

SYSTEMATIC REVIEW

# How can maturity models and safety culture be assessed in various hospitals? A systematic review

Sri Andayani<sup>a</sup>, Fridawaty Rivai<sup>b</sup>

## ABSTRACT

**Background:** This systematic study aims to look at variations in the assessment of maturity models and safety culture in various hospitals. **Method:** This review (covering the time period 2010–2021) employed the PRISMA method, sourcing studies from two well-known academic journal databases: PubMed and Science Direct. The review used the keyword search term “assessment” AND “maturity model” AND (“safety culture” OR “patient safety culture” OR “safety culture maturity”) AND “hospital”. 70 studies were identified in the searching phase and 12 were eligible to be used for the review. **Results:** Of the 12 studies, six had used MaPSaF. They examined the maturity of safety culture with its 10 dimensions that can be categorized as pathological, reactive, calculative or bureaucratic, proactive, and generative. **Conclusion:** The assessment of maturity models and safety culture in Indonesia is developing to a limited extent. It is necessary to develop an assessment of the maturity models and safety culture that can be implemented in hospitals for quality-improvement efforts.

**Keywords:** Assessment of maturity model, Safety culture

<sup>a</sup> Doctorate Student, School of Public Health, Hasanuddin University, Indonesia

<sup>b</sup> School of Public Health, Hasanuddin University, Indonesia

**Corresponding Author:** Dr. Sri Andayani, Doctorate Student, School of Public Health, Hasanuddin University, Indonesia

**E-Mail:** sriandayani.grage@gmail.com

**Received:** 28<sup>th</sup> December 2022

**Accepted:** 05<sup>th</sup> January 2023

**How to Cite this Article:** Andayani S, Rivai F. How can maturity models and safety culture be assessed in various hospitals? A systematic review. *Int Med Sci Acad* 2023;36(1):111-116.

**Access this article online :** [www.jimsaonline.com](http://www.jimsaonline.com)



## Introduction

A culture of safety in hospitals is most certainly related to medical errors and patient-safety events. The application of safety culture could help identify errors that have occurred, help lessons to be learnt from reported incidents and raise awareness to prevent errors from occurring in the future. Safety-culture maturity describes the attitudes and behavior of hospital staff that relate to patient safety, patient safety incidents, incident reporting, case investigations, recommendations, and lesson learning.

A safety-culture maturity model describes a hospital's characteristic essence and attributes that that can be used for safety assessment and quality improvement. Quality-improvement efforts are based on the results of analysis and priority recommendations to achieve a high level of safety-culture maturity.

This review is an overview of maturity model assessment and the culture of safety in various hospitals. The next section of this review discusses findings of a systematic review based on levels of safety-culture maturity and its dimensions.

## Methods

The method used in this systematic review is Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) (Table 1, Figure 1). [1]

## Results

Table 2 has summarized relevant studies (conducted at various hospitals) that used assessment of the maturity model and safety culture. There are seven studies that utilized MaPSaF for the purpose of assessment.

## Discussion

### *Maturity model development*

Our findings suggest that during 2010–2021 the use of models of maturity for evaluating safety culture in various hospitals had been steadily increasing. The MaPSaF, as introduced by the National Patient Safety Agency, has contributed to growth in usage of the maturity model in hospitals.

### **The maturity model as a useful instrument for organizational development**

Most of the publications in this review are “developmental” and provide some evidence that maturity models are a pragmatic approach to safety culture. In general, the use of maturity models is an assessment of safety levels and a core element of safety culture (Table 3 and 4). Maturity models can be interpreted as an “organizational development” tool to generate stable progress from a low level to more optimum safety levels.

**Table 1: PRISMA Method**

Section	Description
Eligibility criteria	The research inclusion criteria were English-written academic journal articles during the period 2010–2021 that were related to the assessment of maturity models and safety culture in various hospitals. Article queries were performed by using selected keywords that were only in the healthcare domain. The exclusion criteria of the studies included irrelevant studies, meeting abstracts, protocols, and all other domains but healthcare in hospitals.
Information sources	At the identification stage, searching for journals was carried out using two well-known academic journal databases (PubMed and Science Direct) within the specific period of 2010–2021.
Searching strategy	Search results from academic journal databases were ranked Q1–Q3 (SCImago) and indexed on Scopus. The keyword search term for processes was “assessment” AND “maturity model” AND (“safety culture” OR “patient safety culture” OR “safety culture maturity”) AND “hospital”.
Selection process	Duplicate articles were removed, then the articles were filtered using the selected inclusion and exclusion criteria.
Data collection process	Data was collected from the academic journal databases PubMed and Science Direct during the specific period of 2010–2021.
Data items	Of 70 studies that were identified during the initial searching stage, 12 were eligible to be used for the review.
Risk study on assessment bias	A risk study/assessment using qualitative and quantitative syntheses.
Effect measure	The results of effect measures by overlooking at the model of maturity and safety in various hospitals.
Synthesis methods	Each full article was assessed for eligibility in the PRISMA framework by conducting qualitative and quantitative syntheses.
Reporting assessment bias	To assess bias in a synthesis, a feasibility test was done.
Certainty assessment	To assess certainty in a set of evidence, qualitative and quantitative syntheses were employed.

The PRISMA method in this systematic review is described as follows:

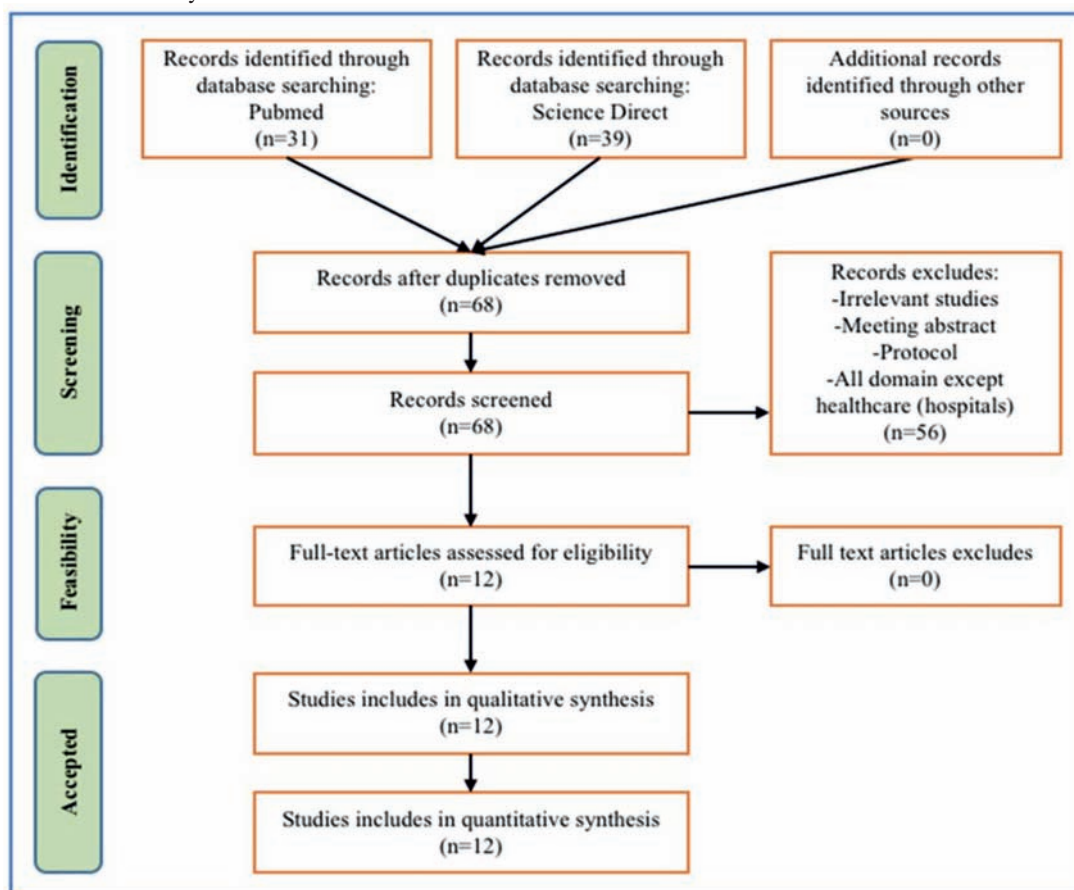


Figure 1 Flow diagram of study selection. [2]

**Table 2 Evidence supporting the assessment of maturity models and safety culture.**

Author	Assessment	Findings	
		Level of Safety Culture	Dimensions of Safety Culture
Law, Madelyn P. et al. (2010). [3]	MaPSaF	The five levels of maturity are pathological, reactive, bureaucratic, proactive, and generative.	A 10-dimensional perspective of safety culture: constant improvement, a focus on safety, system errors and individual accountability, incident recording, evaluation, learning and change, communication, people management, employee education, and teamwork. These occur at five degrees of increasing safety maturity.
Wallis, Katharine and Dovey, Susan. (2011). [4]	PSCIT	The five levels of maturity are A, B, C, D, and E.	The following are the nine dimensions of safety culture: commitment to excellence as a whole, patient safety is given first priority, patients' perspectives on what causes patient-safety incidents and how to spot them, incidents of patient safety are investigated, the team learns together (following an incident of patient safety), concerns about safety are communicated, concerns about employee management and safety, safety education and training for employees, and working as a team to address safety concerns.
O'hrn, Annica, Rutberg, Hans, and Nilsen, Per. (2011). [5]	MaPSaF	This explains the five levels of the evolution of safety culture: pathological, reactive, calculative, proactive, and generative.	In the 50 departments studied, there are five dimensions used to assess safety culture: commitment of the leadership, organizational structure, identification and registration with a systematic approach, improvement research and activities, and patient safety is prioritized across the board.
Halligan, Michele H. et al. (2014). [6]	PSCIT	Pathological, reactive, calculative, proactive, and generative are the five stages of safety culture maturation.	The study collected data on 43 questions across these seven dimensions: safety has the support of high leadership, supervisory assistance in the interest of safety, dangers to one's safety, apprehension of ramifications, learning practices for safety, a culture of reporting, and a culture of learning.
Parker, Dianne et al. (2015). [7]	MaPSaF and AHRQ	N/A	MaPSaF and AHRQ are two instruments for evaluating the culture of patient safety and were identified as a result of this research. The findings suggest that in primary care, indicators of safety culture should be used, based on the care process.
Filho, Anastacio, Pinto, Goncalves, and Waterson, Patrick. (2018). [8]	MaPSaF	Over two-thirds of maturity models are based on Westrum's model, with pathological, reactive, calculative or bureaucratic, proactive, and generative or sustainable stages.	Maturity model assessment is carried out on a general assessment of safety management (the most popular goal), evaluation of safety communication, management's dedication to safety, training in terms of safety, observing and evaluating organizational learning, reporting an event, prioritization of safety, employee participation, incident investigation, trust in the workplace, auditing for safety, review on a regular basis, perceptions of risk, risk assessment, leadership in terms of safety, and workplace stress.
Ramos, Rolsanna R. and Calidgid, Catherine C. (2018). [9]	HSoPSC	It should be a constant effort to determine the level of patient-safety culture: excellent, very good, acceptable, or poor.	There are 12 dimensions of safety culture, namely: unit collaboration, continuous improvement through organizational learning, communication and feedback on errors, across-unit collaboration, expectations and actions of the supervisor/manager, patient safety is promoted, patient safety management assistance, transitions and handoffs, event-reporting frequency, patient safety in general perceptions, transparency of staff communication, and error reaction without punishment.

---

Lawati, Muna Habib Al et al. (2018). [10]	MaPSaF and HSoPSC		Measurement of safety culture is done using two major tools: MaPSaF (10 dimensions) and HSoPSC (12 dimensions). In Kuwait, Turkey, and Iran, the HSoPSC is widely used.
Alqattan, H., Cleland, J., and Morrison, Z. (2018). [11]	HSoPSC	The following are the patient-safety levels: excellent, very good, acceptable, poor, and failing.	The HSoPSC is a commonly used tool for evaluating patient-safety culture in the following dimensions: errors are not punished, staffing, transparency of communication, transitions and handoffs, patient safety (viewed as a whole), cross-unit collaboration, timeliness of event reporting, communication and feedback on mistakes, patient safety needs management support, expectations and actions (encouraging patient safety) from supervisors and managers, continual improvement through organizational learning, and unit collaboration.
Tlili, Mohamed Ayoub et al. (2020). [12]	HSoPSC	The following are the patient-safety levels: excellent, very good, acceptable, poor, and failing.	The questionnaire utilized in the study was the HSoPSC version, which has 10 dimensions and a total of 50 items. The dimensions are: safety attitudes in general, the frequency with which occurrences are recorded, expectations and behavior of supervisors and managers to promote patient safety, learning and improvement within the organization, units' collaboration, transparency in communication, error response that is not punitive, staffing, support from management for patient safety, and cross-unit collaboration.
Litchfield, Ian et al. (2021). [13]	PC-SafeQuest and MaPSaF		When compared to MaPSaF, PC-SafeQuest is thought to be quick and simple to use. Its 10 dimensions of safety culture are: leadership, particularly the promotion of safe practice; there are systems, protocols, and processes in place that standardize or entrench patient safety, or that are followed; safety-related resources; interpersonal partnerships' quality; communication, especially in regards to safety, as well as belief in being able to speak up and report; adapting to mistakes, responding to them, and improving systems are all priorities; personal qualities of employees and their opinions of their impact on the workplace; patient safety is becoming more widely recognized and it is becoming a priority; other ways to make safety a priority; and actual safety concerns have been reported.
Jabarkhil, Abdul Qahir et al. (2021). [2]	HSoPSC	The following are the patient-safety grades: excellent, very good, acceptable, and poor.	There are 12 dimensions of safety culture, namely: reporting events on a regular basis, safety attitudes in general, expectations from supervisors and managers (as well as encouraging safety measures), continual improvement through organizational learning, cross-unit collaboration, transparency of communication, communication and feedback on mistakes, errors are not punished, staffing, patient safety needs management support, unit collaboration, and transitions and handoffs.

---

**Table 3 Defining the dimensions.**

Dimension	Description
1. Commitment to continuous improvement as a whole	How much money has been spent on creating a quality agenda? What do policies and procedures serve, in your opinion? What efforts are made to find collaboration and innovation outside of the organization?
2. Safety is given top priority	How seriously do the hospitals take the issue of patient safety? When it comes to patient safety, who bears responsibility?
3. Individual responsibility and system mistakes	What are the different types of reporting systems? How do incident reports get delivered? Incidents are viewed in two ways: as a chance to point fingers or as a chance to get better.
4. Keeping track of occurrences and best practices	Who investigates incidents, and how are they investigated? What is the aim of keeping a record of an incident?
5. In order to evaluate occurrences and best practices	What method is used to assess any incidents? What kind of acknowledgment does safe practice receive? What is the purpose of the information gathered as a result of the experiment?
6. Learning and bringing about change	After an event, what happens? What systems are in place to ensure that the incident is learned from? What methods are used to implement and assess changes?
7. Concerns concerning safety are communicated	What systems of communication are in place? So, what distinguishes them? How good is the record-keeping in terms of communicating about safety?
8. Personnel management and safety concerns	At work, how are safety concerns addressed? What is the procedure for dealing with employee issues? What are the procedures for hiring and hiring?
9. Education and training for employees	When, how, and why are patient safety education and training programs created? How do the employees feel about them?
10. Teamwork	What factors influence the team formation, and why are they formed in the first place? What is the management style appropriate for teams? In terms of patient safety, how much teamwork is there?

**Table 4 The levels of safety culture maturity.**

Level	Description
1-Pathological	Why should we be concerned about the safety of patients?
2-Reactive <sub>SEP</sub>	When there is an incident, we take the safety of our patients very seriously and act accordingly.
3-Calculative or Bureaucratic	To manage patient safety, we have measures in place.
4-Proactive	We are constantly on the lookout for and considering any patient safety risks.
5-Generative	Everything we do revolves around ensuring patient safety.

## Maturity model perspective

When maturity models are employed to assess a culture of safety, measures of safety culture that are more scientific (objective) are needed. When employing a maturity model, the processes are prioritized over the outcomes, according to a safety practitioner's perspective. Maturity model also emphasized as flexible facts which easily adapt organizational goals. The column "Findings" in Table 2 shows variation in dimensions of safety culture that are assessed using a maturity model.

## Conclusion

The findings of this research show that assessing the maturity models and safety culture in various hospitals is crucial to determining the level of safety-culture maturity. Research on assessment of maturity models and safety culture in Indonesia is developing in a limited way, therefore researchers need to develop an instrument for assessing the maturity models and safety culture to be implemented. We suggest undertaking a study to develop an assessment applicable for hospitals—particularly in Indonesia—as an effort to promote patient safety as well as quality improvement. We acknowledge the limitations of this review, which

does not go into depth regarding how to assess maturity models and safety culture for hospitals in Indonesia.

## What is known about the subject?

The assessment of maturity models and safety culture with its 10 dimensions that can be categorized as pathological, reactive, calculative or bureaucratic, proactive, and generative.

## What does the study performed add to the literature?

The results of this study add to the literature regarding the description of the maturity model assessment and safety culture in various hospitals.

## What are the implications of the results obtained?

This research has implications for the hospital safety culture program and the development of further research.

## Acknowledgement

The author would like to thank the Decan of the Faculty of Public

Health, Hasanuddin University who has facilitated this research.

<b>Conflict of Interest:</b>	All authors declare no COI
<b>Ethics:</b>	There is no ethical violation as it is based on voluntary anonymous interviews
<b>Funding:</b>	No external funding
<b>Guarantor:</b>	Dr. Sri Andayani will act as guarantor of this article on behalf of all co-authors.

## References

1. Page MJ, McKenzie JE, Bossuyt PM, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *Int J Surg.* 2021;10:1–11.
2. Jabarkhil AQ, Tabatabaee SS, Jamali J, et al. Assessment of patient safety culture among doctors, nurses, and midwives in a public hospital in Afghanistan. *Risk Manag Healthc Policy.* 2021;14:1211–7.
3. Law MP, Zimmerman R, Baker GR, et al. Assessment of safety culture maturity in a hospital setting. *Healthc Q.* 2010;13:110–5.
4. Wallis K, Dovey S. Assessing patient safety culture in New Zealand primary care: a pilot study using a modified Manchester Patient Safety Framework in Dunedin general practices. *J Prim Health Care.* 2011;3:35–40.
5. Öhrn A, Rutberg H, Nilsen P. Patient Safety Dialogue: Evaluation of an Intervention Aimed at Achieving an Improved Patient Safety Culture. *J Patient Saf.* 2011;7:185–92.
6. Halligan MH, Zecevic A, Kothari AR, et al. Understanding Safety Culture in Long-Term Care. *J Patient Saf.* 2014;10:192–201.
7. Parker D, Wensing M, Esmail A, et al. Measurement tools and process indicators of patient safety culture in primary care. A mixed methods study by the LINNEAUS collaboration on patient safety in primary care. *Eur J Gen Pract.* 2015;21:26–30.
8. Goncalves Filho AP, Waterson P. Maturity models and safety culture: A critical review. *Saf Sci.* 2018;105:192–211.
9. Ramos RR, Calidgid CC. Patient safety culture among nurses at a tertiary government hospital in the Philippines. *Appl Nurs Res.* 2018;44:67–75.
10. Lawati MHAL, Dennis S, Short SD, et al. Patient safety and safety culture in primary health care: a systematic review. *BMC Fam Pract.* 2018;19:1–12.
11. Alqattan H, Cleland J, Morrison Z. An evaluation of patient safety culture in a secondary care setting in Kuwait. *J Taibah Univ Med Sci.* 2018;13:272–80.
12. Tili MA, Aouicha W, Sahli J, et al. A baseline assessment of patient safety culture and its associated factors from the perspective of critical care nurses: Results from 10 hospitals. *Aust Crit Care.* 2021;34:363–9.
13. Litchfield I, Marsden K, Doos L, et al. A comparative assessment of two tools designed to support patient safety culture in UK general practice. *BMC Fam Pract.* 2021;22:1–13.

