

## The Strategies and Interventions for Interprofessional Collaboration to Improving Patient Safety in Hospitals: A Systematic Review

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### Abstract

Interprofessional collaboration strategies and interventions are carried out to improve patient safety in hospitals. This study aimed to analyze the strategies and interventions used in interprofessional collaboration to improve patient safety. Interprofessional collaboration strategies and interventions were searched using five English-language databases, eligible studies were extracted, and the risk of bias was independently evaluated by two authors. The literature search yielded a total of 10,729 registered papers. We conducted an analysis on 3,793 health professionals. The following articles were included: 1) articles that described an intervention interprofessional collaboration to improve patient safety; 2) those focused on interprofessional collaboration in hospitals; and 3) the research sample included of health care professionals (doctors, nurses, nutritionists, and pharmacists). Interventions that combine lectures, skills practice, and discussions are carried out using an online format and case study practice. The strategies and interventions identified inductively were categorized into four items: 1) team acceptance and readiness for interprofessional collaboration; 2) acting as a team and not as individuals; 3) developing protocols or guidelines for health professionals; and 4) integrating elements of interprofessional collaboration by health professionals in providing health services. The principles of interprofessional collaboration include the need to prioritize structures, processes, and tools that enable interprofessional collaboration to be established in hospitals. Interprofessional collaboration strategies and interventions in hospitals are effective in being able to make changes to improve patient safety and the quality of service.

**Keywords:** hospitals, interprofessional collaboration, patient safety

### Abstrak

**Strategi dan Intervensi Kolaborasi Interprofesional untuk Meningkatkan Keselamatan Pasien di Rumah Sakit: Suatu Tinjauan Sistematis.** Strategi dan intervensi kolaborasi antarprofesional dilakukan untuk meningkatkan keselamatan pasien di rumah sakit. Penelitian ini bertujuan untuk menganalisis strategi dan intervensi yang digunakan dalam kolaborasi interprofesional untuk meningkatkan keselamatan pasien. Strategi dan intervensi kolaborasi interprofesional dicari menggunakan lima basis data berbahasa Inggris, studi yang memenuhi syarat diekstraksi, dan risiko bias dievaluasi oleh dua penulis secara independen. Pencarian literatur menghasilkan total 10.729 makalah yang telah terdaftar. Kami melakukan analisis pada 3.793 profesional kesehatan. Artikel disertakan jika: 1) menggambarkan kolaborasi interprofesional intervensi untuk meningkatkan keselamatan pasien; 2) berfokus pada kolaborasi antarprofesional di rumah sakit; 3) sampel penelitian termasuk profesional perawatan kesehatan (dokter, perawat, ahli gizi, apoteker). Intervensi yang menggabungkan perkuliahan, praktik keterampilan, dan diskusi dilakukan dengan menggunakan format online dan praktik studi kasus. Strategi dan intervensi yang diidentifikasi secara induktif dikategorikan menjadi empat item: 1) penerimaan tim dan kesiapan untuk kolaborasi antarprofesional; 2) bertindak sebagai tim dan bukan sebagai individu; 3) mengembangkan protokol atau pedoman untuk profesional kesehatan; dan 4) mengintegrasikan elemen-elemen kolaborasi antarprofesional oleh profesional kesehatan dalam memberikan layanan kesehatan. Prinsip-prinsip kolaborasi antarprofesional perlu memprioritaskan struktur, proses, dan alat yang memungkinkan kolaborasi interprofesional terjalin di rumah sakit. Strategi kolaborasi dan intervensi interprofesional di rumah sakit efektif dalam dapat melakukan perubahan untuk meningkatkan keselamatan pasien untuk kualitas layanan yang lebih baik.

**Kata Kunci:** keselamatan pasien, kolaborasi interprofesional, rumah sakit

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## Introduction

The incidence of patient safety reported by the World Health Organization (WHO) is estimated at 134 million due to unsafe care, and about 2.6 million causing death. These patient safety incidents occur worldwide, not only in the United States, Europe and Asia, but also in Indonesia (WHO, 2021). Indonesia recorded the following patient safety incidents: near miss events (31.67%), adverse events (31.73%), and sentinel events (3.05%), with an average increase of 25% in the number of patient safety incidents every year (Daud, 2020). Patient safety is an important element in health services because it involves human safety. The priority of patient safety is to minimize risks and prevent patient safety incidents caused by errors resulting from carrying out an action or taking actions that should not be taken (WHO, 2021).

Patient safety incidents that occur are events or conditions caused by health workers from various professions, including doctors, nurses, pharmacists, nutritionists, and other health workers. Patient safety incidents that occur include medical errors, diagnosis errors, medication errors, transfusion errors, patient falls, medication administration errors, and patient identification errors (WHO, 2020). As a direct services provider, the interprofessional collaboration of every health professional is really needed through their participation, involvement, and meetings. Rather than just cooperation and communication, efforts are also needed to implement standard protocols, safe medication management, and positive relationships in the implementation of strategic forms and interprofessional collaboration interventions to improve patient safety in hospitals (Ansa et al., 2020; Kartika, 2019). The study of articles in this review shows that the collaboration strategy used for success in health services, especially for patient safety, can be used with various strategies, both through seminars to increase understanding and through training.

Interprofessional collaboration is a relationship in which each party respects the skills of the other party by recognizing and accepting the scope of the activities and responsibilities of each in achieving common goals. Furthermore, in the collaborative process, several indicators must be met, such as 1) interaction by providing information, asking and giving opinions, giving directions or orders, making decisions, educating, and providing support or approval; 2) a practice environment where each profession has a different field of practice with its own regulations, authority, and expertise, but certain tasks can be carried out together the same; 3) common interests, namely working together to provide satisfaction to all parties; and 4) common goals, which are more patient-oriented and can help determine responsibilities according to each individual's expertise (Dinius et al., 2020; Sillero & Buil, 2021).

The collaboration process is an initiative strategy formed by the WHO, together with the governments of England and Northern Ireland in the Global Patient Safety Collaborative (GPSC), which recognizes that patient safety is an important component in providing health care towards universal health coverage (UHC) and sustainable development goals (SDGs). The main goals of the collaboration are to secure and improve global action on patient safety, reduce the risk of avoidable harm, and build a positive attitude toward improving health security systems at the country level. The overall work collaboration is organized into three strategic areas: leadership to prioritize patient safety by involving patients and families; education and training to build competent health workers and interprofessional training in the field of patient safety; and research to support evidence-based policy processes in patient safety (Soko et al., 2021; WHO, 2020).

Interprofessional collaboration is a solution for improving patient safety and as a reference for higher service quality and lower costs (Hlongwa

& Rispel, 2021). According to the WHO (2020), interprofessional collaboration occurs when two or more professions work together to achieve common goals. Chetty et al. (2020) defined it as a partnership between a team of health professionals and a client in a participatory, collaborative, and coordinated approach to shared decision-making around health and social issues. Interprofessional collaboration is also able to have a better impact on care. Fathya et al. (2021) stated that the implementation of interprofessional collaboration in hospitals provided gives good results, with 67.8% partnership domain, 82.2% cooperation, 66.9% coordination, and 73.8% collaboration. However, several hospitals have not implemented this interprofessional collaboration optimally. We performed a systematic review to identify strategies and interventions for interprofessional collaboration and integration to improve patient safety. More specifically, we listed and analysed the existing strategies, interventions, and outcomes without focusing on a specific profession or disease.

## Methods

**Design.** We conducted a systematic review using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2022 and has been registered with PROSPERO (registration number: CDR42024550886). This includes the number of professions involved in the intervention and form of intervention carried out, including various types of research design methods.

**Data Sources.** A search of five databases was conducted for the completion of this systematic review: Google Scholar, PMC, PubMed, Scopus, and Science Direct. The publication period was limited to 2014–2021. Therefore, the interventions could provide updated knowledge that could be adopted by everyone, and their application could be carried out in hospitals. In addition, we limited the search to 2014 because the research we conducted was sufficient to meet the objectives of our review.

We searched strategy around the following key concepts: interprofessional collaboration, patient safety, strategies and interventions interprofessional collaboration. We combined the keywords presented as “OR”, “AND”, and “NOT”. We used keyword combinations of “interprofessional collaboration OR strategies and interventions interprofessional collaboration”, “interprofessional collaboration AND patient safety”, “interprofessional collaboration AND hospitals”, “interprofessional collaboration OR Teamwork, strategies and interventions interprofessional collaboration AND patient safety”, “strategies and interventions interprofessional collaboration AND hospitals, patient safety AND hospitals”, “interprofessional collaboration OR element of interprofessional collaboration”, and “interprofessional collaboration AND health professionals”. The limitations that we used were English articles that were provided in the full text.

**Inclusion and Exclusion Criteria.** The articles that were included: 1) described an intervention interprofessional collaboration to improve patient safety; 2) focused on interprofessional collaboration in hospitals; 3) consisted of health care professionals (doctors, nurses, nutritionists, and pharmacists); and 4) were published between 2014 and 2021. Articles were excluded when: 1) the focus was on interprofessional education; 2) the research sample comprised students; and 3) the full text was not available.

The data were measured using PICO framework, which includes: 1) Population: health professionals (doctors, nurses, nutritionists, pharmacists, and other health professionals); 2) Interventions: combined lectures, skills practice, and discussions are carried out using an online format and case study practice; 3) Comparison: the principle of interprofessional collaboration need to prioritize structures, processes, and tools that enable interprofessional collaboration to be established in hospitals. Interprofessional collaboration strategies and interventions in hospitals are effective in making changes to im-

prove patient safety for a better-quality service;  
4) Outcomes: the strategies and interventions identified inductively were categorized into four items (team acceptance and readiness for interprofessional collaboration, acting as a team and not as individuals, developing protocols or guidelines for health professionals, and integrating elements of interprofessional collaboration by health professionals in providing health services).

**Data Extraction.** The data extracted for this systematic review included the study location, participant characteristics, intervention description, duration, and research results instruments, as presented in Table 1. We synthesised the results of each study relevant to each of our outcomes. This indicates that systematic reviews with financial conflicts of interest more frequently had statistically favorable results or conclusions and lower methodological quality.

When a quantitative synthesis was considered not meaningful, the results from individual studies were summarised qualitatively.

**Quality Appraisal.** We found that several strategies have had a significant influence on the implementation of this interprofessional collaboration in the hospital environment. Several strategies that we have reviewed are the basis for implementing interprofessional collaboration to improve patient safety. The JBI scale was used to evaluate the quality of this article. In addition, two reviewers provided an objective assessment of our review.

## Results

The literature search yielded a total of 10,729 papers, of which 1,860 duplicates were removed. On screening the titles and abstracts of the remaining 5,359 records, only 2,235 were eligi-

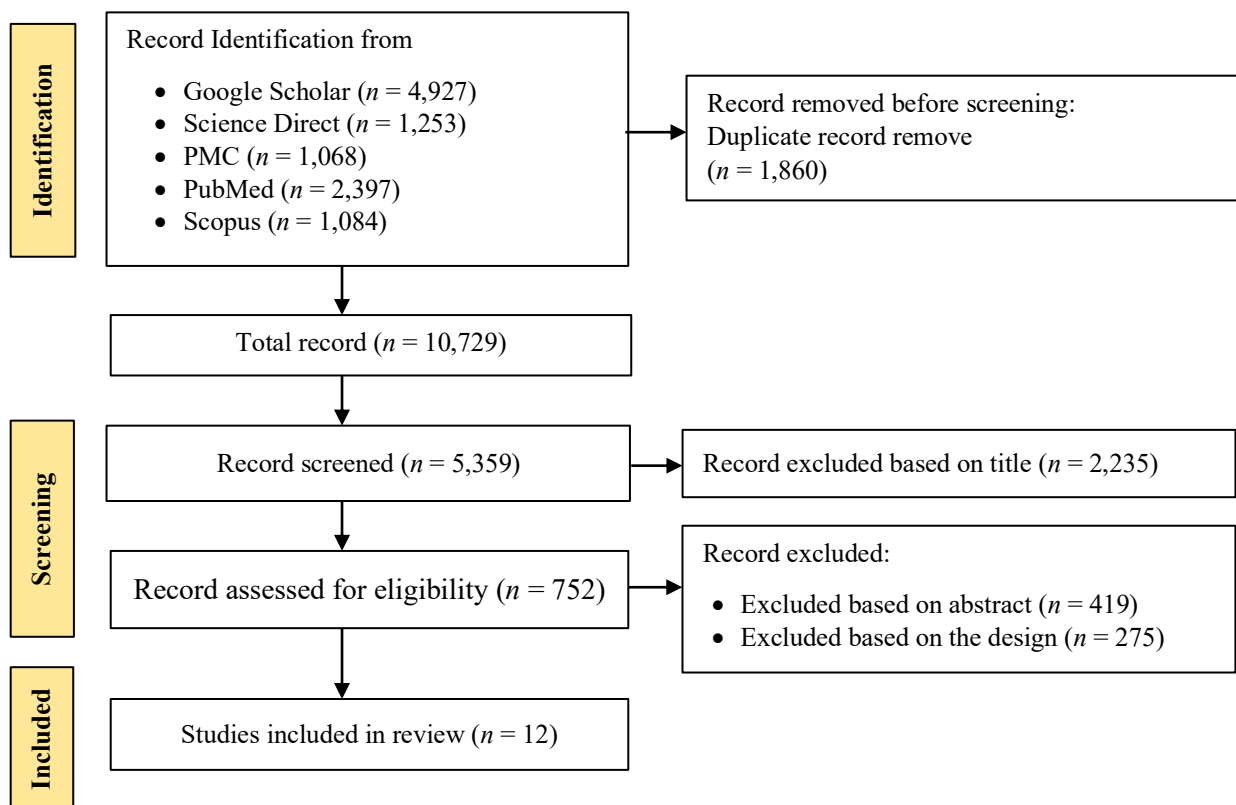


Figure 1. PRISMA 2022 Schematic Selection Process Flowchart for A Systematic Review

Table 1. Description of the Study

Author, Title, Database, Country	Aim	Method	Sample	Results
Ansa et al. (2020) <i>Attitudes and Behavior Towards Interprofessional Collaboration Among Healthcare Professionals in a Large Academic Medical Center</i> (Scopus) USA	To examine the attitudes of health professionals in the care of patients and health care teams as well as their behavior and experience in conducting interprofessional collaboration.	Cross-sectional study.	Doctors, residents, nurses, nurse practitioners, respiratory therapists, occupational therapists, physical therapists, social workers, dietitians, pharmacists, and pathologists.	The results showed that health professionals recognized interprofessional collaboration with mutual respect in the health team, decision-making, and interprofessional communication as Interprofessional Education Collaborative (IPEC) most important core competencies. Institutional policies that facilitate interprofessional collaboration provide a conducive working environment based on IPEC's core competencies.
Ballangrud et al. (2017) <i>"Teamwork in hospitals": A quasi-Experimental Study Protocol Applying a Human Factors Approach</i> (PubMed) Norway	To determine the impact of interprofessional teamwork interventions in a surgical ward.	Quasi-experimental study.	Doctors, nurses, nursing assistants, midwives, physiotherapists, and occupational therapists.	The results show that the implementation of the Systems Engineering Initiative for Patient Safety (SEIPS) model has an impact on team performance, namely 1) reframing the way of observing and monitoring interprofessional team work, and interpreting aspects of team work performance; 2) digging deeper into what contextual factors affect the performance of the health team; 3) measuring the effect of interprofessional teamwork on patient safety, and 4) providing evidence-based recommendations on the content, duration, and frequency of teamwork training programs.
Dinius et al. (2020) <i>Inter-Professional Teamwork and Its Association with Patient Safety in German Hospitals-A Cross Sectional Study</i> (PMC) German	To explore interprofessional teamwork, safety behavior, and patient safety in German hospitals, examining the relationship between interprofessional teamwork and safety behavior as well as the relationship between interprofessional teamwork and patient safety.	Cross-sectional study.	326 teams (doctors and nurses), inpatient.	There was a significant improvement in interprofessional teamwork and patient safety. Then, the impacts obtained are professional groups, work experience, and perceptions of interprofessional teamwork; interprofessional teamwork gives better results.
Hartgerink et al. (2014)	To identify the factors of relational coordination by	Cross-sectional study.	440 professionals involved in	The results showed that participation in multidisciplinary team meetings

Author, Title, Database, Country	Aim	Method	Sample	Results
<i>The Importance of Multidisciplinary Teamwork and Team Climate for Relational Coordination Among Teams Delivering Care to Older Patients</i> (PMC) The Netherlands	professionals in providing care to elderly patients.		providing care to elderly patients. These professionals comprised specialist doctors, nurses, physiotherapists, speech therapists, nutritionists, and social workers.	and team climate are contributors to the development of relational coordination.  Multidisciplinary teams improve performance, and work processes are more effective through interdependence in interactions among health professionals.
Hepp et al. (2015) <i>Using an interprofessional Competency Framework to Examine Collaborative Practice</i> (Google Scholar) Canada	To analyze collaborative practice in acute care units within the domain of the Canadian Interprofessional Health Collaborative (CIHC) framework.	Qualitative study.	113 health care providers from various professions.	The results showed that the application of the CIHC competency was able to identify gaps in collaborative practice; become a strategy and support for competence in improving collaborative practices that can improve the quality of patient care.
Hlongwa & Rispel (2021) <i>Interprofessional Collaboration Among Health Professionals in Cleft Lip and Palate (CLP) Treatment and Care in the Public Health Sector of South Africa</i> (Scopus) South Africa	To design multiprofessional, multidisciplinary collaboration and then provide understanding, practice, and apply these skills through simulation.	Cross-sectional study design.	Health care professionals involved in the delivery of care.	The results showed that the seven categories of interprofessional collaboration could be used as a guide to develop specific strategies to enhance interprofessional collaboration among CLP teams, namely nursing expertise (8 items); shared power (4 items); collaborative leadership (10 items); joint decision-making (2 items); optimizing the professional role and scope (10 items); effective group function (9 items); and communication (8 items). Institutional support and leadership combined with ongoing patient-centered professional development in a multidisciplinary encounter.
Hu & Broome (2019) <i>Interprofessional Collaborative Team Development in China: A Grounded Theory</i> (Science Direct) China	To explore interprofessional team development as a necessary strategy to help nurse managers to better design interprofessional teamwork opportunities and provide the necessary support to achieve the effect of interprofessional collaborative practice.	Grounded theory.	Doctors and nurses.	The results of the study indicated that this theory can be useful for health workers to develop a deeper understanding of the interprofessional collaboration process. The central category of this theory is the process for developing an effective interprofessional collaboration team spanning three stages: exploration, integration, and adjustment.

Author, Title, Database, Country	Aim	Method	Sample	Results
Kurniasih et al. (2019) <i>Interprofessional Collaboration Meningkatkan Pelaksanaan Sasaran Keselamatan Pasien</i> (Google Scholar) Indonesia	To identify interprofessional collaboration in improving the implementation of patient safety goals in hospitals.	Quasi-experiment in the intervention and control groups.	20 nurses and 10 doctors.	The results showed that there was a significant effect between interprofessional collaboration and increased patient safety goals. Interprofessional collaboration had a positive influence on the implementation of patient safety goals. The better the interprofessional collaboration, the better the implementation of patient safety goals.
Lin et al. (2020) <i>Developing and Evaluating a One-Stop Patient-Centered Interprofessional Collaboration Platform in Taiwan</i> (PMC) Taiwan	To develop an interprofessional collaboration platform for effective team collaboration with a hospital information system (HIS). The platform integrates electronic medical records by understanding patient status and transmitting information.	Software development life cycle (SDLC).	Doctors, pharmacists, nurses, lab technicians, and occupational and physical therapists.	The interprofessional collaboration platform was recognized as an effective and convenient tool to help clinical decision-making, improve communication among team members, and develop more functions that will be useful to develop on the platform in the future.
Ma et al. (2018) <i>Inter- and Intra-Disciplinary Collaboration and Patient Safety Outcomes in U.S. Acute Care Hospital Units: A Cross-Sectional Study</i> (Science Direct) USA	To identify the extent of interdisciplinary collaboration between nurses and doctors in patient care units with respect to patient safety.	Cross-sectional study.	900 nurses and doctors from five adult care units in 160 US hospitals.	The results showed that nurse-doctor and nurse-nurse collaboration had a significant effect on patient safety.
Manojlovich et al. (2014) <i>Achieving a Climate for Patient Safety by Focusing on Relationships</i> (PubMed) Canada	To find out the relationship between health professionals who contribute to the patient safety climate after the implementation of interventions to improve collaboration between professionals.	Quasi-experimental survey study design.	1,896 respondents, including doctors, nurses, physiotherapists, and other health workers.	The results of the study showed that collaboration and respect have a positive influence on the patient safety climate. Through the Interprofessional Model of Patient Care (IPMPC), all health care professionals learned how to collaborate and build a patient safety climate. Efforts to foster good working relationships improved the patient safety climate.
Mulidan et al. (2019) <i>The Influence of Reinforcing Nurse-Doctor Collaboration Inter-Professional</i>	To identify the effect of strengthening interprofessional nurse-physician collaboration on patient safety goals.	Quasi-experimental control group, two pre-post-test design.	44 doctors and 44 nurses.	The results showed that there was a significant effect of strengthening interprofessional collaboration on the implementation of patient safety goals in hospital inpatients. This was proven by an increase in

Author, Title, Database, Country	Aim	Method	Sample	Results
<i>Collaboration on Patient Safety Goals at RSUP H. Adam Malik, Medan (Google Scholar) Indonesia</i>				each interprofessional domain of collaboration, namely roles and responsibilities, interprofessional communication, and teamwork.

ble, given the inclusion criteria outlined above. After further reading, the following studies were also excluded: 752 studies lacking intervention, 419 articles that did not focus on interprofessional collaboration, and 275 articles that did not focus on patient safety. Finally, 12 articles that included findings on interventions and strategies for interprofessional collaboration and patient safety (Figure 1), such as discussions, training, skills, and case studies, were included.

The 12 articles included several interventions and strategies for interprofessional collaboration and patient safety, as listed in Table 1, which included cross-sectional research (5), quasi-experimental (4), qualitative study (2), and software development life cycle (SDLC) (1). The countries include Germany, the USA, Indonesia, Norway, Taiwan, Canada, the Netherlands, South Africa, and China, which span the continents of Asia, America, Europe, and Africa.

This literature review used a mixed method synthesis. This method is used to combine quantitative and qualitative data and findings to gain a more comprehensive understanding and to obtain more accurate data results between research using quantitative and qualitative methods.

**Study Characteristics.** The characteristics of each study show that several applications of interprofessional collaboration need to be carried out and have an effect on health professionals in improving patient safety. For example, studies that were conducted on 3,793 health professionals—including doctors and residents, nurses, nurse practitioners, respiratory thera-

pists, occupational therapists, physical therapists, dietitians, pharmacists, and pathologists in inpatient rooms—showed significant results that can improve patient safety (Ansa et al., 2020; Kurniasih et al., 2019; Ma et al., 2018; Mulidan et al., 2019).

Several studies also suggest that the implementation of interprofessional collaboration requires the support of all parties involved. This support can be fostered through discussions, training, case studies, and the use of speaciald platforms designed to improve service quality, which has an effect on patient safety (Ansa et al., 2020; Ballangrud et al., 2017; Hepp et al., 2015; Lin et al., 2020; Mulidan et al., 2019). Furthermore, interprofessional collaboration can improve the attitudes of health professionals towards patient safety by applying collaboration elements such as communication, coordination, role clarification, organizational culture, and conflict resolution (Dinius et al., 2020; Hartgerink et al., 2014; Hlongwa & Rispel, 2021; Hu & Broome, 2019).

**Appraisal Assessment Tool.** The appraisal assessment tool is presented in Table 2 using the JBI scale. Eleven categories of items were assessed from twelve articles (Ansa et al., 2020; Ballangrud et al., 2017; Dinius et al., 2020; Hartgerink et al., 2014; Hepp et al., 2015; Hlongwa & Rispel, 2021; Hu & Broome, 2019; Lin et al., 2020; Ma et al., 2018; Manojlovich et al., 2014; Mulidan et al., 2019; Kurniasih et al., 2019). From the assessment results, the inclusion categories for the articles are presented in Table 2.

**Quality Assessment of Included Studies.** We compared these statistical tests in two different

ways. First, we used a *p*-value as a cut-off point for defining the presence of publication bias using Begg's method, Egger's method, or Macaskill's method. Second, we estimated the sensitivities of these tests corresponding to a fixed false positive rate (0.05 or 0.1) to compare their statistical powers. We evaluated five domains: sample selection, deviations from the intended intervention, missing outcome data, outcome measurement, selection of the reported results, and overall bias. The risk of bias assessment is presented in Table 3.

Among the 12 studies, eight studies had concerns due to the sample selection (Ansa et al., 2020; Ballangrud et al., 2017; Dinius et al., 2020; Hartgerink et al., 2014; Hlongwa & Rispel, 2021; Ma et al., 2018; Manojlovich et al., 2014; Mulidan et al., 2019). Two studies were concerned about deviation from the intended intervention domain (Lin et al., 2020; Ma et al., 2018). In contrast, all studies had a low risk of missing outcome data. Five studies reported a low risk of bias in outcome measures (Dinius et al., 2020; Ballangrud et al., 2017; Hlongwa & Rispel, 2021; Hu & Broome, 2019; Mulidan et al., 2019) and selective reporting of outcome

domains (Ansa et al., 2020; Hartgerink et al., 2014; Hlongwa & Rispel, 2021; Kurniasih et al., 2019; Manojlovich et al., 2014). In conclusion, in line with overall bias, eleven studies had a low risk (Ansa et al., 2020; Ballangrud et al., 2017; Dinius et al., 2020; Hartgerink et al., 2014; Hepp et al., 2015; Hlongwa & Rispel, 2021; Hu & Broome, 2019; Kurniasih et al., 2019; Ma et al., 2018; Manojlovich et al., 2014; Mulidan et al., 2019) and one study had some concerns about a high risk of bias (Lin et al., 2020).

Interprofessional collaboration strategies and interventions provide changes in the attitudes of health professionals by facilitating teamwork. The process of interprofessional collaboration strategies and interventions is the nature of the interaction between one profession and another to determine service quality. The process is able to solve problems, identify sources, and make agreements to collaborate with other parties, in addition to determining basic rules, preparing agendas, organizing sub-subgroups, synthesizing information, analyzing options, and raising desired agreements, and implementing agreed-upon collaboration goals (Soko et al., 2021).

Table 2. Description of Included Studies

		Yes	No	Unclear	No Applicable
1	Is the review question clearly and explicitly stated?	I	-	-	-
2	Were the inclusion criteria appropriate for the review question?	I	-	-	-
3	Was the search strategy appropriate?	I	-	-	-
4	Were the sources and resources used to search for studies adequate?	I	-	-	-
5	Were the criteria for appraising studies appropriate?	I	-	-	-
6	Was the critical appraisal conducted by independently by two or more reviewers?	I	-	-	-
7	Were there methods to minimize errors in data extraction?	I	-	-	-
8	Were the methods used to combine studies appropriate?	I	-	-	-
9	Was the likelihood of publication bias assessed?	I	-	-	-
10	Were recommendations for policy or practice supported by the reported data?	I	-	-	-
11	Were the specific directives for new research appropriate?	I	-	-	-

Overall appraisal: Include ☐ Exclude ☐ Seek further info ☐

Table 3. Risk of Bias Assessment

Authors (Years)	Sample Selection	Deviation from Intended Interventions	Missing Outcome Data	Measurement of the Outcome	Selection of the Reported Result	Overall Bias
Ansa et al. (2020)	H	L	L	L	H	L
Ballangrud et al. (2017)	H	L	L	H	L	L
Dinius et al. (2020)	H	L	L	H	L	L
Hartgerink et al. (2014)	H	H	L	L	L	L
Hepp et al. (2015)	L	L	L	L	L	L
Hlongwa and Rispel (2021)	H	L	L	L	H	L
Hu and Broome (2019)	H	L	L	H	H	L
Kurniasih et al. (2019)	L	SC	L	H	L	L
Lin et al. (2020)	SC	H	L	SC	H	H
Ma et al. (2018)	H	L	L	L	L	L
Manojlovich et al. (2014)	SC	SC	L	L	H	L
Mulidan et al. (2019)	H	L	L	H	L	L
	L	L	L	L	L	L

Note: low risk (L); high risk (H); some concern (SC)

Workshops and information sessions, where the advantages of teamwork and finding common ground were explained, were organized to effect changes in the attitudes of health workers. The advantages of interprofessional cooperation are described as being likelier to accept and adopt patient safety principles. Simple and accessible transfer of knowledge appears to be an important characteristic of successful interventions on the attitudes and knowledge of health professionals (Dinius et al., 2020).

Interprofessional collaboration strategies and interventions can increase awareness of collaboration in hospitals. Increased awareness resulted in better acceptance and team readiness for patient safety. Making health professionals aware of their shortcomings and the need for interprofessional collaboration across multiple disciplines appeared to be an effective way to improve patient safety. In addition to awareness, the potential for improvement in service quality, caused by better collaboration, motivated health workers to change their attitudes toward providing health services (Goldman et al., 2018).

Interprofessional collaboration strategies and interventions are structured guidelines, standardized tools, and protocols used to improve

communication and coordination between health professionals working in hospitals. These protocols provide more effective communication and an evidence-based approach to patient safety (Zajac et al., 2021).

Furthermore, interprofessional collaboration strategies and interventions is apply the elements of interprofessional collaboration, including teamwork, communication, coordination, role clarification, leadership, organizational culture, and conflict resolution. The elements in this interprofessional collaboration effectively improve the quality of service, reduce the rate of complications and errors, and reduce the mortality rate.

These findings are in accordance with Brock et al. (2020) report that teams that worked collaboratively with the application of interprofessional collaboration elements provided direction in treating patients, yielding optimal results, and delivering patient satisfaction. This also concurs with Ansa et al. (2020), who stated that the use of interprofessional collaboration elements can increase satisfaction. In their research, the use of interprofessional collaboration elements was also carried out as a framework for interprofessional competence to be able to determine professional roles, determine service

directions, and be responsible for the attitudes and behavior of health professionals. These seven elements influenced how the competency framework could be applied in different situations. These elements are also the basis for transforming an ordinary work environment into a collaborative environment to achieve treatment goals and improve patient safety.

## Discussion

Interprofessional collaboration is carried out on the basis of professional involvement and working together to solve problems by interacting with each other to provide optimal care. The WHO recommends interprofessional collaboration as important to implement for teams to improve patient safety, not only for individual patients but also for the global population. Implementing strategies and interventions of interprofessional collaboration improves patient safety so that different professions complement each other in providing health services according to their respective expertise (Busari et al., 2017).

This systematic review identified four interventions and interprofessional collaboration strategies aimed at improving and facilitating patient safety in hospitals. The first category is team readiness, which is a prerequisite for enhancing and maintaining efficient interprofessional collaboration. Increasing awareness and confidence in being involved in interprofessional collaboration is also important so that it can change the attitude of professionals to respect each other's team members and actively ask for opinions or receive feedback from other team members (Busari et al., 2017). Making health professionals aware of their shortcomings and the need for collaboration across disciplines is an effective way to facilitate interprofessional collaboration. Additionally, Silva et al. (2021) indicated that experiencing teamwork itself increases awareness of the benefits and importance of collaboration and provides opportunities for health professionals to demonstrate their skills and abilities.

Second, collaborative behavior is required as a form of ease of work between teams. Developing collaborative behavior has a significant impact on patient safety. Collaborative behavior within interprofessional collaboration is able to create staff attention and motivation, reduce carelessness, which risks errors resulting in injury to patients, and increase compliance and responsibility in caring for patients (Alshammari & Dayrit, 2017). To enhance collaborative behavior, the development of shared principles (such as vision, values, ethical norms, and shared goals) is an important prerequisite. Our review found that maintaining safe behavior across teams by making care professionals feel comfortable providing services will improve patient safety (Iedema et al., 2019).

Third, structured guidelines and protocols for care professionals have a positive impact on hierarchy and conflict resolution between team members. Intensive meetings and case studies can also be carried out as a form of joint decision making. The following protocol has three principles that serve as an effective guide: recognize and acknowledge a decision, know and understand the problem that exists, and incorporate the patient's values and preferences into the decision (Ballangrud et al., 2017). Health care services and systems require interprofessional collaboration to be able to adapt to changes in the service system. Apart from that standard operating procedures (SOPs) or structured protocols guarantee the success of services (McLaney et al., 2022; Zajac et al., 2021).

The fourth element is interprofessional collaboration. For health professionals, at the root of the full implementation of interprofessional collaboration lies teamwork, communication, role clarification, coordination, leadership, organizational culture, and conflict resolution (Bochatay, 2019).

**Teamwork.** Teamwork forms the basis for implementing interprofessional collaboration because it can influence health professionals as

agents of change in improving patient safety. This is supported by research (Roller-Wirnsberger et al., 2020), which states that interprofessional teamwork provides the basis for building an integrated approach in promoting and maintaining patient health and increasing the effectiveness of health care delivery. Effective teamwork can reduce hospital stays and treatment costs, improve patient safety and health, encourage innovation in patient care, and increase staff motivation and well-being.

**Communication.** Interprofessional communication is one of the competencies that health professionals require to unite their joint efforts in providing services to patients. Effective communication between health professionals has an important function in improving health care and patient safety. Communication provides clear guidance in interprofessional teamwork by implementing an integrated system of knowledge and information sharing.

This is in accordance with the report by Lindqvist (2015) that communication in interprofessional collaboration provides strategies for health care reform, improves patient service outcomes, decreases drug side effects, reduces morbidity and mortality, optimizes drug dosage, and has been shown to increase job satisfaction. Applying interprofessional communication strategies will create teamwork, encourage open discussions (joint decision-making), recognize and appreciate roles (contributions of each team member), develop relationships of mutual trust (mutual respect with team members) and ensure understanding of treatment decisions.

**Role Clarification.** Clarifying roles in interprofessional collaboration is understanding and developing the role of each profession by considering the ethics of each profession and using each knowledge and expertise to build relationships in collaboration. Role clarification illustrates that each health professional understands the roles of all other professions involved in setting and achieving common goals, recognizes and respects the diversity of roles and res-

possibilities, carries out their role by respecting the ethics of other professions, performs consultations to integrate the skills and knowledge of their profession and others, integrating competencies or roles in service delivery.

This is in accordance with Sniffen et al. (2019), who stated that role clarification or clarity is the main determinant of interprofessional collaboration. Therefore, professional roles are able to transform practice and interactions with other professionals in providing services to patients and ensure that the implementation of each professional's role is on target, optimizing the scope of professional practice and more effective patient management.

**Coordination.** Coordination in interprofessional collaboration is a framework for assessing teamwork that focuses on communication and the existence of good cooperative relationships between health professionals in a team. Coordination in interprofessional collaboration helps evaluate team dynamics, improve quality and efficient performance outcomes, and strengthen systems of care to improve patient safety. This is according to Hustoft et al. (2018), who found that patients treated with a coordinated team have effective outcomes, and that coordination within the team leads to better continuity between health workers. Coordination in care is an integral component of intentional patient care activities between two or more health professionals to facilitate the delivery of appropriate health services as well as the exchange of information between professionals, thereby holding each other accountable for various matters. Coordination in interprofessional collaboration increases job satisfaction and provides social support and resilience in facing stress.

**Leadership.** Leadership in interprofessional collaboration has become a facility for health professionals to set standards and is integrated into the joint decision-making process. Leadership in interprofessional collaboration illustrates how to work on the provision of services in a holistic and flexible manner with differences between

disciplines, roles, and responsibilities in providing services to patients. Leadership in interprofessional collaboration supports optimal service delivery, enhances interdependent working relationships among all health professionals, makes informed and effective decisions, and creates a climate for shared leadership in service delivery.

This is in line with the report by Rizkia et al. (2022), which states that leadership implemented in collaboration between staff is able to find solutions to meet service needs. Interprofessional collaborative leadership builds trust and relationships with other professionals and the skills to create an environment of respect and appreciation for professionals from various disciplines so that each profession has the opportunity to contribute to effective, stable, quality, and improved decision-making among professionals.

**Organizational Culture.** Organizational culture in interprofessional collaboration is a prerequisite for teamwork; it is defined as the shared values, beliefs, or perceptions held by staff in an organization. As an organization in health services, organizational culture is needed for an understanding of the values, beliefs, ethics, attitudes, and behaviors that arise through interaction between health workers.

This is in accordance with Morales-Huamán et al. (2023), who stated that organizational culture is able to encourage a patient-centered interprofessional approach as a strategy to help stimulate change, advance, and realign the health care system by paying special attention to team structure. In addition, an organization with a strong culture helps staff to achieve goals and feel satisfied in their roles, improve staff behavior, influence teamwork and treatment outcomes, increase job satisfaction, and improve service quality, which will improve patient safety.

**Conflict Resolution.** Conflict resolution in interprofessional collaboration is one of the main

challenges for health professionals because they are required to manage conflicts in teams, find solutions to each problem from different ideas, and proactively deal with disagreements, and respond effectively to all types of conflicts. According to research Cullati et al. (2019), conflict resolution establishes communication to attract or encourage involvement and attention among team members, encouraging the search for potential solutions to express conflicts, including the development of useful creative compromises to help address complex health problems.

### **Implications for Nursing and Health Policy.**

Increasing the effectiveness of interprofessional collaboration affects the sense of trust and respect between nurses, doctors, and other health workers, directly improving the performance and professionalism of the team, decision-making, and interprofessional roles. Interprofessional collaboration has a positive impact on the health team, which is more effective when implementing care for patients, improving the quality of care, increasing the self-efficacy of each health profession, implementing appropriate medication, and reducing mortality and patient safety incidents. This interprofessional collaboration is able to improve the work environment between professions and then becomes a potential strategy to encourage and improve job satisfaction and patient safety. For this reason, support from hospital management must be optimized so that the implementation of interprofessional collaboration is more effective.

### **Conclusion**

This systematic review identified four categories of strategies and interventions for interprofessional collaboration to improve patient safety in hospitals: 1) acceptance and team readiness toward interprofessional collaboration, 2) acting as a team and not as an individual, 3) developing protocols or guidelines for health professionals, and 4) integrating elements of interprofessional collaboration by health professionals. The process of interprofes-

sional collaboration in health services must be improved because the current global climate is not professional enough for health workers to work in, and it is necessary to develop interprofessional efforts to treat patients. According to the principle of interprofessional collaboration, it is necessary to prioritize structures, processes, and tools to enable interprofessional collaboration to be affirmed and committed to in hospitals so that organizational capacity can create awareness and understanding about collaboration between staff, doctors, nurses, and other health workers.

## Rerefences

- Alshammari, H.F., & Dayrit, R.D.J. (2017). Conflict and conflict resolution among the medical and nursing personnel of selected hospitals in Hail City. *IOSR Journal of Nursing and Health Science*, 6 (3), 45–60. doi: 10.9790/1959-0603014560.
- Ansa, B.E., Zechariah, S., Gates, A.M., Johnson, S.W., Heboyan, V., & De Leo, G. (2020). Attitudes and behavior towards interprofessional collaboration among healthcare professionals in a large academic medical center. *Healthcare*, 8 (3), 323. doi: 10.3390/healthcare8030323.
- Ballangrud, R., Husebø, S.E., Aase, K., Aaberg, O.R., Vifladt, A., Berg, G.V., & Hall-lord, M.L. (2017). “Teamwork in hospitals”: A quasi-experimental study protocol applying a human factors approach. *BMC Nursing*, 16, 34. doi: 10.1186/s12912-017-0229-z.
- Bochatay, N. (2019). Discussing teamwork in health care: From interprofessional collaboration to coordination and cooperation. *Health Information and Libraries Journal*, 36, 367–371. doi: 10.1111/hir.12282.
- Brock, T., Vu,T., Kadirvelu, A., Lee, C.Y., & Kent, F. (2020). Implementing a collaborative medicine and pharmacy educational activity in two countries. *Medical Education Online*, 25 (1), 1780697. doi: 10.1080/10872981.2020.1780697.
- Busari, J.O., Moll, F.M., & Duits, A.J. (2017). Understanding the impact of interprofessional collaboration on the quality of care: A case report from a small-scale resource limited health care environment. *Journal of Multidisciplinary Healthcare*, 10, 227–234. doi: 10.2147/JMDH.S140042.
- Chetty, S., Bangalee, V., & Brysiewicz, P. (2020). Interprofessional collaborative learning in the workplace: A qualitative study at a non-governmental organisation in Durban, South Africa. *BMC Medical Education*, 20 (1), 346. doi: 10.1186/s12909-020-02264-5.
- Cullati, S., Bochatay, N., Maître, F., Laroche, T., Muller-Juge, V., Blondon, K.S., Junod Perron, N., Bajwa, N.M., Viet Vu, N., Kim, S., Savoldelli, G.L., Hudelson, P., Chopard, P., & Nendaz, M.R. (2019). When team conflicts threaten quality of care: A study of health care professionals’ experiences and perceptions. *Mayo Clinic Proceedings: Innovations, Quality and Outcomes*, 3 (1), 43–51. doi: 10.1016/j.mayocpiqo.2018.11.003.
- Daud, A. (2020). *Sistem pelaporan insiden keselamatan pasien*. Retrieved from: [https://persi.or.id/wp-content/uploads/2020/08/materi\\_drarjaty\\_ereport\\_web060820.pdf](https://persi.or.id/wp-content/uploads/2020/08/materi_drarjaty_ereport_web060820.pdf)
- Dinius, J., Philipp, R., Ernstmann, N., Heier, L., Göritz, A.S., Pfisterer-Heise, S., Hammerschmidt, J., Bergelt, C., Hammer, A., & Körner, M. (2020). Inter-professional teamwork and its association with patient safety in German hospitals-A cross sectional study. *PLoS ONE*, 15 (5), e0233766. doi: 10.1371/journal.pone.0233766.
- Fathya, N.A. Effendy, C., & Prabandari, Y.S. (2021). Implementation of interprofessional collaboration practices in type B teaching general hospital: A mixed methods study. *Jurnal Pendidikan Kedokteran Indonesia*, 10 (2), 162–176. doi: 10.22146/jpki.60093.
- Goldman, J., Kitto, S., & Reeves, S. (2018). Examining the implementation of collaborative competencies in a critical care setting: Key challenges for enacting competency-based education. *Journal of*

- Interprofessional Care*, 32 (4), 407–415. doi: 10.1080/13561820.2017.1401987.
- Hartgerink, J.M., Cramm, J.M., Bakker, T.J., van Eijdsen, A.M., Mackenbach, J.P., & Nieboer, A.P. (2014). The importance of multidisciplinary teamwork and team climate for relational coordination among teams delivering care to older patients. *Journal of Advanced Nursing*, 70 (4), 791–799. doi: 10.1111/jan.12233.
- Hepp, S.L., Suter, E., Jackson, K., Deutschlander, S., Makwarimba, E., Jennings, J., & Birmingham, L. (2015). Using an interprofessional competency framework to examine collaborative practice. *Journal of Interprofessional Care*, 29 (2), 131–137. doi: 10.3109/13561820.2014.955910.
- Hlongwa, P., & Rispel, L.C. (2021). Interprofessional collaboration among health professionals in cleft lip and palate treatment and care in the public health sector of South Africa. *Human Resources for Health*, 19 (1), 25. doi: 10.1186/s12960-021-00566-3.
- Hu, Y., & Broome, M. (2019). Interprofessional collaborative team development in China: A grounded theory study. *Journal of Nursing Management*, 27 (6), 1075–1083. doi: 10.1111/jonm.12775.
- Hustoft, M., Biringer, E., Gjesdal, S., Aßmus, J., & Hetlevik, Ø. (2018). Relational coordination in interprofessional teams and its effect on patient-reported benefit and continuity of care: A prospective cohort study from rehabilitation centres in Western Norway. *BMC Health Services Research*, 18 (1), 719. doi: 10.1186/s12913-018-3536-5.
- Iedema, R., Greenhalgh, T., Russell, J., Alexander, J., Amer-sharif, K., Gardner, P., Juniper, M., Lawton, R., Mahajan, R.P., McGuire, P., Roberts, C., Robson, W., Timmons, S., & Wilkinson, L. (2019). Spoken communication and patient safety: A new direction for healthcare communication policy, research, education and practice. *BMJ Open Quality*, 8 (3), e0007421. doi: 10.1136/bmjopen-2019-000742.
- Kartika, I.R. (2019). Deskripsi penerapan patient safety pada pasien di bangsal bedah [Description of the application of patient safety on patients in surgical wards]. *Human Care Journal*, 4 (2), 86–94. doi: 10.32883/hcj.v4i2.455.
- Kurniasih, Y., Sari, K.R., Santosa, A. (2019). Interprofesional collaboration meningkatkan pelaksanaan sasaran keselamatan pasien [Interprofessional collaboration to improve the implementation of patient safety goals]. *Journal Helath of Studies*, 3 (2), 113–120. doi: 10.31101/jhes.883.
- Lin, H.J., Ko, Y.L., Liu, C.F., Chen, C.J., & Lin, J.J. (2020). Developing and evaluating a one-stop patient-centered interprofessional collaboration platform in Taiwan. *Healthcare*, 8 (3), 241. doi: 10.3390/healthcare8030241.
- Lindqvist, S. (2015). Interprofessional communication and its challenges. In J. Brown, L.M. Noble, A. Papageorgiou & J. Kidd (Eds.), *Clinical communication in medicine* (pp. 157–167). John Wiley and Sons, Ltd. doi: 10.1002/9781118728130.ch25.
- Ma, C., Park, S.H., & Shang, J. (2018). Inter- and intra-disciplinary collaboration and patient safety outcomes in U.S. acute care hospital units: A cross-sectional study. *International Journal of Nursing Studies*, 85, 1–6. doi: 10.1016/j.ijnurstu.2018.05.001.
- Manojlovich M., Kerr M., Davies B., Squires J., Mallick R., & Rodger G.L. (2014). Achieving a climate for patient safety by focusing on relationships. *International Journal for Quality in Health Care*, 26 (6), 579–584. doi: 10.1093/intqhc/mzu068.
- Mclaney, E., Morassaei, S., Hughes, L., Davies, R., Campbell, M., & Di Prospero, L. (2022). A framework for interprofessional team collaboration in a hospital setting: Advancing team competencies and behaviours. *Healthcare Management Forum*, 35 (2), 112–117. doi: 10.1177/08404704211063584.
- Morales-Huamán, H.I., Medina-Valderrama, C.J., Valencia-Arias, A., Vasquez-Coronado, M.H., Valencia, J., & Delgado-Caramutti, J. (2023).

- Organizational culture and teamwork: A bibliometric perspective on public and private organizations. *Sustainability*, 15 (18), 13966. doi: 10.3390/su151813966.
- Mulidan, M., Suza, D.E., & Arruum, D. (2019). The influence of reinforcing nurse-doctor inter-professional collaboration on patient safety target at RSUP H. Adam Malik, Medan. *Journal of Nursing and Health Science*, 8 (5), 43–49. doi: 10.9790/1959-0805084349.
- Rizkia, D.G., Girsang, A.J., Kusumapradja, R., Hilmy, M.R., Pamungkas, R.A., & Dewi, S. (2022). The effect of interprofessional collaboration and transformational leadership on patient safety with work motivation as intervening variables. *RISSET: Jurnal Aplikasi Ekonomi Akuntansi dan Bisnis*, 4 (2), 039–053. doi: 10.37641/riset.v4i2.156.
- Roller-Wirnsberger, R., Lindner, S., Liew, A., O'Caomh, R., Koula, M.L., Moody, D., Espinosa, J.M., van Durme, T., Dimitrov, P., Benjak, T., Nicolaidou, E., Hammar, T., Vanhecke, E., Junius-Walker, U., Csizmadia, P., Galluzzo, L., Macijauskienė, J., Salem, M., Rietman, L., & Rodriguez-Mañas, L. (2020). European collaborative and interprofessional capability framework for prevention and management of frailty- A consensus process supported by the Joint Action for Frailty Prevention (ADVANTAGE) and the European Geriatric Medicine Society (EuGMS). *Aging Clinical and Experimental Research*, 32 (4), 561–570. doi: 10.1007/s40520-019-01455-5.
- Sillero, A.S., & Buil, N. (2021). Enhancing interprofessional collaboration in perioperative setting from the qualitative perspectives of physicians and nurses. *International Journal of Environmental Research and Public Health*, 18 (20), 10775. doi: 10.3390/ijerph182010775.
- Silva, L.C., Caldas, C.P., Fassarella, C.S., Souza, P.S. (2021). Efeito da cultura organizacional para a segurança do paciente em ambiente hospitalar: Revisão sistemática [Effect of the organizational culture for patient safety in the hospital setting: A systematic review]. *Aquichan*, 21 (2), e2123. doi: 10.5294/aqui.2021.21.2.3.
- Sniffen, K., Briggs, E., Hinyard, L., & Breitbach, A.P. (2019). Interprofessional role clarity, case-based learning, and perceptions of group effectiveness among athletic training and physical therapy students in a shared professional course. *Internet Journal of Allied Health Sciences and Practice*, 17 (4), 6. doi: 10.46743/1540-580X/2019.1847.
- Soko, T.N., Jere, D.L., & Wilson, L.L. (2021). Healthcare workers' perceptions on collaborative capacity at a Referral Hospital in Malawi. *Health SA Gesondheid*, 26, 1561. doi: 10.4102/hsag.v26i0.1561.
- World Health Organization (WHO). (2020). *Health worker safety: A priority for patient safety*. Retrieved from: [https://cdn.who.int/media/docs/default-source/world-patient-safety-day/health-worker-safety-charter-wpsd-17-september-2020-3-1.pdf?sfvrsn=2cb6752d\\_2](https://cdn.who.int/media/docs/default-source/world-patient-safety-day/health-worker-safety-charter-wpsd-17-september-2020-3-1.pdf?sfvrsn=2cb6752d_2)
- World Health Organization (WHO). (2021). *Global patient safety action plan 2021-2030: Toward eliminating avoidable harm in health care*. Retrieved from: <https://iris.who.int/bitstream/handle/10665/343477/9789240032705-eng.pdf?sequence=1>
- Zajac, S., Woods, A., Tannenbaum, S., Salas, E., & Holladay, C.L. (2021). Overcoming challenges to teamwork in healthcare: A team effectiveness framework and evidence-based guidance. *Frontiers in Communication*, 6, 606445. doi: 10.3389/fcomm.2021.606445.