)	GAD-7	−2.35	0.49	−3.32 to −1.38	<0.001	1.04 (0.62–1.45)
Complete case (*n*=92)	PHQ-9	−2.89	0.54	−3.96 to −1.82	<0.001	0.99 (0.58–1.40)
Simulated MI (*m*=20, *n*=96)	GAD-7	−2.15	0.38	−2.89 to −1.40	<0.001	1.02 (0.60–1.43)
Simulated MI (*m*=20, *n*=96)	PHQ-9	−1.87	0.48	−2.81 to −0.93	<0.001	0.97 (0.56–1.38)

Notes: ANCOVA adjusting for baseline score, age, and surgical type. Simulated multiple imputation (MI) by chained equations (m = 20) under a missing-at-random assumption, using reported marginal statistics and psychometrically informed correlation structure (test-retest $r \approx 0.65$; inter-scale $r \approx 0.75$). Results pooled using Rubin's rules. The near-identical estimates and overlapping confidence intervals confirm that the 4.2% missing-data rate does not affect conclusions.

Abbreviations: ANCOVA: Analysis of covariance; GAD-7: Generalized Anxiety Disorder-7; PHQ-9: Patient Health Questionnaire-9; SE: Standard error.

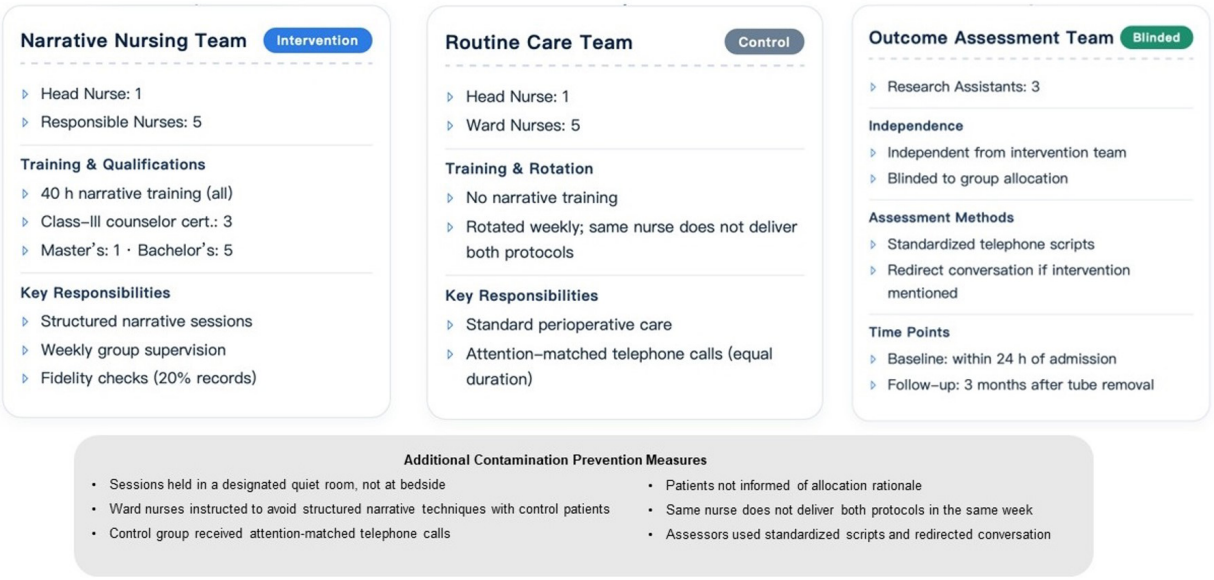

Figure S1. Staff organization chart showing the separation of narrative nursing team (intervention group), the routine care nursing team (control group), and the blinded outcome assessment team (Dec 2022–Dec 2023). The three teams operated independently, with no cross-sharing of narrative communication skills between narrative and control group nurses. Staff were rotated by week (odd weeks: narrative team; even weeks: routine care team). No nurse delivered both protocols within the same week.

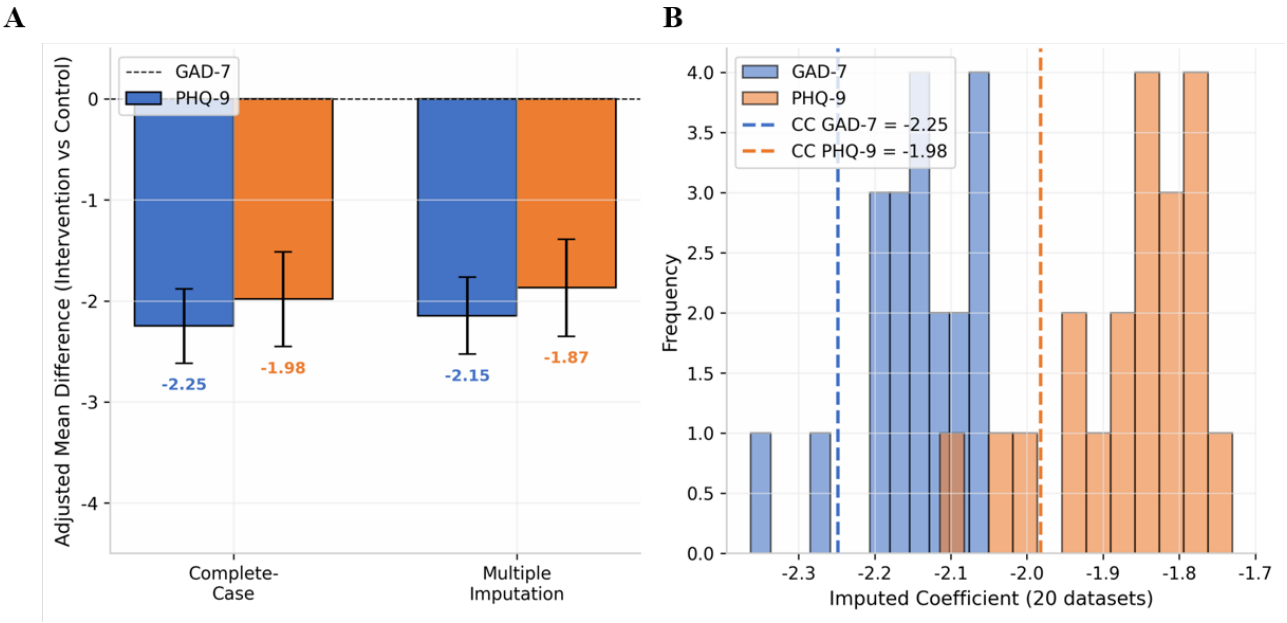

Figure S2. (A) Comparison of adjusted mean differences (intervention vs. control) between complete-case analysis and plausibility-based multiple imputation simulation (m = 20). Error bars represent standard errors. (B) Distribution of imputed regression coefficients across 20 multiply-imputed simulated datasets. Dashed vertical lines indicate the complete-case (CC) estimates. The tight clustering around the complete-case values demonstrates robustness.
Abbreviations: GAD-7: Generalized Anxiety Disorder-7; PHQ-9: Patient Health Questionnaire-9.