Nursing's Evolving Role in Patient Safety

A content analysis of *AJN* articles spanning 115 years.

ABSTRACT

Background: In its 1999 report *To Err Is Human: Building a Safer Health System*, the Institute of Medicine (IOM) suggested that between 44,000 and 98,000 Americans die annually as a result of medical errors. The report urged health care institutions to break the silence surrounding such errors and to implement changes that would promote a culture of safety.

Objective: Our aim in conducting this content analysis of *AJN* articles was to explore the nurse's historical and contemporary role in promoting patient safety. We chose to focus on *AJN* because, as the oldest continuously published nursing journal, it provided a unique opportunity for us to view trends in nursing practice over more than 100 years.

Methods: We reviewed all *AJN* tables of contents from 1900 through 2015, identifying for inclusion articles with titles that suggested a focus on nursing care, patient safety, or clinical content. We then read and analyzed each of the final 1,086 articles over a period of nine months.

Findings: Our content analysis indicates that the early articles (from 1900 through 1920) focused on such safety measures as asepsis and the newly understood germ theory. In the 1930s, articles proposed methods for preventing medication errors and encouraged the development of written procedures to standardize care. During World War II, nurse authors identified improved patient survival rates with the use of "shock wards" and recovery rooms. The 1950s saw the emergence of progressive patient care initiatives, through which patients were assigned to various levels of care (intensive, intermediate, self, long-term, or home care) based on patient acuity. The 1960s brought increasingly complex equipment and medication regimens, which created safety problems. Hospital-acquired infections were recognized. Unit-dose medication was instituted in the 1970s. In the next two decades, medication and nursing-procedure safety were emphasized. From 2000 to 2015, articles looked beyond human performance as causes of health care errors to systemic factors, such as poor communication, patient–nurse ratios, provider skill mix, disruptive or inappropriate provider behavior, shift work, and long working hours.

Conclusions: Emphasis on patient safety increased as patient care became more complex. As nurses developed a professional identity, they often put a spotlight on safety concerns and solutions. The IOM report, which encouraged research focused on systemic solutions to errors, was instrumental in furthering the very culture of safety that the nursing profession had championed.

Keywords: culture of safety, medication safety, nursing, nursing care, nursing history, patient safety

In response to research suggesting that 44,000 to 98,000 U.S. patients die each year as a result of medical errors, the Institute of Medicine (IOM) recognized a need for comprehensive health care delivery reform.[1] Its 1999 report *To Err Is Human: Building a Safer Health System* provided the impetus for breaking the silence surrounding health care errors in order to ensure that safety is built into the processes of care.[1] This report was followed in 2004 by the Joint Commission's National Patient Safety Goals,[2] and a year after that by the Quality and Safety Education for Nurses initiative.[3] Because the IOM estimate of annual deaths resulting from medical errors was based on data collected between 1984 and 1992, James sought to provide an update in 2013.[4] Based on medical record evidence collected

between 2002 and 2008 within broad hospital populations, and applying a different mode of analysis, James estimated that more than 400,000 premature deaths each year were attributable to preventable adverse events. There continues to be much debate about how best to define, measure, and prevent deaths due to medical errors.

In order to explore the historical and contemporary role of the nurse in promoting patient safety, we performed a content analysis of 1,086 articles published in *AJN* from its inception in October 1900 through December 2015. We chose to focus on *AJN* because, as the oldest continuously published nursing journal, it provided a unique opportunity for us to view trends in nursing practice related to patient care and safety over more than 100 years.

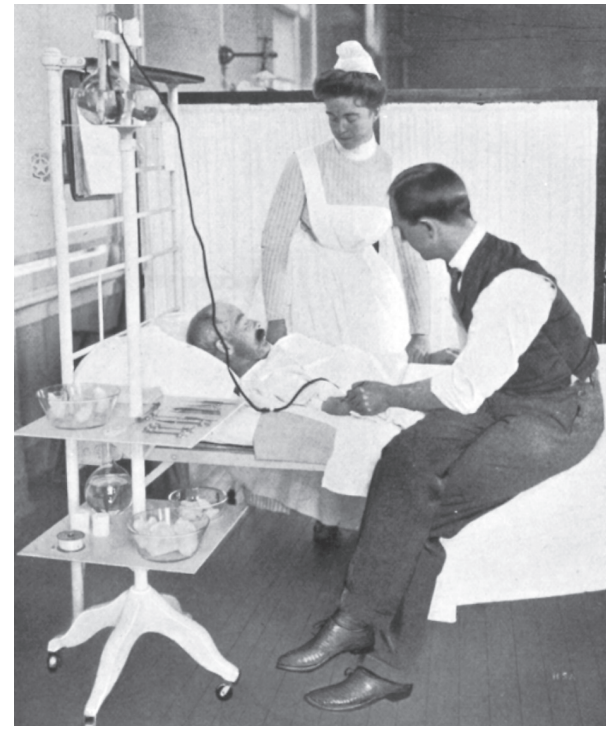
METHODS

We used the JSTOR database to access all issues of *AJN* from 1900 through 2007 and the Ovid database to access all issues from 2008 through 2015. We reviewed the table of contents in each issue, excluding feature articles with titles suggesting a nonclinical focus. We each independently read and analyzed articles with titles that suggested a clinical focus for patient safety content and met to compare notes, identifying trends, categories, and themes. This process continued for more than nine months. When all clinical articles published from 1900 through 2015 had been analyzed, the data were clustered into intervals of 10, 15, or 20 years, depending on the amount of data and the themes that emerged in each era.

FINDINGS

1900–1919. From the earliest articles in this period, it is clear that nurses played an important role in patient safety. In 1908, an article by a physician on the duties of nurses in managing home-based surgeries emphasized sponge counts as a critically important nursing responsibility: "When the abdomen is about to be closed, she should count her sponges, and this should be done deliberately and several times in order that there be absolutely no question."[5] Decubitus ulcers and hypostatic pneumonia were widely recognized as complications of prolonged bed rest, and the nurse's role in preventing these complications through frequent position changes was well documented. As an RN author explained in 1908, a nurse needed to have knowledge that went well beyond assessing and documenting vital signs[6]:

> Not only must she be fully trained to care for patients who are doing well . . . , but she must know the danger and complications likely to arise and be able to guard against them, and report the earliest symptoms of such changes, and should emergencies arise be able to do the right thing, at the right time, till the doctor arrives.



All photos are from the *AJN* archives.

In this era preceding the discovery of antibiotics, safety in nursing care focused largely on the newly understood germ theory. Maintaining cleanliness and asepsis was critical in preventing contagion. A nurse writing in 1906 advised colleagues caring for a patient in a private home to hang a sheet over the door of the sick room. "This is done . . . to prevent any germs from following the draught outward when the door is opened."[7] A physician author described the role of the nurse as follows[8]:

> She is taught to make her hands sterile whenever they are to come in contact with abraded surfaces so that infection by carelessness or ignorance may not be conveyed by her. She is also taught to prevent the spread of disease-bearing microbes from patients with diphtheria, scarlet fever, pneumonia, and the numerous avenues by which sickness may be conveyed from sick to well.

While prevention of contagion was a prevalent theme, the analysis of articles from these two decades

revealed little about nursing practices concerning other aspects of patient safety. For example, the use of hot water bottles[9-11] and restraints[12, 13] were often discussed, with no mention of precautions to prevent injuries. In a 1910 article, a physician and nurse explained hydrotherapy, a practice commonly used to treat psychiatric ailments.[14] The treatment required the patient to be immersed in bathwater, "without removal except for cleaning the tubs," for periods "varying from a day to two or three months."[14] Water temperatures were generally kept at 98°F to 100°F. While the article described the physical properties of the tubs and rooms, there was no discussion of precautions to prevent accidental drowning or bacterial infection, or any explicit mention of the risk of scalding.

During this period, little was written about fall prevention. A physician who authored an article titled "Medical Gymnastics in Locomotor Ataxia" devoted only a single sentence to the subject, stating that "at all times" the patient should "be well guarded from falls and injury."[15] As was typical in this era, an article on delirium described various manifestations of the condition and warned the reader that the patient might get out of bed and fall.[12] Little of the article, however, was devoted to nursing care. The only advice the author offered the reader was to fasten the patient "under a restraining sheet."[12]

An alarming article published in 1909 described the "baking oven" used to treat rheumatism, nephritis, and pelvic congestion.[16] The patient, wrapped in a blanket, was placed in the oven at temperatures of 200°F to 250°F for 45 minutes to an hour. The only safety precautions described were as follows: "A nurse remains with the patient, and the pulse is watched, but is not recorded unless so ordered. Stimulants are at hand in a nearby medicine closet."[16]

When analyzing these early writings, it is necessary to understand the prevailing conventions of the time. Most hospital units were open rooms in which all patients could be easily seen and attempts to get out of bed would be readily noticed. In addition, for the segment of the population that could afford it, much nursing care was delivered in the home by private duty nurses who cared for a single patient at a time, decreasing the risk of falls and accidental injury.

Because nurses were not yet recognized as independent professionals with expertise that was distinct from and complementary to that of physicians, many articles were written by physicians, who focused on pathophysiology and symptomatology rather than nursing care. References were rarely cited. Even the articles written by nurses failed to emphasize the role of the nurse in patient care. Furthermore, data on adverse outcomes were yet to be collected in an organized manner that could inform practice.

1920–1929. Over the next decade, articles continued to highlight knowledge and new technology, still tending to focus on its proper use and application rather than on the associated nursing care and safety precautions. An article introducing electrotherapy—a technology that used an electric current to treat a variety of conditions, including "constipation, paralysis, . . . a sluggish liver, a badly functionating [*sic*] kidney, or an inflamed appendix"—noted that the heat generated by the current could damage tissues, but did not discuss how to prevent injury.[17] An article describing a heating apparatus for IV solutions discussed the advantages it offered both the patient and the nurse, but included no precautions.[18] An article on applying hot surgical dressings, which were boiled for 30 minutes before being applied directly to a wound, failed to mention the possibility of burns.[19] "A Simple Method of Procuring Blood for Diagnosis from Infants" not only neglected to describe safety measures to take when puncturing the anterior fontanel to sample blood from the sinus route, but denied that the procedure carried any risk of infection, perforation, or shock, stating, "The method is so simple that even an inexperienced operator does not hesitate to try it."[20]

The field of psychiatric nursing was growing during this time and many articles focused on this emerging specialty area. "Nursing the Mental Patient" was typical in that it discussed the need for psychiatric nurses, as well as their desirable qualities (tact, diplomacy, and cheerfulness), but made little reference to patient safety other than to say, "A harsh word spoken in a moment of exasperation, or a thoughtless laugh in the presence of a sensitive patient, does incalculable injury."[21] Private duty nursing was a common topic, but as with articles on hospital nursing, content focused on disease processes and symptoms rather than on patient care and safety.

Insulin, which would later be identified by the Joint Commission as a "high-alert" medication,[22] was discovered as a lifesaving treatment for type 1 diabetes in 1921. The propensity of insulin to induce hypoglycemia was quickly recognized, and "The Treatment of Diabetes with the Aid of Insulin" advised nurses to teach patients about balancing food and insulin intake.[23] After being admitted to the hospital, the author

Summary of Findings: 1900–1919

- Safety in nursing focused largely on the newly understood germ theory.
- Articles stressed the importance of hand hygiene.
- Articles were often written by physicians and focused on pathophysiology and symptomatology rather than nursing care.
- References were rarely cited.
- Interventions, such as hot water bottles, restraints, "baking ovens," and hydrotherapy, were discussed with no mention of safety precautions.

Summary of Findings: 1920–1929

- Many articles focused on how to operate new technology.
- Potentially harmful interventions, such as electrotherapy, IV warmers, and hot surgical dressings, continued to be described with no mention of safety precautions.
- Articles discussed the newly discovered insulin and discussed measures nurses could take to prevent hypoglycemia.
- Articles on psychiatric nursing discussed the need for psychiatric nurses and the qualities they should possess, but did not address patient safety.
- Side rails were discussed as safety aids for "helpless patients."
- Unit manuals ("ward standard books") were recommended to increase efficiency and standardize care.
- Low beds (18 to 20 inches from the floor) were recommended for patients at risk for falling.
- The first article devoted entirely to safety was on electrical safety and was published in 1929.

noted, the patient's "basal metabolism is determined and a diet calculated which will meet his caloric needs, afford him sufficient protein, and in which the proportion of fat to carbohydrates will not be unduly high."[23] The article then discussed measures nurses could take to prevent hypoglycemia, including ensuring that insulin is not administered "too far in advance of the meal" and that the meal is "served on time," reducing the insulin dose if the patient is vomiting or has diarrhea, reporting to the physician if the patient doesn't eat the food served after insulin has been administered, and revisiting the patient's diet and dosage in the presence of weight changes.

Other signs that patient safety was moving to the forefront of nursing literature included the first mention of side rails in the January 1924 issue, which featured two photos of beds for "helpless patients."[24] The November 1924 issue introduced the idea of a unit manual or "ward standard book."[25] Although ensuring "patient safety" wasn't explicitly included in the book's stated purpose, it was implied, as the concept was said to have "evolved in connection with the movement for increased efficiency and standardization in hospital management, including care of patients."[25] A 1926 article by Russell highlighted the American Hospital Association standards for hospital furniture and suggested the use of low beds (18 to 20 inches from the floor) for patients at risk for falling.[26] A 1928 article on tonsillectomies advised nurses to add methylene blue to cocaine so that it would be distinguishable from Novocaine.[27] The first article we found that was devoted entirely to safety was on the topic of preventing electrical accidents, such as shocks and fires.[28] Unlike the 1910 article on hydrotherapy, a 1929 article on the same treatment included a section devoted to patient safety that advised such nursing actions as frequently checking the water temperature, never leaving the patient unattended, keeping the patient well hydrated, and lowering the water temperature if the patient has a fever.[29]

1930–1939. Many articles of the 1930s continued to neglect patient safety and often imparted erroneous information. An article on caring for an elderly patient with numerous conditions that predispose to injury (a fractured hip, emaciation, fragile skin, and frequent confusion) included no discussion of preventing falls or other injuries.[30] The 1935 article "Analgesia in Obstetrics" urged the use of paraldehyde in childbirth to provide "the complete relief of suffering from the very onset of labor, throughout its entire course, and for several hours following delivery," claiming that the drug had been "definitely demonstrated" to have no "untoward effects upon either mother or baby,"[31] a statement we now know to be untrue.

This decade did, however, bring increased attention to the importance of medication administration safety. By 1933, drug administration errors were recognized as a big problem, and *AJN* published its first article on the subject.[32] The author had surveyed 30 schools of nursing about the steps they required students to take in order to prevent errors when administering medication. The steps that received the most responses were to read the medication labels three times, use medication tickets to indicate doses, permit no interruptions while medications were being poured or administered, and identify patients by name before administering medication.[32]

A 1939 article suggested additional methods for preventing medication errors, such as exclusive use of either the metric or apothecary system—"and preferably the metric"—at all hospitals, consistent use of either trade names or "official" (generic) names or both; use of name cards on patient beds; exclusive use of white (not colored) medication cards; and use of a record (separate from the patient's medical record) for all medication orders on which nurses indicate administration of a drug with a check mark, a time stamp, and their signature in order to prevent double dosing.[33] The nurse author pointed out that physicians' illegible handwriting and failure to cooperate with nurses

who question unusual dosages are frequent contributors to medication errors.

The dangers inherent in insulin administration were covered in more detail than in the previous decade. In 1938, Taylor urged nurses to read insulin orders twice, have "a head nurse or supervisor check the vial of insulin and syringe containing the dosage," and "read with care the unit strength per cubic centimeter of the particular vial of insulin, . . . understand[ing] that U-20 represents 20 units of insulin per cubic centimeter and . . . that U-80 [is] insulin of four times greater strength."[34] (In 1938, insulin was available in four strengths: U-20, U-40, U-80, and U-100.) An article on oxygen therapy discussed potential dangers related to the fact that it "very actively support[s] combustion" and, in high concentrations, may damage lung tissue, particularly when delivered in areas at or near sea level.[35] The use of radium to treat various cancers had increased, and an article explaining the treatment discussed precautions that should be taken to protect both patients and health care providers.[36] This decade also brought awareness of the role nurses play in recognizing digitalis toxicity[37] and sulphanilamide toxicity.[38]

In 1939, the article "Safety in Hospitals" was devoted entirely to safety of both patients and hospital personnel.[39] This one-page article discussed a wide range of potential dangers, including defective electric appliances, hospital furniture, and assistive devices; poor lighting; burns from hot water bottles and overheated electric pads; and slippery bathtubs. The author further maintained that it was necessary "to educate the hospital personnel to be safety-minded, by use of bulletin boards, posters . . . and meetings for discussing safety."[39]

Summary of Findings: 1930–1939

- Fall prevention was not addressed.
- Insulin administration was considered to have a high risk of error because of insulin's multiple concentrations.
- Methods to prevent medication errors were proposed.
  - No interruptions while medications were being prepared or administered
  - Consistent use of either trade names or "official" (generic) names or both
  - Identification of patients by name before medication administration
- The nurse's role in recognizing medication toxicity was recognized.
- Analgesia for labor and delivery was recommended without safety precautions or discussion of potential harm.
- The second article devoted entirely to safety was published in 1939.
- Hospital safety education and prevention meetings were recommended.

1940–1949. In the 1940s nurses were active inventors of safety equipment and protocols, and *AJN* invited them to share their inventions with readers. Rich described an "inhalation screen" that protected small children from heat sources used in steam inhalation treatments, allowing the nurse to leave the child unrestrained and not requiring the nurse to keep constant watch at the bedside.[40] Graves discussed policies and procedures pediatric nurses could employ to prevent falls, choking, smothering, burns, and medication errors.[41] Martin analyzed the types of accidents that occurred most frequently in a children's hospital and developed a prevention program that included "clinics, conferences, and a class on accidents."[42] Foot supports were used to promote proper alignment in pediatric patients with polio and patients using respirators, who were confined to bed rest for long periods. In a 1947 article, Irene described the materials required to make the foot supports and provided directions for assembly and use.[43] McQuaid wrote about a new system nurses developed and implemented to "assure uniform, consistent use" of the card file system, thereby reducing errors in patient care and strengthening the effectiveness of the file.[44] Hofmann and colleagues described what may have been the first specialty bed used in nursing practice: a sawdust bed designed to prevent pressure sores in emaciated and incontinent patients.[45]

Nurses caring for World War II casualties recognized that patient survival required close observation and rapid intervention. As Setzler explained in a 1944 article, "Seconds count in the saving of lives of these men and just as rapidly are lives lost by delayed treatment."[46] Equipment, personnel, and logistical needs along with priority procedures were detailed for rapid treatment in "shock wards." "Shock carts" were developed to transport needed equipment to the bedside to speed emergency care. In 1946, Welch recommended the medications and equipment that should stock the cart and where each of the items should be located.[47] An increase in the number of patients having

surgery and the obstacles to safe care when patients were returned immediately to the unit led to the creation of recovery rooms in hospitals throughout the country.[48] Having a space, equipment, and staff dedicated to the care of postoperative patients improved both safety and efficiency. Nurses supported the use of postoperative recovery rooms to prevent "a stormy postoperative convalescence."[49] Hurlburt and Oscadal credited the establishment of an obstetric recovery room with reducing deaths related to postpartum hemorrhage and shock.[50]

The war introduced new safety concerns, as nurses joined the military, leaving fewer available to care for patients at home. Richardson detailed the disaster plans implemented at a Connecticut hospital and the procedures developed for safely treating patients with explosion injuries, whose clothing may contain dangerous chemicals.[51] The chief medical officer of the Office of Civilian Defense wrote about the expanded Volunteer Nurse's Aide Corps, the purpose of which was "to maintain professional nursing standards, conserve nursing resources, and safeguard the health of the people in this period of national peril."[52] Nurses were cautioned that "in the handling of gas casualties, . . . to do the wrong thing may be more serious than to do nothing."[53] For such patients, first responders were advised, "Do not attempt artificial respiration [as it] may do more harm than good, and even cause sudden death."[53] In light of the nursing shortages, Barrett proposed that nurses simplify nursing procedures to increase patient safety, eliminating "from our nursing procedures those aspects which are nonessential to the patient's welfare and comfort."[54] As nurse shortages continued after the war, nurses were encouraged to assess alternate staffing practices for safety[55,56] and to participate in hospital licensure to improve quality and safety of patient care.[57]

By the 1940s, fires had become a significant safety issue, with multiple hospital fires occurring daily. Ruth in 1946 and Pellenz in 1949 wrote about the role of nurses in fire prevention, fire control, and patient evacuation.[58,59] One in five of the fires were attributed to smoking and careless use of matches; other common causes included defective wiring, short circuits, misuse of electrical equipment, improper storage of combustible materials, and use of such therapeutic equipment as oxygen tents and heating pads.[58] The 1949 fire at Saint Anthony's Hospital in Effingham, Illinois, which killed 74 people, occurred three months following publication of the Pellenz article. McCurdie and Livingstone described methods for preventing and controlling anesthesia explosions, such as eliminating high-static bedclothes in the operating rooms, testing the conductivity of shoes worn by all operating room personnel, and safely storing and transporting combustible materials.[60,61]

1950–1959. Many 1950s articles emphasized rapid intervention for high-risk patients as a safety priority. As in the previous decade, they praised the lifesaving potential of well-staffed and well-stocked surgical recovery rooms,[62,63] as well as the Air Force "crash wards" and hospital annexes, which were located near landing fields in order to provide rapid treatment to accident victims.[64] This decade introduced progressive patient care initiatives, through which, based on "their over-all medical and nursing needs," patients were assigned to intensive care, intermediate care, self-care, long-term care, or home care—each offering different services within different settings and with varying staffing patterns—but the only patient outcome discussed was patient satisfaction.[65]

The 1950s saw a growing recognition that specialized care for premature infants could reduce the high mortality rates in this population. Losty and colleagues described the initiation of a New York City transport service developed to provide safe and rapid transportation of premature infants to centers with specially trained medical and nursing personnel.[66] They described the planning; the necessary equipment; the responsibilities of the transport personnel; and the favorable responses of nurses, parents, and physicians. For nursing students completing their

Summary of Findings: 1940–1949

- Nurses were active inventors of safety equipment and protocols.
- Procedures and policies to prevent accidents, such as falls, choking, and burns, were developed.
- Sawdust beds were recommended for emaciated and incontinent patients to prevent pressure sores.
- Nurses developed and implemented a system to "assure uniform, consistent use" of the card file system used to organize patient information.
- World War II nurses recognized that "shock wards" and recovery rooms improved survival in surgical and obstetric patients.
- Post–World War II nursing shortages required nurses to simplify nursing procedures and caused hospitals to use alternate staffing practices.
- Nurses were encouraged to participate in hospital licensure to improve patient care quality and safety.
- In response to numerous hospital fires, nurses took on major roles in fire prevention, fire control, and patient evacuation.
- Hospital disaster plans were created.

pediatric rotations, Latham promoted an educational program that emphasized safety for hospitalized children.[67] The program provided care guidelines that addressed the different precautions nurses should take depending on the child's developmental stage.

In 1950, Press reported that "[n]ext to cardiovascular disease and cancer, accidents kill more people in our nation than any other cause" and urged nurses to promote accident prevention within hospitals, industrial sites, schools, and homes.[68] Hospital accident prevention targets included patient falls, unsafe use of bed rails, hot water bottle burns, operating room fires and explosions, electrical equipment accidents, and radiation exposure.[68-74] Safety information reprinted from other journals was also embedded within articles, such as a boxed advisory on sponge count procedures[75] and a boxed declaration of X-ray safety.[76]

In 1953, Hall described patient information plates that could reduce transcription errors.[77]

Summary of Findings: 1950–1959

- Hospitals established progressive patient care initiatives through which patients were assigned to care at various levels of intensity, based on their acuity.
- Specialized care for premature infants was instituted.
- Pediatric safety was included in nursing education.
- The importance of positively identifying patients before administering any treatment was reinforced.
- Additional safety precautions were proposed for medications seen as posing the greatest risks to patients, such as barbiturates, opioids, and sedatives.
- Patient information plates were used to prevent transcription errors.
- Strategies for preventing suicide and self-harm were suggested.
- In-service educational programs were provided for nurses in areas such as neurology.

The importance of positively identifying patients before administering any treatment or procedure, which had been discussed in the 1930s, was reinforced in this era.[69,78] Byrne urged nurses to ask patients to state their names before administering medication. Her study, however, found that "[i]n spite of the emphasis we placed on this factor, [there was] an increase in the number of errors."[79] For medications seen as posing the greatest risks to patients—barbiturates, opioids, sedatives, weight loss medications, intramuscular injections, IV medications, and blood products—specific safety precautions were proposed, including establishing legal and procedural controls for dispensation, discriminate use, and proper technique in preparation and administration.[80-86]

Articles in the 1950s discussed psychiatric safety in greater detail than in the 1920s, promoting communication techniques that protected both patients and nurses and describing appropriate nurse–patient relationships.[87-89] An *AJN* news item alerted nurses to a study of patients who had previously attempted suicide, which concluded that for those whose prior suicide attempts were considered "serious," certain psychiatric diagnoses, including manic-depressive disorder and dementia, were risk factors for future attempts and warranted patient hospitalization.[90] Self-inflicted injury was identified as an uncommon but preventable hospital occurrence.[73]

In-service educational programs were provided for nurses in such specialty areas as neurology to increase patient safety and nurse satisfaction.[91]

Educational programs were used to help nurses "keep up with the continuous changes in nursing and related fields, to understand the policies, philosophy, and working environment of the particular organization or institution, and to provide better care to patients."[92]

1960–1969. With the increasing complexity of medication regimens and the introduction of such hospital equipment as adjustable beds and hydraulic lifts, the 1960s prompted more specific mentions of patient safety within nursing articles. Kaplan and Bernheim cautioned readers about the potential dangers associated with Sengstaken tubes used to treat bleeding esophageal varices.[93]

In this period, fall prevention received more attention, though it was often still cursory in nature. For example, an article on postoperative ambulation had only a single sentence implying the risk of falls: "Elderly patients need additional assistance to prevent accidents and to help re-establish self-confidence."[94] On the other hand, a literature review called "Why Old People Fall" summarized the physiologic reasons older adults are more likely to fall and included practical suggestions for preventing falls both in the hospital and in the home.[95] Specifically, it suggested that nurses supervise or assist older patients with standing, ambulation, and power-building exercises; teach

Summary of Findings: 1960–1969

- The introduction of intricate medication regimens, rotational beds, and hydraulic lifts made patient care increasingly complex.
- Fall prevention continued to receive little attention.
- Burns from hot water bottles were a common source of litigation.
- Sources of hospital-acquired infections were recognized, and nurses initiated prevention programs.

older patients that hyperextension of the neck can cause them to lose equilibrium; advise them not to sit up, stand up, or turn too quickly; teach them not to turn on the heel, but to walk in a small circle to make a turn; and instruct patients at discharge that they should remove scatter rugs from their home, avoid slippery floors and doorsills, keep their home well lit, and use assistive devices if necessary.[95]

An article on caring for patients with Ménière's disease suggested that these patients should have side rails on their beds, be advised not to get up and walk without assistance while hospitalized, keep an uncluttered home environment, and have a lamp at the bedside.[96]

Burns from hot water bottles were a common source of litigation in this decade. An *AJN* column of this period, *The Law and the Nurse*, warned nurses that they could be held liable for such injuries.[97, 98]

The 1960s brought an emerging understanding of the risks of hospital-acquired infections. Authors advocated against bladder catheterization for urinary incontinence[99] and routine orders to catheterize postoperative patients.[100] Suddarth recommended individual dressing packs to prevent wound infections, and Hall advocated for antibiotic stewardship to prevent microbial resistance.[101, 102] Streeter and colleagues described a retrospective surveillance program that became a proactive, nurse-led infection control and prevention program.[103]

Despite these advances, the term "patient safety" was not specifically mentioned in the 1960–1962 American Nurses Association (ANA) platform.[104] Articles about potentially dangerous treatments, such as home oxygen,[105] or the care of patients with potentially dangerous conditions, such as alcoholism,[106] suicidal ideation,[107] and visual spatial neglect,[108] continued to appear, though some were less solution-oriented than others, seeking to shed light on innovations or underrecognized conditions, rather than to focus specifically on safety precautions.

1970–1979. The increasing complexity of pharmacologic interventions led Levine to recognize the inadequacies of "the medication procedure" nurses are taught, which she described as "a ritual, complete with the powerful emotions which attend ritualistic behavior."[109] Although the "five rights" (right drug, right dose, right route, right time, right patient) were well known, Levine noted that it was commonplace for the wrong drug to be administered in the wrong dose, by the wrong route, and at the wrong time to the wrong patient. The article called for comprehensive reform of medication delivery, using a team approach that involved a nurse, a physician, and a pharmacist and emphasized the availability of nurse-oriented resource materials. In the 1970s, medication safety was also addressed in articles focused on warfarin interactions,[110] the transition to U-100 insulin,[111] lidocaine toxicity,[112] and the benefits of unit-dose medication systems.[113]

An article on stroke discussed such interventions as bed rest, side rails, and restraints or presence of a family member to avoid use of restraints.[114] Trought warned of potentially dangerous equipment used in patient care, provided examples of related hazards, and advised nurses to develop procedures for reporting defective or malfunctioning equipment.[115]

Intermittent positive pressure breathing treatments, at one time a standard part of care, became controversial in the 1970s as their potential to cause a pneumothorax was recognized. Nurses were advised to use safer methods to deliver aerosolized drugs, such as hand nebulizers, and to help patients mobilize secretions by using mucolytic aerosols and expectorants, providing sufficient hydration, and encouraging patients to practice coughing and deep breathing.[116] Articles continued to remind nurses that urinary catheters could be sources of nosocomial infections[117, 118] and that cuffed endotracheal tubes could cause tracheal necrosis.[119] Several articles were devoted to safe administration of IV therapy and the dangers of stopcock contamination.[120-122]

Summary of Findings: 1970–1979

- Articles called for comprehensive reform of medication delivery practices and advocated an interprofessional team approach, the availability of nurse-oriented nursing resource materials, and unit-dose medication systems.
- Patient care equipment was recognized as potentially hazardous, and nurses were advised to develop procedures for reporting defective or malfunctioning equipment.
- Authors suggested encouraging family member presence to avoid use of patient restraints.
- Intermittent positive pressure breathing treatments were recognized as potential causes of pneumothorax, and safer methods of delivering aerosolized drugs were proposed.
- Articles highlighted IV safety and prevention of stopcock contamination.

Despite these strides, there were many missed opportunities to emphasize patient safety and nursing care. An article on perceptual defects in hemiplegia explained that such defects can be both puzzling to others and dangerous. The authors described nursing care and offered readers a number of strategies for providing patients an environment more conducive to success, stimulation, and safety in dressing and moving.[123] Morris and Rhodes wrote about the care of confused patients.[124] The article did not discuss how to protect disoriented, delusional, or psychotic patients from self-injury, but rather focused on how to differentiate functional from organic confusion—a distinction that can help nurses prevent some patients from becoming increasingly confused and others from being restrained unnecessarily or from receiving inappropriate medication. Reminiscent of articles from earlier in the century, a 1973 article about depression was authored by a physician and a psychologist. While it made no specific recommendations for keeping depressed patients safe, its purpose was to help nurses recognize the signs and symptoms of depression, so patients could receive proper care.[125]

1980–1989. In the 1980s, health care communities became increasingly aware of the need to focus on accident prevention. Discussing the results of a retrospective analysis of four-and-a-half years of nurse-initiated incident reports at a 629-bed teaching hospital, Lynn noted that accidents could be categorized either as falls or as "patient-inherent," procedure-related, or equipment-related incidents.[126] In addition, accidents were found to occur most frequently between the hours of 8:30 AM and 1 PM and during the summer months when staff turnover was highest. Diagnoses associated with the highest risk of accidents included neurologic disorders; chronic debilitating disorders, such as anemia, pulmonary or heart disease, or immunosuppressant disorder; and cancer, especially if metastatic or at an advanced stage. Physical, mental, and sensory status impairments were also found to increase the risk of accidents. Safety precautions, such as using nonskid footwear and bed brakes, and planning patient rounds to meet patient needs, were recommended.[126] Focusing on the reduction of sensory deficits on safety, Bozian and Clark suggested reducing background noise, supplying reading material in large print, having door frames painted in vivid colors, keeping traffic patterns clear, and encouraging physical activity and balance exercises.[127]

Medication safety also remained a priority in this decade. The unit-dose system was gradually implemented, initially to reduce nursing time, medication waste, and costs to patients, though it was soon found to reduce medication errors and transcription errors on medication tickets because it required physician orders to be double-checked by both nurses and pharmacists. A 1980 overview by Palmer identified some distribution problems built into its increasingly widespread use and the potential for mistakes resulting from nurse frustration with these problems and their subsequent workarounds, and called on nurses to communicate the difficulties in order to make the system workable and safe.[128] In 1982, *AJN* introduced the column *Nurses' Drug Alert* in an editorial by Mary B. Mallison.[129, 130] The column was intended to alert nurses "to important clinical developments in current drug usage."[130]

Medication errors were known to cause patient harm and nursing liability. System processes and similar packaging of drugs available in multiple dosages contributed to errors. In the column *The Legal Side*, Cushing addressed some of the legal hazards nurses may face in connection with such errors, advising nurses that they could reduce drug errors by avoiding rote administration, knowing appropriate dosages, identifying and reporting system problems, and including patients in medication administration procedures.[131]

Transcription processes were also identified as a source of medication errors. Cushing cautioned nurses that they may be held liable for failing to challenge an incorrect order; clarify an incomplete order; or review all order transcriptions for accuracy, consistency, and sequence.[132]

Cushing used legal issues to promote patient safety in other nursing practice areas as well. She warned that nurses were liable if they failed to communicate or act on critical information that resulted in patient harm and encouraged nurses to anticipate possible safety hazards based on patients' conditions.[133]

Equipment and procedural errors were frequent article topics. Ostrow and O'Rourke discussed how to prevent air embolism in central venous catheters and how to respond if an embolism occurs.[134, 135] Brosnan and colleagues authored a continuing education article on reducing stopcock contamination and associated sepsis.[136] McFadden described how to determine the need for suctioning, and thereby

Summary of Findings: 1980–1989

- Accident awareness, fall prevention measures, and bed alarms were encouraged.
- More frequent patient rounds, nonskid footwear, and bed brakes were recommended.
- Unit-dose medication systems were widely implemented.
- Double-check systems were introduced to reduce medication errors and transcription errors on medication tickets.
- Nurses were advised to include patients in the medication administration process to decrease errors and to seek order clarification as needed.
- Disconnection of breathing tubes from ventilators led to the introduction of alarm modification.
- Articles discussed how to avoid introducing air emboli into central venous catheters, stopcock contamination, and aspiration during nasogastric tube feeding.
- Reuse of critical invasive devices or single-use equipment was discouraged.

reduce respiratory compromise, in intubated neonates.[137]

In the early 1980s, a study commissioned by the U.S. Food and Drug Administration (FDA) found that accidental disconnections of breathing tubes from ventilators, which may be fatal if not quickly discovered and remedied, were common and rarely reported events.[138] An *AJN* article by Janowski discussed the FDA's interim report, which recommended equipment and alarm modification, dissemination of the findings among nurses, and increased institutional data collection regarding the circumstances surrounding disconnections.[138]

Articles addressed the potential for serious injury associated with arterial access procedures, outlining measures for monitoring such procedures and intervening to preserve function and life if complications arose.[139] Irwin and Openbrier discussed complications associated with nutritional support of patients receiving mechanical ventilation, advising nurses that they can often prevent aspiration pneumonia by passing nasoenteric feeding tubes beyond the pylorus, confirming tube placement by X-ray or fluoroscopy, avoiding excessive stomach filling, and keeping the patient's head elevated.[140]

Since safety data on the reuse of disposable devices were scarce, Radany and colleagues recommended against the reuse of critical invasive devices, suggesting that nurses convene an interdisciplinary committee to investigate complications associated with the practice and prepare guidelines.[141] Other safety topics covered in this era included protecting vulnerable patients from shock when using electrical equipment[142] and using bed alarms to reduce restraint use.[143]

1990–1999. The prevention of medication errors became the focus of a monthly *AJN* column, *Med Errors*, beginning in October 1993. The column covered numerous reasons such errors occur, including use of chemical names rather than generic names,[144] interruptions during medication administration,[145] failure to clarify questionable orders,[146] the use of trailing zeros,[147-149] look-alike and sound-alike medications,[150, 151] failure to educate patients on their medications,[152-154] and the admission of patients with the same name to the same room.[155] The column also provided medication safety tips, such as confirming the "five rights" and reading labels three times,[156] and explored technologic solutions to prevent errors, such as using electronic medication administration records,[157] using systems theory to refine policies and procedures,[158] and communicating equivalent doses when prescribing prodrug formulations.[159]

Various authors drew attention to the structural and process changes of the 1990s, which reduced the number of RNs at the bedside, increased patient and family complaints, worsened nurse-sensitive outcomes, and reduced perceived quality of care.[160, 161] When delegation to unlicensed assistive personnel emerged as a factor in patient safety, Parkman emphasized the "four rights of delegation"—delegating the right task to the right person, using the right communication (clear and concise, specifying both the objective and the expectations), and providing the right feedback.[162] Nurses were encouraged to know the skill levels of the personnel to whom they delegated tasks,[163] to recognize the dangers associated with inappropriate delegation, and to prevent employers from making staffing

Summary of Findings: 1990–1999

- A monthly column on preventing medication errors discussed numerous reasons such errors occur and suggested safety tips, including using electronic medication administration records, refining policies and procedures through systems theory, and communicating equivalent doses when prescribing prodrug formulations.
- Increased use of unlicensed assistive personnel emerged as a factor in patient safety, and nurses developed staffing and delegation principles.
- Reducing the use of patient restraints became a nursing priority.

changes that encouraged inappropriate delegation.[164] The ANA developed nurse staffing principles that called for health care organizations to define unit intensity based on the number of patients within the unit levels of intensity, environmental architecture and geography, available technology, and competency of the care providers, and to gather data on the relationship between staffing and patient outcome.[165] Articles encouraged institutions to improve patient safety and quality of care by investigating the causes of errors, rather than blaming individuals.[166]

In the late 1990s, reducing the use of patient restraints emerged as a nursing priority. In order to improve patient safety, the Joint Commission, then known as the Joint Commission on Accreditation of Healthcare Organizations (JCAHO), required nurses to try alternatives before restraining patients,[167] and revised the standards for restraint use in nonpsychiatric patients.[168]

2000–2015. In the 2000s, articles on patient safety began to focus less on human performance and more on such systemic factors as poor communication among health care workers, patient–nurse ratios, nurse skill mix, disruptive or inappropriate provider behavior, shift work, and long working hours.[169-172] To address safety issues, articles proposed new health information technology, standards for interprofessional communication, use of standardized patient assessment tools and checklists, and simulation as an educational tool.[169, 173-176] Throughout these 15 years, four columns with a patient safety focus appeared in various issues: *Med Errors*, *Practice Errors*, *Health and Safety*, and *Safety Monitor*.

In 2001, Talerico and Capezuti critically examined the use of side rails through the years and dispelled myths regarding their usefulness as safety devices.[177] Illustrations depicted several ways patients may become entrapped by side rails and injured, even fatally. The authors included a decision tree to guide nurses in selecting alternative safety equipment.

In 2003, Clarke and Aiken suggested that the medical performance measure "failure to rescue" could be used to evaluate nursing care.[170] The authors proposed that this measure, which refers to the failure to prevent patient deaths from complications, emphasizes the need for surveillance (assessing and recognizing complications) and timely action (anticipating complications and mobilizing a care team when they occur). The authors pointed out that lower nurse–patient ratios were consistently linked with high failure-to-rescue rates.

Durkin discussed establishing rapid response teams as a means of getting caregivers to the bedside quickly.[178] Although hospitals had used "code blue" teams for many years, they were summoned only *after* patients experienced a cardiac or respiratory arrest. The goal of rapid response teams was to intervene *before* these devastating and often irreversible events occurred.

Analyses of medication errors continued to focus on systemic factors and to move away from placing blame on individuals. The executive summary of a symposium on safe medication administration identified barriers to medication safety in research, education, policy, practice, and administration.[179] Changes in Medicare reimbursement for several preventable hospital-acquired conditions resulted in improved safety efforts for preventable "never" events.[180] Roark described an FDA proposal that would require drug manufacturers to place bar codes on all prescription and over-the-counter medications used in hospitals—a method that had drastically reduced medication errors when instituted previously in Veterans Health Administration hospitals.[174]

Articles recommended medication reconciliation as a way to reduce medication errors that occur during transition periods (admission to the hospital, transfer to another unit, discharge to home)[181, 182] and the use of care bundles (multiintervention protocols) to remedy problems commonly associated with specific physiologic conditions. *AJN* published articles on care bundles that addressed ventilator-associated pneumonia,[183] sepsis,[184] central line–associated bloodstream infections,[185] and even socioeconomic barriers to treatment.[186]

Summary of Findings: 2000–2015

- Systemic factors were recognized as contributing to errors.
- Four columns with a patient safety focus (*Med Errors*, *Practice Errors*, *Health and Safety*, and *Safety Monitor*) were introduced.
- Side rails were recognized as dangerous.
- The medical performance measure "failure to rescue" was applied to nursing care.
- Rapid response teams were established within hospitals.
- The U.S. Food and Drug Administration proposed that drug manufacturers put bar codes on all prescription and over-the-counter medications used in hospitals.
- Articles recommended medication reconciliation as a means of reducing medication errors that occur during transition periods.
- Care bundles (multiintervention protocols) were developed to remedy problems commonly associated with specific physiologic or socioeconomic conditions.
- Changes in financial reimbursement resulted in improved safety efforts for preventable "never" events.

DISCUSSION

Before the discovery of antibiotics, the only tools available to halt the spread of disease were asepsis, isolation, and cleanliness. As a result, attention to infectious diseases was a central focus of *AJN* articles in the journal's first decades. In the early 20th century, when nurses were not yet recognized as having an

independent professional identity distinct from that of physicians, articles were often written by physicians and adhered to a medical model, emphasizing symptoms and diagnoses rather than nursing care. Perhaps as a result, medical procedures were often instituted with no apparent recognition of safety threats.

The increasing complexity of nursing procedures, equipment, and medication regimens; a growing sense of independent professional identity; and various pressures exerted by World War II emerged as driving forces in the development of safety protocols and the recognition of rapid intervention as key to patient survival. Today's nurses continue to recognize the importance of rapid intervention through the use of emergency protocols, rapid response teams, and guidelines that expedite lifesaving interventions. The Centers for Medicare and Medicaid Services supports the ability of nurses to enter orders into the computerized electronic health record in accordance with state, local, and professional guidelines to promote early treatment and reduce delays.[187]

A shortage of nurses at the bedside during and after World War II resulted in an increased use of unlicensed assistive personnel. Nurses came to recognize the dangers associated with inappropriate delegation, prompting the ANA to develop safe staffing principles and to call on health care organizations to use a wider range of metrics to define unit intensity levels. In 1999, legislation passed in California gave rise to the movement to implement minimum nurse–patient staffing ratios. Since that time, the debate on how to determine and ensure safe nurse staffing has become a national conversation, with bills introduced at the federal level.[172] The resistance of health care facilities to follow safe staffing principles remains an issue for nurses today. In response, Senator Jeff Merkley (D-OR) and Representatives Lois Capps (D-CA) and David Joyce (R-OH) introduced into Congress the ANA-supported Registered Nurse Safe Staffing Act, which would require all hospitals participating in Medicare to establish RN staffing plans, using a committee composed primarily of direct care nurses.[188, 189]

Specialized nursing education and in-service programs were identified as fundamental to patient safety in the 1950s. The importance of ongoing nursing education continues today. In its 2010 report, *The Future of Nursing: Leading Change, Advancing Health*, the IOM has called for educational pathways that would enable licensed RNs who have a diploma or associate's degree to obtain a baccalaureate, and for residency programs for nurses who have completed prelicensure or advanced practice degree programs or are transitioning into a new clinical practice area.[190] The IOM further called on schools of nursing to double the number of nurses with doctoral degrees by the year 2020.[187] The IOM holds that "[a]ll health care organizations and schools of nursing should foster a culture of lifelong learning and provide resources for interprofessional continuing competency programs."[190]

Throughout the years, numerous authors recommended instituting safety measures, including better methods for identifying patients before intervention, increased accountability when administering such high-alert medications as insulin, and improved caregiver comunication, which were subsequently recommended in the JCAHO Patient Safety Goals 2003.[191] In fact, the 1939 recommendation by nurses to hold meetings to discuss hospital safety and safety education[39] may have been an early attempt to promote interprofessional collaboration, a current safety recommendation of the IOM.[190]

The goal of the 1999 IOM *To Err Is Human* report was to break the cycle of inaction with regard to patient safety. The report was successful in fostering the recognition that errors were often due to systemic factors rather than the actions of individuals. Articles published between 2000 and 2015 focused on the systemic factors that affect patient safety and proposed systemic solutions. History teaches us the importance of implementing recognized solutions in a timely manner. As key stakeholders with the power to advance proven safety measures, nurses must encourage the necessary changes through education and leadership.

Limitations. This content analysis was limited in that all articles were published in a single journal. Articles with important safety information would certainly have been published in other nursing journals as well, but *AJN* is the oldest continuously published nursing journal and, as such, provides a lens through which to view trends in patient care and safety. One strength of the analysis is that both the search for relevant articles and the article analyses were conducted independently by the two authors.

CONCLUSIONS

Our content analysis of articles published in *AJN* revealed that patient safety was a primary goal of nursing from the journal's inception in 1900. However, the recognition of safety threats and the response of nurses changed over time. Three major themes related to patient safety were repeated throughout the 115 years covered in this analysis: infection prevention, medication safety, and response to new technology. Over the past several decades, processes and procedures to improve patient safety have been recommended but have not been universally adopted, despite substantial supportive evidence. The IOM highlighted patient safety as a serious public health issue in 1999. Although efforts have been made to improve patient safety since that time, the work "has progressed at a rate much slower than anticipated."[192] Reflecting on the historical and contemporary role of the nurse in promoting patient safety and overcoming barriers to the implementation of safety measures

may inspire nurses to take action that improves patient safety today. ▼

For 117 additional continuing nursing education activities on safety, go to www.nursingcenter.com/ce.

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