Outcomes in Otolaryngology: The Interplay between the Risk Analysis Index, Sex, and Partnership Status

Carine Tamamian, BS;[1] Desiree Delavary, BS;[2] Jun Yun, BS;[3] Lauran K. Evans, MD MPH;[3] Matthew E. Lin, MD;[3] Maie St. John, MD PhD;[3] Dinesh K. Chhetri, MD[3]

[1]University of California, San Diego School of Medicine, La Jolla, CA, USA.
[2]A.T. Still University School of Osteopathic Medicine, Mesa, AZ, USA.
[3]Department of Head and Neck Surgery, David Geffen School of Medicine at University of California Los Angeles, Los Angeles, CA, USA.

Introduction

- **Risk Analysis Index (RAI)** is a frailty assessment tool used to predict postoperative surgical outcomes. It is a 14-item questionnaire scored from 0 to 81 points that incorporates demographic, clinical, and functional domains.[1]
- Frail status is defined at **RAI cutoff >30**.[2]
- Although RAI predicts outcomes in otolaryngology, [3] sex-specific differences remain understudied.
- Studies in other surgical specialties such as vascular surgery show frailty and gender independently predict poor outcomes.[4]
- Research in surgical oncology showed that partnered patients had lower incidences of 90-day complications and death.[5,6] Although many of these studies do not explore the differences across the sexes.
- Herein, we aim to investigate the impact of frailty, partnership status, and ethnicity on postoperative complications, with a focus on identifying sex-specific patterns in otolaryngology patients.

Methods and Materials

- Retrospective chart review from 2022 to 2024.
- **Patients ≥18 years old with available data regarding RAI scores, demographics, and outcomes were included**. Patients were excluded if they were <18 or had incomplete records.
- RAI was administered 3 weeks preoperatively. Data on length of stay and post-discharge services were collected.
  Total complications were defined as the occurrence of at least one of the following events postoperatively:

- Aspiration
- Pneumothorax
- Sepsis
- Surgical site infection
- Hematoma
- Hemorrhage
- Acute anemia
- Respiratory distress
- Tracheostomy
- Flap failure
- Deep vein thrombosis
- Pulmonary embolism
- Post-procedure fever
- Ileus

- Outcomes were assessed using multivariate logistic regression and chi-square tests.
- Patients were drawn from several subspecialties, including Facial Plastics, Head & Neck, Laryngology, Otology/Neurotology, Rhinology/Skull Base, and Sleep Medicine.

Results

Table 1. Patient demographics.

Variable	Female *n (%)*	Male *n (%)*	p-value
Total (n=1542)	732 (47.4)	810 (52.5)	
FPRS	56 (47)	64 (53)	0.92
General Otolaryngology	55 (72)	21 (28)	<0.0001
HNC Surgery	188 (47)	216 (53)	0.70
Laryngology	127 (52)	115 (48)	0.10
Otology/Neurotology	85 (55)	70 (45)	0.06
Rhinology/Skull Base surgery	205 (46)	243 (54)	0.42
Sleep Medicine	16 (16)	81 (84)	<0.0001
Mean age (years)	52	56	<0.0001
Mean RAI Score	17.45	22.9	<0.0001
Frail patients (RAI>30)	126 (17.2)	222 (27.4)	<0.0001
% Complication	364/732 (49.7)	505/810 (62.3)	<0.0001
% Partnered	360/732 (49.2)	528/810 (65)	<0.0001
% Hispanic	143/732 (19.5)	96/810 (11.9)	<0.0001

FPRS = Facial Plastics and Reconstructive Surgery
HNC = Head and Neck Cancer

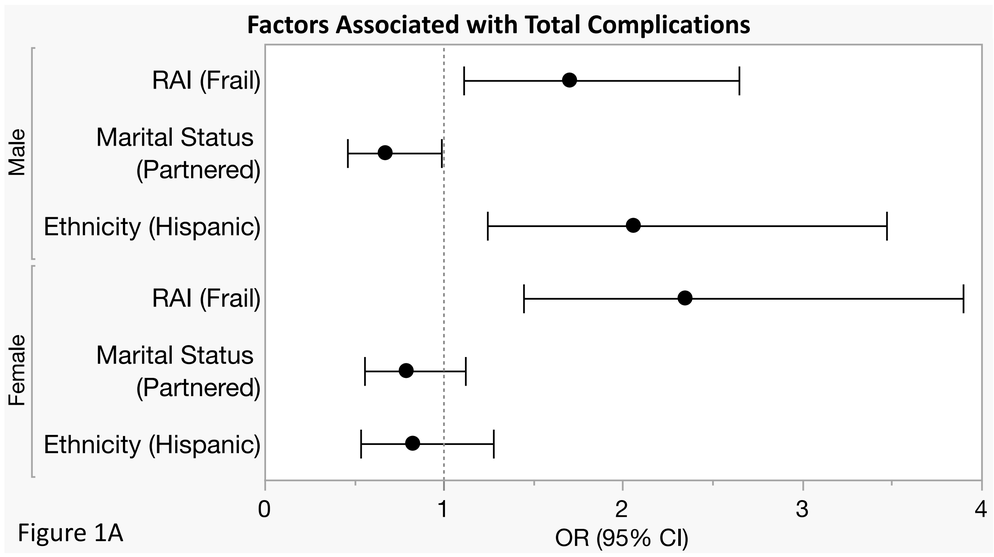

Figure 1A

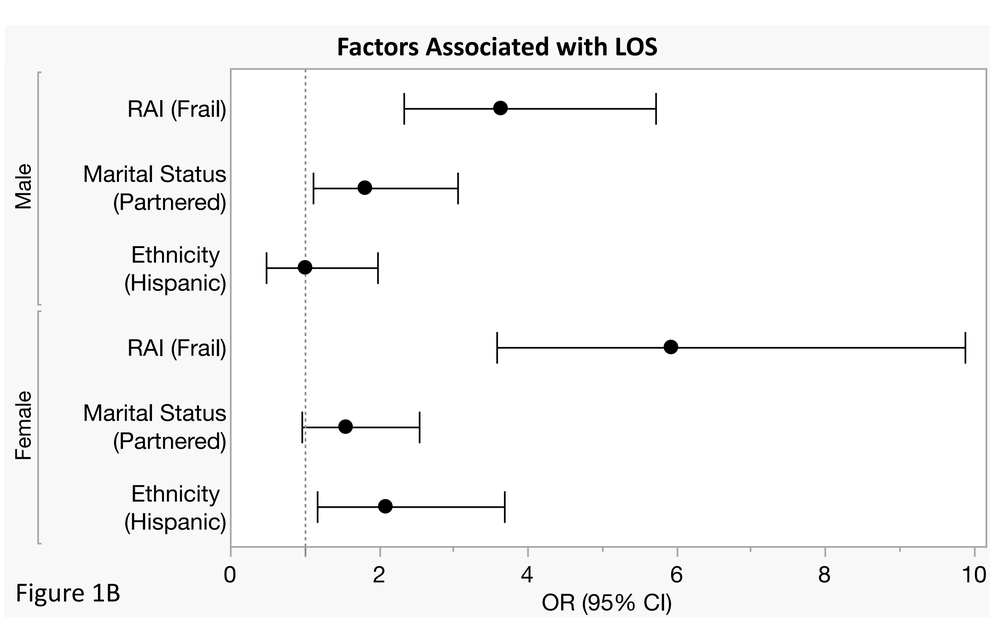

Figure 1B

Figure 1. Odds ratios (OR) with 95% confidence intervals (CI) for predictors of (A) Total complications and (B) Length of Stay (LOS) > 1 day stratified by sex. Frailty significantly increased complications in both males and females, while being **partnered was protective in males.** Hispanic ethnicity was linked to higher complication odds in males, but not females. **Marital status and ethnicity were predictors of LOS > 1day in males and females** respectively.

Results

- Frail males were more likely than frail females to report being in a committed partnership **(77.5% vs 56%).**
- Partnership was significantly associated with **increased frailty in males** (OR 2.19, p<0.0001), but not in females (OR 1.40, p=0.09).
- Complications were more common in frail men (82.4%, OR 3.88, 95% CI 2.65–5.68, p<0.0001) than frail women (77.0%, OR 4.25, 95% CI 2.72–6.63, p<0.0001).
- Sex did not significantly alter the impact of partnership status or ethnicity on nursing home or home health needs.

Discussion

- Frailty was a consistent predictor of postoperative complications in both males and females.
- Despite higher partnership/frailty rates, frail men had fewer complications than frail women in partnerships, suggesting the presence of sex-specific differences.
- Hispanic ethnicity was associated with increased complication risk in males but not in females, showing potential disparities in perioperative care or recovery support that warrant further research.
- Together, these findings suggest that **both biological and social factors may contribute to postoperative outcomes** and should be considered in risk stratification and patient counseling.
- Further research should explore incorporating additional questions regarding social determinants into existing risk assessment tools.

Conclusion

- Frailty remains a powerful predictor of postoperative complications. Partnership status was associated with lower overall complication rates in **males** only.
- Future studies should confirm these findings in larger, prospective cohorts as well as qualitative studies to better understand the possible disproportionate caregiving and social responsibilities often carried by women.

Contact

Carine Tamamian, BS
University of California, San Diego School of Medicine
ctamamian@health.ucsd.edu
818-515-8344

References

1. Hall, Daniel E., et al. "Development and initial validation of the risk analysis index for measuring frailty in surgical populations." JAMA surgery 152.2 (2017): 175-182.
2. Evans, Lauran K., et al. "Risk Analysis Index Versus Modified Frailty Index: Outcomes After Otolaryngologic Surgery." *The Laryngoscope* (2025).
3. Evans, Lauran K., et al. "Risk Analysis Index Frailty Score as a Predictor of Otolaryngology Surgical Outcomes." *Otolaryngology–Head and Neck Surgery* 171.6 (2024): 1728-1735.
4. Brahmbhatt, Reshma, et al. "Gender and frailty predict poor outcomes in infrainguinal vascular surgery." *Journal of Surgical Research* 201.1 (2016): 156-165.
5. Tang, Yuzhe, et al. "The association of marital status with kidney cancer surgery morbidity-a retrospective cohort study." Frontiers in Oncology 13 (2023): 1254181.
6. Neuman, Mark D., and Rachel M. Werner. "Marital status and postoperative functional recovery." JAMA surgery 151.2 (2016): 194-196.