

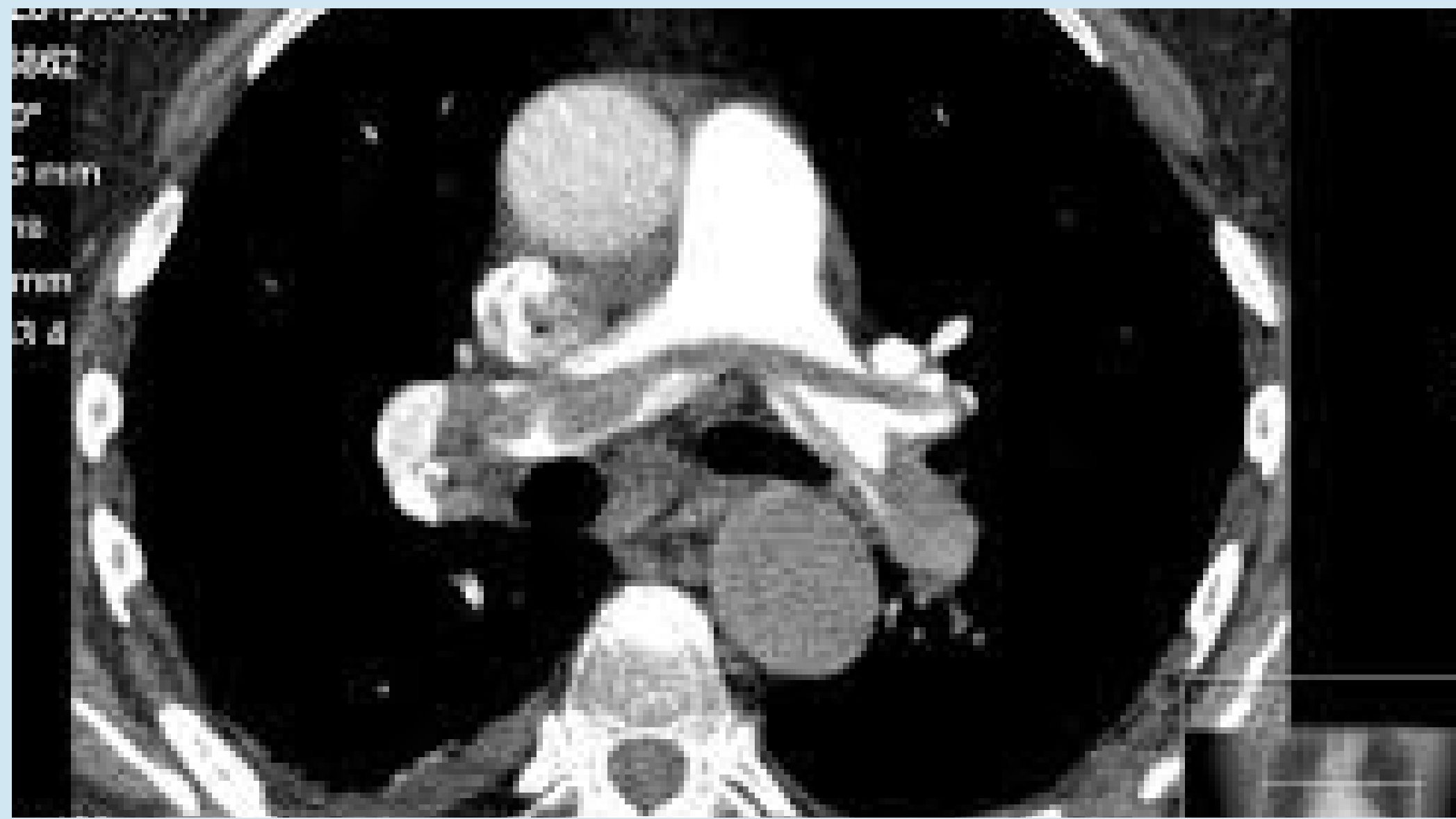
An Audit of Contrast Enhancement Quality in CTPA Scans and Its correlation with BMI

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01. Introduction

- CTPA is the gold-standard test for diagnosing pulmonary embolism.
- Accurate diagnosis requires adequate contrast enhancement (≥ 250 HU) in the pulmonary arteries.
- This audit investigates contrast enhancement quality of CTPA scans at the hospital and if higher patient BMI leads to poorer contrast quality in CTPA scans.

02. Objectives

Analyse the proportion of CTPA scans that meet the diagnostic threshold of ≥ 250 HU in the main pulmonary artery (MPA)

Identify any correlation between suboptimal enhancement and Body Mass Index (BMI)

Discover potential areas for improvement in imaging protocols with a view to reduce the number of misdiagnoses or unnecessary repeated imaging

03. Related literature

- Chen M et al. CTPA with 20% reduced contrast dose using multiphasic injection. WJR, 2017.
- Kim C et al. Pulmonary enhancement via leg vein contrast injection. Medicine, 2017.
- Ye M et al. Iterative reconstruction & enhancement boost in obese CTPA. BMC Med Imaging, 2024.
- Bates DDB et al. Suboptimal CTPA outcomes in emergency settings. Emerg Radiol, 2016.
- Megyeri B et al. CTPA at 100 kVp improves quality in overweight patients. Clin Radiol, 2015.
- Ratnakanthan PJ et al. Weight-adjusted contrast dosing for PE evaluation. J Med Imaging Radiat Sci, 2020.
- Garg KK et al. Improving CTPA yield via NICE guideline adherence. Future Healthc J, 2023.

04. Methodology

Study design: Retrospective audit.

Sample: 49 consecutive CTPA scans for suspected pulmonary embolism (Jan–May 2025). Collected using PACS and CRIS systems

Measurement: Contrast attenuation in the main pulmonary artery (HU).

Standard: Adequate enhancement defined as ≥ 250 HU

Analysis: Scans classified as adequate or inadequate; correlation between BMI and HU values statistically assessed.

05. Results

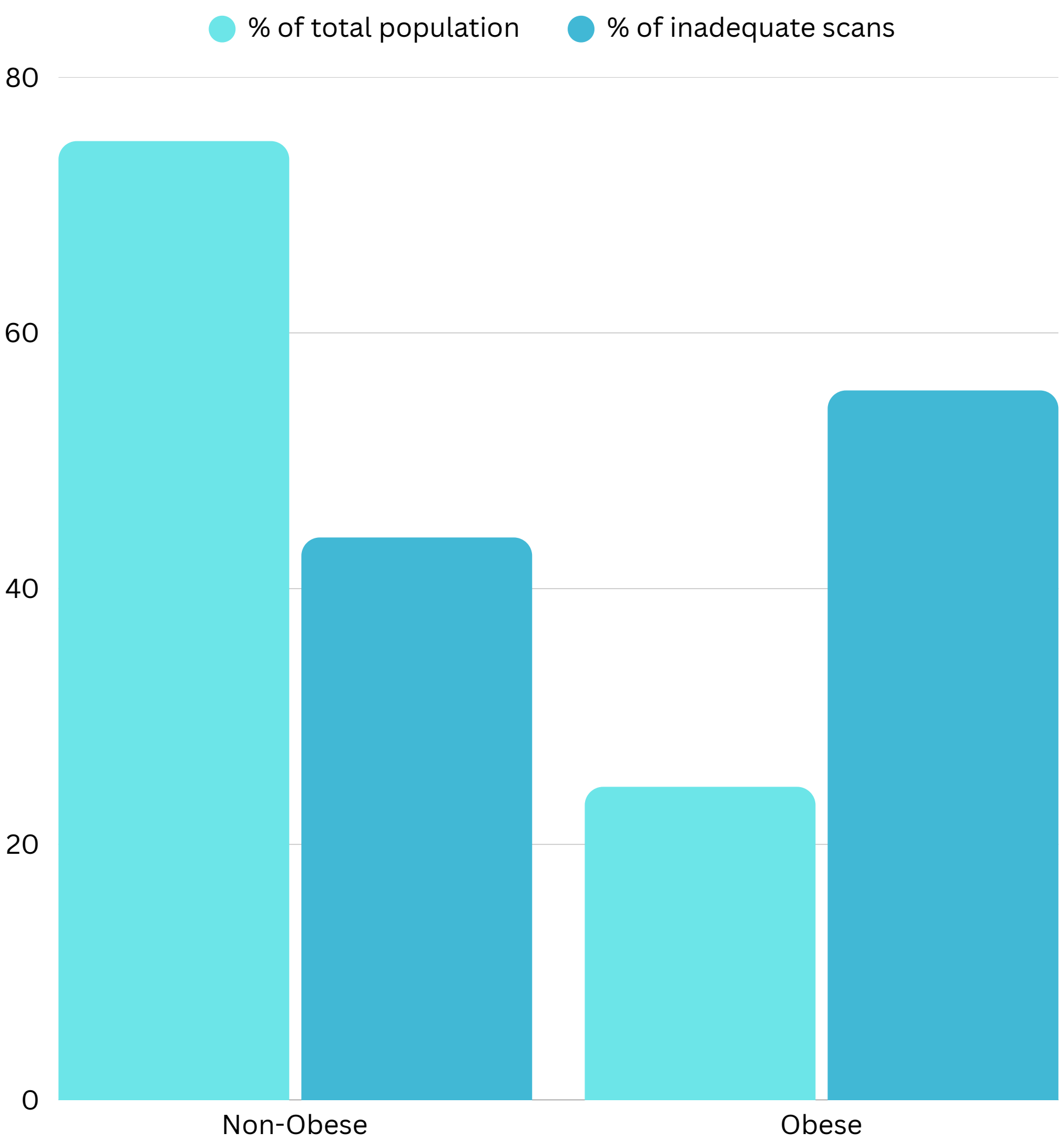


Figure 1. Proportion of inadequate scans in Non-Obese and Obese (BMI > 30) groups compared to the total population (n=49)

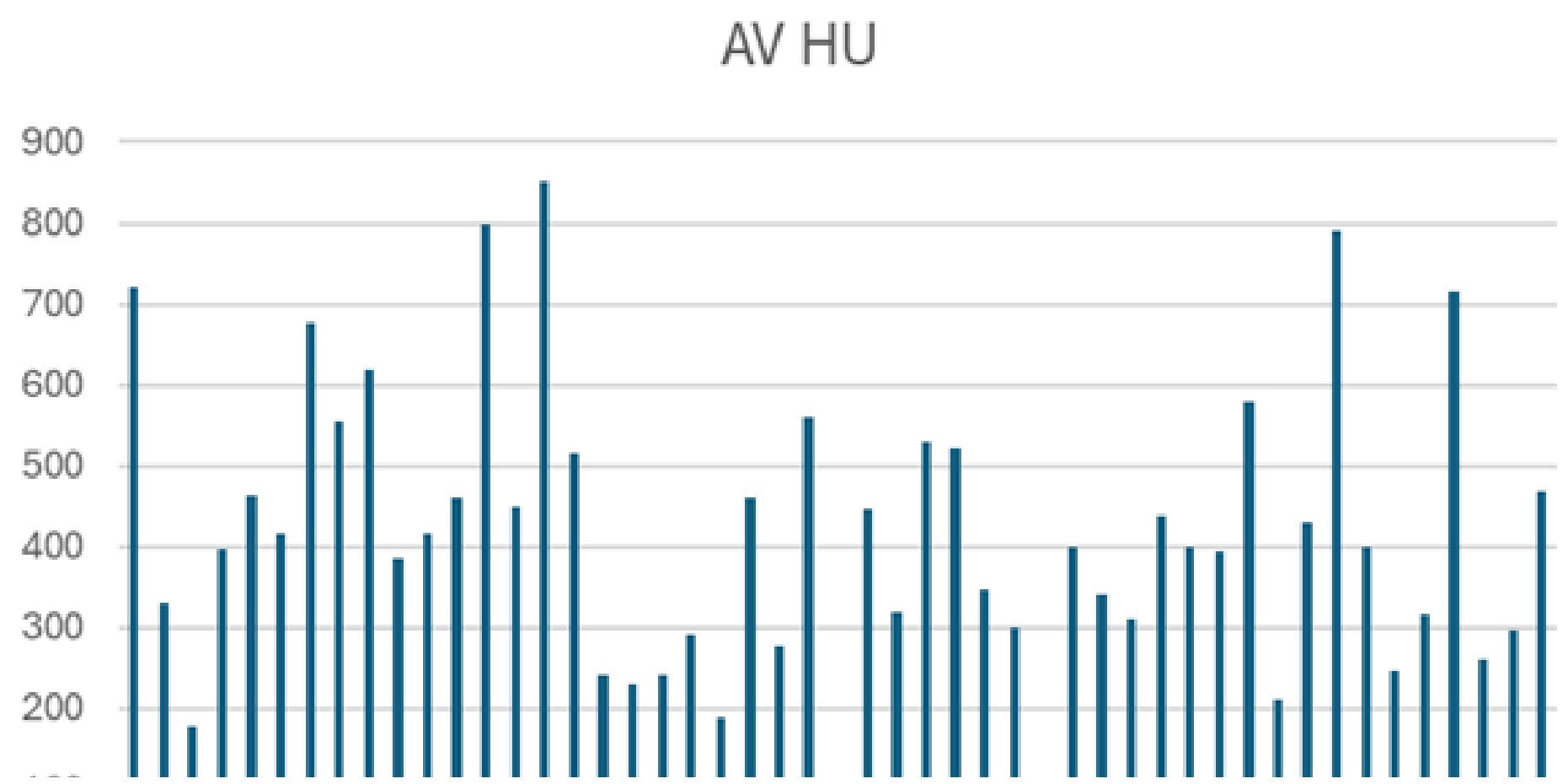


Figure 2. Average HU

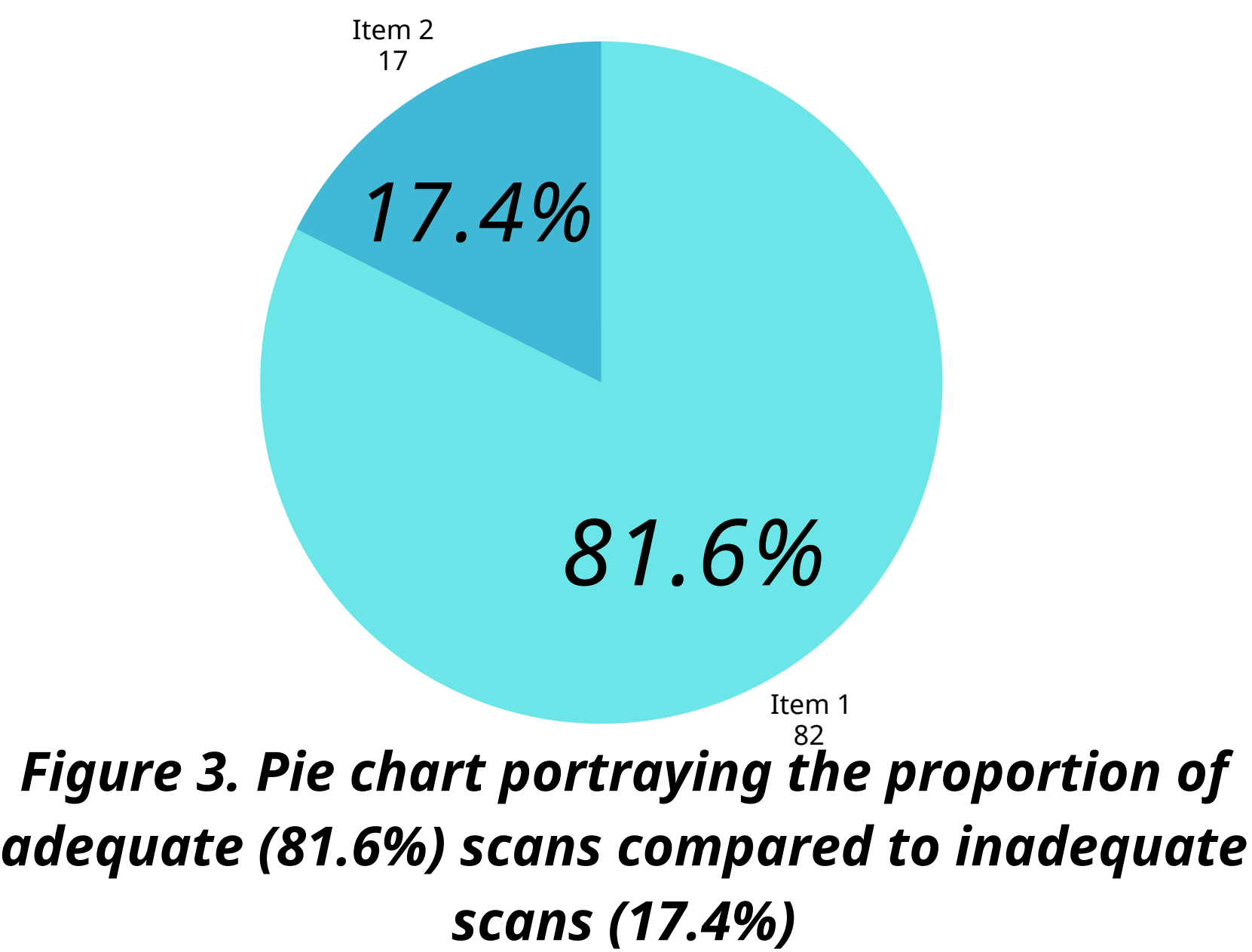


Figure 3. Pie chart portraying the proportion of adequate (81.6%) scans compared to inadequate scans (17.4%)

06. Recommendations

- Review protocols for high BMI patients: Adjust contrast dose/flow rate for BMI > 30 to improve enhancement.
- Raise BMI awareness: Include BMI in pre-scan planning and educate staff on its impact.
- Add feedback system: Allow radiologists to flag scans with poor contrast for quality review.
- Re-audit in 12 months: Evaluate outcomes after protocol changes.

07. Conclusion

18.4% of CTPA scans showed poor contrast, within reported literature ranges.

Higher BMI was linked to reduced pulmonary artery opacification, consistent with previous studies (R=-0.35)

The PE positivity rate (14.3%) was slightly below RCR guidance, suggesting possible overuse in low-risk cases.

Findings highlight the need for weight-adjusted contrast protocols and better patient selection to improve scan quality and diagnostic yield