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Corresponding author:
Jing Zhang

rjyxzbc2025@163.com

Author Affiliation:
Renji Hospital, Shanghai Jiao Tong
University School of Medicine.

The role of medical equipment reliability assessment in improving healthcare service quality: A systematic review

Zhang, J; Lou, Z; He, X; Jin, Z; Cao, D; Xu, Y; Zhang, W; Zhou, J; Zhang, J.

ADMINISTRATIVE INFORMATION

Support - None.
Review Stage at time of this submission - Data analysis.
Conflicts of interest - None declared.
INPLASY registration number: INPLASY2025120062

Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 17 December 2025 and was last updated on 17 December 2025.

INTRODUCTION

Review question / Objective This study systematically reviews the existing literature on how reliability assessment of medical equipment contributes to enhancing healthcare service quality.

Condition being studied With the rapid advancement of medical technology, medical equipment plays a vital role in diagnosis, treatment, and patient monitoring. Since equipment reliability is directly linked to healthcare quality, patient safety, and clinical decision-making, there is a growing need to systematically evaluate its impact.

METHODS

Search strategy ("medical equipment" OR "medical devices" OR "biomedical equipment") AND ("performance" OR "reliability" OR "maintenance") AND ("assessment" OR "predict" OR "inspect" OR "priorit*").

Participant or population Any type of medical device used in clinical settings.

Intervention Explicit exploration, definition, or application of one or more key parameters for medical equipment reliability assessment.

Comparator NA.

Study designs to be included Observational studies (e.g., cross-sectional, cohort, case-control) and literature outlining standards.

Eligibility criteria The inclusion criteria were as follows: (1) study design: observational studies (e.g., cross-sectional, cohort, case-control) and literature outlining standards; (2) population: any type of medical device used in clinical settings; (3) topic: explicit exploration, definition, or application of one or more key parameters for medical equipment reliability assessment; and (4) language: published in English.

Information sources PubMed, EMBASE, and Web of Science.

Main outcome(s) Explicit exploration, definition, or application of one or more key parameters for medical equipment reliability assessment.

Quality assessment / Risk of bias analysis The quality of the included studies was assessed using a specified framework, which evaluated study objectives, input parameters, methodological rigor, anticipated outputs, and expected outcomes.

Strategy of data synthesis The extracted key parameters were systematically categorized according to a pre-defined classification framework.

Subgroup analysis NA.

Sensitivity analysis NA.

Language restriction English.

Country(ies) involved China.

Keywords medical equipment; reliability assessment; healthcare quality; predictive maintenance; preventive maintenance; systematic review.

Contributions of each author

Author 1 - Jidong Zhang.

Author 2 - Zhenglin Lou.

Author 3 - Xinyi He.

Author 4 - Zhongxin Jin.

Author 5 - Dan Cao.

Author 6 - Yiyi Xu.

Author 7 - Weixin Zhang.

Author 8 - Junyu Zhou.

Author 9 - Jing Zhang.