Huddles and their effectiveness at the frontlines of clinical care: a scoping review

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BACKGROUND: Brief, stand-up meetings known as huddles may improve clinical care, but knowledge about huddle implementation and effectiveness at the frontlines is fragmented and setting specific. This work provides a comprehensive overview of huddles used in diverse health care settings, examines the empirical support for huddle effectiveness, and identifies knowledge gaps and opportunities for future research.

METHODS: A scoping review was completed by searching the databases PubMed, EBSCOhost, ProQuest, and OvidSP for studies published in English from inception to May 31, 2019. Eligible studies described huddles that (1) took place in a clinical or medical setting providing health care patient services, (2) included frontline staff members, (3) were used to improve care quality, and (4) were studied empirically. Two reviewers independently screened abstracts and full texts; seven reviewers independently abstracted data from full texts.

RESULTS: Of 2,185 identified studies, 158 met inclusion criteria. The majority (67.7%) of studies described huddles used to improve team communication, collaboration, and/or coordination. Huddles positively impacted team process outcomes in 67.7% of studies, including improvements in efficiency, process-based functioning, and communication across clinical roles (64.4%); situational awareness and staff perceptions of safety and safety climate (44.6%); and staff satisfaction and engagement (29.7%). Almost half of studies (44.3%) reported huddles positively impacting clinical care outcomes such as patients receiving timely and/or evidence-based assessments and care (31.4%); decreased medical errors and adverse drug events (24.3%); and decreased rates of other negative outcomes (20.0%).

DISCUSSION: Huddles involving frontline staff are an increasingly prevalent practice across diverse health care settings. Huddles are generally interdisciplinary and aimed at improving team communication, collaboration, and/or coordination. Data from the scoping review point to the effectiveness of huddles at improving work and team process outcomes and indicate the positive impact of huddles can extend beyond processes to include improvements in clinical outcomes.

STUDY REGISTRATION: This scoping review was registered with the Open Science Framework on 18 January 2019 (https://osf.io/bdj2x/).

KEY WORDS: communication; cooperative behavior; group processes; patient care teams; quality improvement.

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INTRODUCTION

Brief, focused, stand-up meetings known as huddles have the potential to improve medical care by enabling collaborative and efficient information exchange and fostering a shared view of current clinical conditions.[1] Huddles have been shown to minimize hierarchical barriers to care delivery, enhance frontline staff satisfaction, and improve clinical outcomes.[2] In contrast to historically dominant provider-centric medical practice models, huddles operationalize medicine as a cooperative science: all team members (e.g., physicians, nurses, medical assistants, administrative staff, laboratory workers) work together for the patient's good,[3] promoting stronger teamwork and communication[4] and situation awareness on the unit floor.[1] This increased communication with and among members of the team may also lead to better understanding of

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the daily work of frontline staff, potentially a key to sustaining quality improvement.[5]

Ideally, huddles optimize participant engagement, last 10–15 min, focus only on essential patient and procedural information,[1,6] and are held on a regular basis;[7] in practice, however, huddles take many forms. Some may involve only the patient's immediate clinical team, meeting as needed at the patient's bedside.[8] Others may involve all clinical and non-clinical staff and be scheduled for the start of each workday or other regular interval.[9] Huddle structure may also vary, depending, in part, on the use of any facilitation strategies, scripts, or communication tools such as CUS ("I am concerned! I am uncomfortable! This is a safety issue!")[10] or SBAR (Situation-Background-Assessment-Recommendation).[11] Yet despite understanding some of the myriad variations in huddle structures and processes, knowledge of huddle implementation and effectiveness at the frontlines of health care remains fragmented and is limited to particular settings. In a preliminary search for relevant reviews available through MEDLINE, the Cochrane Database of Systematic Reviews, and *JBI Evidence Synthesis*, we found three systematic reviews focusing on the use of huddles: one to promote patient safety in the perioperative setting[2] and two focused on their use in inpatient settings.[12,13] A more comprehensive understanding of huddle practices and characteristics has the potential to help clinicians and health care administrators across diverse settings understand how this process can help improve patient care.

In contrast to the prior, narrow systematic reviews on huddles in specific settings, this scoping review thus provides a comprehensive overview of the scope and volume of research on the broad category of clinical-setting huddles that involve frontline staff. In keeping with standard indications for conducting a scoping review,[14] this review has the following purposes: to describe characteristics of such huddles (e.g., structures, processes), identify empirical support for the effectiveness of huddles for improving health care quality, and highlight knowledge gaps and opportunities for more detailed evidence syntheses and empirical research.

METHODS

We performed this scoping review using the Joanna Briggs Institute's established method for a scoping review[15] and guidance from the Preferred Reporting Items for Systematic Reviews and Meta-Analyses Extension for Scoping Reviews (PRISMA-ScR).[16] The final protocol was prospectively registered with the Open Science Framework[17] on 18 January 2019 (https://osf.io/bdj2x/) and published in the peer-reviewed literature.[18]

Scope of the Review

We used the PCC (Population, Concept, and Context) framework to define eligibility criteria.[16] To be eligible for inclusion, articles had to (1) take place in any clinical or medical setting that provides health care patient services, including inpatient, outpatient, or residential settings; (2) include frontline staff members (i.e., employees with patient contact, including health care providers and non-clinical/administrative staff);[19] (3) describe, investigate, or explore the huddling practice as a targeted intervention to improve processes and outcomes broadly related to quality of care (e.g., staff engagement and satisfaction, perceptions of safety culture, adverse drug events, patient length of stay); and (4) provide empirical data. Eligible study designs included qualitative studies; experimental and quasi-experimental studies (e.g., randomized or non-randomized controlled trials, before and after studies, interrupted time-series studies); analytic observational studies (e.g., prospective or retrospective cohort studies, case-control studies); and descriptive cross-sectional studies. Dissertations, gray literature, and conference proceedings that met inclusion criteria were also considered. We excluded study protocols; articles that described huddles as a platform through which other interventions were disseminated; articles that solely focused on adherence to a checklist (e.g., surgical safety checklist); simulation studies, and research summaries lacking original data.

Data Sources and Searches

To be as comprehensive as possible, we performed an initial limited search of PubMed and CINAHL Plus with Full Text, followed by an analysis of each identified article's title, abstract, Medical Subject Headings (MeSH) terms, and keywords. For our full search, we used all resulting relevant MeSH terms and keywords to search the following databases: PubMed, EBSCOhost (including CINAHL Plus with Full Text, Dentistry & Oral Sciences Source, ERIC, Health Business Elite, Health Policy Reference Center, PsycArticles, PsycBooks, Psychology and Behavioral Sciences Collection, PsycINFO, Rehabilitation & Sports Medicine Source, Social Work Reference Center, and SocINDEX with Full Text), ProQuest (including the Family Health Database, Health & Medical Collection, Health Management Database, Nursing & Allied Health Database, Psychology Database, and PTSDpubs), and OvidSP. Appendix 1 lists the full search strategy used for PubMed, CINAHL Plus with Full Text, EBSCOhost, ProQuest, and OvidSP. We augmented the full database search by scanning the reference list of the Institute for Healthcare Improvement's (IHI's) white paper that guides health care practitioners in using daily huddles as part of a quality management system[5] for additional articles that we then assessed. Studies published in English from inception to May 31, 2019, were considered for inclusion.

Study Selection

All articles identified during the full database and additional searches were uploaded into EndNote X8.2 (Clarivate Analytics, Philadelphia, PA, USA), and duplicates were removed.

We conducted an initial screening for inclusion based on titles and abstracts. Two reviewers (C.B.P., C.W.H.) independently conducted the first screening of the abstracts based on the inclusion criteria to identify articles to include for further review. Disagreements on article inclusion were resolved by discussion or with input from two additional reviewers.

Following this, we reviewed the full text of those articles that met initial screening. Two independent reviewers assessed each article against the inclusion criteria, with disagreements resolved through discussion or with input from a third reviewer. Full-text articles that did not meet the inclusion criteria were excluded from the scoping review. Results of the search are presented in a PRISMA flow diagram (Fig. 1).[16]

Data Abstraction and Quality Assessment

Seven reviewers independently abstracted relevant data from each full-text article meeting all inclusion criteria. An Excel spreadsheet was used to collect data about, for example, clinical setting, study design, huddle purpose, participating staff, and indicators of huddle effectiveness. The data abstraction tool is available in Appendix 2. To summarize huddle purpose, we began with an adapted list of the four benefits of huddles as outlined by the IHI (engage, update, recognize, and identify)[20] and added two additional ones based on our findings (plan, provide) (Table 1).

Two secondary reviewers (C.B.P., C.W.H.) independently abstracted relevant data from all full-text articles to assess consistency with primary reviewers. As in the study selection process, disagreements between primary and secondary reviewers were resolved through team discussion or in consultation with a third reviewer. We did not perform formal assessments of methodological quality because a scoping review aims to provide an overview of the existing evidence, irrespective of quality.[15,16] We did categorize studies by evidence quality (e.g., peer-reviewed, gray literature, presence of a control comparison group), however, to inform future research.

Role of the Funding Source

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RESULTS

We identified a total of 2,185 publications through electronic database searches and reference lists (Fig. 1). After removal of duplicate publications across databases (*N*=1,330) and exclusion after initial title and abstract review (*N*=535), we performed full-text review of 325 studies. Two researchers (a primary and secondary reviewer) independently reviewed each article, with 90% agreement between both reviewers prior to resolution through team discussion or in consultation with a third reviewer. One-hundred fifty-eight studies met inclusion criteria;[1,6,8,9,11,21–173] 139 (88.0%) were peer-reviewed and 19 (12.0%) were gray literature. Details related to our broad objectives are summarized below. Select details on the included studies are available in Appendix 3.

Year and Location of Studies

The first study meeting eligibility criteria was published in 2004;[11] the majority (71.5%; *N*=113) were published between 2014 and 2019.[8,9,21,22,25,27,30–32,34–37,39,41–44,47–49,51,53,56–58,62,63,65,67–70,72,74,76,77,79,81,83,85,87,89,90,92–94,96,97,99–102,104–108,110–113,115–120,122–139,141,142,144,146–150,152–159,161–170,173] Seventy-four percent (*N*=117) were performed in the USA,[1,6,8,9,11,21,23,25,27,28,30,33–35,37–40,42–44,46–53,55–62,64,65,69,71,72,74,76–78,84–89,91,93,96–102,104,106,107,109,112,114–126,128–132,135–147,149–153,155,156,158–161,164–170,172,173] 13.9% (*N*=22) in the UK,[22,26,29,31,36,41,54,63,67,70,75,79,83,92,94,105,110,111,113,133,154,162] 8.9% (*N*=14) in Canada,[24,32,45,68,73,80,82,90,103,108,127,134,157,171] and 3.2% elsewhere (the Netherlands [*N*=2],[81,163] Thailand [*N*=1],[95] Israel [*N*=1],[66] and Australia [*N*=1][148]).

Clinical Setting

A majority (30.4%; N=48) of all studies described implementation of huddle-based interventions throughout entire hospitals or health care systems.[1,6,21,23,25,28,30,37,39,41,42,47,56,57,62,63,71,73,74,83,87,89,91,94,98,104,105,109,114,1-15,117,123,125,128–131,133,135–137,143,150,160,162,165,169,170] Specific unit-level clinical settings included the following: perioperative settings/operating room (15.2%; *N*=24),[11,24,26,29,38,45,46,52,59,65,66,70,75,76,78–82,84,86,95,103,113] intensive care units (12.7%; *N*=20),[33,44,50,61,77,88,96,108,110,112,121,124,138,140,151,152,159,163,171,172] inpatient medical or surgical departments (13.3%; *N*=21),[35,49,51,54,60,67,85,92,99–101,111,116,118,141,147,154,155,157,168,173] long-term care facilities (6.3%; *N*=10),[31,40,97,120,122,127,132,139,148,166] primary care (6.3%; *N*=10),[43,55,58,64,68,69,93,142,149,164] emergency departments (5.1%; *N*=8),[8,90,145,146,151,153,158,161] and labor and delivery (3.8%; *N*=6).[53,72,119,126,156,167] Two percent or fewer studies were specific to each of the following settings: neurology and stroke (*N*=3),[34,107,144] oncology (*N*=2),[48,98] dental (*N*=2),[22,36] behavioral health (*N*=2),[27,139] pathology (*N*=1),[32] radiology (*N*=1),[9] cystic fibrosis (*N*=1),[102] outpatient echocardiography laboratory (*N*=1),[106] and brain and spinal cord rehabilitation (*N*=1).[134]

Study Design

Among peer-reviewed studies, 107 used quantitative methods only and 32 used qualitative or mixed methods. Among studies in the gray literature, 18 used quantitative and 1 used qualitative methods.

Only 9 studies (5.7%), all from the quantitative peer-reviewed literature, used a comparison group design.[38,49,87,90,115,121,138,141,162]

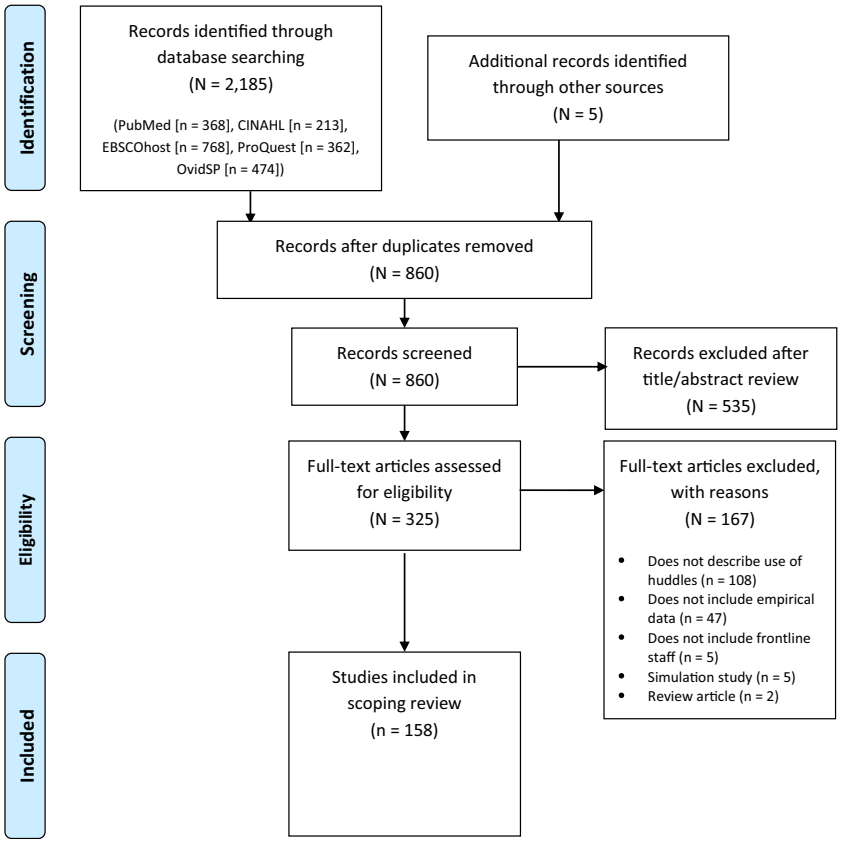

Figure 1. PRISMA flow diagram.

Nearly half of all studies (*N*=75) were analytic observational,[1,23,26,28,31,34,37,41,46–48,50,51,55,58–61,67,71,72,74–80,83,84,86,89,91,94,96,97,99,101,106,107,109–112,115,117,119,123,125,128–130,132–134,137,140,142,143,146–148,150,153,157–161,163,166–168,170,172] 34.2% (*N*=54) were experimental or quasi-experimental,[8,11,27,29,32,33,35,38,42,43,45,49,51–53,56,65,70,73,81,85,87,90,92,95,102–105,108,113,114,116,118,120–122,124–126,131,135,136,138,139,141,144,149,152,155,156,162,165,173] and 9.5% (*N*=15) were descriptive cross-sectional.[9,22,30,36,39,40,57,64,66,93,100,127,151,169,171] Twenty-one percent of studies (*N*=33) used qualitative methods,[6,21,24,25,29–31,37,43,44,54,55,57,58,62–64,66,68,69,77,80,82,87,88,98,127,142,145,148,154,157,164] among which half (*N*=17) used mixed methods.[29–31,37,43,57,58,64,66,68,77,80,87,127,142,148,157]

Huddles were the sole intervention in 42.4% of studies (*N*=67)[6,8,9,11,24–26,28–30,36,38,40,42–47,51,52,54,55,57–60,62,63,65–68,74–78,80–86,88,89,95,104,105,109,110,113,116,117,123,125,127,130,134,136,138,140,144,153,164,169] and part of a larger intervention bundle in 57.6% (*N*=91).[1,21–23,27,31–35,37,39,41,48–50,53,56,61,64,69–73,79,87,90–94,96–103,106–108,111,112,114,115,118–122,124,126,128,129,131–133,135,137,139,141–143,145–152,154–163,165–168,170–173]

Huddle Purpose

Studies used huddles for multiple purposes (Table 1). The majority (67.7%) of studies (*N*=107) described huddles as being used to engage team members in thinking and talking about their work and to improve communication, collaboration, and/or coordination.[6,8,11,21–124] Roughly equal numbers of studies described huddles used to identify issues requiring immediate attention or escalation to high-level management for resolution (27.2%; *N*=43);[1,8,9,21,25,27,29,30,32,37,39,44,53,55,57,59,63,69,75,84,87,93,98,116,122,126,134,144,146,–149,153–162,165,167,171] update team members about safety and quality issues that affect their work, including reviewing prior issues (24.1%; *N*=38);[6,29,32,40,57,72,73,77,83,87,89,110,111,113,118,122,123,125–139,167–171,173] and plan for or improve processes for future work (22.8%; *N*=36).[9,31,34,50,55,57,59,60,66,69,71,93,100,108,121,122,130,132,134,135,140–151,166,168,170,172] Fewer studies described huddles used to recognize work-related issues that may be addressed by training, coaching, or revising tools and methods (4.4%; *N*=7)[40,57,62,89,112,152,169] or to provide a framework for running Plan-Do-Study-Act cycles (1.3%; *N*=2).[163,164]

Theories and Tools

More than one-third of the studies (37.3%; *N*=59) were based on a conceptual rationale,[1,6,11,21,23,27,30–32,35,37,42,47,49,53,54,57,58,61–63,66,67,69,70,73,75,78,83,89,90,94,98,107,115,119–121,123,125–128,132,133,135,145–148,156,159,162–164,166,170,172,173] such as a theory (why the subject of interest will have an impact) and/or a framework or model (how a theory is operationalized).[174] Among these studies, the most common were high reliability organizational principles (17.6%; *N*=9),[1,6,63,69,70,123,125,128,135] crew resource management (17.6%; *N*=9),[11,54,61,75,78,89,94,98,121] and Lean Six Sigma (15.7%; *N*=8).[27,30,32,49,115,126,163,170]

Only 7.6% of studies (*N*=12) mentioned organizing their huddles using existing tools or communication scripts (e.g., SBAR;

Table 1 Huddle Purpose and Outcome Measures (*N*=158 Articles)

Huddle purpose*†	Outcomes	
	Related to work and team process	**Related to clinical care**
Engage team members in thinking and talking about their work; improve communication, collaboration, and/or coordination[21–24]	Improved efficiency, process-based functioning and communication across clinical roles[6,8,25–73] Improved situational awareness and staff perceptions of safety[6,8,11,26,30,31,35–37,40,45–47,53,55–57,60,62,63,67–69,71,73–86] Increased staff satisfaction and engagement[6,8,11,30,33,38,41,47,49,58,60,62,68,69,77,79,85,87–89] More supportive practice climate[6,8,11,28,30,40,43,47,49,50,57,58,62,66–69,71,79,84,85,90,91] Enhanced self-efficacy among frontline staff to implement evidence-based practices[30,34,38,48,51,54,58,66,71,77,81,87,92–95] Other[11,28,29,32,38,42,52,57,61,70,71,75,76,79,86,96–99]	Increased proportion of patients receiving timely, evidence-based assessment or treatment[27,30,41,51,94,97,99–108] Decreased medical errors and adverse events[11,25,50,86,109–113] Decreased length of hospital stay[30,49,94,114–118] Decreased rate of negative outcomes, such as infections, falls, and pressure ulcers[31,89,94,97,119–122] Increased patient satisfaction[116,117,123] Decreased costs[116,117] Other[34,36,51,56,63,72,74,117,124]
Update team members about safety and quality issues that affect their work, including reviewing prior issues (108, 111, 119, 141, 149, 159)	Improved efficiency, process-based functioning and communication across clinical roles[6,29,32,40,57,72,73,125–127] Improved situational awareness and staff perceptions of safety[6,40,57,73,77,83,128,129] Increased staff satisfaction and engagement[6,77,87,89,127,128,130] More supportive practice climate[6,40,57,127] Enhanced self-efficacy among frontline staff to implement evidence-based practices[29,77,87,127,131] Other[32,57,125]	Increased proportion of patients receiving timely, evidence-based assessment or treatment[132,133] Decreased medical errors and adverse events[110,111,113,128,134–136] Decreased length of hospital stay[118] Decreased rate of negative outcomes, such as infections, falls, and pressure ulcers[89,122,125,130,133,137] Increased patient satisfaction[123] Other[72,138,139]
Plan for future work/improving processes for future work (108, 128, 129, 149, 162)	Improved efficiency, process-based functioning and communication across clinical roles[9,31,34,50,55,57,59,60,66,69,71,140–145] Improved situational awareness and staff perceptions of safety[31,55,57,60,69,71,84,145–147] Increased staff satisfaction and engagement[59,60,69,130,142,148] More supportive practice climate[9,50,57,66,69,71] Enhanced self-efficacy among frontline staff to implement evidence-based practices[34,66,71,93,148] Other[57,71]	Increased proportion of patients receiving timely, evidence-based assessment or treatment[100,108,132,149] Decreased medical errors and adverse events[121,134,135] Decreased length of hospital stay[144] Decreased rate of negative outcomes, such as infections, falls, and pressure ulcers[31,122,130,150] Increased patient satisfaction[141,149] Other[34,141,149,151]
Recognize work-related issues that can be addressed by training, coaching, and revising tools and methods (119)	Improved efficiency, process-based functioning and communication across clinical roles[40,57,62] Improved situational awareness and staff perceptions of safety[40,57,62] Increased staff satisfaction and engagement[89] More supportive practice climate[40,57,62] Other[57]	Decreased medical errors and adverse events[112] Decreased rate of negative outcomes, such as infections, falls, and pressure ulcers[89,152]
Identify issues requiring immediate attention or escalation to higher-level management for resolution (54, 84, 111, 141)	Improved efficiency, process-based functioning and communication across clinical roles[8,9,25,27,29,30,32,37,39,44,53,55,57,59,63,69,126,144,153–155] Improved situational awareness and staff perceptions of safety[8,30,37,53,55,57,63,69,75,84,146,153,156] Increased staff satisfaction and engagement[8,30,37,59,63,69,87,156,157] More supportive practice climate[8,9,30,57,69,84,154,156] Enhanced self-efficacy among frontline staff to implement evidence-based practices[30,87,93,154] Other[29,32,57,75,98,154]	Increased proportion of patients receiving timely, evidence-based assessment or treatment[27,30,149,158–160] Decreased medical errors and adverse events[1,25,134,161] Decreased length of hospital stay[30,116,144,157,162] Decreased rate of negative outcomes, such as infections, falls, and pressure ulcers[122] Increased patient satisfaction[116,117,149] Other[1,63,149,155,157,160]
Provide a framework for running PDSA cycles		Decreased medical errors and adverse events[163] Other[164]

**List of huddle purposes adapted from IHI[20]*

†Citations in Huddle Purpose column represent articles that characterized a huddle purpose(s) but did not characterize a specific outcome(s)

Table 2);[8,21,23,65,73,94,101,138,145,146,159,166] 15.8% (*N*=25) developed and published their own huddling tools.[27,29,36,42,45,46,49–51,56,60,68,78,80,87,89,96,98,104,112,130,134,136,141,153]

Participating Staff

In studies that identified huddle participants' job categories (*N*=120), nurses were involved in 88.3% of the studies (*N*=106);[1,6,8,9,11,21,24–26,28–30,34–46,49–51,53–60,62,63,65,66,68–73,75,77–81,83–89,91,95,96,98–100,103,104,110–114,117,119–123,125,127,129,130,133,136,138,140,142–

Table 2 Common Tools Used to Communicate in or Monitor Frontline Staff Huddles

Tool	Description
CUS ("I am concerned! I am uncomfortable! This is a safety issue!")[10]	The CUS assertive statements help frontline staff speak up or speak out in uncomfortable situations. A script is presented, using "I am concerned," "I am uncomfortable," and "This is a safety issue."
SBAR (Situation-Background-Assessment-Recommendation)[11]	The SBAR technique provides a framework for health care team members to discuss a patient's condition. "S" is a concise statement of the problem, "B" is pertinent and brief information about the situation, "A" is the team member's analysis and considerations of options, and "R" is the team member's request or recommendation.
Huddle Observation Tool (HOT)[175]	The HOT is a participant/non-participant observation tool that may be used to provide objective measures of (1) huddle effectiveness and (2) changes to huddles, situational awareness, and collaborative culture over time.

150,152,153,155,157–160,162,164,165,173 physicians in 75.8% (*N*=91);[6,9,11,24,26,28–30,32,35,36,38–46,49–51,53–59,62,63,65,66,68–73,75,78–81,83–87,91,94–96,98–101,103,104,108–114,117–119,121–123,134,136,140–142,145,146,149,152,153,155,157,158,160,162,164,165,172] members of ancillary services (e.g., social workers; pharmacists; technicians; case managers; respiratory, physical, or occupational therapists) in 50.8% (*N*=61);[11,26,28–30,36–40,45,49,50,54,63,65,66,69–71,75,78,80,81,83–85,89,91,94,96,98–101,103,105,109–112,114,117,118,121,122,125,136,142–144,146,149,152,155,157–160,162,164] managers in 23.3% (*N*=28);[1,6,9,21,25,27,30,32,34,40,44,57,63,69,74,88,89,98,117,123,126,136,143,150,162,164,169,172] and other frontline staff (e.g., clerical staff, environmental services) in 13.3% (*N*=16).[9,30,32,37,55,58,63,68,89,94,98,125,136,162,164,169] Many huddles were interdisciplinary in nature, including participants from more than one job category. More than 24% of all studies (*N*=38) did not specify participants' job categories. Three percent (*N*=5) of all studies explicitly included patients and/or their family members and peer supports.[27,30,53,57,125]

Nurses, usually charge nurses or nurse managers, facilitated the huddles in 40.0% of studies (*N*=20)[1,28–30,43,44,57,60,85,88,89,112,125,129,130,136,138,147,149,150] where information on facilitator job category was included (*N*=52).[1,9,21,22,28–30,33,35,40,43,44,47,51,54,55,57,59,60,68,69,71,83–85,87–89,98–100,108,111,112,117,123,125,127,129,130,135,136,138,145,147,149,150,162,164,169–171]

Other huddle facilitators were attending physicians or medical directors (32.0%; *N*=16),[9,22,28–30,40,54,55,57,71,84,87,98–100,136] unspecified administrative leaders (26.9%; *N*=14),[9,21,30,33,44,47,57,83,88,123,136,150,169,170] physician trainees (13.5%; *N*=7),[1,35,51,55,100,108,117] unspecified members of the health care team (13.5%; *N*=7)[57,59,68,69,127,145,162] or safety team (7.7%; *N*=4),[47,135,136,171] and pharmacists (6.0%; *N*=3).[111,136,164] In 67.1% (*N*=106) of all studies, information about huddle leaders was lacking.

Among studies that specified the number of huddle participants (*N*=31),[1,8,31,42,45,53,55,58,62,65,68,71,72,82,87,91,100,104,118,127,138,140,142,144,145,148,153,158,163,165,169] a range of 2 to 20 frontline staff members attended huddles. Nearly 77% of the studies (*N*=121), however, did not specify the number of participants.

Huddles, when duration was specified, lasted anywhere between 2 and 30 min. Most of these huddles were held either once (41.1%; *N*=53)[6,9,26,27,29,34,35,39,40,42,45,47,51,55,60,62,67–69,73,74,77,80,81,85,87,92,93,102,104,108,111,113,114,116–118,123,126,129,131,138,140,142–144,149,155,160,162,169,170,172] or twice (12.7%; *N*=20) daily,[1,23,28,33,37,43,44,58,59,88–90,120,128,133,145,154,156,157,160] 24.7% (*N*=39) before or after an event of interest (e.g., surgery, fall, activation of sepsis alarm),[8,22,24,36,49,53,54,64–66,71,72,78,82–84,91,96,100,105,109,112,119,121,122,130,135–137,141,146,150,152,158,161,165,168,173] and 8.9% (*N*=14) on a weekly basis or more infrequently.[30–32,66,110,127,132,134,147,148,163,164,166,171] Nearly 18% of studies (*N*=28) did not provide this level of detail when describing the huddles.

Effectiveness of Huddles

All 9 quantitative studies with a control comparison group reported statistically significant improvements associated with huddles.[38,49,87,90,115,121,138,141,162] Of the 123 quantitative studies without a control comparison group, all but 2 reported improvements. Half (*N*=60) of these studies reported positive findings reaching statistical significance.[1,27,29,32,33,35,39,41,45,46,51,52,56,58,61,65,71,72,75,78–81,84,85,91,94,99,101–104,106,109,112,113,116–119,122,125,129,130,134,135,139,142–144,146,148,149,152,155–157,163,165,173] All studies reported at least one outcome, with many reporting multiple process and clinical care outcomes. Of the 63.9% (*N*=101) studies measuring work and team process outcomes (Table 1), all but 1 reported that the huddle had a statistically significant positive impact on frontline staff.[6,8,9,25–99,125–131,140–148,150,153–157] Of these, studies found evidence for improved efficiency, process-based functioning, and communication across clinical roles (64.4%; *N*=65);[6,8,9,25–73,125–127,140–145,153–155] improved situational awareness and staff perceptions of safety and safety climate (44.6%; *N*=45);[6,8,11,26,30,31,35–37,40,45–47,53,55–57,60,62,63,67–69,71,73–86,128,129,145–147,153,156] increased staff satisfaction and engagement (29.7%; *N*=30);[6,8,11,30,33,37,38,41,47,49,58–60,62,63,68,69,77,79,85,87–89,127,128,130,142,148,156,157] perceptions of a more supportive practice climate (26.7%; *N*=27);[6,8,9,11,28,30,40,43,47,49,50,57,58,62,66–69,71,79,84,85,90,91,127,154,156] and enhanced self-efficacy among frontline staff to implement evidence-based practices and/or improve care (20.8%; *N*=21).[29,30,34,38,48,51,54,58,66,71,77,81,87,92–95,127,131,148,154] Only 2 qualitative studies (less than 2% of all studies) specifically assessed and reported on unintended negative consequences of the huddling practice, including added pressure on staff time and workload,[22] exclusion of clinical trainees, and inadvertent reinforcement of medical hierarchies.[24] We summarize the major findings on huddle team process outcomes in Fig. 2.

Seventy studies (44.3%) measured clinical care outcomes[1,11,25,27,30,31,34,36,41,49–51,56,63,72,74,86,89,94,97,99–101,104–125,128,130,132–139,141,144,149–152,155,157–164], of which all reported the huddle had a positive clinical impact. Positive

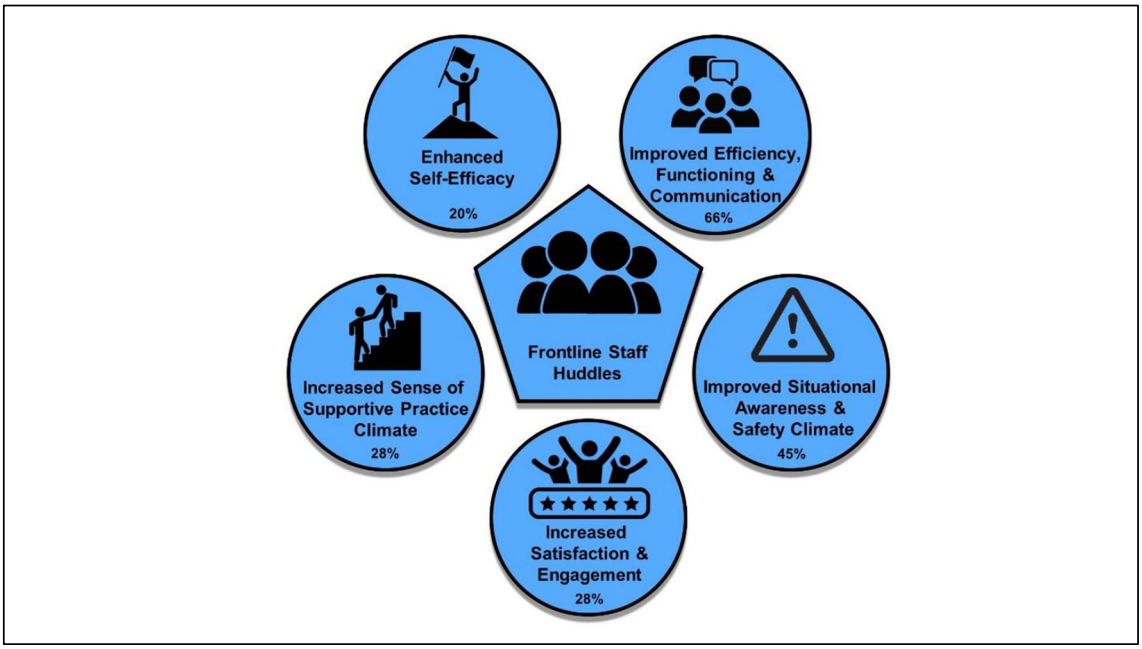

Figure 2 Positive work and team process outcomes associated with frontline huddles (with percent of studies reporting each outcome; *N*=101). Studies could report more than one outcome; percent totals are over 100.

clinical care outcomes included the following: increased proportion of patients receiving timely and/or evidence-based assessments or care (31.4%; *N*=22);[27,30,41,51,94,97,99–108,132,133,149,158–160] decreased medical errors and adverse drug events (24.3%; *N*=17);[1,11,25,50,86,109–113,121,128,134–136,161,163] decreased rate of other negative outcomes, e.g., infections, falls, and pressure ulcers (20.0%; *N*=14);[31,89,94,97,119–122,125,130,133,137,150,152] decreased length of hospital stay and improvements to discharge-related measures (15.7%; *N*=11);[30,49,94,114–118,144,157,162] increased patient and family satisfaction (7.1%; *N*=5);[116,117,123,141,149] and decreased costs (2.9%; *N*=2).[116,117]

DISCUSSION

We undertook this scoping review to provide a comprehensive overview of huddles used in health care, examine the empirical support for huddle effectiveness, and identify knowledge gaps and opportunities for future studies. Findings from our review show that huddles involving frontline staff are an increasingly prevalent practice across diverse health care settings. Huddles are generally interdisciplinary and aimed at improving team communication, collaboration, and/or coordination. Data from our review point to the effectiveness of huddles at improving work and team process outcomes and indicate the positive impact of huddles can extend beyond processes to include improvements in clinical outcomes.

For a huddle to be clearly distinguished as effective, it must (1) be identifiable as a huddle and (2) be linked to a positive outcome. But identification of a huddle may be difficult. This scoping review included articles that self-identified interventions as huddles or that otherwise described quick, "touch base" meetings of healthcare team members, convened by a designated or situational leader, to enhance or regain situational awareness, discuss critical issues and emerging events, anticipate outcomes and likely contingencies, assign resources, and express concerns.[2,7] But study authors' definitions of huddles varied considerably, owing to heterogeneity of studies' participants and huddle frequency, duration, and purpose. Some practices were labeled as huddles and therefore included in our review but represent conceptually different practices. Handoffs, meaning predominantly one-way transfers of information,[7] stand in contrast to the majority of studies, where huddle information exchange was more collaborative and engaged. Huddle interventions should also ideally be distinguished from rounds, which are typically didactic,[176–178] specific to the clinical care and plan for a given patient, and attended primarily by members of that patient's healthcare team (physicians and nurses). Shift change report, when relevant verbal or written information is passed from one shift of workers (e.g., outgoing nurses) to another (e.g., oncoming nurses) to maintain continuity of care and patient safety,[179–181] should also be a distinct category. In addition, some studies did not link targeted objectives to the study intervention, making it impossible to distinguish whether the huddle was related to positive outcomes.[23,166–173] These findings point to a need in the literature for improved coherence in studies' definitions of huddles and tighter links between study huddle interventions and outcomes.

Use of published tools may help promote clarity around the huddling process. The Standards for Quality Improvement Reporting Excellence (SQUIRE),[182] for example, provide guidance on reporting new knowledge about how to improve health care. Another tool is the Huddle Observation Tool,[175] a

psychometrically sound observational assessment tool that records team processes occurring during a huddle, enables qualitative measures of huddle effectiveness, and facilitates continuous quality improvement of the huddle itself. Systematic use of these tools will promote standardization of the huddling practice; enable greater understanding of local variations in huddling structure, processes, and implementation strategies; and facilitate intra- and inter-study evaluations of huddle effectiveness.

This review also identified a gap in the literature: the lack of conceptual rationales for implementation of huddle-based interventions. This is consistent with other reviews of quality improvement studies in health care[183–185] and is despite an extensive menu of relevant theories, models, and frameworks for quality improvement and implementation science. We did not assess whether studies that used an explicit conceptual rationale were of higher quality or were more effective than other studies; however, conceptually grounded interventions are more likely to be widely disseminated.[186] Ample resources, e.g., Dissemination & Implementation Models in Health Research & Practice (https://dissemination-implementation.org/), exist to help health care practitioners and researchers select and apply appropriate conceptual approaches for quality improvement. Use of conceptual approaches provides a better sense of how and why an intervention succeeds or fails;[174] describes or guides efforts to translate research into practice (i.e., "how-to" process models); and helps evaluate implementation strategies. Greater use of theories, models, and frameworks in future studies on huddles will promote comparison opportunities and, consequently, bring rigor to the growing body of research on the huddling practice.

Many opportunities exist for future research on frontline huddles in healthcare. Researchers should consider experimental study designs comparing a huddle intervention with a control group, as well as quasi-experimental studies assessing the impact of huddles independent of contemporaneous trends or other quality improvement initiatives. This will reduce potential sources of confounding, enhancing the methodological rigor of huddle-based studies. Future research should also specifically evaluate unanticipated consequences associated with the huddling practice, as we only found two studies assessed and reported on negative outcomes. Qualitative research methods, specifically, may enable greater exploration of mechanisms through which huddles may (or may not) impact work and team processes and clinical care outcomes. Finally, implementation studies are needed to facilitate the adoption, scale-up, and maintenance of proven huddle-based interventions in routine healthcare practice.

The potential for reporting (publication) bias represents a limitation of our scoping review. It is possible that practitioners or researchers with positive experiences of or significant findings about huddles submitted more manuscripts for publication and were more successful at being published than those with negative or not significant findings. Heterogeneity of setting, population, study design and methods, and purpose among the large number of studies reviewed also added complexity to our data collection efforts. Nevertheless, it is this same heterogeneity that demonstrates the breadth of clinical settings that have adopted the frontline staff huddling practice and indicates where gaps remain, such as huddle use in non-hospital-based settings (e.g., long-term care) and huddles that incorporate input from non-clinical staff members and patients.

CONCLUSION

A rich and rapidly growing body of empirical research appears to support the use of huddles in diverse clinical contexts for improving work and team processes and the quality of clinical care. This evidence base would greatly benefit from improvements in the conceptualization and design of studies on huddles and an increase in research on theoretically guided huddle-based interventions.

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