



## ORIGINAL RESEARCH ARTICLE

## Awareness and Utilization of the RIPASA Score for Acute Appendicitis among Emergency and Surgical Physicians: A Cross-Sectional Study

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### Abstract

**Background:** Accurate diagnosis of acute appendicitis remains challenging, particularly in emergency settings [1], and several clinical scoring systems have been developed to support decision-making, including Alvarado and RIPASA scores [2,3]. The RIPASA score has demonstrated favorable diagnostic performance, particularly in Asian and Middle Eastern populations [4]; however, data on clinicians' awareness and real-world utilization are limited.

**Objective:** To assess awareness, utilization, and perceived barriers to the use of the RIPASA score among emergency and surgical physicians.

**Methods:** A single-center cross-sectional survey was conducted among physicians involved in the assessment and management of suspected acute appendicitis. The total target population consisted of 128 physicians. A total of 119 responses were received (response rate 93.0%), of which 16 were excluded due to duplication, irrelevance, or incomplete data. The final analysis included 104 participants. Descriptive statistics were used, and comparisons between specialties were performed using the Chi-square test.

**Results:** Overall, 85.6% of participants were aware of the RIPASA score, while 51.0% reported using it in clinical practice. Utilization of the RIPASA score was higher among surgical physicians than emergency physicians (55.9% vs 41.7%); however, the difference was not statistically significant ( $p = 0.24$ ). The most commonly reported barriers were unfamiliarity with the score, lack of training, and perceived time constraints.

**Conclusion:** Despite high awareness, utilization of the RIPASA score remains moderate. Although use appeared higher among surgical physicians, no statistically significant difference was observed between specialties. Targeted training and integration of RIPASA into clinical workflows may improve its adoption.

### Keywords

RIPASA score, Acute appendicitis, Emergency medicine, Surgery, Clinical decision tools, Cross-sectional survey

### Introduction

Acute appendicitis is one of the most common causes of acute abdominal pain presenting to emergency departments worldwide [5], with evolving diagnostic approaches in emergency medicine practice [6]. Despite advances in imaging modalities, the diagnosis of acute appendicitis continues to pose a clinical challenge, particularly in early or atypical presentations. Delayed or inaccurate diagnosis may result in complications such as perforation, while overdiagnosis can lead to unnecessary imaging, increased healthcare costs, and negative appendectomy rates.

To support clinical decision-making, several clinical scoring systems have been proposed to improve diagnostic accuracy in acute appendicitis [7,8,1-

3], including the Alvarado, AIR, and RIPASA scores [7,8]. Among these, the RIPASA score incorporates demographic characteristics, clinical symptoms, physical examination findings, and laboratory parameters, and has demonstrated favorable diagnostic accuracy in multiple studies, particularly in Asian and Middle Eastern populations. Previous research has shown that the RIPASA score may outperform traditional scoring systems in certain populations.

Although the diagnostic performance of the RIPASA score has been evaluated in several populations, limited evidence exists regarding physician awareness and real-world utilization of this tool in clinical practice. This study was therefore designed as an exploratory cross-sectional survey to assess awareness, utilization, and perceived barriers to the use of the RIPASA score among emergency and surgical physicians.

## Methods

### Study design and setting

This study was designed as a single-center cross-sectional survey, conducted at a tertiary care hospital in Saudi Arabia that provides emergency and surgical services to a wide catchment area.

The study was conducted over a defined data collection period using an electronic questionnaire. This study was reported in accordance with the STROBE statement [9].

### Study population

The total target population consisted of 128 physicians working in the emergency and surgical departments, including 85 surgical physicians and 43 emergency physicians:

- Emergency medicine physicians
- General surgeons
- Pediatric surgeons
- Residents working in the above specialties

Physicians with less than six months of clinical experience and medical students were excluded from the study.

### Sampling and recruitment

Participants were recruited using a convenience sampling approach. The survey was distributed to all eligible physicians in the emergency and surgical departments ( $n = 128$ ). A total of 119 responses were received, corresponding to a response rate of 93.0%.

A formal a priori sample size calculation was not performed because the study was designed as an exploratory single-center survey intended to describe awareness and utilization patterns. A pragmatic target of approximately 150 responses was selected to maximize representation of eligible physicians.

### Data collection tool

Data were collected using a structured, self-administered electronic questionnaire developed after a review of the relevant literature on appendicitis scoring systems and clinical decision tools. The questionnaire consisted of approximately 20 items divided into four main sections:

1. Demographic and professional characteristics (e.g., specialty and years of clinical experience)
2. Awareness and knowledge of the RIPASA score
3. Utilization of the RIPASA score in clinical practice
4. Perceived barriers to the use of the RIPASA score

The questionnaire was designed to be concise and required approximately 5-7 minutes to complete.

The questionnaire was reviewed for content validity and clarity before data collection. It was distributed to 15 consultant physicians from emergency medicine and surgical specialties who were not included in the final study sample. Feedback was obtained regarding the relevance, clarity, and comprehensiveness of the questionnaire items. Minor modifications were made in response to their feedback to improve wording and ensure alignment with the study objectives.

The final version of the questionnaire was pilot-tested to ensure ease of completion and feasibility.

### Data collection procedure

The survey was administered electronically to ensure ease of access and anonymity. No identifying information was collected. Responses were automatically recorded in a secure database. Duplicate entries and questionnaires with substantial missing data were excluded during data cleaning before analysis.

### Statistical analysis

For comparative analysis, participants were grouped into emergency physicians and surgical physicians, as these specialties are directly involved in the diagnostic and management pathway of suspected acute appendicitis.

Data were analyzed using IBM SPSS Statistics (IBM Corp., Armonk, NY, USA). Descriptive statistics were used to summarize participant characteristics and survey responses. Categorical variables were presented as frequencies and percentages. Comparisons between emergency medicine and surgical physicians regarding RIPASA utilization were performed using the Chi-square test. Because the study was exploratory and based on convenience sampling, results were interpreted cautiously. A  $p$ -value  $< 0.05$  was considered statistically significant.

## Results

A total of 128 physicians were eligible for participation in this study. Of these, 119 completed the survey,

yielding a response rate of 93.0%. Sixteen responses were excluded due to duplication, irrelevance, or incomplete data. Consequently, 104 participants were included in the final analysis.

### Participant characteristics

The demographic and professional characteristics of the participants are summarized in [table 1](#). More than half of the respondents (54.8%) had 1-5 years of clinical experience, followed by 6-10 years (27.9%), while 17.3% had more than 10 years of experience. Participants were primarily from surgical specialties (65.4%), with the remainder from emergency medicine (34.6%).

### Awareness of the RIPASA score

Overall, 85.6% (n = 89) of participants were aware of the RIPASA score, whereas 14.4% (n = 15) were not familiar with it. In terms of clinical practice, 51.0% (n = 53) reported using the RIPASA score, while 49.0% (n = 51) did not routinely use it ([Table 2](#)).

### Comparison of utilization by specialty

Utilization of the RIPASA score was higher among surgical physicians (55.9%) compared with emergency physicians (41.7%). However, no statistically significant association was observed between physician specialty and RIPASA score utilization (p = 0.24) ([Table 3](#)).

### Perceived barriers to using the RIPASA score

The reported barriers to the use of the RIPASA score are presented in [table 4](#). The most frequently cited barrier was unfamiliarity with the score (49.0%), followed by lack of formal training (35.6%) and the perception that the score is time-consuming (19.2%). A smaller proportion of participants reported limited availability of the score or absence of local protocols (5.8%).

**Table 1:** Demographic and professional characteristics of participants (n = 104).

| Variable                     | Category           | n (%)     |
|------------------------------|--------------------|-----------|
| Years of clinical experience | 1-5 years          | 57 (54.8) |
|                              | 6-10 years         | 29 (27.9) |
|                              | > 10 years         | 18 (17.3) |
| Specialty                    | Emergency Medicine | 36 (34.6) |
|                              | Surgery*           | 68 (65.4) |

Data are presented as numbers (percentages). Percentages are calculated based on the total study population (n = 104).

\*Surgery includes general surgery, pediatric surgery, surgical residents, and other surgical subspecialties.

**Table 2:** Awareness and utilization of the RIPASA score among participants (n = 104).

| Variable                                     | Response | n (%)     |
|----------------------------------------------|----------|-----------|
| Awareness of the RIPASA score                | Yes      | 89 (85.6) |
|                                              | No       | 15 (14.4) |
| Use of the RIPASA score in clinical practice | Yes      | 53 (51.0) |
|                                              | No       | 51 (49.0) |

Data are presented as numbers (percentages). Percentages are calculated based on the total study population (n = 104).

**Table 3:** Comparison of RIPASA score utilization between emergency physicians and surgical physicians (all levels).

| Specialty group      | Use RIPASA - Yes | Use RIPASA - No | Total |
|----------------------|------------------|-----------------|-------|
| Emergency physicians | 15 (41.7%)       | 21 (58.3%)      | 36    |
| Surgical physicians  | 38 (55.9%)       | 30 (44.1%)      | 68    |

Data are presented as numbers (percentages). Percentages are calculated by row.

\* Surgery (all levels) includes surgical specialists and surgical residents across all surgical specialties.

**Table 4:** Reported barriers to using the RIPASA Score (n = 104).

| Barrier                                   | n (%)     |
|-------------------------------------------|-----------|
| Lack of formal training                   | 37 (35.6) |
| Unfamiliarity with the RIPASA score       | 51 (49.0) |
| Score perceived as time-consuming         | 20 (19.2) |
| Not readily available / no local protocol | 6 (5.8)   |

Participants were allowed to select more than one response; therefore, percentages exceed 100%.

## Discussion

This study provides important insight into physicians' awareness and real-world utilization of the RIPASA score in the assessment of suspected acute appendicitis.

The main findings demonstrate that, despite a high level of awareness among participating physicians, actual utilization of the RIPASA score in clinical practice remains moderate. The high response rate (93.0%) enhances the representativeness of the findings and reduces the likelihood of non-response bias. Although utilization appeared higher among surgeons than emergency physicians, no statistically significant difference was observed between the two groups.

The observed discrepancy between awareness and utilization highlights an important implementation gap. Previous studies have primarily focused on the diagnostic accuracy of the RIPASA score [5,7,8], whereas our study addresses its real-world utilization among physicians, highlighting an important implementation gap. In particular, in Asian and Middle Eastern populations, awareness alone does not appear to be sufficient to ensure consistent adoption in daily clinical practice. This finding is consistent with broader literature on clinical decision tools, which suggests that validated scoring systems are often underutilized due to workflow constraints and limited integration into routine practice [9,10].

The higher utilization of RIPASA among surgeons compared with emergency physicians may reflect differences in clinical roles and decision-making processes; however, this difference did not reach statistical significance in the present study. Surgeons are often directly responsible for operative decisions and may therefore place greater emphasis on structured risk stratification tools when evaluating suspected appendicitis. In contrast, emergency physicians

frequently manage high patient volumes and time-sensitive presentations, which may increase reliance on imaging modalities or clinical judgment rather than formal scoring systems. This difference in practice patterns may partially explain the lower utilization observed in the emergency medicine group, although no statistically significant association was observed.

Analysis of perceived barriers further supports these findings. Unfamiliarity with the RIPASA score and lack of formal training were the most commonly reported obstacles, suggesting that many clinicians may not feel sufficiently confident to apply the score consistently. Additionally, a notable proportion of participants perceived the RIPASA score as time-consuming, which may limit its use in busy emergency settings. These barriers are potentially modifiable and point toward practical strategies for improving adoption, such as targeted educational interventions, incorporation of the score into local clinical protocols, and integration into electronic medical record systems to reduce time burden.

This study addresses an important gap by focusing on physician behaviour rather than diagnostic performance. Improving the utilization of validated scoring systems such as RIPASA may help standardize the initial assessment of suspected acute appendicitis, reduce unnecessary imaging, and support more consistent referral and management decisions. From an educational perspective, incorporating RIPASA training into emergency and surgical curricula may improve familiarity and confidence in its use. At an institutional level, embedding the score into clinical pathways or electronic order sets could facilitate routine application and overcome time-related barriers [11-20].

## Limitations

Several limitations should be acknowledged. First, the study was conducted at a single center, which may limit the generalizability of the findings to other settings or healthcare systems. Second, the reliance on self-reported data may introduce recall or social desirability bias. Third, the study focused on awareness and utilization rather than clinical outcomes, and therefore cannot determine whether increased use of RIPASA directly improves diagnostic accuracy or patient outcomes. Fourth, the absence of statistically significant differences may be related to sample size limitations.

Despite these limitations, the sample size was adequate for descriptive and comparative analyses, and the study addresses a notable gap in the literature regarding real-world use of the RIPASA score among emergency and surgical physicians.

In addition, convenience sampling may have introduced selection bias. No multivariable analysis was performed; therefore, potential confounding by years

of experience, level of training, or subspecialty could not be assessed.

## Ethics Approval and Consent to Participate

This study was conducted in accordance with the ethical standards of the institutional research committee and in compliance with the Declaration of Helsinki. Ethical approval was obtained from the Institutional Review Board of the participating hospital. Informed consent was obtained from all participants before participation in the survey.

## Consent to Publish

Not applicable.

## Availability of Data and Materials

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

## Competing Interests

The authors declare that they have no competing interests.

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