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Review Article

Improving teamwork in maternity services: A rapid review of interventions



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ABSTRACT

Background: Teamwork is essential for providing safe, effective and women-centred maternity care and several high profile investigations have highlighted the adverse consequences of dysfunctional teamwork. Maternity teams may need support to identify the most relevant intervention(s) for improving teamwork. **Objective:** To identify and describe current 'off-the-shelf' teamwork interventions freely or commercially available to support improvements to teamworking in UK maternity services and conduct a gap analysis to identify areas for future development.

Design: Rapid scoping review

Methods: A multi-component search process was used to identify teamwork interventions, comprising: (1) bibliographic database search (Medline, PsycINFO, CINAHL, MIDRS, NICE evidence research database); (2) identification of relevant policies and UK reports; and (3) expert input from key stakeholders (e.g., maternity service clinicians, managers, policymakers, and report authors). Data were extracted including the scope and content of each intervention and a gap analysis used to map interventions to the integrated team effectiveness model (ITEM) and structure level (macro, meso, micro) and results presented narratively.

Findings: Ten interventions were identified. Interventions were heterogeneous in their purpose and scope; six were classified as training courses, three were tools involving observational or diagnostics instruments, and one was a programme involving training and organisational re-design. Interventions were focused on teamwork in obstetric emergencies ($n = 5$), enhancing routine care ($n = 4$) or understanding workplace cultures ($n = 1$). Users of interventions could vary, from whole organisations, to departments, to individual team members. All interventions focused on micro (e.g., team leadership, communication, decision-making, cohesion, and problem solving), with two also focused on meso aspects of teamwork (resources, organisational goals). Evidence for intervention effective on objective outcomes was limited.

Conclusions: Interventions that address key aspects of teamworking are available, particularly for improving safety in obstetric emergency situations. Most interventions, however, are focused on micro features, ignoring the meso (organisational) and macro (systems) features that may also impact on team effectiveness. Evidence-based team improvement interventions that address these gaps are needed. Such interventions would support team ownership of quality improvement, leading to improvements in outcomes for service users, staff and organisations.

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Introduction

Although the UK is still one of the safest places in the world to have a baby, there is evidence that it could be safer

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(O'Neill, 2008; Wang et al., 2014; National Maternity Review, 2016; MBRRACE-UK, 2021). In recent years successive government-commissioned and independent reports have demonstrated the need for a transformation in maternity services to improve safety and quality of care (Kirkup, 2015; National Maternity Review, 2016; Ockenden, 2020; Health and Social Care Committee, 2021a, (Health and Committee, 2021b)). A consistent recommendation is that improvements in safety and quality of maternity care (including prevention of avoidable incidents, maternal and infant deaths) require more effective teamwork and the transformation of sometimes dysfunctional working-cultures within individual organisations or maternity teams (Cornthwaite et al., 2013; Kirkup, 2015; National Maternity Review, 2016; Ockenden, 2020; Health and Social Care Committee, 2021a, (Health and Committee, 2021b))

Despite the recurring call for improvements in teamwork in maternity services, most recently cited as a key feature in the interim Ockenden report (resulting from an independent review of maternity services provided at The Shrewsbury and Telford NHS Trust; Ockenden, 2020), it appears to be an ongoing, unresolved issue. Indeed, the deficits identified in care were related to the lack of such multidisciplinary teamworking, which are not unique to Shrewsbury and Telford, and changes are recommended for maternity services across England. One of the immediate and essential actions called for in the Ockenden report is that: 'Staff who work together must train together. Trusts must provide evidence of multidisciplinary training and working...' (page 27).

Team-based healthcare can be defined as "the provision of health services to individual, families and/or their communities by at least two health providers who work collaboratively with patients [women] and their caregivers – to the extent preferred by each patient – to accomplish shared goals within and across settings to achieve coordinated, high quality care" (Mitchell et al., 2012, p5). Healthcare teams are varied and complex: a woman in pregnancy may receive care from a range of different teams, depending on her needs. All women in pregnancy in the UK will be cared for by a midwife (who will provide care as part of a wider midwifery team); some women may need obstetric care, and women with more complex pregnancies (such as those with physical or mental health comorbidities) may need care from a wider range of professionals (e.g., cardiologists, diabetologists, psychiatrists, nurses, maternity support workers etc.). The involvement of a wider range of professionals beyond the midwife is affected by complications identified before, during or after birth and the assessment of 'risk' associated with those complications (NICE, 2019; 2020).

Regardless of which/how many different teams are involved – whether uni- or multi-disciplinary – they require good teamwork and communication to formulate effective and safe care plans for women and their infants, using the principles of shared decision-making outlined in NICE recommendations (NICE, 2019, 2021; Health Improvement Scotland, 2021). Effective teamworking comprises many components but at its core includes a) ensuring alignment with a shared purpose/vision/goal; b) understanding and appreciating the different contributions from team members; c) making the most of similarities/differences within the team; and d) developing skills for managing internal conflict (Mickan and Rodger, 2000; NHS Leadership Academy, 2013). However, the evidence suggests that effective teamworking is often lacking (e.g. sub-optimal leadership, communication, biased and non-inclusive decision-making) resulting in safety and quality issues (O'Neill, 2008; Cornthwaite et al., 2013; Mannion and Thompson, 2014; Prosser-Snellings, 2015; Ockenden, 2020). Furthermore, poor interprofessional relationships between midwives and obstetricians have been identified as a potential source of conflict due to differing philosophies of care and working styles (Downe et al., 2010; Behruzi et al., 2017). Therefore, importance

of collective competence, well-defined roles and responsibilities within the maternity multidisciplinary team, based on professional expertise rather than hierarchy, has been recognised (Liberati et al., 2021) with clear standards and protocols for communication and coordination of care between and across professions recommended (O'Neill, 2008). Further, the need for teams to engage in team-based development and learning opportunities together with their multidisciplinary colleagues has been recognised (Siassakos et al., 2013; Ockenden, 2020). However, reports rarely signpost to specific interventions to improve teamworking, and existing interventions vary widely in relation to their aims and purpose, underpinning evidence-base and pedagogical principles. Further, interventions may target different structure levels, e.g., macro (systems level), meso (organisation level) or micro (team/department level), and this context may be important in helping to identify the most appropriate intervention for quality improvement for individual teams (Robert and Fulop, 2014). Maternity care teams may need support to identify the most relevant intervention(s) according to their priorities for improvement and on-going teamwork issues. Therefore, due to the urgency of need highlighted by the Ockenden Review (Ockenden 2020), this study aimed to undertake a rapid scoping review (Khangura et al., 2012) to describe and classify current 'off-the-shelf' teamwork interventions available freely or commercially to support improvements to teamworking in maternity services and conduct a gap analysis to identify areas for future development.

Methods

Rapid literature search strategy

A rapid scoping review has components of a systematic review but is a simplified process and may draw on a variety of sources (e.g., expert opinion) to identify and produce the required information in a short time frame (Khangura et al., 2012). Rapid reviews are well-suited to timely issues, particularly with focused research question involving interventions (Tricco et al., 2015).

This rapid review focused on existing teamwork-focused interventions currently used or available to maternity services in the UK. A multi-component search process was used, comprising: (1) bibliographic database search; (2) identification of relevant policies and reports; and (3) expert input from key stakeholders in addition to the report authors (e.g., maternity service clinicians, managers, policymakers) regarding teamwork tools they were aware of and/or used in practice.

Eligible interventions included: interventions to support, train, assess and/or re-design teamwork in maternity care; those aimed at maternity teams, units or departments and/or groups of health care professionals involved in antenatal, labour and birth, postnatal and neonatal care (O'Neill, 2008); general teamwork interventions (not maternity-specific) that were known to be used in maternity services; and available or published in the English language. Interventions not specifically focusing on teamwork in maternity and not known to be used in maternity services currently were excluded as were those not available in English language.

Bibliographic database search and eligibility criteria

The database search was performed using Medical literature analysis and retrieval system online (Medline), PsycINFO, Cumulative Index to Nursing and Health Literature (CINAHL), Midwives Information and Resource Service (MIDRS), NICE evidence research database and University of Surrey library catalogue databases (March 2011 to March 2021). The following search terms were used: maternity care/services, teamwork, tools, interventions using Boolean operators 'and/or'. Reference lists of included papers and

review articles were also searched to identify further primary research papers.

Policy and report search

A search of UK policy and reports were performed in January and February 2021 by searching Google and Google Scholar search engines for relevant policy and reports published in the previous 15 years. The same search terms were used as with the database search. Records were downloaded, read and reference lists screened to identify any relevant interventions.

Stakeholder engagement

In order to assist in the rapid identification of relevant interventions, which would inform the review and gap analysis, on-line stakeholder involvement and engagement meetings were undertaken. These were held between February and March 2021. Participants were asked if they were aware of any existing teamwork interventions and how/if they had used them. The associated resources/publications for identified tools were identified.

All potentially eligible interventions ascertained through methods 1–3 were screened against the eligibility criteria for inclusion (by NA or SB) and verified by another reviewer (JH). Where eligibility was uncertain this was discussed to gain consensus (with CT and JG). Once eligible interventions were identified relevant publications relating to each intervention were accessed (for example through publications listed on intervention websites).

Data extraction

A reviewer extracted data (SB) and each record was independently checked by a second reviewer (JH). Data were extracted and tabulated into a standardised template, including: the details of the main publication(s) or website; description of the core intervention components and processes including the resource/time-commitment, setting and content of the intervention and recommended frequency or cycles; the clinical pathway focus (e.g. low or high risk pathway), setting (e.g. community or hospital-based; antenatal, labour and birth, or postnatal) and type of team (i.e. teams involved in direct care of a woman or teams convened for specific project or management tasks such as maternity risk management teams) (Lemieux-Charles and McGuire, 2006); the classification of the type of interventions as training, tools, organisational re-design or programmes (Buljac et al., 2020, see Supplement 1 for definitions); the details of how the intervention was developed including any underpinning design methods and evidence-base, theories, frameworks and pedagogical content for training interventions; the ownership and sustainability of the team quality-improvement process and the details of any identified barriers or facilitators to use/implementation. Evidence of the intervention's effectiveness was extracted and described in relation to objective (e.g., clinical outcomes, quality indicators, cost-effectiveness) and subjective outcomes (e.g., perceived team effectiveness and well-being) in order to distinguish between objective measures of performance and perceived team effectiveness (Lemieux-Charles et al., 2006) was also extracted from cited peer reviewed publications. A narrative synthesis of findings is presented (Siddaway et al., 2019).

Gap analysis

The scope and content of each intervention was mapped by the reviewer (SB) to the integrated team effectiveness model (ITEM, Lemieux-Charles et al., 2006) and the structural level (macro, meso,

micro; Robert and Fulop, 2015; Kruk et al., 2018), then independently checked and verified by a second reviewer (JH). ITEM resulted from a review of healthcare team effectiveness and considers macro (health systems, social and policy context), meso (organisational context including goals, structures, rewards) and micro (team) features that relate to team effectiveness. Micro (team) features include task design (task type, task features and team composition); team processes; team psycho-social traits (see Supplement 2).

Results

Identification and type of interventions

In total, 187 records were retrieved either from databases ($n = 159$) or other methods ($n = 28$) (Fig. 1). Stakeholder engagement involved 14 maternity healthcare professionals across multiple institutions (midwifery, obstetrics/gynaecology, general practice) and NHS England maternity policy/workforce representatives. After excluding duplicates and ineligible records, 14 were identified as potentially eligible. These were then examined in detail and assessed for eligibility. After excluding those that were not an intervention, ten eligible interventions were identified (Table 1).

Six of the interventions were classed as training (ALSO; CRM; MOET; PROMPT; PRONTO and TeamSTEPSS, see Table 1 for full names and references). These six interventions focused on training groups of health professionals in relation to specific aspects of teamworking skills at micro-level. These included interventions primarily focused on knowledge transfer (ALSO), simulation-based training (MOET, PROMPT, PRONTO) or training using specific principles in combination with specific methods, techniques, and strategies such as role-modelling, pre-procedural briefings and checklists (CRM, TeamSTEPSS). Compared to other interventions, CRM was found to be more variable in its application and features when used in different maternity settings. For example, one organisation used CRM as a two-day course involving lecture-based content and workshops with role-play (Haller et al., 2008), whereas another hospital ran a CRM intervention over five months via organisation 'Safer Healthcare' which included team training sessions, educational components, role-modelling of senior staff, and use of checklists (Mancuso et al., 2016).

Three interventions were tools involving the use of specific teamwork instrument(s) (NOTSS; SBAR; and SCORE) however, their focus differed. SBAR includes resources for structured communication techniques which may be used in combination with checklists, online guidance and resources/film scenarios. SBAR originated from the US Navy and was adapted for use in healthcare (NHS England, 2018) and was originally a component of the TeamSTEPSS programme but is included here as specific teamwork instrument as can be used as an independent tool without integrating into that programme. SBAR and NOTSS are both micro-level tools but SBAR is designed to improve teamwork through providing a framework for improving communication techniques between team members whereas NOTSS enables peer observers to learn how to provide feedback on non-technical skills to individual obstetric team members. SCORE is a meso-level culture survey designed for department-level use, providing feedback to the wider organisation and its management about the safety climate, working culture and human factors. SCORE includes benchmarking within organisations and incorporates local engagement using automated action planning and tracking. Overall, two of the interventions are adaptations of (PRONTO, Walker et al., 2014) or originate from (SBAR, NHS England, 2018) components of the original TEAMSteps training.

One intervention (moreOB) is a programme combining meso and micro features, rather than an individual instrument, consist-

Table 1
Summary of characteristics of included maternity teamwork interventions (*n* = 10).

Intervention <i>Level of intervention</i>	Brief description of intervention	Target audience (team members)	Clinical focus of intervention	Delivery method and duration. <i>Recommended frequency/cycles</i>	Summary of evidence for effectiveness ¹ <i>O=Objective; S=Subjective</i>
Intervention type:	Training				
ALSO Advanced Life Support in Obstetrics (www.aafp.org/cme/programs/also.html) <i>Micro</i>	An interprofessional and multidisciplinary training course using knowledge and skill transfer	All maternity/obstetrics care team members	Obstetric emergency	Knowledge training; 2-day course onsite or externally <i>Every 3–5 years</i>	Higher staff confidence in dealing with emergencies and improved test scores on course content (S) Reductions in mortality, blood loss, post-partum haemorrhage (O) Better reported understanding of external attendance (S) Improved use of briefing and communication (O) No reduction in obstetric complications (e.g. post-partum haemorrhage, eclampsia) (O) Satisfaction with training (S) Improved knowledge regarding managing obstetric emergencies (O) Increase in perimortem caesarean (O)
CRM Crew Resource Management (Haller et al., 2008; Meintel, 2004) <i>Micro</i>	Crew resource management train the trainer approach including simulation, role, play, checklist training, lectures and videos	All maternity/obstetrics care team members	Obstetric emergency and routine practice	1–2day course, external attendance <i>Unspecified</i>	Improved perception of team management of emergency situations, communication (S) Improved attitude toward safety (O) Improved clinical outcomes include reduced length of stay in hospital for babies, fewer cord lactates and Apgar 1 scores (O) Increased self-efficacy and goal achievement (S) Improved knowledge, promotion of team-based practice change (O) Decreased incidence of perinatal mortality and post-partum complications after caesarean (O)
MOET Managing of Obstetric Emergencies and Trauma (Johanson et al., 2002) <i>Micro</i>	Systematic training approach to resuscitation and treatment of medical emergencies through lectures, simulations, and demonstrations	Senior physicians (midwives can only be observers)	Obstetric emergency	Knowledge and simulation training; 2-day course <i>Every 4 years</i>	
PROMPT Practical Obstetric Multi-Professional Training (www.promptmaternity.org) <i>Micro</i>	Often using the train-the-trainer model, PROMPT incorporates both lectures and simulation-based activities where teams train together	All maternity/obstetric care team members <i>Usual team train together</i>	Obstetric emergency	Knowledge and simulation training; 1–2-day course onsite (on the ward) <i>Annually</i>	
PRONTO Programa de Rescate Obstétrico y Neonatal: Tratamiento Óptimo y Oportuno (<i>Translated as Neonatal and Obstetric Rescue Program: Optimal and Timely Treatment</i>) (https://prontointernational.org) <i>Micro</i>	International training course that uses the train the trainer approach to facilitate simulation-based team training and is often used in resource-limited settings/ low-income countries but has also been used within economically developed healthcare systems	All obstetric and neonatal care team members	Obstetric emergency	2 modules (the first takes two days, the second one day) 2 or 3 months apart <i>Unspecified</i>	
TeamSTEPPS Team Strategies and Tools to Enhance Performance and Patient Safety (www.ahrq.gov/teamstepps/index.html) <i>Micro</i>	Principle and tool-based training through classroom teaching, videos, role-play and coaching – ran via the train the trainer approach	All obstetrics/ maternity care team members	Routine practice, hospital-based care	Tool kits and training with different packages available (e.g., 2–6 h). ‘Champions’ train peers <i>Unspecified</i>	Staff perception of improvement to patient safety and supervisor promoting safety (S) Increased respect between staff members and teamwork within the unit (S)

(continued on next page)

Table 1 (continued)

Intervention <i>Level of intervention</i>	Brief description of intervention	Target audience (team members)	Clinical focus of intervention	Delivery method and duration. <i>Recommended frequency/cycles</i>	Summary of evidence for effectiveness ¹ <i>O=Objective; S=Subjective</i>
Intervention type:	Tools				
NOTSS Non-Technical Skills for Surgeons (https://www.rcog.org.uk/en/careers-training/about-speciality-training-in-og/assessment-and-progression-through-training/non-technical-skills-for-surgeons-notss) <i>Micro</i>	A tool that provides a framework that facilitates feedback on surgeons' use of non-technical skills (situation awareness, decision making, communication and teamwork, and leadership)	Surgeons (obstetricians)	Routine practice in surgery (obstetrics)	Feedback tool. Freely available on RCOG and 1-day course to train use of tool <i>Unspecified</i>	Staff used the non-technical skills in both the operating room and outside (O) Improved performance of non-technical skills in real time (O)
SBAR Situation Background Assessment Recommendation (http://www.ihl.org/resources/Pages/Tools/SBARToolkit.aspx) (https://www.england.nhs.uk/improvement-hub/publication/safer-care-sbar-situation-background-assessment-recommendation-implementation-and-training-guide/) <i>Micro</i>	A tool used to help structure communication to be clear and concise between staff members, particularly across different disciplines or levels of staff	All obstetrics care team members (mainly midwives and physicians)	Routine practice and communication	Communication tool-information freely available on QI NHS and one day course available <i>Unspecified</i>	Staff reported higher job satisfaction (S) Improved teamwork and safety climate (O) No improvements to Apgar score (O)
SCORE Safety, Communication, Operational Reliability and Engagement Survey (https://safeandreliablecare.com/score-survey) <i>Meso and Micro</i>	Online tool (survey) used to assess safety culture. Produces automated reports to understand results across the origination and automated debriefing and action planning/tracking. Incorporates benchmarking.	Unit level: whole department or organisation invited to participate, and management engaged in process.	Culture focused	Culture survey (10 min) to assess whole maternity department <i>Every 9–12 months</i>	No research studies found in maternity setting
Intervention type:	Programme				
moreOB Managing Obstetric Risk Efficiently (https://www.moreob.com) <i>Micro and Meso</i>	Multi-faceted programme incorporating taught modules and learning activities involving workshops, knowledge testing and simulation. Led by multidisciplinary team of front-line staff and process supported by organisational managers. It also includes an interactive online platform as part of the programme	All obstetrics team members	Routine practice, obstetrics procedures and hospital-based care	Multi-component modules, up to 3-year cycles; onsite <i>Unspecified</i>	Perceived improvement to patient safety, confidence, communication, teamwork and health care provider knowledge (S) No evidence of improvement in maternal or neonatal outcomes (from peer reviewed articles) (O)

¹ See online Supplement 3 for details of source studies.

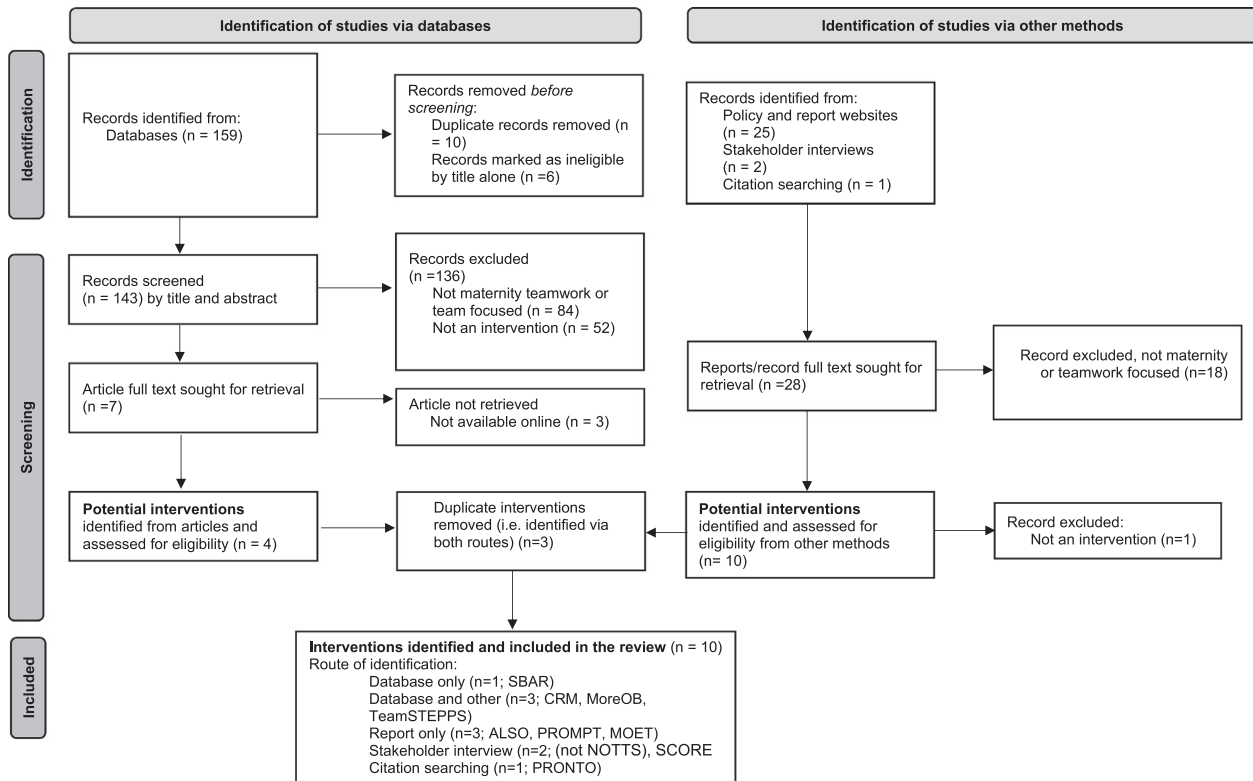


Fig. 1. Flow diagram for rapid review of included studies (searches of databases and other sources).

ing of components of knowledge transfer and modification of care practices (organisational systems to increase safety). No interventions focused on comprehensive organisational re-design in maternity services were identified. For ease, the interventions which will be referred to in the following sections by their acronyms (see Table 1 for detailed references).

Target audience for interventions

The intended target audience varies across the interventions. Five (comprising the programme and four of the training interventions) are specifically designed for use by maternity teams (moreOB, ALSO, MOET, PROMPT, PRONTO).

Of these, four are appropriate for all maternity team members (ALSO, moreOB, PROMPT, PRONTO). For example all maternity staff (such as midwives/nurses, obstetricians, anaesthetists, other physicians and administrative/clerical working at specific hospitals were potentially eligible to enrol but would not necessarily participate at the same time as their authentic team. Only PROMPT trains participants together in their usual, authentic team to include at least 1 obstetrician, 1 midwife and 1 anaesthetist from the same unit. MoreOB requires staff members to jointly participate in the module, but it is unclear if they train together.

One intervention (MOET) is designed for maternity units but aimed only at senior medical clinicians including obstetricians, anaesthetists and trauma specialists, to teach them advanced non-technical skills such as leadership, communication and situation awareness. Course content assumes a high medical knowledge (attendees require specific medical qualifications) and midwives can only attend as observers. NOTSS is a tool designed for use by and to assess obstetricians only. One intervention was adapted from a generalised team training approach to include maternity-specific curriculum and content (CRM), however the training does not necessarily include authentic teams. Three interventions use gener-

alised teamwork content (i.e., non-maternity specific) which can be used by maternity professionals in training (TeamSTEPPS), as a tool (SBAR) or to assess the culture of the wider organisation (SCORE).

Clinical focus and purpose of intervention

Four of the training interventions are specifically focused on teamworking during obstetric emergencies for example, maternal cardiac arrest, maternal sepsis, and major obstetric haemorrhage (ALSO, MOET, PROMPT, PRONTO); only PRONTO explicitly includes neonatal emergencies/teams. One intervention focuses on the safety culture within the wider organisation providing feedback from all members of staff at a given point in time (SCORE). The remaining are focused on different aspects of teamwork across a range of areas of routine practice including communication amongst maternity team members (SBAR), patient safety specifically in obstetric units (CRM, TeamSTEPPS, moreOB) or surgical non-technical skills (NOTSS) across a range of situations. No interventions are specifically designed to be appropriate in community settings, midwifery-led units or for cross-boundary working between different types of maternity teams (e.g., continuity of care teams, high risk teams, management teams) or other teams/professionals they may work with (health visitors, primary care or other specialist services). None of the tools allows teams to adapt the tool content to their specific and local quality improvement needs. Most maternity-specific interventions are focused on improving teamwork in the period in and around labour and birth, the majority focussing on obstetric emergencies (ALSO, MOET, PROMPT, PRONTO). Other interventions focus on routine teamwork in practice (CRM, TeamSTEPPS, NOTSS, SBAR, moreOB), or the generalised/wider teamwork culture (SCORE).

Delivery method, duration and resources required

Most of the training interventions are discrete interventions designed to be delivered in person and last 1–2 days (ALSO, CRM, MOET, PROMPT). PRONTO involves a similar time commitment but consists of two modules that are attended approximately 3 months apart. TeamSTEPPS has varied packages available impacting on delivery method and duration. The programme (moreOB) comprises of multi-component core and flexible (based on teams' goals) modules designed to be undertaken in up to 3-year cycles. Of the three tools, two (NOTSS and SBAR) can involve completion of a one-day training course. SCORE (a culture survey designed to be used every 9–12 months, taking 10mins to complete) was the only intervention we found that did not require any training, however the intervention component of this tool would be the activities following completion that could be significant in terms of human resource depending on issues raised (Table 1).

For those that did require training, the location/type of training was variable. One of the training interventions and one of the tools required attendance at specialist facilities (MOET, NOTSS); others involved training that could be delivered in-house (TeamSTEPPS, moreOB) or the option of in-house or external attendance (ALSO), or use a "train-the trainers" approach which may require the trainers to attend training outside of the organisation (CRM, PROMPT, PRONTO). Two of the interventions are delivered remotely/online (SCORE, moreOB); or are hybrid/available in different training delivery modes (NOTSS).

Most of the interventions are available through commercial or non-profit organisations including the training courses (ALSO, MOET, moreOB), although as mentioned some use a train-the-trainer model (CRM, PROMPT, PRONTO, TeamSTEPPS) or are tools (NOTSS, SBAR) including the collection and analysis of a culture survey services (SCORE). However, the NOTSS tool is freely available on the RCOG website and SBAR is available via the NHS without the additional taught training components.

The frequency of training updates or repeated intervention cycles is unspecified for six interventions (CRM, PRONTO, TeamSTEPPS, NOTSS, SBAR, moreOB), and varies for those where it is reported. As a tool, SBAR is designed for routine use in daily communication between staff whereas PROMPT training is recommended once a year as is the SCORE culture survey. Participation in ALSO and MOET training is less frequent at around once every 4 years.

Evidence of intervention effectiveness

Most of the interventions had some peer reviewed 'effectiveness' data available (Table 1, Supplement 4). However, objective outcomes were less commonly reported compared to subjective outcomes. We could find no evidence in the literature of the evaluation of the SCORE culture within the maternity field specifically, only its use as an outcome measure in itself (e.g., Crowe and Manley, 2019).

Eight of the ten interventions cite evidence of their use being associated with improvements in different aspects of subjective team effectiveness. This included improved teamworking and communication (CRM, PROMPT, TeamSTEPPS, moreOB), shared decision-making (CRM) and greater respect between staff members (TeamSTEPPS). Improvement for individual team member outcomes included higher confidence in clinical ability and skills (PRONTO, MOREob), higher confidence in dealing with emergencies (ALSO, PROMPT) and increased job satisfaction (CRM, TeamSTEPPS). The reported benefit on wider organisational/team outcomes included improved safety for patients and workload for team members (TeamSTEPPS) and increased perceived achievement of team goals (PRONTO).

Eight interventions (ALSO, CRM, MOET, PRONTO, PROMPT, SBAR, TeamSTEPPS moreOB) had been evaluated empirically in relation to impact on clinical outcomes, though such evidence was methodologically heterogeneous, and only one study was in the UK (Supplement 3). There was limited peer-reviewed evidence that the teamwork interventions were associated with improvements in objective outcomes including reduction in reduced length of hospital stay for babies, umbilical artery lactate levels/pH and caesarean section (PROMPT) maternal blood loss (ALSO), reduction in caesarean deliveries and neonatal mortality (PRONTO) or maternal mortality (ALSO, PRONTO) (Table 1 and Supplement 3). Evidence was sought, but not supported, for associations between the teamwork interventions and important clinical outcomes such as Apgar score and other neonatal outcomes (CRM, PROMPT, SBAR, moreOB) or other maternal outcomes such as obstetric complications (such eclampsia, perineal tears and postpartum haemorrhage) (CRM, moreOB). However, it should be noted that the moreOB website cites non-peer reviewed evidence relating to a range of maternal, neonatal and subjective outcomes (see <https://www.moreob.com/features-outcomes>).

Barriers and facilitators to implementation

Barriers and facilitators to implementation were evaluated for four of the interventions (CRM, PROMPT, NOTSS, SCORE, moreOB). moreOB was found to have organisation level barriers such as requiring the hospital organisation to commit to the intervention for three years which presented sustainability challenges (Milne et al., 2013; Reszel et al., 2019). Although these barriers were not specifically detailed, they were described as relating to maintaining focus, active participation and engagement over three-years, as well as the limited time of staff and lack of funding (Milne et al., 2013; Reszel et al., 2019). Likewise, self-reported resistance to using CRM pre-procedural briefings was identified as a potential barrier to sustainability and the adoption of CRM resources in routine practice, which may be related to staff fatigue with training, though evidence for this is speculative and requires further in-depth exploration (Mancuso et al., 2016). Barriers and facilitators to applying NOTSS in obstetrics and gynaecological practice has been explored in Rwanda using a mixed-method evaluation, where resource and infrastructure were found to be key barriers to use (including variability between teams/sites in equipment, medication and hospital guidelines that impacted on its use), although it is unclear to what extent such barriers would apply in the UK context (Abahuje et al., 2021). However, an additional barrier concerned staff feeling unable to speak up and providing critical feedback, when other (especially more senior) members of staff made mistakes, which may be relevant in the UK context (Abahuje et al., 2021).

As part of a multi-centre RCT of the PROMPT intervention across Scotland, the authors noted wide variations in the content, fidelity and timing of the implementation of PROMPT (Lenguerrand et al., 2020). Contrary to previous single centre studies (e.g. Shoushtarian et al., 2014; Weiner et al., 2015), there was no evidence of an effect on trial outcomes (including Apgar rate $<7^{\text{mins}}$) (Lenguerrand et al., 2020). The authors suggested that implementation at scale presented unforeseen implementation barriers and that further research was needed to understand how maternity units can be best supported to implement such intervention locally, effectively and authentically (Lenguerrand et al., 2020).

The facilitators to implementation (where reported) were similar across interventions. These included having an engaged and supportive organisation and committed champions (moreOB, Reszel et al., 2019); active encouragement of participation, clear explanations of the intervention, and emphasis of the voluntary and anonymous participation (SCORE, Lockwood et al., 2020). For training courses, the opportunity to learn from perceived experts in the

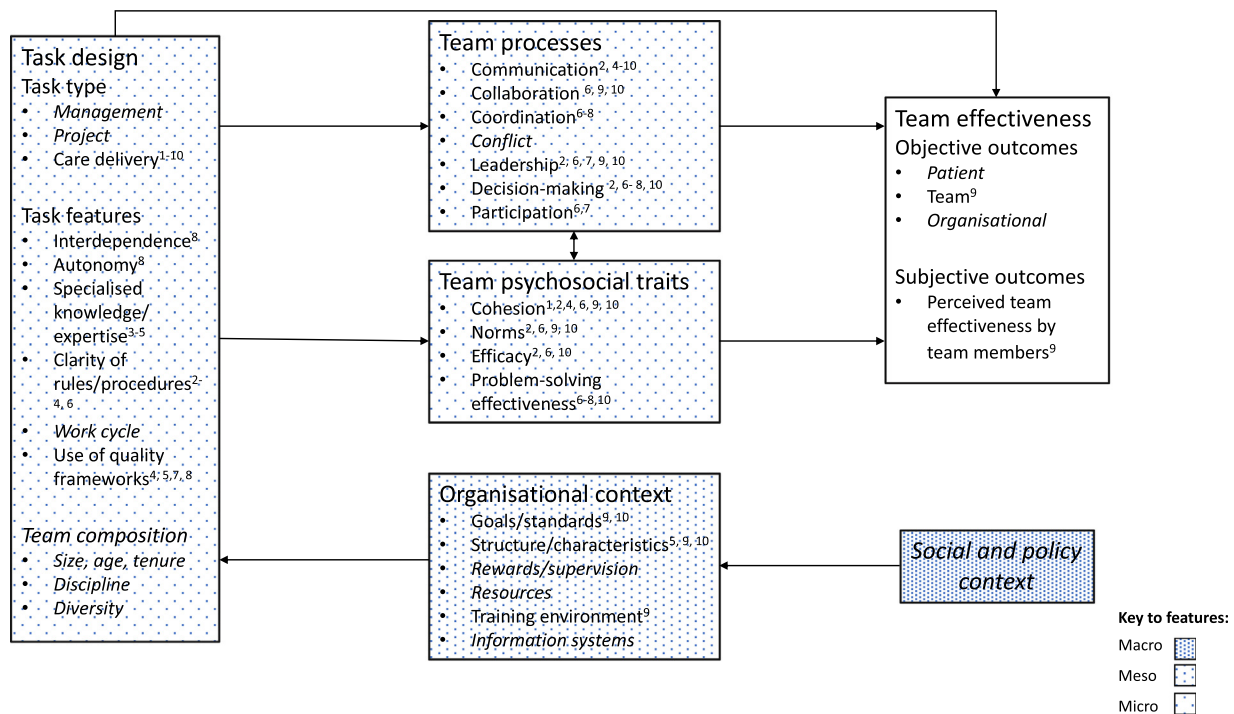


Fig. 2. Gap analysis: intervention components mapped to the integrated teamwork effectiveness model (ITEM, Lemieux-Charles and McGuire, 2006) Adapted from Lemieux-Charles and McGuire, 2006 Intervention key: 1, ALSO; 2, CRM; 3, MOET; 4, PROMPT; 5, PRONTO; 6, TeamSTEPPS; 7, NOTSS; 8, SBAR; 9, SCORE; 10, moreOB.

field was suggested to be important in encouraging participation and engagement (NOTSS, Abahuje et al., 2021).

Gap analysis using ITEM

All interventions were focused on either individual maternity care clinicians or teams that come together to provide direct patient care (care delivery teams). None were designed to be used by management or project teams (e.g. strategic risk management or quality improvement teams (Fig. 2). No interventions focused on improving work cycles or team composition for example through changes to discipline or skills mix and/or diversity. Eight interventions mapped to the team-psychosocial traits (ALSO, CRM, PROMPT, TeamSTEPPS, NOTSS, SBAR, SCORE, moreOB) or team processes (CRM, PROMPT, PRONTO, TeamSTEPPS, NOTSS, SBAR, SCORE, moreOB) components of the ITEM model (Lemieux-Charles and McGuire 2006) (Fig. 2, for specific sub-components). Seven interventions also incorporated other components including task features (CRM, MOET, PROMPT, PRONTO, TeamSTEPPS, NOTSS, SBAR) whereas only SCORE included components of team outcomes as part of the tool which included department wide assessments of burnout, intentions to leave and work-life balance.

There was little coverage in the interventions of meso (organisational) determinants of team effectiveness, though two included a focus on organisational goals, standards and structures (SCORE, moreOB), their training environment (SCORE), and none included assessment of or aims to improve information systems, rewards/supervision or resources. None explicitly targeted macro features such as components of the social and policy context. SCORE was used as a central tool to assess workplace culture and support quality improvement within maternity and neonatal services by NHS Improvement between 2018 and 2020. This work was undertaken by the then named Maternity and Neonatal Health Safety Collaborative (now re-named the Maternal and Neonatal Safety Improvement Programme).

Discussion

Following repeated calls to improve teamwork in maternity care in UK (Kirkup, 2015; National Maternity Review, 2016; Ockenden, 2020; Health and Social Care Committee, 2021a, (Health and Committee, 2021b)), this rapid scoping review aimed to identify, describe, and critically evaluate the evidence for currently available teamwork interventions. Ten interventions were identified. They were heterogeneous in their substance, purpose and scope, ranging from tools (such as checklists) to training courses and programmes; some were intended for whole departments/organisations, and others to be used by individual team members.

Despite the maternity-specific recommendation for ‘those who work together to train together’ (Ockenden et al., 2020, page 27), we identified few interventions designed for that purpose. Whilst some interventions could be used by whole teams, only one required all team members to participate (PROMPT) and others were instead targeted at specific professional groups (e.g., senior medical maternity staff), individual members (e.g., obstetricians), or whole departments/organisations (SCORE). None appeared to routinely incorporate wider care teams for example neonatal care, diabetology, cardiology or social care/psychiatry which may be important for higher risk pregnancies.

All of the interventions included in this review targeted health-care staff who provide direct patient care, rather than those working in maternity management or quality improvement/project teams. Many interventions were tools or training aimed at supporting non-technical skills (e.g., communication, leadership) during emergency or hospital-based care, particularly during labour/birth. This is perhaps unsurprising given the potentially high-risk environment and challenges that may be faced during labour/birth, but some of these excluded essential members of the maternity team including midwives (e.g. MOET and NOTSS). We found no evidence of existing interventions for use specifically by midwife-led teams,

community-based teams, or cross boundary working. The need for such interventions is likely to increase in the context of Continuity of Care (National Maternity Review, 2016) and the multidisciplinary management of high-risk pregnancies and complex care needs (NICE, 2019).

The ITEM model (Lemieux-Charles and McGuire, 2006) provides an evidence-based *meso*, macro, micro framework for examining healthcare team effectiveness. According to this evidence-based framework, interventions aimed at improving the effectiveness of healthcare teams may only work optimally if they consider the wider (*meso*, macro) influences on team effectiveness as well as the micro (team) lens. This review, however, found that most interventions focused only on the micro (team-level) features of teamworking, particularly communication, leadership and decision-making. Macro and *meso* factors, which may act as barriers to improving micro team performance (Zasada et al., 2021), were largely ignored in the included interventions.

One exception to this was the only 'programme' intervention we found (moreOB) which incorporating both team training (micro) and organisational re-design (*meso*) features. moreOB included many features in its design known to be related to team improvement (such as team training, local clinician ownership and managerial support) (Bridges et al., 2017), but is resource intensive. However, it is important to note that despite including both micro and *meso* elements, the evidence of effectiveness that we found for this intervention remained subjective, with no evidence of objective benefit (e.g. patient outcomes) (moreOB, see Supplement 4). In contrast, and in line with previous systematic reviews (Ameh et al., 2019), there is emerging evidence for impact on objective patient outcomes (particularly regarding improved management of emergency scenarios) from some of the other less resource-intensive training interventions (ALSO, CRM, MOET, PROMPT, PRONTO); but not from the tools (NOTSS, SBAR, SCORE, see Supplement 4). These findings should however be interpreted with caution, not least due to the methodological complexities of evaluating programmes that involve organisational change compared with training courses. In addition, it may be that typical objective effectiveness outcome measures are less sensitive indicators in countries where childbirth is generally safe. Patient reported outcomes and experience measures may be more sensitive and important in developed healthcare systems such as in the UK (Dickson et al., 2019) as well as evaluations of healthcare team member skills, competences and behaviours.

Although some of the interventions included some aspect of assessment and feedback (NOTSS, SCORE), none enabled micro clinical team ownership of their team improvement or tailoring of content, as a key feature of their design. Furthermore, whilst the importance of embedding continuous cycles of improvement, and being able to benchmark and compare performance across organisations is now well known and supported (Burstin et al., 1999; Meissner et al., 2006; Brandrud et al., 2013), only SCORE had the capacity for this feature inbuilt into its design.

There is a large body of literature relating to team training and teamwork improvement in healthcare, but the heterogeneity (in design, measures and outcomes), and poor quality of much of the literature makes it challenging to know 'what works?' (Weller and Boyd, 2014). The evidence of the effectiveness of the interventions within this review was similarly heterogenous and sparse, with very limited evidence regarding the sustainability of the reported changes. There is, however, strong evidence that assessment and feedback alone can improve performance (Jamtvedt et al., 2006; Ivers et al., 2012), and that ownership of the process by the team involved is much more likely to result in implementation of such interventions (Bridges et al., 2017; Ivers et al., 2012). The 'ideal' maternity intervention is proposed in Box 1, based on existing evidence and stakeholder engagement regarding the most important

criteria for success in implementation and quality improvement in healthcare. These principles have underpinned a team improvement programme designed for cancer teams (MDT-FIT, Taylor et al., 2012; 2021; Harris et al., 2016) that is currently being adapted for use by other types of healthcare teams, named TEAM-QI (team evaluation and assessment measure- quality improvement), with a pilot underway in maternity teams. The interventions reviewed here all had elements of these principles underpinning them, but none provide all of these features, but could be combined and/or adapted to meet this ideal. Robust evaluation (process and outcomes) adhering to agreed principles on reporting should be considered to support further progress improvements to teamworking in maternity care.

Box 1: Principles underpinning an 'ideal' maternity team intervention

Engagement of the participating team in the process of assessment and feedback

Have the capacity for quality improvement across macro, *meso* and micro levels of teamworking

Provide opportunities for continuous improvement

Allow comparison within and between teams (benchmarking)

Be adaptable to enable inclusion of different types of teams, including those with a safety/risk management focus, those that work cross-boundaries etc.

Enable all team members to have a voice to support honest feedback

Be developed with healthcare team members for their use in a collaborative (bottom-up) way to ensure team ownership of improvement

Integrate support from managers to facilitate improvement

Be as resource-efficient as possible so that it can be used in a busy resource-limited healthcare organisation

Strengths and limitations

To our knowledge this is the first synthesis of teamwork interventions designed for and/or used within maternity services in the UK. By describing and critically evaluating the interventions we provide a resource that can be used by maternity healthcare professionals and healthcare managers to select the most appropriate interventions for the issues they face. A key strength was that we included stakeholder engagement, however because this was a rapid time-limited review we focused on clinicians and policymakers, and it would be useful for future systematic reviews to also include engagement with the developers of the interventions. As this is a rapid scoping review, we may have omitted some relevant interventions, and the interpretation of our findings may therefore be limited (Khangura et al., 2012). Indeed, the peer review process highlighted an article that was not found in our search or stakeholder consultation (Lavelle et al., 2018) describing an intervention developed at a London (UK) NHS Trust involving an inter-professional training course including lectures followed by simulation informed by the MBRRACE. Similar to the other simulation-based training reviewed here, it focuses on micro features and positive effects on self-reported clinical confidence, teamwork, communication and leadership (at 6-month follow up), therefore its inclusion would not have affected our overall interpretation of the results. It is unclear if this training programme has subsequently been made available for other maternity teams. A strength of our analysis was that it was underpinned by ITEM as a pragmatic evidence-based framework for our rapid scoping review and gap analysis, however

we acknowledge that other conceptual or theoretical frameworks for team effectiveness may be useful to consider in future work.

Conclusion

The interventions identified and critically evaluated in this rapid review were heterogeneous. Whilst these interventions each have value in supporting improvements to maternity care, and addressed some important aspects of teamworking in maternity care, nearly all focused on micro features, ignoring *meso* and macro features that are known to impact on team effectiveness. Evidence-based team improvement interventions are needed to address the limitations and gaps identified by this review. By engaging teams in the process, and ensuring that quality improvement is continuous and sustainable, such interventions could enhance outcomes for service users, staff and organisations.

Conflict of interest

DB is Editor in Chief of 'Midwifery'. BWL has previously received funding from Health Education England and Cancer Alliances for training cancer MDTs in assessment and quality improvement methods in the UK; CT, JH and JG have previously received funding from NHS organisations within England and Scotland for supporting cancer teamwork improvement; JG is the Director of Green Cross Medical Ltd that developed MDT-FIT for use by National Health Service Cancer Teams in the UK. All other authors have no potential conflicts of interest. All other authors have no potential conflicts of interest.

Ethical approval

Not applicable.

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Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:[10.1016/j.midw.2022.103285](https://doi.org/10.1016/j.midw.2022.103285).

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