

Prospective Validation of the Canadian Syncope Risk Score in an Indian Emergency Department: Performance in Syncope and Near-Syncope

Manan Shah

erdoc1996@yahoo.com

Kokilaben Dhirubhai Ambani Hospital and Medical Research Institute

Sanjay Mehta

Kokilaben Dhirubhai Ambani Hospital and Medical Research Institute

Sagar Shah

Kokilaben Dhirubhai Ambani Hospital and Medical Research Institute

Deepack Kotharthil

Kokilaben Dhirubhai Ambani Hospital and Medical Research Institute

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Abstract

Background

Risk stratification of patients presenting with syncope in the emergency department (ED) remains challenging owing to the absence of universally validated clinical decision tools applicable to non-Western populations. The Canadian Syncope Risk Score (CSRS) was derived and validated in Canadian EDs but has not been prospectively evaluated in Indian patients, nor formally assessed in near-syncope presentations. This study aimed to validate the CSRS in an Indian ED population and extend its evaluation to patients presenting with near-syncope.

Methods

Prospective single-center observational cohort study conducted at a 750-bed quaternary care hospital in Mumbai, India, from January 2023 to March 2024. Adults aged ≥ 18 years presenting within 24 hours of syncope or near-syncope were enrolled consecutively. The primary outcome was a composite of 30-day serious adverse events not evident during index ED evaluation, classified as arrhythmic (arrhythmias, procedural interventions) or non-arrhythmic (myocardial infarction, structural heart disease, pulmonary embolism, or hemorrhage). Diagnostic accuracy of CSRS at different cutoff values was evaluated using ROC curve analysis.

Results

Of 272 patients analyzed (mean age 54.9 ± 19.4 years; 54% male), 54 (19.9%) experienced 30-day serious outcomes, including 6 deaths. Adverse event rates increased progressively across CSRS risk tiers, from 0% (very low) to 81.8% (very high; $p < 0.001$). At a cutoff of 2 for the overall cohort, CSRS demonstrated an AUC of 0.872 (95% CI, 0.822–0.922), sensitivity of 74.6%, and specificity of 83.0%. In near-syncope patients, a cutoff of 1 yielded an AUC of 0.860, sensitivity of 76.9%, and specificity of 76.4%. At a cutoff of 0, sensitivity reached 96.4%, supporting its use as a high-sensitivity rule-out strategy.

Conclusions

The CSRS demonstrated strong ordinal risk discrimination and diagnostic accuracy consistent with prior validation studies in a prospective Indian ED cohort, and performed reliably in near-syncope patients. Implementation of the CSRS has the potential to reduce unnecessary admissions and standardize ED disposition decisions without compromising patient safety. This study provides the first prospective evidence for CSRS applicability across the full syncopal spectrum in a non-Western ED setting.

Introduction

Syncope—defined as a transient, self-limited loss of consciousness caused by global cerebral hypoperfusion with characteristic rapid onset and spontaneous complete recovery—accounts for approximately 1%–3% of ED visits and up to 6% of hospital admissions globally [1, 2]. In the United States alone, the annual cost of syncope-related hospitalizations has been estimated to exceed \$2.4 billion, with per-admission costs ranging from \$22,000 to \$26,000 [2]. Despite this economic burden, the majority of ED syncope presentations carry a benign underlying etiology, and hospitalization confers minimal incremental benefit in the absence of high-risk features. In the absence of validated risk stratification tools, however, more than half of all ED patients with syncope are admitted to hospital [1].

Patients who experience the sensation of impending loss of consciousness without a complete syncopal episode—classified as near-syncope or presyncope—have historically been regarded as a milder variant. Prospective data have challenged this assumption: Thiruganasambandamoorthy et al. reported serious outcomes in 5.1% of near-syncope patients within 30 days, a rate comparable to frank syncope.[3]Bastani et al. similarly found no significant difference in 30-day serious adverse clinical events between older patients presenting with near-syncope versus syncope [4]. Taken together, these findings support managing syncope and near-syncope within a unified clinical framework.

Traditional risk stratification tools—including the San Francisco Syncope Rule (SFSR) and the Risk Stratification of Syncope in the Emergency Department (ROSE) score—have demonstrated limited generalizability in external validation and require biomarkers not routinely available in many settings [5, 6]. A systematic review of 19 risk stratification tools identified that most lack adequate external validation, and individual patient data (IPD) meta-analyses have consistently found that no existing tool surpasses well-calibrated clinical judgment in predicting short-term outcomes.[7]

The Canadian Syncope Risk Score (CSRS), derived and validated by Thiruganasambandamoorthy et al. from a prospective multicenter cohort of 4,030 patients across six Canadian EDs, represents a methodological advance over prior tools [8]. The CSRS incorporates clinical variables, ECG findings, high-sensitivity troponin, and—distinctively—the treating physician's clinical impression of syncope etiology at ED discharge, acknowledging the evidential weight of gestalt. Critically, the score targets serious outcomes not evident during the index ED evaluation, directly addressing the clinically relevant diagnostic uncertainty that governs disposition decisions. A multicenter external validation demonstrated a sensitivity of 97% and AUC of 0.87.[1]

Despite its robust derivation, the CSRS has not been prospectively evaluated in Indian patients, who may differ substantially in comorbidity burden, disease prevalence, and healthcare utilization patterns from North American populations. Furthermore, the applicability of the CSRS to near-syncope—excluded from the original derivation—has not been formally assessed in a prospective cohort. This study aimed to address both gaps by prospectively validating the CSRS in an Indian ED population and extending its evaluation to patients presenting with near-syncope.

Methods

Study Design and Setting

This prospective single-center observational cohort study was conducted at the Emergency Department of Kokilaben Dhirubhai Ambani Hospital and Medical Research Institute, a 750-bed quaternary care center in Mumbai, India. Enrollment occurred consecutively from January 2023 to March 2024. The study was approved by the Institutional Ethics Committee (IEC-A) and conducted in accordance with institutional protocols and ethical guidelines. Written informed consent was obtained from all participants or their legally authorized representatives. This study is reported in accordance with the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines for observational cohort studies.

Participants

Eligible patients were adults aged ≥ 18 years of either sex presenting to the ED within 24 hours of syncope or near-syncope. Syncope was defined per the 2018 European Society of Cardiology (ESC) guidelines as a transient, self-limited loss of consciousness caused by global cerebral hypoperfusion with rapid onset and spontaneous complete recovery [2]. Near-syncope was defined as a sensation of impending loss of consciousness without complete loss. Patients were excluded if they had: prolonged loss of consciousness (>5 minutes); non-spontaneous recovery; altered mental status from baseline; witnessed seizure activity; loss of consciousness following major trauma including head injury; intoxication with alcohol or illicit substances; syncope attributable to a serious condition requiring immediate ED intervention (e.g., acute myocardial infarction, pulmonary embolism, intracranial hemorrhage, aortic dissection, or documented arrhythmia prior to monitoring); or a terminal illness with expected survival of less than 30 days.

Sample Size

Sample size was calculated using a sensitivity-based formula for diagnostic studies.[9] Assuming an adverse outcome prevalence of 15% (midpoint of the reported range of 7%–23%), a target sensitivity of 90%, a 95% confidence level, and an allowable error of 10%, the required sample was 230 patients. Accounting for a 20% dropout and loss to follow-up rate, a minimum of 272 patients were enrolled.

Study Protocol

After confirmation of eligibility and acquisition of informed consent, a standardized initial evaluation was performed, comprising detailed clinical history, physical examination including supine and standing blood pressure, 12-lead ECG, and clinically indicated laboratory investigations including cardiac

biomarkers. Variables required for CSRS calculation were recorded using a structured data collection form. Patients were stratified into five CSRS-defined risk categories (very low, low, medium, high, and very high). While CSRS-based guidance generally favored discharge for very low and low risk patients and admission for high and very high risk patients, final ED disposition was governed by institutional protocols, physician discretion, and patient-related factors. Both admitted and discharged patients were included in the analysis to minimize selection bias.

Outcome Ascertainment

The primary outcome was a composite of serious clinical and procedural events occurring within 30 days of the index ED visit, limited to those not identified during the initial evaluation. Outcomes were classified as arrhythmic (clinically significant arrhythmias; pacemaker or defibrillator implantation; cardioversion; or unexplained death) or non-arrhythmic (myocardial infarction, structural heart disease, pulmonary embolism, hemorrhage, or other serious non-arrhythmic diagnoses). Outcome ascertainment was performed via structured medical record review of the index visit, subsequent ED visits, hospitalizations, and outpatient investigation results, supplemented by standardized telephonic follow-up at 30 days.

The secondary outcome was reduction of inappropriate hospital admissions: specifically, the proportion of CSRS-classified very low and low risk patients who were discharged and experienced no serious adverse event within 30 days.

Statistical Analysis

Data were entered into Microsoft Excel and analyzed using SPSS version 25.0 (IBM Corporation, Armonk, NY, USA). Continuous variables were expressed as mean $\pm$ standard deviation or median with interquartile range as appropriate; categorical variables were reported as frequencies and percentages. Comparisons between the syncope and near-syncope groups were performed using the chi-square test or Fisher's exact test for categorical variables and the independent samples t-test for continuous variables. Receiver operating characteristic (ROC) curve analysis was used to evaluate the diagnostic performance of the CSRS; optimal cutoff values were identified using Youden's index. Sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV), and overall accuracy were calculated at selected thresholds. Statistical significance was defined as a two-sided p-value < 0.05 .

Results

Enrollment and Baseline Characteristics

Of 273 patients initially enrolled, 1 withdrew consent and 2 were lost to follow-up, yielding a final analytic cohort of 272 patients: 149 (54.8%) with syncope and 123 (45.2%) with near-syncope. The mean age

was 54.9 ± 19.4 years, with the majority of patients aged 61–80 years (Table 1). Males constituted 54% of the cohort (n = 147).

Table 1. Age distribution of study participants (N = 272)

Age Group	N	%
≤30 years	36	13.2
31–40 years	35	12.9
41–50 years	37	13.6
51–60 years	41	15.1
61–70 years	50	18.4
71–80 years	53	19.5
≥81 years	20	7.3

Hypertension was the most prevalent comorbidity (41.9%), followed by diabetes mellitus (25.4%) and coronary artery disease (20.2%). Baseline comorbidities were comparable between the syncope and near-syncope groups (all $p > 0.05$) (Table 2).

Table 2. Baseline comorbidities by presentation type

	Near syncope (n=123)		Syncope (n=149)		Total (n=272)		P value
	N	%	N	%	N	%	
Hypertension	54	43.9	60	40.3	114	41.9	0.545
Diabetes mellitus	31	25.2	38	25.5	69	25.4	0.955
Coronary artery disease	23	18.7	32	21.5	55	20.2	0.570
Atrial fibrillation	4	3.3	1	0.7	5	1.8	0.115
Valvular presentation	3	2.4	5	3.4	8	2.9	0.656
Congestive heart failure	4	3.3	3	2.0	7	2.6	0.705
Others	32	26.0	47	31.5	79	29	0.318

CSRS Scores and Risk Stratification

The mean CSRS for the overall cohort was 0.19 ± 2.7 . The near-syncope group had a slightly lower mean score (-0.18 ± 2.8) compared with syncope patients (0.48 ± 2.6). Across the full cohort, 84 patients

(30.5%) were classified as very low risk, 87 (32.4%) as low risk, 62 (22.8%) as medium risk, 28 (10.3%) as high risk, and 11 (4.0%) as very high risk (Table 3). Near-syncope patients were more frequently classified as very low risk (37.4%) compared with syncope patients (24.8%).

Table 3. Distribution of patients across CSRS risk categories

Risk Category	Near syncope (n=123)		Syncope (n=149)		Total (n=272)	
	N	%	N	%	N	%
Very low	47	37.4	37	24.8	84	30.5
Low	40	33.3	47	31.5	87	32.4
Medium	22	17.9	40	26.8	62	22.8
High	7	5.7	21	14.1	28	10.3
Very high	7	5.7	4	2.7	11	4.0

ED Disposition

Overall, 120 patients (44.1%) were admitted, 91 (33.5%) were discharged from the ED, and 61 (22.4%) left against medical advice (DAMA). Admission was more frequent among syncope patients (59.1%) than near-syncope patients (26.0%). By contrast, CSRS-based criteria would have recommended admission for only 64 patients (23.5%) and discharge for 208 (76.5%), suggesting substantial over-admission relative to CSRS-guided recommendations. No significant difference in CSRS-recommended disposition was observed between syncope and near-syncope groups ($p = 0.088$).

Thirty-Day Serious Adverse Events

Fifty-four patients (19.9%) experienced a serious adverse event within 30 days of the index visit (Table 4). Of these, 32 events were non-arrhythmic and 16 were arrhythmic (including 6 deaths classified as unexplained); 22 patients required procedural intervention.

Table 4. Thirty-day serious adverse outcomes by type

Outcome	N	%
Death	6	2.2
Myocardial infarction	9	3.3
Significant arrhythmia	16	5.9
Procedural intervention for arrhythmia	10	3.7
Structural heart disease	2	0.7
Aortic dissection	2	0.7
Subarachnoid hemorrhage	1	0.4
Severe pulmonary arterial hypertension	1	0.4
Significant hemorrhage	5	1.5
Other serious non-arrhythmic condition	12	4.4
Other procedural interventions	12	4.0

Association Between CSRS Risk Categories and Outcomes

A clear monotonic gradient in adverse event rates was observed across CSRS risk tiers: 0% in the very-low-risk group, 11.5% in the low-risk group, 25.8% in the medium-risk group, 67.9% in the high-risk group, and 81.8% in the very high-risk group ($p < 0.001$) (Table 5; Fig. 1).

Table 5. Association between CSRS risk category and 30-day serious adverse events

	Very Low (n=84)	Low (n=87)	Medium (n=62)	High (n=28)	Very High (n=11)	Total (n=272)	P
No event	84 (100%)	77 (87.5%)	46 (74.2%)	9 (32.1%)	2 (18.2%)	218 (80.1%)	<0.001
Adverse event	0 (0%)	10 (12.5%)	16 (25.8%)	19 (67.9%)	9 (81.8%)	54 (19.9%)	

[Insert Figure 1 here]

Adverse events were significantly more frequent in patients presenting with syncope compared with near-syncope (27.5% vs. 10.6%; $p = 0.001$) (Fig. 2). Among 120 admitted patients, 33 experienced adverse outcomes during hospitalization, including 5 deaths.

[Insert Figure 2 here]

Among the 171 patients classified as very low or low risk, only 10 (5.8%) experienced a serious adverse event, and no patient sustained a ventricular arrhythmia or death, supporting the safety of expedited discharge in this subgroup.

Troponin Subgroup Analysis

High-sensitivity troponin I was measured in 101 patients (37.1%)—39 in the near-syncope group and 62 in the syncope group—primarily in those with higher CSRS scores or clinical concern. Among this subgroup, the mean CSRS was 1.02 ± 3.0 , and 28 patients (27.7%) experienced adverse outcomes. Consistent with CSRS-based predictions, adverse events clustered in higher-score categories. Among the 171 patients without troponin measurement, 84.8% experienced no adverse event, and the majority belonged to lower CSRS risk tiers, these findings support selective rather than routine troponin testing guided by CSRS risk tier.

Diagnostic Accuracy of the CSRS

For the overall cohort at a cutoff of 2, the CSRS yielded an AUC of 0.872 (95% CI, 0.822–0.922), sensitivity of 74.6%, specificity of 83.0%, PPV of 52.6%, NPV of 92.8%, and overall accuracy of 81.3% (Table 6; Fig. 3).

Table 6. Diagnostic performance of CSRS in the overall cohort (cutoff = 2)

Parameter	Value	95% CI
AUC	0.872	0.822–0.922
Sensitivity	74.6%	61.0–85.3%
Specificity	83.0%	77.4–87.8%
Positive predictive value	52.6%	44.3–61.0%
Negative predictive value	92.8%	89.1–95.3%
Accuracy	81.3%	76.2–85.8%
Youden's Index	0.57	—

[Insert Figure 3 here]

At a cutoff of 0, sensitivity increased to 96.4% with specificity of 45.2%, confirming its utility as a high-sensitivity rule-out strategy. In the syncope subgroup, a cutoff of 2 achieved an AUC of 0.882 (95% CI, 0.820–0.944) with sensitivity of 76.2% and specificity of 86.0% (Table 7; Fig. 4).

Table 7. Diagnostic performance of CSRS in syncope patients (cutoff = 2)

Parameter	Value	95% CI
AUC	0.882	0.820–0.944
Sensitivity	76.2%	60.6–88.0%
Specificity	86.0%	77.9–91.9%
Positive predictive value	68.1%	56.4–77.8%
Negative predictive value	90.2%	84.2–94.1%
Accuracy	83.2%	76.2–88.8%
Youden's Index	0.62	—
		-

[Insert Figure 4 here]

In near-syncope patients, a cutoff of 1 demonstrated an AUC of 0.860 (95% CI, 0.768–0.952), sensitivity of 76.9%, and specificity of 76.4% (Table 8; Fig. 5).

Table 8. Diagnostic performance of CSRS in near-syncope patients (cutoff = 1)

Parameter	Value	95% CI
AUC	0.860	0.768–0.952
Sensitivity	76.9%	46.2–94.6%
Specificity	76.4%	67.3–83.9%
Positive predictive value	27.8%	19.7–37.6%
Negative predictive value	96.6%	91.3–98.7%
Accuracy	76.6%	68.2–83.7%
Youden's Index	0.53	—
		-

[Insert Figure 5 here]

Discussion

This prospective single-center cohort study validated the Canadian Syncope Risk Score in an Indian ED population, enrolling 272 adults presenting with syncope or near-syncope over 15 months. The primary analysis confirmed strong ordinal risk discrimination across all five CSRS risk tiers, with an overall AUC

of 0.872—consistent with the original multicenter Canadian validation [1]. A secondary analysis extended these findings to near-syncope patients, providing the first prospective evidence that the CSRS performs adequately in this clinically significant but historically understudied population.

Demographic Profile and Comorbidity Burden

The mean age of 54.9 ± 19.4 years and predominance of hypertension (41.9%), diabetes mellitus (25.4%), and coronary artery disease (20.2%) are consistent with the demographic profile of syncope presentations at tertiary care centers in published literature. Pires et al. similarly reported hypertension as the most prevalent comorbidity in ED syncope cohorts [10]. The comparable comorbidity burden between syncope and near-syncope groups (all $p > 0.05$) supports homogeneous comparison and is consistent with the position that both presentations represent a shared pathophysiologic continuum of cerebral hypoperfusion.

ED Disposition and Over-Admission

Among the 171 patients classified as very low or low risk, the observed 30-day serious event rate was 5.8% (10/171), with no ventricular arrhythmias or deaths—consistent with the guiding principle of the CSRS that the majority of syncope patients can be safely discharged. However, actual ED admission (44.1%) substantially exceeded CSRS-recommended admission (23.5%), a pattern consistent with North American cohorts where syncope hospitalization rates historically exceed 50% in the absence of structured risk tools [1]. The elevated DAMA rate (22.4%) likely reflects patient and family decisions rather than clinical judgment and is an important contextual consideration when interpreting disposition patterns. These findings support the potential of CSRS implementation to reduce unnecessary admissions and optimize resource utilization in Indian EDs.

Serious Adverse Event Rate

The 30-day serious outcome rate of 19.9% in this cohort substantially exceeds rates reported in the original CSRS derivation (3.17%)[8]and multicenter external validation (3.6%) [1]. This disparity most plausibly reflects referral bias: our institution is a quaternary private hospital serving a disproportionately comorbid population, and the adverse event rate reflects patient case-mix rather than differences in syncope biology per se. Notably, 38 of 54 adverse events (70.4%) occurred during the index hospitalization, suggesting that admitted patients were appropriately selected as higher risk. The 12 non-cardiac serious outcomes—including acute cholecystitis, ectopic pregnancy, pneumothorax, ruptured abdominal aortic aneurysm, and septic shock—underscore that syncope in complex patients may be the sentinel presentation of a broad spectrum of life-threatening conditions.

Performance in Near-Syncope

A key secondary objective was to evaluate whether the CSRS performs adequately in near-syncope patients. Consistent with Bastani et al. [4] and Thiruganasambandamoorthy et al. [3], we observed a meaningful rate of 30-day serious outcomes in near-syncope patients (10.6%), contradicting the

assumption that near-syncope is inherently benign. Although the overall adverse event rate was lower than in frank syncope (10.6% vs. 27.5%; $p = 0.001$), both groups demonstrated consistent ordinal risk gradation with increasing CSRS score. CSRS performance characteristics in near-syncope (AUC 0.860; sensitivity 76.9% at cutoff ≥ 1) were nearly equivalent to those in frank syncope (AUC 0.882), affirming the score's utility across this clinical spectrum and supporting its extension beyond the original derivation population.

Diagnostic Accuracy and Cutoff Selection

At a cutoff of 0, the CSRS achieved high sensitivity (96.4%) with reduced specificity (45.2%), confirming its value as a rule-out strategy for early discharge decisions. At a cutoff of 2, moderate sensitivity (74.5%) with substantially improved specificity (83.0%) makes this threshold more appropriate for guiding hospital admission rather than excluding risk. In medium-risk patients (CSRS 1–3), serious arrhythmic outcomes were infrequent (8.1%) and no deaths occurred, supporting a shared decision-making approach for this subgroup that weighs individual patient factors, access to outpatient follow-up, and patient preferences—rather than routine hospitalization.

Comparison with Other Risk Stratification Tools

The SFSR, ROSE score, and other established syncope risk tools have demonstrated significant limitations in external validation [5, 6]. These tools enrolled patients with serious conditions already identified at ED assessment, introducing ascertainment bias and reducing real-world applicability; the ROSE score additionally requires BNP measurement unavailable in many resource-limited settings. The CSRS uniquely excludes patients with serious causes already evident, incorporates physician gestalt as a formal scoring variable, and was derived in a prospective multicenter design. Zimmermann et al. demonstrated that the CSRS outperformed the OESIL score for patients aged ≥ 40 years [11]. While physician gestalt alone performed comparably to the CSRS in that analysis, the structured CSRS provides a reproducible, documentable framework that standardizes clinical judgment—particularly valuable in high-volume or trainee-heavy EDs.

Role of High-Sensitivity Troponin

Consistent with the approach used in the original CSRS derivation, absent troponin values were treated as normal for scoring purposes. This imputation appears clinically supported by our data: 84.8% of patients without troponin measurement had no serious adverse event, and these patients were predominantly in lower CSRS risk categories. Our findings support selective troponin measurement guided by CSRS risk tier—particularly in medium-to-high-risk patients—rather than universal testing.

Limitations

This study has several limitations. First, the single-center design at a quaternary private hospital limits generalizability to public hospitals, secondary care facilities, and non-metropolitan EDs where syncope epidemiology and diagnostic resources differ. Second, the sample size resulted in sparse data in the

high and very high-risk subgroups, reducing precision of point estimates in these strata. Third, the CSRS component reflecting physician etiology classification (vasovagal vs. cardiac) is inherently subjective and may vary across providers and training levels. Fourth, the 22.4% DAMA rate introduced differential loss to follow-up risk, partially mitigated by telephonic follow-up at 30 days. Finally, the findings cannot be extrapolated to pediatric patients or pregnant women, who were excluded per the original CSRS design.

Conclusion

In this prospective cohort of 272 ED patients presenting with syncope or near-syncope at a tertiary care center in India, the CSRS demonstrated strong ordinal risk discrimination and diagnostic accuracy consistent with prior validation studies, with an overall AUC of 0.872. Score performance was preserved in near-syncope patients, supporting application of the CSRS across the full clinical spectrum of syncopal presentations. A CSRS score below 0 identified a very-low-risk subgroup suitable for early discharge; scores ≥ 4 reliably identified patients at high probability of 30-day serious outcomes. Implementation of the CSRS in Indian EDs has the potential to reduce over-admission and standardize disposition decisions without compromising safety. Multicenter prospective validation across diverse Indian healthcare settings—including public hospitals and secondary care facilities—is necessary to establish broader generalizability and assess the score's population-level impact on admission rates and clinical outcomes.

Abbreviations

AUC, area under the curve; BNP, B-type natriuretic peptide; CI, confidence interval; CSRS, Canadian Syncope Risk Score; DAMA, discharge against medical advice; ECG, electrocardiogram; ED, emergency department; ESC, European Society of Cardiology; NPV, negative predictive value; PPV, positive predictive value; ROC, receiver operating characteristic; ROSE, Risk Stratification of Syncope in the Emergency Department; SFSR, San Francisco Syncope Rule; STROBE, Strengthening the Reporting of Observational Studies in Epidemiology; TLOC, transient loss of consciousness.

Declarations

Ethics Approval and Consent to Participate

This study was approved by the Institutional Ethics Committee (IEC-A) of Kokilaben Dhirubhai Ambani Hospital and Medical Research Institute, Mumbai, India. All procedures were conducted in accordance with the ethical standards of the institutional research committee and with the 1964 Helsinki Declaration and its later amendments. Written informed consent was obtained from all participants or their legally authorized representatives prior to enrollment.

Consent for Publication

Not applicable. This study contains no individually identifiable patient data in any form.

Availability of Data and Materials

The datasets generated and analyzed during this study are available from the corresponding author on reasonable request, subject to institutional data sharing policies.

Competing Interests

The authors declare that they have no competing interests.

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Authors' Contributions

Conceptualization: Manan Shah, Sanjay Mehta

Methodology: Manan Shah, Sanjay Mehta

Data Curation: Manan Shah, Sagar Shah, Deepack Kotharthil

Formal Analysis: Manan Shah

Investigation: Manan Shah, Sagar Shah, Deepack Kotharthil

Project Administration: Manan Shah

Supervision: Sanjay Mehta

Writing – Original Draft: Manan Shah

Writing – Review & Editing: All authors

All authors read and approved the final manuscript and take responsibility for the integrity and accuracy of the work.

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Figures

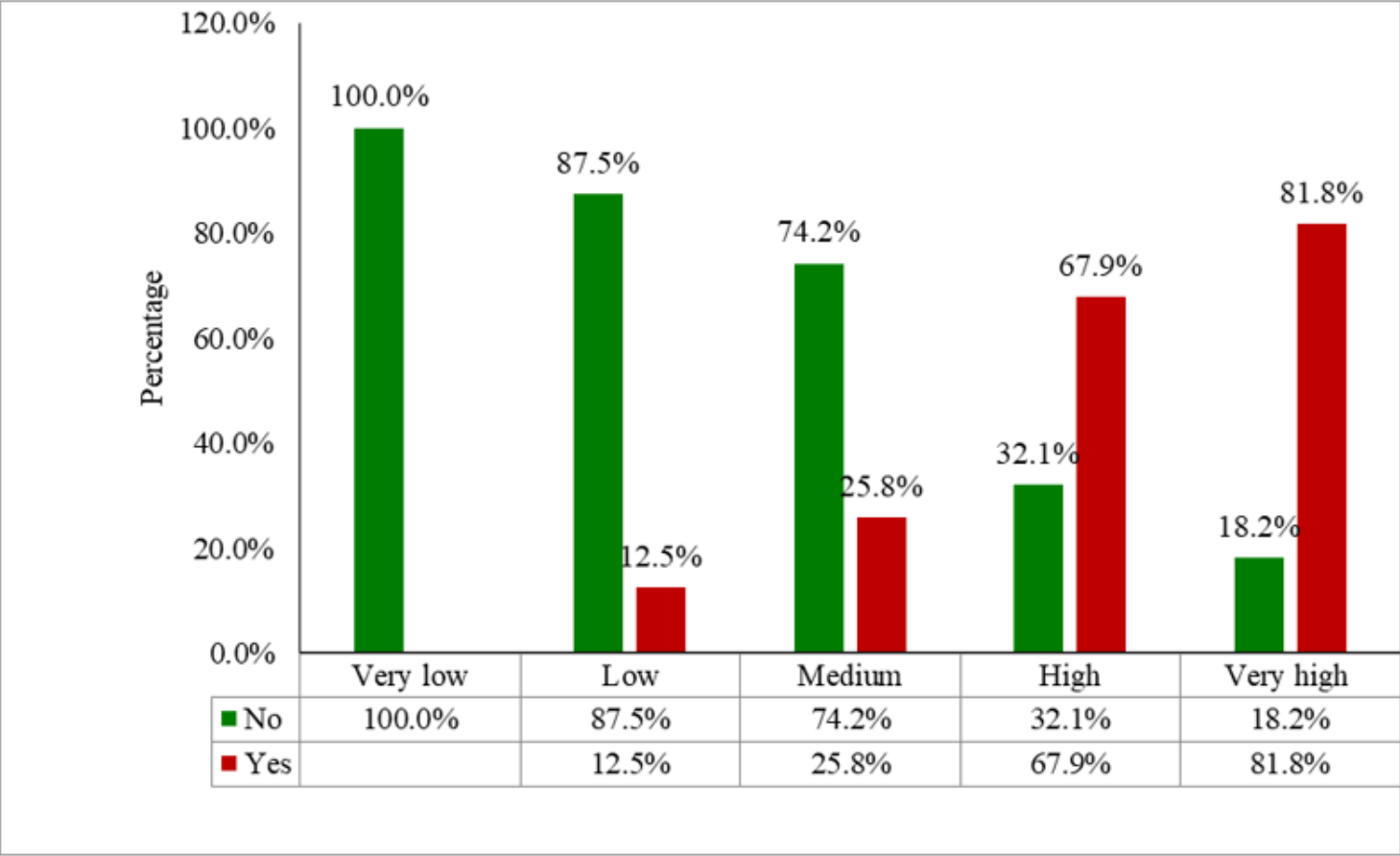


Figure 1

Incidence of adverse events across different CSRS risk categories.

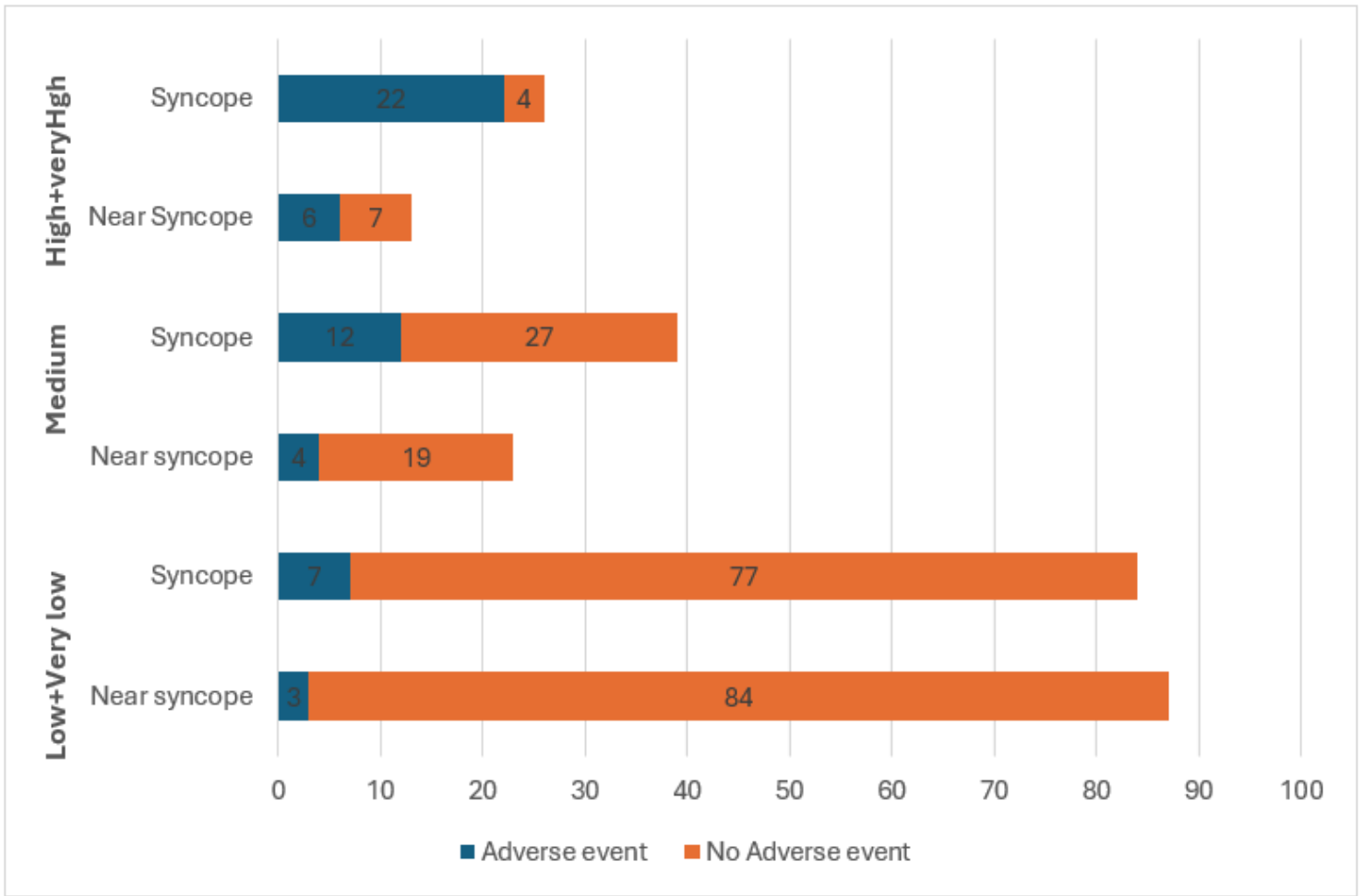


Figure 2

Comparison of adverse event incidence across all risk categories for syncope and near-syncope.

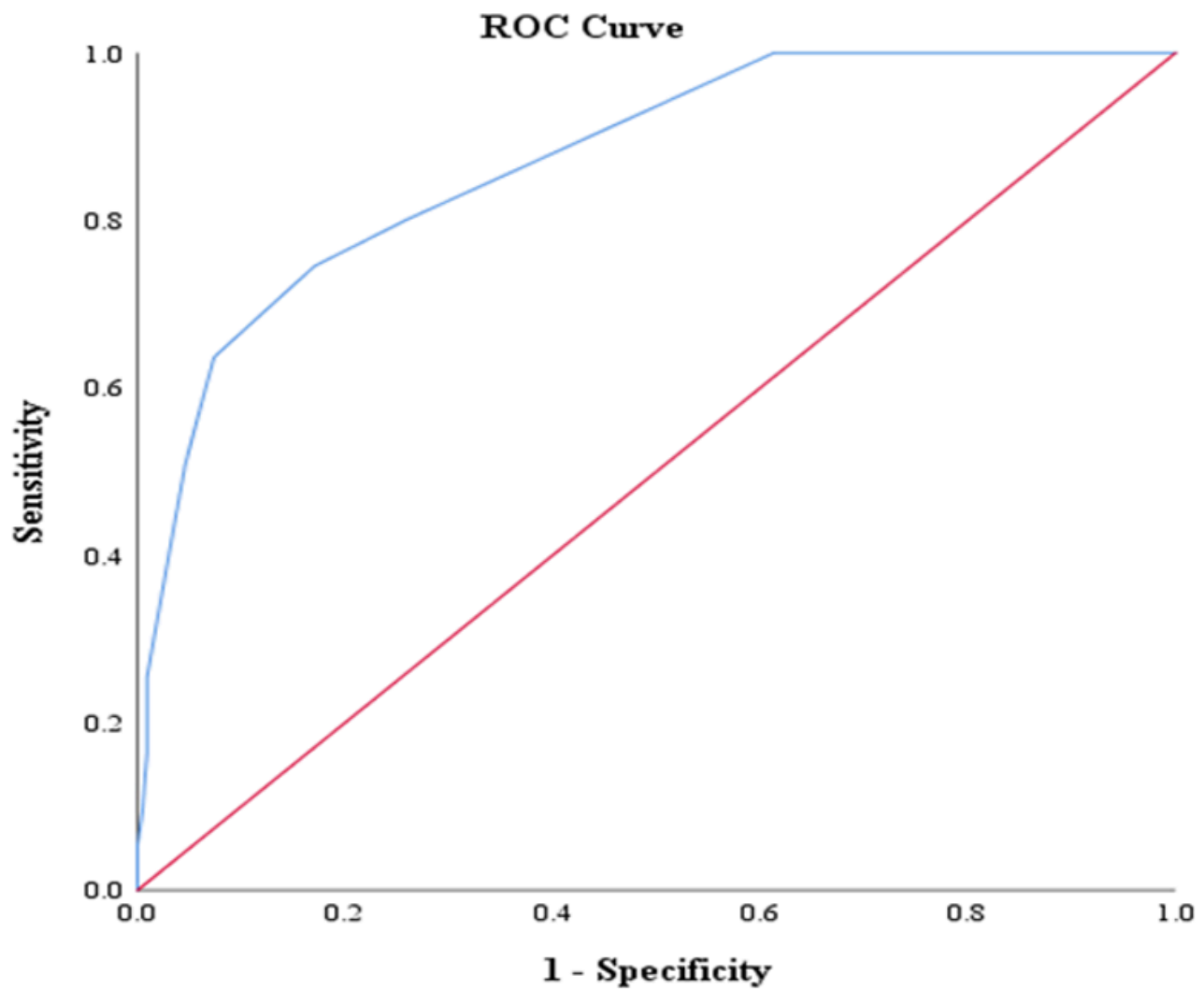


Figure 3

Receiver operating characteristic (ROC) curve demonstrating diagnostic accuracy of CSRS in the overall study population at a cutoff value of 2.

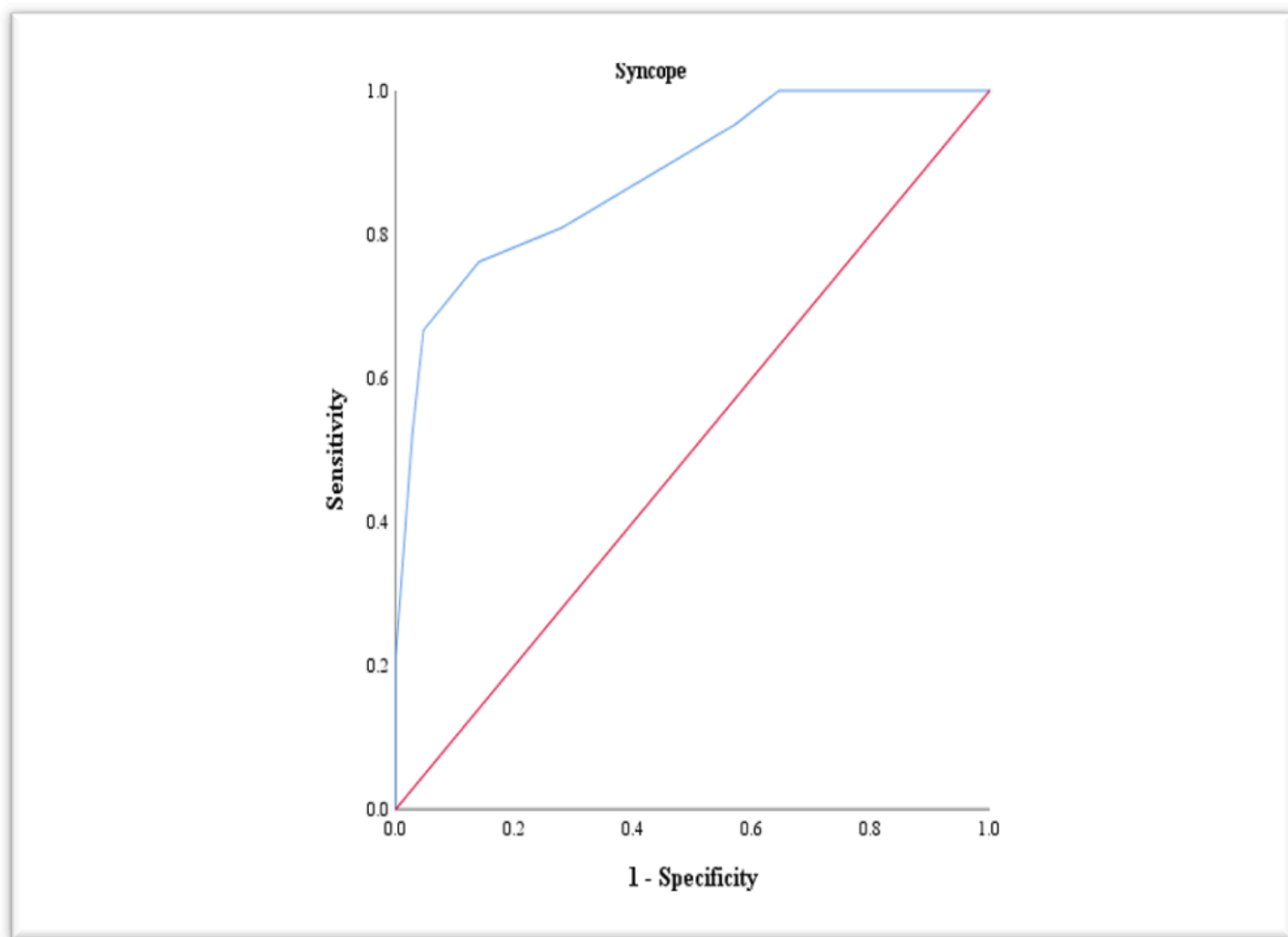


Figure 4

Receiver operating characteristic (ROC) curve demonstrating diagnostic accuracy of CSRS in patients with syncope at a cutoff value of 2.

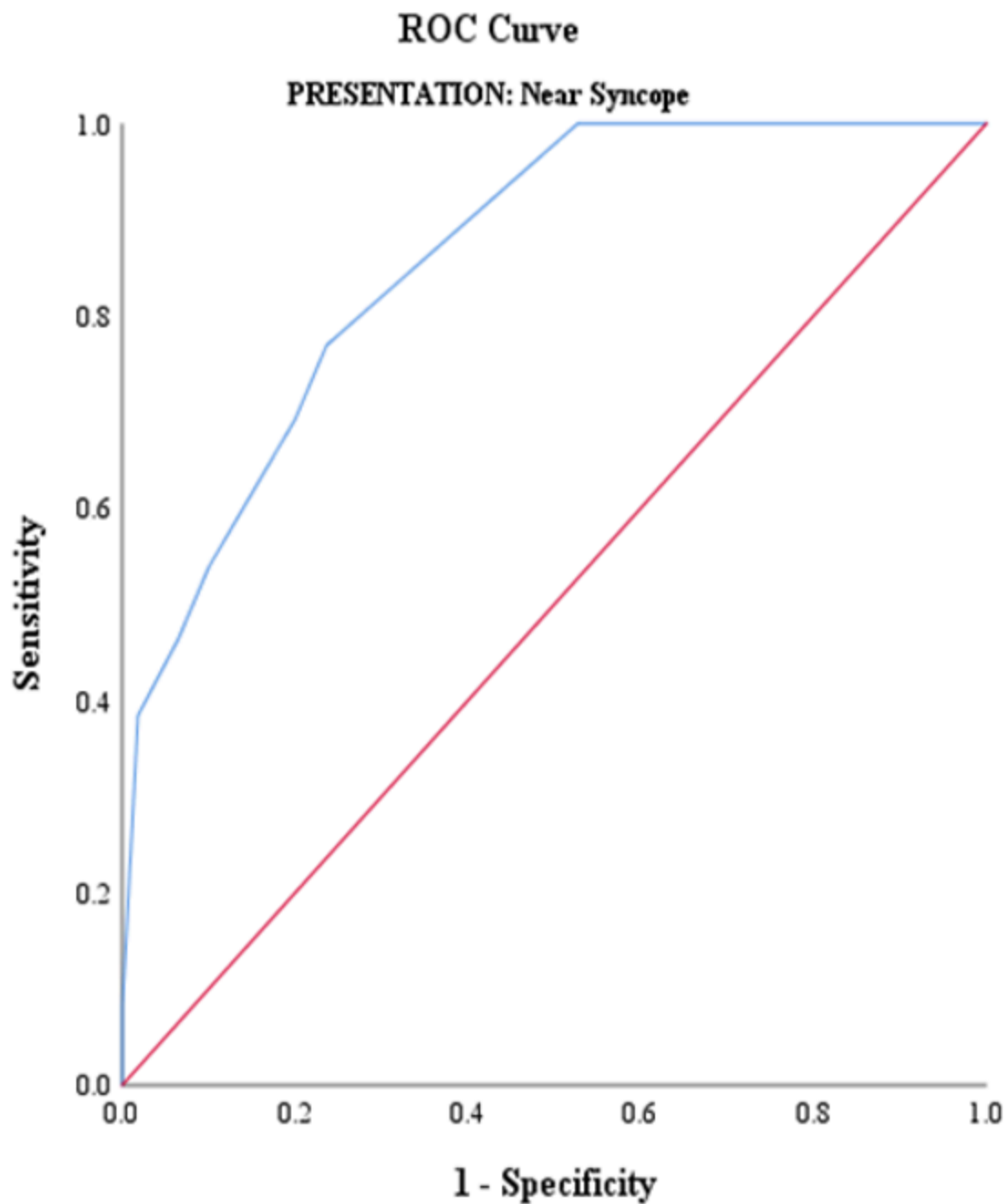


Figure 5

Receiver operating characteristic (ROC) curve demonstrating diagnostic accuracy of CSRS in patients with near syncope at a cutoff value of 1.

Supplementary Files

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

- [CSRSSupplementaryCompatible.docx](#)