

Review Article

Mortality in Magnet Hospitals: A Systematic Review

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ABSTRACT

Magnet hospitals are recognized for quality patient outcomes and nursing excellence. It was aimed to examine the effects of Magnet hospitals on mortality rate. Searches for this review were carried out using the PubMed, Scopus, and CINAHL databases without any year limitation. Search terms included Magnet hospitals, non-Magnet hospitals, and mortality. Inclusion criteria were: The identified 58 articles published in international journals, and 13 of those articles that met the inclusion criteria were included in this review. This systematic review adhered to the PRISMA guideline. Articles meeting the research criteria were evaluated for methodological quality with the Joanna Briggs Institute Meta-Analysis of Statistics Assessment and Review Instrument (JBI-MASARI) Critical Appraisal Tool. The research types used of the included studies were descriptive comparative research (n = 8), cohort study (n = 4), and retrospective, two-stage panel design (n = 1). Three descriptive comparative studies found that there was no difference in the mortality rates of Magnet hospitals and non-Magnet hospitals. By contrast, five descriptive comparative studies and five longitudinal studies determined that mortality rates were lower in Magnet hospitals. Overall, the findings of this systematic review indicated that Magnet hospitals are associated with lower rates of mortality. Considering the organizational consequences of mortality such as quality and cost savings, this systematic review provides significant contributions to hospital executives, as well as the nurse-clinicians, whether or not to obtain magnet status.

KEYWORDS: Magnet hospital, mortality, non-Magnet hospital, systematic review

INTRODUCTION

The Magnet concept first emerged in research that explored examples of recruiting and retaining successful nurses during the nursing shortage in the early 1980s. This research identified 41 hospitals that were able to attract and retain qualified nurses, and these hospitals were called Magnet hospitals by researchers. McClure *et al.* (1983) identified characteristics associated with management, professional practice and professional development, referred to as forces of magnetism, that were responsible for the success of Magnet hospitals.^[1,2] In 1990, the American Nurses Credentialing Center (ANCC), a component of the American Nurses Association (ANA), set new criteria and created a new model for nursing excellence and quality patient care. In addition, ANCC developed a voluntary recognition

program to authorize Magnet organizations, and the first Magnet hospital was credentialed in 1994.^[2-6] The model created by the ANCC provides a framework for nursing practices and research in the future. This model also serves as a roadmap for organizations trying to reach the Magnet Recognition Program. Components of the model include transformational leadership, structural empowerment, exemplary professional practice, new knowledge, innovation and improvements and empirical quality results.^[7] According to data provided by the ANCC, there are 580 Magnet hospitals in the world: 566 of them are in the US, three in Saudi Arabia, two in

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Australia, and the rest are in Belgium, Jordan, Canada, China, England, Lebanon, Taiwan, Japan, and United Arab Emirates.^[8]

Magnet hospitals are considered to be “better than the average” organizations in terms of nursing job satisfaction and patient care outcome because of their distinctive organizational features.^[9] Patient care outcomes are one of the most important indicators of quality care in healthcare organizations and promoting positive patient outcomes is one of the main goals of the Magnet recognition.^[10] Furthermore, Magnet hospitals reveal the relationships between structure, process, and outcome standards within the content of quality standards. Some of the quality indicators associated with the patient care outcomes of these hospitals are rates of falls and mortality, pressure ulcers management, prevention and monitoring, pain management and rates of catheter-associated infections, etc., Other quality indicators in healthcare organizations are hospital readmission rates, nursing turnover rate, a penetrating stab wound from a needle (or other sharp objects), nosocomial infections, etc.^[6] The aim of this systematic review was to examine the effects of Magnet hospitals on mortality.

METHODS

Search strategy: Searches conducted for this review were carried out using the PubMed, Scopus, and CINAHL databases; without any year limitation, and keywords were searched as “Magnet hospitals AND non-Magnet hospitals AND mortality”. Searches were carried out between January and May 2021. In addition, in this strategy, the reference lists of selected articles were also examined for additional relevant articles.

Eligibility criteria

The criteria for inclusion in the study were determined according to PICO (Population, Intervention, Comparison, Outcome), and the research was evaluated by the researchers in this PICO framework. In addition, this systematic review findings were reported based on the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines.^[11]

Results of the search produced 58 studies that were published in international journals. These articles were uploaded to Rayyan, a systematic review screening platform.^[12] The first step was elimination of the duplicate studies. After duplicate studies were removed, the records were then screened for eligibility. In this stage, critical analysis of the title and abstract, critical reading of the full text and recount of the selected articles was performed. Screening was conducted in a masked manner and separately by two researchers,

and any disagreements about screening were resolved through discussion. Finally, 13 of the articles met the criteria shown below and were included in this review. The search and inclusion stages of the articles are shown in Figure 1.

The inclusion criteria for the articles in this review were the following:

- Research studies that compared mortality in Magnet hospitals and non-Magnet hospitals.
- The language of the research article was English.
- The full text of the article was accessible.

Research Question:

- Is there a difference in mortality rates between hospitals with Magnet status and those without?

Methodological quality evaluation

Articles meeting the research criteria were evaluated for methodological quality with the Joanna Briggs Institute Meta-Analysis of Statistics Assessment and Review Instrument (JBI-MASStARI) Critical Appraisal Tool. According to this assessment tool, studies are evaluated in terms of four types of bias, namely selection bias, performance bias, detection bias, and attrition bias. The JBI-MASStARI assessment tool consists of nine items; for each item, the answer “yes” is valued at one point, and answers including “no”, “unclear”, and “not applicable” are valued at zero points. Scores range between 0 and 9 points, and the higher the total score, the higher the methodological quality of the study. The Turkish version of the tool was adapted by Nahcivan and Seçginli in 2015. For the JBI-MASStARI Critical Appraisal Tool, the content validity index was 0.90, and Cronbach’s alpha coefficient was 0.68.^[13] The studies included in this systematic review were evaluated by two researchers according to the JBI Critical Appraisal Checklist for Descriptive/Case Series [Table 1] and JBI Critical Appraisal Checklist for Comparable Cohort/Case Control [Table 2].

As a result of the methodological quality evaluation, the highest score for a study was seven, and the lowest was four. One of the studies was seven points, five of them were six points, four of them were five points and three of them were four points.

Since the JBI-MASStARI Critical Appraisal Tool total score does not have a cut-off point, all studies (n = 13) were included in this review, regardless of the methodological quality evaluation score.

Data extraction and synthesis: Data were extracted for authors, year of publication, aim, study design, sample characteristics, databases, and main results. The effect measures of mortality were mean difference and risk

ratio. There was heterogeneity in study designs and samples, thus the synthesis of the findings was conducted as a narrative synthesis, instead of meta-analysis.

RESULTS

General characteristics of the research

All the research studies (n = 13), which were conducted between 1994 and 2021 (August), were included in this review. All the studies were conducted in the United States. The types of research of the included studies were descriptive comparative research (n = 8), cohort study (n = 4), and retrospective, two-stage panel design (n = 1). The studies used in this review, and the data from those studies, were obtained from national databases [Table 3]. The most used databases were American Hospital Association annual survey, New York Statewide Planning and Research Cooperative System Database, and Pediatric Health Information System Database. Six of these studies focused on hospitals; four focused on both patients and hospitals; and the other three focused on patients. In the six studies that focused on hospitals, the number of patients, the population was not clearly defined.^[14-19] In the majority of the studies, the sample numbers were unequal, and the majority of the data were collected from non-Magnet hospitals.^[14-25] The results are presented on Table 3. In summary, three of the eight descriptive comparative studies, there was no difference between Magnet hospitals and non-Magnet hospitals in terms of mortality rates.^[16,18,26] In five

other descriptive comparative studies, mortality rates in Magnet hospitals were lower.^[14,15,17,22,24] Similarly, mortality rates were lower in Magnet hospitals than in non-Magnet hospitals in the four cohort studies.^[20,21,23,25] In the retrospective, two-stage panel design study, although there was no difference between Magnet and non-Magnet hospitals for the rate of 30-day surgical mortality in 1999, the rate of 30-day surgical mortality was lower in Magnet hospitals in 2006.^[19]

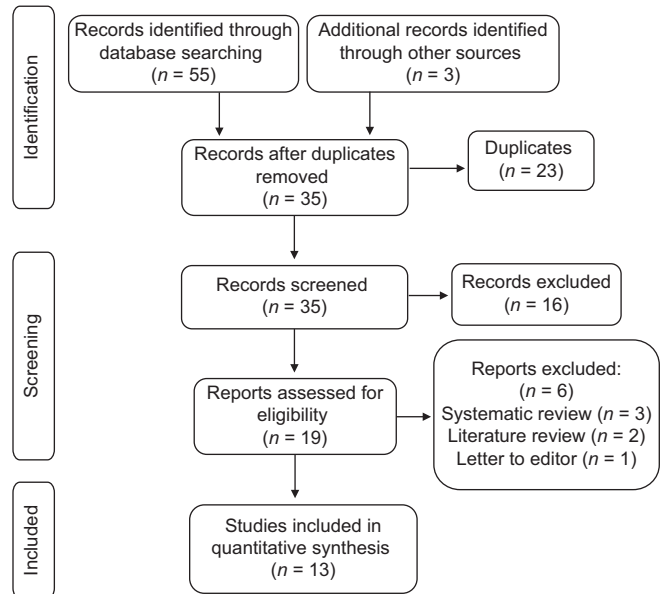


Figure 1: PRISMA Flow Diagram of the Systematic Review Study Selection Process

Table 1: Descriptive/Case series methodological quality evaluation of studies included in the study

Studies	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	MQTS
Aiken, Smith, & Lake (1994)	N	N	Y	Y	Y	N/A	U	Y	Y	5
Aiken, Sloane, Lake, Sochalski, & Weber (1999)	N	N	Y	Y	Y	N/A	U	Y	Y	5
Hickey, Gauvreau, Connor, Sporing, & Jenkins (2010)	N	N	N	Y	Y	N/A	U	Y	Y	4
Goode, Blegen, Park, Vaughn, & Spetz (2011)	N	Y	N	Y	Y	N/A	U	U	Y	4
McHugh <i>et al.</i> (2013)	N	N	Y	Y	Y	N/A	U	Y	Y	5
Evans <i>et al.</i> (2014)	N	Y	Y	Y	Y	N/A	U	Y	Y	6
Rettiganti <i>et al.</i> (2018)	N	Y	Y	Y	Y	N/A	Y	Y	Y	7
Hamadi, Martinez, Palenzuela, & Spaulding (2021)	N	Y	Y	Y	Y	N/A	U	Y	Y	6
%	0	50	75	100	100	N/A	12,5	87,5	100	

Q: Quality, MQTS: Methodological Quality Total Score, Y: Yes, N: No, Unclear: U, N/A: Not Applicable

Table 2: Comparable cohort/Case control methodological quality evaluation of studies included in the study

Studies	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	MQTS
Friese, Xia, Ghaferi, Birkmeyer, & Banerjee (2015)	N	N	N/A	Y	Y	Y	N/A	Y	U	5
Kutney-Lee <i>et al.</i> (2015)	N	N	N/A	Y	Y	Y	N/A	Y	U	4
Bekelis, Missions, & MacKenzie (2017)	N	Y	N/A	Y	Y	Y	N/A	Y	Y	6
Missios & Bekelis (2018)	N	Y	N/A	Y	Y	Y	N/A	Y	Y	6
Aamodt, Travers, Thibault, & Willis (2021)	N	Y	N/A	Y	Y	Y	N/A	Y	Y	6
%	0	60	N/A	100	100	100	N/A	100	60	

Q: Quality, MQTS: Methodological Quality Total Score, Y: Yes, N: No, Unclear: U, N/A: Not Applicable

Table 3: Summary of results from studies examining mortality

Study	Aim	Design	Sample characteristics	Databases	Results
Aiken, Smith, & Lake (1994)	To investigate whether Magnet hospitals have lower mortality than hospitals with similar structural features.	Descriptive comparative research	$n=5092$ hospitals Magnet hospitals: 39 non-Magnet hospitals: 5,053	Health Care Financing Administration (HCFA) Medicare hospital mortality rate file. The American Hospital Association (AHA) Annual Survey	*Magnet hospitals' mortality rates were 7.7% lower than the matched control hospitals ($P=0.011$). *After adjusting for differences in predicted mortality, the Magnet hospital had a 4.6% lower mortality rates ($P=0.02$).
Aiken, Sloane, Lake, Sochalski, & Weber (1999)	To compare differences in AIDS patients' 30-day mortality and satisfaction with care in dedicated AIDS units, scattered-bed units in hospitals with and without dedicated AIDS units, and in Magnet hospitals known to provide good nursing care.	Descriptive comparative research	$n=503$ hospital units Magnet hospitals: 162 non-Magnet hospitals: 341	The American Hospital Association (AHA) Annual Survey	*The 30-day mortality was lower in Magnet hospitals as compared to non-Magnet hospitals ($P<0.01$). *Patients in Magnet hospitals had odds on dying that were lower, by a factor of 0.40, than did patients in conventional (non-AIDS and non-Magnet hospitals) scattered-bed units ($P<0.01$).
Hickey, Gauvreau, Connor, Sporing, & Jenkins (2010)	To examine the relationship of nurse staffing, skill mix, and Magnet recognition to institutional volume and mortality rates associated with congenital heart surgery at children's hospitals	Descriptive comparative research	$n=38$ hospitals 19,732 congenital heart surgery cases Magnet hospitals: 16 non-Magnet hospitals: 22	2005-2006 Pediatric Health Information System Database	*There was no significant difference between mortality rates in hospitals with Magnet status and those without ($P=0.42$).
Goode, Blegen, Park, Vaughn, & Spetz (2011)	To compare patient outcomes and staffing in Magnet and non-Magnet hospitals	Descriptive comparative research	$n=54$ hospitals Magnet hospitals: 19 non-Magnet hospitals: 35	The 2005 University HealthSystems Consortium (UHC) Operational Database and Clinical Database	*There were no statistically significant differences between Magnet and non-Magnet hospitals in mortality rates for congestive heart failure and myocardial infarction patients ($P>0.05$).
McHugh <i>et al.</i> (2013)	To determine whether Magnet hospitals have lower risk-adjusted mortality and failure-to-rescue compared with non-Magnet hospitals and to determine the most likely explanations	Descriptive comparative research	$n=564$ hospitals 641,187 patients Magnet hospitals: 56-109,090 patients non-Magnet hospitals: 508-641,187 patients	The American Hospital Association annual hospital survey (2006-2007) Patient outcomes from California, Florida, Pennsylvania, and New Jersey hospitals discharge abstract databases in 2006-2007	*The average rate of 30-day mortality was lower in Magnet hospitals as compared to non-Magnet hospitals ($P<0.001$). *Magnet hospitals had 14% lower odds of 30-day mortality compared with non-Magnet hospitals ($P<0.001$).
Evans <i>et al.</i> (2014)	To compare the survival rates between Magnet-designated trauma centers and their non-Magnet counterparts.	Descriptive comparative research	$n=27$ hospitals 72,830 patients Magnet hospitals: 10-30,831 patients non-Magnet hospitals: 17-42,999 patients	Pennsylvania Trauma Outcome Study data set of Level I and II trauma centers (2009-2011)	*The unadjusted mortality rates were found to be similar in the Magnet and non-Magnet hospitals ($P=0.24$). *A binary multivariate logistic mortality prediction model that controls for numerous factors (age, sex, mechanism of injury, systolic blood pressure, temperature, etc.) correlated with mortality demonstrated a significant 20% reduction in the odds of mortality at Magnet hospitals ($P=0.03$).

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Table 3: Contd...

Study	Aim	Design	Sample characteristics	Databases	Results
Friese, Xia, Ghaferi, Birkmeyer, & Banerjee (2015)	To investigate patient outcomes in Magnet and non-Magnet hospitals over time.	Cohort study	<i>n</i> =993 hospitals 1.897,014 patients Magnet hospitals: 331-839,802 patients non-Magnet hospitals: 662-1.057,212 patients	Medicare data (1998-2010)	*In the matched controls, 30-day mortality was lower in Magnet hospitals as compared to non-Magnet hospitals (<i>P</i> <0.01). *In multivariable analyses, Magnet hospitals had 7.7% lower odds of 30-day mortality compared with non-Magnet hospitals (<i>P</i> <0.01). *Magnet hospitals had significantly lower rates of risk-adjusted 30-day mortality throughout the study period.
Kutney-Lee <i>et al.</i> (2015)	To compare changes over time in rates of patient outcomes (mortality and failure-to-rescue) in a sample of hospitals that attained Magnet recognition between 1999 and 2007 with hospitals that remained non-Magnet.	Retrospective, two-stage panel design	<i>n</i> =136 hospitals Magnet hospitals: 11 non-Magnet hospitals: 125	Pennsylvania Health Care Cost Containment Council (PHC4) The American Hospital Association (AHA) Annual Survey	*In 1999, there was no significant differences between Magnet and non-Magnet hospitals for the rate of 30-day surgical mortality (<i>P</i> >0.05). *In 2006, the rate of 30-day surgical mortality was lower in Magnet hospitals as compared to non-Magnet hospitals (<i>P</i> =0.05). *On average, the changes in 30-day surgical mortality rates over the study period were lower in emerging Magnet hospitals than in non-Magnet hospitals, by 2.4 fewer deaths per 1000 patients (<i>P</i> <0.01).
Bekelis, Missions, & MacKenzie (2017)	To investigate whether hospitalization in a Magnet hospital is associated with improved outcomes for patients with ischemic stroke.	Cohort study	<i>n</i> =176,557 patients Magnet hospitals: 32,092 non-Magnet hospitals: 144,465	New York Statewide Planning and Research Cooperative System database (2009-2013)	*Mortality was 7.9% in Magnet hospitals and 8.9% in non-Magnet hospitals. * In unadjusted analysis, Hospitalization in a Magnet hospital was associated with lower inpatient mortality as compared to non-Magnet hospitals (<i>P</i> <0.001). *In instrumental variable analysis, hospitalization in Magnet hospitals was associated with a lower inpatient mortality rate (23.9%) as compared to non-Magnet hospitals (<i>P</i> <0.001).
Missios & Bekelis (2018)	To determine whether hospitalization in a Magnet hospital is associated with improved outcomes for patients undergoing neurosurgical operations.	Cohort study	<i>n</i> =190,787 patients Magnet hospitals: 68,046 non-Magnet hospitals: 122,741	New York Statewide Planning and Research Cooperative System database (2009-2013)	*Mortality was 0.4% in Magnet hospitals and 0.9% in non-Magnet hospitals. *In unadjusted analysis, Hospitalization in a Magnet hospital was associated with lower inpatient mortality as compared to non-Magnet hospitals (<i>P</i> <0.001). *In instrumental variable analysis, hospitalization in a Magnet hospitals was associated with a lower inpatient mortality rate (0.8%) as compared to non-Magnet hospitals (<i>P</i> <0.001).
Rettiganti <i>et al.</i> (2018)	To evaluate the relationship between Magnet recognition and patient outcomes in pediatric critical care	Descriptive comparative research	<i>n</i> =41 hospitals 823,634 patients Magnet hospitals: 23-454,616 patients non-Magnet hospitals: 18-369,018 patients	The Pediatric Health Information System (PHIS) database	*The unadjusted in-hospital mortality was lower in Magnet hospitals (Magnet vs. non-Magnet; <i>P</i> =0.003). *If adjusted the inverse probability of treatment weighting method (IPTW) models, there was no significant difference in mortality between Magnet and non-Magnet hospitals (<i>P</i> =0.40).

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Table 3: Contd...

Study	Aim	Design	Sample characteristics	Databases	Results
Hamadi, Martinez, Palenzuela, & Spaulding (2021)	To examine the relationship between hospitals' Magnet status and performance on readmission and mortality rates for Medicare beneficiaries.	Descriptive comparative research	n=3877 hospitals Magnet hospitals: 355 non-Magnet hospitals: 3522	The Centers for Medicare and Medicaid Services (CMS) The American Hospital Association (AHA) Medicare Cost Reports The Area Health Resource Files (2013-2016)	*Magnet hospitals had decreased odds of having higher mortality rates as compared to non-Magnet hospitals on CMS high-risk conditions including: Acute myocardial infarction ($P<0.01$), Coronary artery bypass grafting ($P<0.05$), heart failure ($P<0.05$), and pneumonia ($P<0.001$).
Aamodt, Travers, Thibault, & Willis (2021)	To determine whether an association exists between hospital Magnet status and patient safety events for persons with Parkinson disease	Cohort study	n=493,760 patients Magnet hospitals: 40,121 non-Magnet hospitals: 453,639	The Nationwide Inpatient Sample (NIS) Healthcare Cost and Utilization Project (HCUP) Agency for Healthcare Research and Quality (AHRQ) (2000-2010)	*In univariate logistic regression analysis, Magnet hospitals had 26% lower mortality among Parkinson disease inpatients compared with non-Magnet hospitals. *In the multivariate model analysis, Magnet hospitals had 21% lower mortality among Parkinson disease inpatients as compared to non-Magnet hospitals.

DISCUSSION

Magnet hospitals, known for their ability to attract and retain nurses, help to create a hospital system poised to improve patient outcomes. There are 580 Magnet hospitals in the world, and that number is increasing day by day. In this systematic review, the aim was to investigate the effects of Magnet hospitals on mortality. The systematic review included 13 articles that met the research criteria. Due to the small number of Magnet hospitals, the majority of the data in the included studies were collected from non-Magnet hospitals.

All of the studies (n = 13) provided information regarding this question. Three of the studies found that there was no difference in the mortality rates of Magnet hospitals and non-Magnet hospitals.^[16,18,26] These studies were descriptive comparative designs. On the other hand, five descriptive comparative studies determined that mortality rates were lower in Magnet hospitals.^[14,15,17,22,24] More importantly, five longitudinal studies found that mortality rates were lower in Magnet hospitals.^[19-21,23,25] Four of these longitudinal studies were cohort studies, and one was retrospective, two-stage panel design. Out of a total 13 studies, 10 (77%) found lower rates of mortality in Magnet hospitals as compared to non-Magnet hospitals.

Although both descriptive studies and cohort studies are observational studies, cohort studies produce the most reliable clinical evidence among the observational studies due to the fact that they identify clinical or

health outcomes based on exposure.^[27] Hence, this systematic review suggests that Magnet hospitals have lower rates of mortality compared with non-Magnet hospitals, considering the research designs of the studies examined. Magnet hospitals maintain well-qualified nurse executives in a decentralized environment, and offer an autonomous, self-managed, self-governed climate that allows nurses to fully practice their clinical expertise. Their organizational structures emphasize open participatory management and use Professional practice models for the delivery of nursing care.^[28] Moreover, Magnet hospitals lead the way in the creation of professional practice environments that result in improved patient outcomes.^[29] These distinctive organizational features that contribute to better nurse working environments are likely to have an effect on these findings.

This systematic review focused only on mortality rates. Hence, this systematic review differs from other systematic reviews by both examining current researches about mortality and evaluating a single patient outcome to isolate one of the most important patient outcomes from others. For example, previous systematic reviews focused on patient, nurse, and organization outcomes. Other reviews reported that Magnet hospital had better nursing, patient, and organizational outcomes.^[30-32] Overall, this systematic review adds to current literature that Magnet hospitals are associated with lower rates of mortality. Recently, Rodríguez-García *et al.* (2020) claimed that Magnet hospitals were associated with

greater profit and cost savings due to lower rates of mortality and workplace accidents.^[31] Mortality is the one of the most important patient outcomes to provide quality care, and the effects of mortality on costs are obvious. Therefore, examination of mortality rate as a single variable, or outcome, reveals the unique value of this systematic review. With this updated finding, hospital executives could obtain concrete data on mortality in the decision-making process about whether to pursue Magnet status for their organization. Since Magnet hospitals are known for nursing excellence, nurse executives have also an important role to obtain Magnet hospital status. Moreover, one of the important responsibilities of chief nurse executive is to research programs that are useful to the delivery of patient care and share this information with the rest of the executive team in the organization. A strong and convincing statement by nurse executives is a key strategy to engage executive decision makers, including the chief financial officer, as obtaining Magnet status requires financial investment.^[33] The support of the entire executive team is needed in achieving Magnet hospital status, and nurse executives should encourage their organizations to attain Magnet hospital status because of its improved patient outcomes and better nurse working environment.

Although obtaining Magnet hospital status, known for their high quality of patient care outcomes, is attractive for hospitals, there are significant obstacles to achieving Magnet hospital status. The most important of these obstacles is the cost of achieving Magnet hospital status. Drenkard (2010) reported that the process of a hospital attaining Magnet hospital status may cost between \$46,000 and \$251,000, depending on hospital bed size and resource decisions made by the organization.^[33] In a study, it is stated that the process of obtaining Magnet recognition status cost an average total investment of \$2,125,000 and takes 4.25 years. It is also suggested that the cost of attaining a Magnet hospital status may be offset by higher net inpatient income.^[34] Although it is costly and takes time for hospitals to gain Magnet status, hospitals should not give up because of revenue gains as patients and insurers are attracted to Magnet hospitals due to higher quality. Furthermore, considering that the lower rates of mortality are associated with cost savings and Magnet hospitals will attract patients as they provide the delivery of quality patient care, the efforts of hospital executives to achieve Magnet hospital status will be worthwhile.

The strength of this study is that it only investigates mortality outcome, not all patient outcomes. Carrying out the research process systematically is also the strength of the research. The results of this systematic

review cannot be generalized to all Magnet hospitals. The low number of studies and varying sample sizes and differing methods of the research studies also limit this systematic review. Although methodological quality evaluation was carried out by two independently researchers using JBI-MAStARI Critical Appraisal Tool to minimize bias, there are likely to be some questions about bias and quality of the reviewed studies.

This systematic review evaluates a single patient outcome, that of mortality rate. Although the number of studies included in the study is limited, the results, with a high level of evidence, suggest that the mortality rates in Magnet hospitals are lower than in non-Magnet hospitals. Considering the organizational consequences of mortality such as quality and cost savings, this systematic review provides significant contributions to hospital executives, as well as the nurse-clinicians, whether or not to obtain magnet status. However, the number of research studies evaluating mortality in Magnet and non-Magnet hospitals remains limited. There is need to conduct longitudinal, quasi-experimental studies evaluating the effectiveness of Magnet and non-Magnet hospitals in order to obtain strong evidence. Further, it can be suggested that, to the extend it is possible, researchers conduct random sample selection to prevent selection bias, and obtain a well-defined sample to make comparisons between Magnet and non-Magnet hospitals' quality indicators such as the mortality rate.

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Conflicts of interest

There are no conflicts of interest.

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