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Considering the team in team formulation: A systematic review

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Considering the team in team formulation: a systematic review

Abstract

Purpose: Team formulation, used to understand patient problems and plan care is a growing practice in adult mental health and learning disability services. This paper explores definitions applied to team formulation (as distinct to therapy formulation), its underpinning theories, and the inter relationship between the team and the process of formulation.

Design/Methodology/approach: A database search (main search term of team formulation) of peer-reviewed studies was conducted using PRISMA guidelines. A main and second reviewer conducted quality appraisals and thematic analysis. Data were analysed by convergent qualitative synthesis design using thematic analysis to transform evidence from quantitative and qualitative studies into qualitative findings.

Findings: Initial searching produced 4532 papers, 10 of which were eligible for inclusion. Team formulation has no distinct definition. Theories underpinning the practice of therapy formulation emanating from general psychological theory underpin team formulation. Seven studies applied psychological theories to the examination of team formulation. No studies examined the impact of the team on the formulation. Six themes were generated regarding the impact of team formulation on the team; ‘increased knowledge and understanding’, ‘altered perceptions, leading to altered relationships, feelings and behaviours’, ‘space to reflect’, ‘useful when stuck or challenged’, ‘perceived increase in effectiveness’, and ‘improved team working’.

Research limitations/implications: Limited evidence and variable quality compromised availability of review evidence.

Originality/value: This is the first review to examine team formulation through the context of the team. The authors argue that a conceptual framework to encompass team inputs, processes and outputs in team formulation practice should guide future research.

Keywords: Team formulation. Evidence based team formulation. Team formulation definition. Team formulation theory. Team context and team formulation. Team formulation impact.

Paper type: Literature review

Declaration of Interest: None

Introduction

Multi-disciplinary mental health and learning disability clinical teams, working together to develop individual patient case formulations is an increasing practice within the United Kingdom (Johnstone., 2011). Known as 'team formulation', the purpose is to develop a shared understanding of the patient to determine the interventions (Johnstone, 2014). Research underpinning team formulation is of relevance to clinical practice globally. National guidelines indicate that care that should be provided based on diagnosis (for example see NICE, 2014a, 2014b; NIMH, 2016), however individualised care is also required (HMG/DH, 2011; World Health Organization, 2015). Team formulation guides the design of individual care for patients experiencing a range of mental health problems, some of which are considered complex (for example see Berry, Barrowclough, & Wearden, 2009). Therefore, determining a patient's unique needs through the lens of team formulation may afford this individualised focus. Understanding the evidence base for this practice is of critical importance in supporting teams to use evidence based practice.

Individual psychological case formulation (therapy formulation) emanated from behaviour therapy in the 1950's when it was developed as a central component for understanding the problematic behaviours of individual patients (Bruch, 2015). Now it is recognised as a central tenet of most one-to-one psychological therapies where a single therapist works with a single patient to develop a collaborative formulation (Sturmey, 2009). Studies examining therapy formulation report a weak evidence base. For example, a recent systematic review examining the inter-rater and test–retest reliability of therapy formulations across various therapeutic modalities reported considerable differences in reliability. This ranged from slight to substantial, depending on practitioner experience and therapy modality (Flinn, Braham, & das Nair, 2015). Furthermore, there is limited evidence for impact on patient outcomes (Bieling & Kuyken, 2003; Kuyken, 2006). Researchers examining formulation within the Cognitive

Behavioural Therapy (CBT) model challenge whether the scientific constructs underpinning formulation are evidence based and able to demonstrate a valid framework for understanding patient problems. Research has not yet comprehensively examined the descriptive and explanatory elements of therapy formulation, particularly in relation to outcome prediction (Bieling & Kuyken, 2003).

Despite these uncertain foundations, formulation has continued to evolve, from one-to-one application in individual psychological therapy, to its most recent application by teams. The earliest published report of formulation being used by teams was in 1997, when a practice account of the use of Cognitive Analytic Therapy (CAT) formulation was described as a team endeavour, used to understand patients diagnosed with personality disorder. This descriptive account, published in a non-peer reviewed professional forum magazine (Dunn, 1997) has preceded further descriptive accounts (for example see Davenport, 2002; Robson & Quayle, 2009; Shirley, 2010; Whomsley, 2010), and the suggested evidence for the benefits of team fomulation continues to expand. However, evidence is originating from a small research base accompanied by a greater number of practice accounts and opinion pieces, published in non-peer reviewed publications, which attest to the benefits of team formualtion. This is evident from a succinct summary of team formulation offered by Johnstone, which highlights the benefits of team formualtion as supporting increased team functioning and well-being (for example using the expertise of all team memebrs, increasing team ability to reflect), and bringing a more balanced and effective approach to interventions (Johnstone, 2014). This evidence base poses several problems. Rather than evidence-based practice, team formulation is developing from a basis of untested and poorly collated, practice-based experience. As the practice spreads, the degree to which team formulation can be considered a separate phenomenon to therapy formulation, with its own unique definition and underpinning theory, is not clear. Furthermore, researchers have examined the impact of the clinician on the

therapy formulation, scrutinising the level of practitioner skill and experience on the formulation produced (Dudley, Park, James, & Dodgson, 2010; T. D. Eells, Lombart, Kendjelic, Turner, & Lucas, 2005), however, it is unclear whether studies on team formulation are similarly accounting for the team context.

The impact of team processes on the execution of specific team tasks is well documented. A large study of over 400 United Kingdom National Health Service health care teams, including teams from physical and mental health care, concluded that team processes such as participation, reflexivity, decision making, leadership and communication impacted on team levels of effectiveness and innovative practice (Borrill et al., 2013). Teamwork is also essential for team reliability and patient safety (Baker, Day, & Salas, 2006) and professional differences in teams impact on joint working and knowledge sharing (Baxter & Brumfitt, 2008). Nonetheless, the impact of the team processes involved in team formulating remain undefined and untested. Considerations such as these may be crucial in developing an evidence base that embeds team formulation within the team context.

The aim of this paper is to report the results of a systematic mixed study review of team formulation research. The specific objectives are to provide a systematic map of research on team formulation in adult mental health and learning disability services (including forensic and older people's services), and to examine and synthesise the findings in relation to:

a. how team formulation is being defined as a phenomenon in its own right and as distinct to psychological therapy formulation
b. the theoretical underpinnings of team formulation
c. the impact on the formulation through team involvement
d. the impact on the team due to formulating as a team

The present review takes a deductive, theory driven approach to examine if current research on team formulation addresses these aspects and highlights the direction for future research.

Method

Literature searching

A search strategy was created with an initial search in the Web of Science database, using the term 'team formulation'. This enabled development of a wider range of terms (Table one). Boolean operators were used and searches restricted to peer reviewed, human studies and disciplines related to mental health services. The electronic databases were searched during October 2016 and included Cinahl, Medline, Psycarticles, Psyinfo, SCIE, Social Sciences Citation Index and Embase. Date boundaries were not specified in order to maximise output from search results that ran from inception date of each database.

Insert Table one here. Search Terms

Inclusion screening

Based on the inclusion criteria in Table two, all identified records were screened by title and then abstract before final full text reading of identified records.

Insert Table two here. Inclusion Criteria

Exclusion criteria included records focused on psychological therapy formulation that did not involve a team, opinion pieces, and descriptive records.

General approach

A convergent qualitative synthesis design using thematic analysis (Figure one) was employed to transform evidence from both quantitative and qualitative studies into qualitative findings (Pluye & Hong, 2014). A theory-driven strategy focusing on specific research objectives as pre-defined themes, and an amalgamation of evidence from both intervention and non-intervention research were used to understand the phenomena of 'team' within team formulation (Fetters, Curry, & Creswell, 2013; Hong, Pluye, Bujold, & Wassef, 2017).

Insert Figure 1 here. Synthesis design

Data extraction and quality assessment

A standardised data extraction form (EPPI-Centre, 2003) was adapted to fit with specific review aims. The type of quality assessment used was matched to study type. Quality assessment tools included Quality Assessment Tool for Before-After (Pre-Post) Studies With No Control Group (NIH, 2014), Critical Appraisal Skills Programme (CASP) Qualitative Studies Checklist (CASP, 2017a) and CASP Randomised Control Trial Checklist (CASP, 2017b). Quantitative studies with a qualitative element were assessed for both where possible. If the qualitative part of the study was not reported as such, then the main study design was assessed. Three studies were quality appraised by a second reviewer to ensure consistency in quality appraisal.

Data synthesis

Examination began with introductory and background sections to studies in order to identify definitions of team formulation (review aim one). Thematic analysis was used (Braun & Clarke, 2006) in which line-by-line coding was applied for both quantitative and qualitative

studies to create descriptive themes for all other review aims. Theoretical underpinnings (review aim two) were identified and logged semantically, as they were cited in the studies. Thematic analysis was employed to establish the purpose of citing theories within studies.

Coding was employed to locate instances where the impact of the team on the formulation, and the formulation impact on the team (review aims three and four), was reported in study findings. Located instances were subjected to selective and semantic coding, in which the reviewers used the explicit descriptions given in research findings (Braun & Clarke, 2013). Visual mapping was applied for instances located for review aim four in order to develop themes derived from coding (Braun & Clarke, 2013). NVivo qualitative data software was used to support the coding process (QSR International Pty Ltd, 2015). Final themes were reached through consensus agreement with an independent second reviewer (NH-G). This type of data transformation analysis is suitable to precede the development of a conceptual framework where none currently exists (Hong et al., 2017) as is the case for team formulation.

Results

Figure two illustrates the search process. The search resulted in 10 research studies that matched the inclusion criteria and all were UK based studies. Of these, five were uncontrolled pre-post studies (Berry et al., 2009; Ingham, 2011; Ingham, Clarke, & James, 2008; Maguire, 2006; Revolta, Orrell, & Spector, 2016), three of which had a descriptive feedback element (Ingham, 2011; Ingham et al., 2008; Revolta et al., 2016). There were three qualitative studies (Christofides, Johnstone, & Musa, 2012; Mohtashemi, Stevens, Jackson, & Weatherhead, 2016; Summers, 2006), and two randomised controlled trials (RCT) (Berry et al., 2016; Kellett, Wilbram, Davis, & Hardy, 2014). One of the RCTs was a mixed method

study employing non-blinded randomisation and content analysis of semi-structured interview material (Kellett et al., 2014).

Insert figure two here. PRISMA diagram

Study details and key findings including reported effect sizes are presented in table three. The team formulation in the studies was conducted either as team formulation meetings involving the whole or part of the team where the meeting was facilitated by a psychologist or psychological therapist; or team formulation training centred on real clinical case material, including team discussion. Team supervision was also provided in some instances.

Insert table three here. Included Studies Details

Quality appraisal results

Three of the pre-post uncontrolled intervention studies were deemed to be of poor quality (Ingham, 2011; Ingham et al., 2008; Maguire, 2006) due to high levels of bias. Two further studies of this kind were judged as poor to fair quality (Berry et al., 2009; Revolta et al., 2016) because although still vulnerable to high levels of bias due to design, clearer detail was reported about loss-to-follow-up of participants and p-values for pre to post intervention.

Three of the pre-post studies also contained a qualitative element in the form of descriptive feedback gathered from the sample post intervention (Ingham, 2011; Ingham et al., 2008; Revolta et al., 2016). In all three studies, this qualitative data focussed on acceptability of formulation training given. CASP qualitative study analysis (CASP, 2017a) suggests that the style of reporting in all three studies is not in keeping with high quality qualitative research reporting.

Use of the CASP qualitative study tool indicated that the methodological quality of the three qualitative studies was variable, but generally of fair quality. However the qualitative part of the mixed method study (Kellett et al., 2014) was poor. The RCT feasibility study (Berry et al., 2016) was also assessed using the CASP for RCT tool and was rated as fair.

Definitions of team formulation

None of the studies offered a definition of formulation explicit to team formulation, and where a definition was given this was distinct to the therapy type. There was no examination of whether this definition of formulation was applicable to a formulation conducted by a team.

Five studies employing therapy formulation definitions, researched team formulation against these definitions (Christofides et al., 2012; Ingham, 2011; Kellett et al., 2014; Mohtashemi et al., 2016; Summers, 2006). These studies identified formulation as a hypothesis, drawing on psychological theory, regarding the origins, development and maintenance of mental health problems. Four studies provided the function of a formulation, but not the definition (Berry et al., 2009; Berry et al., 2016; Ingham et al., 2008; Revolta et al., 2016). Formulation function was described as providing a framework to understand the origin, development and maintenance of mental health problems. One study did not provide a definition or describe the function of a formulation (Maguire, 2006).

Theoretical underpinnings

Thirteen theories emerged across 10 studies in relation to team formulation research. Theories were used to support both study rationale and question, or as underpinning the team formulation process. Explicit explanation in describing the link between theory and its application in the study varied. For example Berry and colleagues (Berry et al., 2009; Berry

et al., 2016) offered a clear link between attribution theory and study rationale. However, other researchers referred to psychological theory as underpinning formulation, without defining the theory (Ingham, 2011; Mohtashemi et al., 2016; Summers, 2006). With the exception of one study (Kellett et al., 2014), theory was applied to individual staff working in teams and not applied to group level data. The relationship to theory, its part in the studies and related findings is outlined in table four.

Insert table four here. Underpinning theories.

Team impact on the formulation

None of the studies purposely examined the impact of the involvement of the team on the quality, content or outcomes of the produced formulation. It was not possible to apply convergent qualitative synthesis as only one study reported results indicating two impacts that the team had on the formulation. Firstly, the amount of perceived creativity brought to the formulation by use of team input:

"Participants believed that formulations benefited care planning, staff-patient relationships, staff satisfaction and team working, through increasing understanding of patients, bringing together staff with different views and encouraging more creative thinking" (Summers, 2006, p.341).

Secondly, the view that the team formulation was an enduring concept rather than a hypothesis subject to change over time:

"At least three participants seemed to consider formulations as statements of fact" (Summers, 2006, p.342).

Formulation impact on the team

Eight studies reported team outcomes occurring as a result of team formulation and coding resulted in 66 codes from which six themes were conceptualised. These themes were: 'increased knowledge and understanding', 'altered perceptions, leading to altered relationships, feelings and behaviours', 'space to reflect', 'useful when stuck or challenged', 'perceived increase in effectiveness', and 'improved team working'.

Increased knowledge and understanding. Team formulation increased understanding and knowledge of the patient, the origin and nature of their problems, and increased knowledge of the way the team and patient interacted. Although not the most frequently coded, this theme was the mechanism through which all other themes were described as operating, and as such could be seen as a key outcome of team formulation.

Altered perceptions, leading to altered relationships, feelings and behaviours. Closely linked to this was the most frequently coded theme that described the impact of team formulation on staff perceptions and the resulting change in staff/patient relationships, staff feelings about the patient and staff behaviours towards the patient. Perceptions were altered in relation to the patient's problems, their efforts at recovery, how long recovery might take and how much control the patient and staff member had in this. Changed perceptions about staff/patient relationships were positive, however one study did report that staff perceived a worse relationship with patients after formulating. The impact of altered perceptions was described as resulting in altered staff feelings and behaviours, in particular less blaming behaviours towards patients, increased empathy and a more positive approach to care. Patients also reported feeling less criticised by staff. Furthermore, there was an impact on the staff perceptions of their own emotions in terms of feeling more satisfied, but with the recognition that formulating can be personally emotionally challenging.

Space to reflect. The third theme captured the opportunities for clinical reflection afforded by team formulation. Reflection was possible as meeting to formulate gave the team increased

time to think about the patient. This supported creation of new ideas about the patient and the care, and was viewed as a major benefit of team formulation. There was one concern that such reflection could result in a high degree of speculative suggestion based only on partial information.

Useful when stuck or challenged. The fourth theme identified team formulation as a useful process when patients presented with behaviours that challenged the team. Team formulating was also reported as useful when teams felt 'stuck' in thinking about how to progress a patient's care.

Perceived increase in effectiveness. The impact of having time to think and increasing understanding about the patient lead to the fifth theme in which team formulating was perceived as helping to increase the effectiveness of the team. This was described as bringing consistency to team practice, improving problem solving ability, supporting the team to change clinical direction and changing unhelpful patterns of relating with the patient. An increase in clinical confidence was perceived, leading to care which was more helpful for being based on a formulation (rather than diagnosis alone).

Improved team working. The sixth theme, also linked to team effectiveness, described the impact of team formulation on the team as a unit, relative to strengthening how team members work together. Within this theme, team formulation was reported as improving the team climate and working capability. In addition, trust and sharing within the team were reported as improved directly due to team formulating. Team practices were improved through team formulation that brought unity to understanding, different perspectives, ideas and disciplines. Sharing information in this way was viewed as a practice of effective teams and communication via team formulation credited for turning individuals in teams into team members.

Discussion

This is the first review that focuses on the 'team' aspect of team formulation, providing a comprehensive systematic mixed studies review of the peer reviewed research evidence for this team practice. The key objectives were to identify the definitions and theories applied to team formulation research, and to qualitatively synthesise findings on the bidirectional influences of team formulation and team.

Methodological Rigour

The methodological rigour of the 10 studies included suggests an emerging field of research with study quality being highly variable and mostly low. Using team formulation as the intervention in pre-post uncontrolled small-scale studies formed half of all methodological approaches. This represents a problem for the evidence base for team formulation as it is difficult to determine causation and there is a risk of high levels of bias (Goodacre, 2015). The Cochrane Collaboration recommends that such studies constitute insufficient evidence to inform theory (Cochrane, 2017).

Rigour of analysis was difficult to determine for all three studies examining the impact of team formulation on team members. The small number of studies further reduces the available research evidence that the impact of formulating has on team members.

While RCTs are considered capable of providing reliable evidence of effectiveness (Cochrane, 2017), the two RCTs within the review were compromised by methodological limitations. For example, Kellett and colleagues recognised that the sample size was small and there was a risk of contamination between the intervention and 'treatment as usual' arms (Kellett et al., 2014). Berry and colleagues acknowledged that the reported modified staff

perceptions could be attributed to staff feeling that their own needs for support were better met rather than the impact of formulating (Berry et al., 2016).

Definitions of Team Formulation

Defining a phenomena in research is critical for the measurement of variables and comparison of findings across studies (Coolican, 2009). One included study provided no definition of formulation (Maguire, 2006) and the remaining nine applied the definition of therapy formulation to team formulation. This assumption that team formulation *is* the same as therapy formulation has not yet been examined and is further challenged by therapy formulation having more than one definition (Johnstone & Dallos, 2014). The Division of Clinical Psychology in the United Kingdom offers an overarching definition that describes psychological therapy formulation as the amalgamation of all knowledge gained by an assessment process that may involve psychological, systemic and biological aspects. The definition posits therapy formulation as drawing on psychological research and theory, to provide a framework for describing problems, needs and their development and maintenance (DCP, 2010). Other key authors of formulation literature emphasise the hypothetical nature of therapy formulations (Butler, 1998; Tracy D. Eells, 2006). Applying the therapy formulation definition to team formulation fails to account for the influences and context of the team itself. Any working definition should account for the focus on a shared understanding as proposed by Johnstone (Johnstone., 2011), but in addition acknowledge that this is underpinned by team involvement:

‘Team formulation is a shared team activity drawing on psychological theories (individual and group), where two or more team members meet to discuss an evolving integrated formulation. Team formulation is a shared understanding which includes a service user’s personal meaning of their experiences and which leads to a hypothesis about the causes

and maintenance of their mental health problems, strengths and coping, in turn leading to an agreed individualised plan of care to support personal recovery. The service user is involved in the formulation discussion wherever possible'.

Theory and Team Formulation

There is an assertion that team formulation is underpinned by psychological theories used in therapy formulation. Some studies specify which psychological theory, whilst others do not (see table four). This represents an assumption that therapy formulation and team formulation can be underpinned by the same theories; however, this has not been empirically examined. In addition there is an emergence of studies drawing on theory (such as attachment or attribution) which drive study hypotheses proposing a relationship between team formulation, staff perceptions, attitudes and behaviours towards service users, resulting in a changed relationship. Four of the included studies have tested these hypotheses (see Berry et al., 2009; Berry et al., 2016; Ingham, 2011; Kellett et al., 2014). However, due to the number of studies and quality, there is no level of generalisation in these theories yet (Ravatch & Riggan, 2012), and not all study hypotheses were supported in relation to this changed staff-patient relationship (see Berry et al., 2016). In keeping with the properties of a theory, none offered have explanatory qualities in relation to the processes of team formulation (Ravatch & Riggan, 2012). In other studies, claims that such theories are important within team formulation remain an untested assertion (for example see Christofides et al., 2012; Ingham & Clarke, 2009). None-the-less, together these studies represent an early attempt to examine an evolved form of formulation (from therapy to team), and give partial support to the impact of team formulation on team members.

The application of theory in the studies is mainly about individuals in teams, rather than teams per se. Only one study aggregated the analysis of individuals in the teams studied to a group level (see (Kellett et al., 2014). This suggests that researchers are examining individual team members rather than the team as a unit. This narrow focus ignores the range of well-tested theories relating to teams generally, that may also be relevant to team formulation. For example, theories of shared mental models in teams describe a cognitive representation of shared team knowledge in relation to a task or team values (Mathieu, Maynard, Rapp, & Gilson, 2008). Team formulation may lead to developing such a shared mental model, in relation to either a particular patient, the general task of formulating or the values that formulating can bring to a team when ideas are shared. In addition, theories of team identity and cohesion may underpin team formulation research by explaining the collective sense-making that team formulation may bring, and which is understood to help team identity develop (Huettermann, Doering, & Boerner, 2017). Regular team formulating may help in developing team cohesion as team members share this common task around a set of common goals and team values (Mathieu et al., 2008).

Team Impact on Formulation

The impact of the team on the formulation was not examined in any of the included studies. Therapist factors have been found to impact on therapy formulation quality (Dudley et al., 2010; T. D. Eells et al., 2005), yet this review did not find any studies examining the quality of the formulation produced by a team. Training the team in the mechanics of formulating was examined (see (Ingham, 2011), however this was by brief training without accompanying long-term supervision or on-going learning; aspects both recognised as important in one-to-one therapy competency and skill development (BABCP, 2010). Status of team members has been reported as influencing the ability of other team members to have a voice within group

meetings and discussions (Mannix & Sauer, 2006; Silver, Troyer, & Cohen, 2000). In team formulation, the dominance of one profession may serve to reduce the input of other team members and influence the formulation if key information is withheld.

Although the clinical focus of the teams was reported, there was no examination of the type of team and how this influenced the team formulations. Team type is of key interest in team research where there is recognition of the interplay between team type, task and outcomes. For example, established researchers of teams suggest that composition, technology and distance and the degree of empowerment and delayering present in different types of teams impacts on task performance (Tannenbaum, Mathieu, Salas, & Cohen, 2012). Other researchers suggest that not all teams function as 'real' teams, which can also influence task performance. For example 'pseudo' teams, who possess lower degrees of interdependence, shared objectives, reflexivity and boundedness may also have lower task performance ability (West & Lyubovnikova, 2012).

Formulating and its Impact on the Team

To date, team formulation studies offer only partial insights into the impact of the team formulation on the team. The review identified themes suggesting that team formulation leads to increased understanding, team reflection time and problem solving ability. This part of the review yielded the most results, perhaps reflecting the interest of researchers to identify influences on the team. However, only four included studies used validated self-report and observational measures (Berry et al., 2009; Berry et al., 2016; Kellett et al., 2014; Revolta et al., 2016), while the remaining six studies used un-validated self-report measures and descriptions of staff observations and experiences (see table three). Overall, the small number and variable quality of included studies limits the evidence for the impact of team formulation on the team.

Three studies (Berry et al., 2009; Berry et al., 2016; Revolta et al., 2016) examined the impact of team formulation on the attitudes of team members but did not account for possible confounds researched in other fields. For example, self-categorisation theory demonstrates the influence of group membership on attitudinal changes of individuals. The theory posits that individuals compare self to others, and are motivated to adopt the values and attitudes of other group members due to the desire to belong to the 'in-group' (Haslam, Powell, & Turner, 2000; Hogg & Terry, 2000; Reynolds, Turner, & Haslam, 2003). The impact of self-categorisation in relation to team formulation is yet to be explored.

Time for the team to reflect on care and treatment planning by formulating as a team is also identified as a key theme within the included studies. However, from the included studies suggesting that team formulation confers this time for reflection, there is no examination of whether team formulation is the only or most appropriate method of team discussion for improving treatment planning. Research with mental health multi-disciplinary team meetings has also shown an association between the meeting process and effective treatment planning (Raine et al., 2014). In order to understand the value of team formulation as a mechanism for this, further research targeting whether teams have increased reflection time specifically because of team formulation should be undertaken. This also applies to the fourth theme identified, where team formulation was perceived as a good tool for helping teams struggling with patient behaviours. Knowing the specifics of what it is about team formulation that leads to this perception; above other forms of team discussion is needed to strengthen this claim. Within the included studies, the ability of team formulation to reduce patient behaviours that challenge due to altered staff perceptions of the patient seems largely to be an opinion and claims of this outcome require consideration in conjunction with study design and limitations. To illustrate this, the study by Ingham (2011), used an idiosyncratic observation measure of a patient's challenging behaviours over time, before the introduction of formulation and after it.

However, this measure was not validated and inter-rater reliability not assessed. The study may have been subject to high levels of bias given its design (Goodacre, 2015), and observed changes in the patient's behaviour could have been due to other factors such as medication or recovery.

The perception that team effectiveness increases because of team formulation was inferred as a finding, but not directly tested in three of the included studies (Christofides et al., 2012; Ingham, 2011; Revolta et al., 2016). Research into team effectiveness is extensive and includes factors such as team cohesion, participation, member attitudes to the team and clarity of objectives (Borrill et al., 2013; Richter, Dawson, & West, 2011). None of these factors were examined in the studies reviewed and therefore the impact of team formulation on team effectiveness must largely be seen as an untested assumption.

Overall, the findings of the fourth review aim suggest a growing interest in the impact that team formulation may have on a team. Findings suggest that it can help increase a team's emotional awareness and ability, while helping them to operate more efficiently. If these are potential impacts then the use of team formulation may herald a new way forward in promoting team effectiveness. However, present research is limited in the number of studies, quality and design and cannot be considered as reliable evidence of this impact.

Limitations. The decision to limit the review to studies published in peer reviewed journals, accessible by academic database was taken in order to focus the review on the most robust available evidence. This is in keeping with guidance on evidence based healthcare (National Academy of Sciences, 2001; NICE, 2014b). This is important as the practice of team formulation is increasingly used to plan care decisions; a crucial aspect of care. The inclusion of only ten studies for analysis, although potentially affecting the ability to answer the review aims, did ensure that only robust evidence was included. However, this may have limited the

ability to answer the review questions with assurance. Studies published within non-peer reviewed professional forum magazines and those not accessible by academic database would have increased the available number of studies amenable to review, but may have reduced the credibility of evidence. To mitigate further against the small number of studies reviewed, a robust methodology using PRISMA guidelines (Moher, Liberati, Tetzlaff, Altman, & Grp, 2009) was employed including the use of a second reviewer for quality appraisals.

The included research studies were variable in research aims, design, methodology, reporting, statistical analysis, sample size, and type. This heterogeneity prevented the use of one type of review analysis such as meta-analysis or qualitative evidence synthesis. Therefore, an accepted review style that could analyse the contribution of both quantitative and qualitative findings, and include the use of quality appraisals was used with rigour (Hong et al., 2017). This style limited the statistical analysis of quantitative findings, but did consolidate all kinds of evidence into a format by which the review aims (three and four) could be addressed. A second reviewer, who independently generated themes relating to the review aims, strengthened the approach.

Conclusions

This review found a paucity of research studies. The quality of included studies was variable and their mixed focus considerably restricts the degree of evidence behind the practice of team formulation. Yet this is a promising approach that may impact beneficially on teams as well as conferring clinical benefits via individualised care planning and increased understanding of patients. Specific aspects, which remain poorly understood, include the influence of the team on the formulation and the influence of formulating as a team on the team. The untested assumption about team formulation that it can be suitably and wholly underpinned by therapy formulation theory, is likely to continue until team formulation is

clearly defined within its own right as a team psychological activity. A conceptual framework, which informs systematic consideration of the range of factors and theories involved in team formulation, which takes into account the team inputs, processes, and outputs, of formulating as a team, should inform future research. Such a guiding conceptual framework would highlight the possibilities for future research as abundant. Lessons can be gained from therapy formulation in this respect. The evidence for therapy formulation is also considered weak, however it is drawn from sound case observations, together with general theories, which in combination produce testable theories specific to therapy formulation (Bieling & Kuyken, 2003).

Defining and increasing the evidence base for team formulation remains a challenge, but represents a worthwhile one if the benefits to teams as well as patients are to be firmly established.

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Table One. Search Terms

Search Term
Team formulat*
Team clinical case formulat*
Team case meeting
Formulat* meeting
Case conceptuali$ation
Case discussion
Team case discussion
Case planning
Team case planning
Clinical case meeting
Team clinical case meeting
Clinical formulat* meeting
Staff focused formulat*
Complex case discussion
Complex case forum
Multi-disciplinary team meeting
Cognitive case formulat*
Cognitive case conceptuali$ation
Cognitive case discussion
Cognitive behavio$ral formulat* meeting
Cognitive behavio$ral conceptuali$ation meeting
Case formulat* meeting

Team case conceptuali$ation

Team psychiatric formulat*

Team psychological formulat*

Table two. Inclusion criteria

Inclusion Criteria

• **Review aims**
  ○ Gives any definition of formulation (applied to a team formulation study), or;
  ○ Offers a theoretical basis for *team* formulation (includes therapy formulation theories if used as underpinning team formulation), or;
  ○ Explores the impact the team has on the formulation, or;
  ○ Explores the impact on the team of formulating as a team.

• **Setting/population**
  ○ Relevant to adult mental health multi-disciplinary teams (includes learning disability, services for older people, offender health), and;
  ○ Team formulation implemented in consultation, supervision or shared team format, and;
  ○ Involves any therapeutic modality (e.g. *CBT, *CAT)

• **Study features**
  ○ Any study design.
  ○ Published in peer reviewed journal and available on academic database.
  ○ Any publication date, in English language
  ○ Includes studies regarding evaluation of training teams to formulate

*CBT = Cognitive Behavioural Therapy. CAT = Cognitive Analytical Therapy

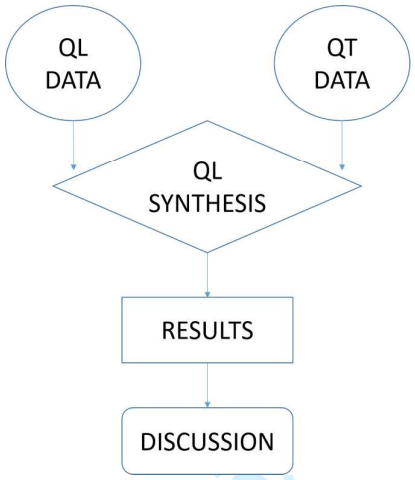

Figure 1. Synthesis design (Hong et al., 2017).

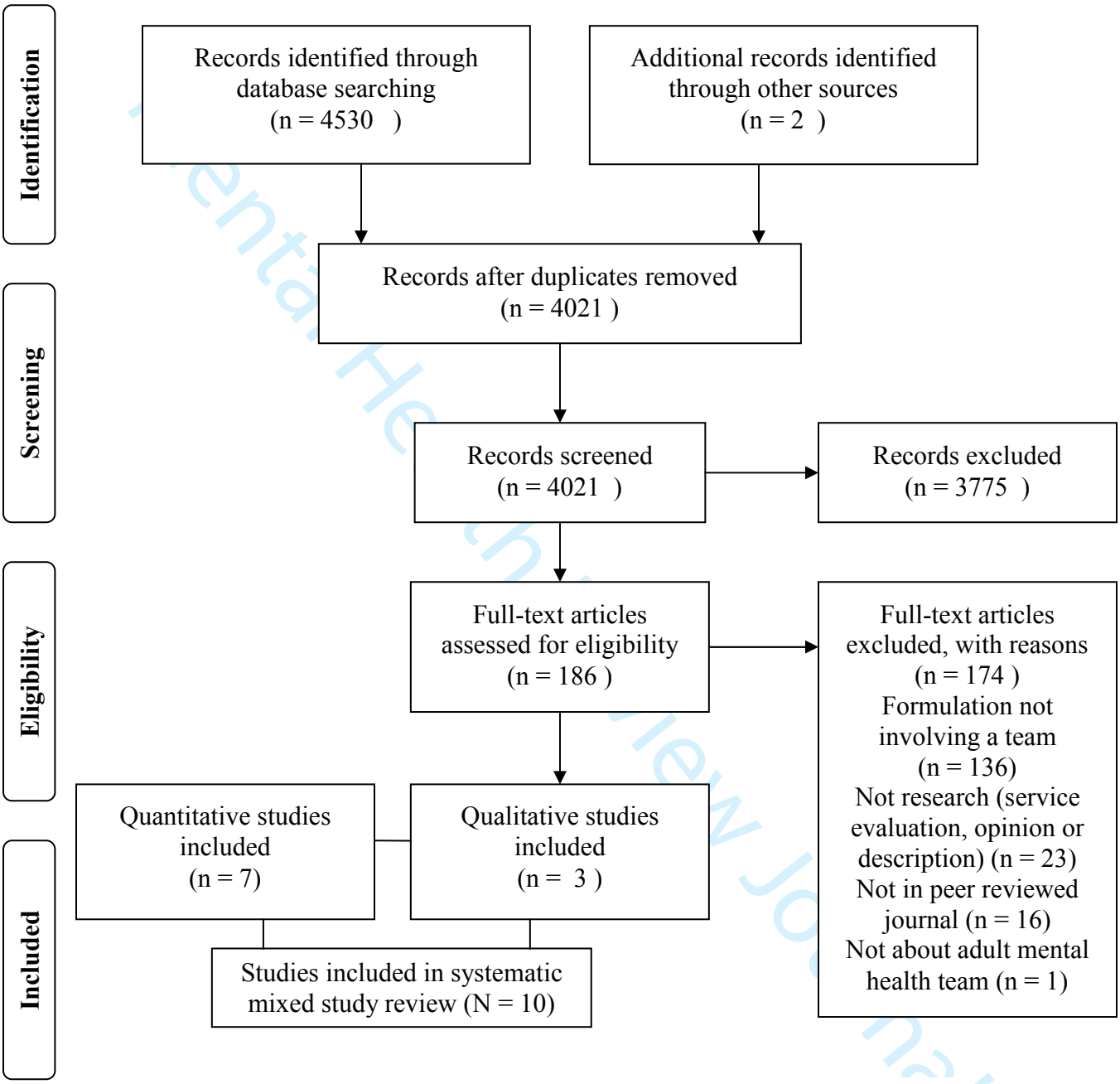

Figure two. PRISMA Flow Diagram illustrating systematic review process

Table three. Included study characteristics

Study authors	Aim of research	Methodological approach	Participants and setting	Formulating method	Key findings	Effect size
Summers 2006	To understand benefits and limitations of using psychological formulations for patients with serious mental illness. To find out via staff views.	Qualitative. Grounded theory. Semi-structured interviews	25 staff. High dependency rehabilitation unit	Team meets to formulate then therapist writes formulation up. Sometimes discussed with patient.	Staff believed formulations benefit the care plans. Staff-patient relationships, staff satisfaction, team working through understanding improved. Some staff see formulation as tentative, others as statement of fact.	NA*
Maguire, 2006	To formulate target behaviours in group of homeless men. To provide CBT* interventions. To enable staff to use CBT techniques, via formulations and supervision. To train staff to operate within CBT framework, to increase perceived capability.	Uncontrolled quantitative pre-post intervention study. Self-report using un-validated scale.	Four residents. 15 staff. Residential for homeless men	Staff training with two groups of staff. Individual formulation and treatment given to patients by team psychologists. Staff supervision and training sessions by psychologist. Not reported whether whole team was involved in project.	Staff perceived they could be more effective, less hopeless, possibly less stressed as a result of training.	Not available
Berry et al., 2009	To develop formulations for individual patients' mental health needs with staff teams and explore effects of the formulation process on staff appraisals of	Uncontrolled quantitative pre-post intervention study. Self-report using validated measures.	30 staff. Three rehabilitation in-patient units.	Formulations meetings held with groups of staff facilitated by psychologist.	Statistically significant changes in staff perceptions on all dimensions post intervention. Predictions supported.	Not available

	patients.					
Ingham et al., 2008	To pilot a novel training workshop in bio-psychosocial formulation in terms of its effects upon awareness of bio-psychosocial case formulation with direct care staff.	Uncontrolled quantitative pre-post intervention study. Un-validated pre-post scale to measure change in ability to formulate plus self-report.	10 unqualified care staff. Acute in-patient mental health in intellectual disability setting	CBT formulation training workshop for direct care staff. Does not report if all in the same team. Used 5Ps* framework	Hypothesis supported. Staff improved in all of the 5Ps except 'predisposing'. Staff found training satisfactory. Staff appraisal ability of formulation changed. Greater feelings of mastery and understanding of patient problems.	d = -1.927 (large effect)
Christofides, et al., 2012	To investigate use of psychological formulations in MDT* working as reported by clinical psychologists	Qualitative. Inductive thematic design. Semi-structured interview.	10 Community and in-patient adult mental health services	Psychologists who use formulation in MDTs were interviewed. They reported this as contributing informally within formulation meetings	Psychological hypotheses were shared more often informally.	NA
Ingham, 2011	To provide a pilot evaluation of brief formulation development workshops with direct care staff supporting people with intellectual disability.	Uncontrolled quantitative pre-post intervention study. Un-validated pre-post observational measure, plus un-validated self-report.	Seven staff. Intellectual disabilities in adult mental health	Psychologist trains team in formulation and applies to one patient in training.	Challenging behaviour in patient decreased. Participants felt workshops were very satisfactory.	Not available
Kellett et al., 2014	To evaluate the clinical and organisational efficacy of formulation based consultancy. Has three hypotheses; reduces	RCT*. Validated self-report perception scale. Validated self-report measure re team climate. Semi-structured	10 patients in each arm. Eight staff Assertive outreach.	Consultancy model. Staff were trained, supervised and had CAT* meetings with the therapist.	No differences in patient outcomes. CAT facilitated enhanced team practice.	(staff results) Participative safety (d = 1.72) large Support for innovation (d = 2.42) large Task orientation (d = 0.30) mod

	patient's distress, patients easier to engage with, team climate will improve. Qualitative part aims to explore staff experience	interviews.				Team vision (d = 0.14) small
Berry et al., 2016	To assess the feasibility and potential efficacy of a ward based psychological intervention to improve staff-patient relationships. Main aims were to determine rates of recruitment, uptake and retention and estimate effect size on a range of patient and staff outcomes.	RCT. Feasibility study. Validated self-report measures of staff/patient alliance, perceived criticism, ward atmosphere and staff well-being. Mixture of self-report and validated observation measures used for patient perceptions. Observation of ward environment and case notes.	51 patients, 85 staff across 10 wards. Rehabilitation in-patients	24 one hour sessions facilitated by a psychologist and therapist. Formulations derived from the meetings. All staff on duty who were available attended the mtgs.	Patients felt less criticised by their keyworkers and reported improved relationships and ward organisation. Staff in the intervention arm reported lower depersonalisation. But no significant differences in terms of staff perceptions of relationships, stress and other aspects of burnout, patient outcomes, length of stay, change in treatment or relapse. Staff reported a worse relationship with patients after the intervention. Some aspects of staff burnout improved. Team formulation reduced patient perceptions of criticism by	Therapeutic relationship effect sizes. Individual results given for each question in each scale for control and intervention mean and SD. Effect sizes calculated using effect size calculator. Effect sizes included: Working Alliance Inventory (two results given) (d = -0.648) moderate negative effect (d = 1.142) large positive effect. Perceived Criticism Scale (four results given). (d = 0.499) small positive (d = 0.729) med positive (d = -1.742)large negative

					developing empathy and understanding from staff.	(d = -1.674) large negative Ward Atmosphere Scale (six results given) (d = -0.154) small negative (d = -0.058) small negative (d = 0.018) small positive (d = 2.212) large positive (d = 3.334) large positive (d = 1.518) large positive
Revolta et al., 2016	To evaluate the feasibility of training staff from a variety of settings on the BPS* model of dementia, examining its impact on attitudes, competence and formulation skills.	Uncontrolled quantitative pre-post intervention study. Some qualitative feedback sought too regarding training. Validated self-report measures. Observation of pre-post ability using a validated model.	37 staff across three dementia care homes	Training workshops delivered which included ability to formulate. Training staff in teams to use a model which includes team formulation.	Formulation skills and ability to develop appropriate interventions increased significantly. No significant difference found in overall approach to dementia, and no significant change to levels of hope or person-centeredness. No significant difference on sense of competence. All groups showed an improved attitude towards dementia. Training helped to	d = 0.59 (medium positive effect) on problem solving exercise

					improve understanding of dementia and problem solving ability.	
Mohtashemi et al., 2016	To understand how psychiatrists understand the concept of formulation, including team formulation	Qualitative. Informed by grounded theory.	12 psychiatrists. Various settings. AMH	Team formulation is facilitated by a psychologist	Four conceptual categories emerged. - Formulation leads to a diagnosis, and psychological understanding is not always needed, but helpful. -Created unified understanding between psychology and psychiatry and team communication device. Brings information together. -Time is a barrier to using psychological understanding. -Pressure to treat people medically at cost of psychological understanding. Gap in psychiatry training.	NA

*NA = Not Applicable. *CBT = Cognitive Behavioural Therapy. *5Ps = Presenting problem, Predisposing, Precipitating, Perpetuating, Protective Factors. *MDT = Multi-Disciplinary Team. *RCT = Randomised Controlled Trial. *CAT = Cognitive Analytic Therapy. *BPS = Bio-Psycho-Social. *AMH = Adult Mental Health.

Table five. Theories underpinning team formulation research

Study	Theories applied	How applied	Was application of theory supported in findings*
Summers, 2006	Psychological theory (does not specify which)	Applies the psychological theory underpinning therapy formulation to team formulation.	NA*. Theory not focus of research study
Maguire, 2006	Change	Used to examine whether formulation would increase staff understanding of a particular behaviour often observed in sample patient group (reluctance to change), that may invoke hopelessness, burnout and stress in staff.	Yes
Ingham et al., 2008	Bio-psychosocial	Applies theory to support integration of clinical knowledge used in therapy formulation to team formulation.	Yes
	Attribution	To see if formulating can alter unhelpful/critical appraisals and impact on staff helping behaviours.	NA: Impact of intervention on staff attribution not tested
Berry et al., 2009	Social exchange	To rationalise the study of staff-patient relationships as a central determinant of relapse and recovery.	Yes
	Attribution	To support study rationale in relation to staff attributions of patient behaviours and mental health problems. To see if formulating can alter unhelpful/critical staff appraisals and impact on staff helping behaviours.	Yes
	Cognitive Behavioural	To provide background theoretical evidence for use of formulation in teams. Applies the psychological theory underpinning therapy formulation to team formulation.	NA: Theory not focus of research study
	Interpersonal	To provide background theoretical evidence for use of formulation. Applies the psychological theory underpinning therapy formulation to team formulation.	NA: Theory not focus of research study
	Attachment	To provide background theoretical evidence for use of formulation. Applies the psychological theory underpinning therapy formulation to team formulation.	NA: Theory not focus of research study
	Cognitive Analytical	To provide background theoretical evidence for use of formulation. Applies the psychological theory underpinning	NA: Theory not focus of research study

		therapy formulation to team formulation.	
Ingham, 2011	Psychological theory (does not specify which)	To provide background theoretical evidence for use of formulation. Applies the psychological theory underpinning therapy formulation to team formulation.	NA: Theory not focus of research study
	Attribution	To support study rationale in relation to staff attributions of patient behaviours and mental health problems. To see if formulating can alter unhelpful/critical staff appraisals and impact on staff helping behaviours.	Yes
	Systemic	Used for study rationale; patterns and narratives within staff-patient relationships are explored via formulation with the intention of producing a change in relationships.	No distinct reporting in findings in relation to this theory and impact of intervention
Christofides et al., 2012	Behaviour	Applies behavioural theory underpinning therapy formulation to team formulation.	NA: Theory not focus of research study
	Psychodynamic	Applies formulation to understand staff countertransference feelings towards service user to inform formulation.	NA: Theory not focus of research study
Kellett et al., 2014	Communication	As study rationale suggesting that therapy formulation may improve team communication and clarity of objectives.	Task orientation tested as part of quantitative measure, otherwise communication and clarity of objectives not tested.
	Attachment	Formulating staff-patient relationships can draw staff attention to dysfunctional roles and procedures adopted by both, to see if this would alter practice.	Yes
Berry et al., 2016	Social exchange	To support the study of staff-patient relationships as a central determinant of relapse and recovery.	Yes
	Attribution	To support study rationale in relation to staff attributions of service user behaviours and mental health problems. To see if formulating can alter unhelpful/critical staff appraisals and impact on staff helping behaviours.	Yes
Revolta et al., 2016	Bio-psychosocial	Applies theory to support content of team training in use of bio-psychosocial formulation with team.	Yes
Mohtashemi et al., 2016	Psychological theory (does not specify	To provide background theoretical evidence for use of formulation. Applies the psychological theory underpinning	NA: Theory not focus of research study

which)	therapy formulation to team formulation.

*Note: Findings need to be regarded in conjunction with study quality appraisal and effect sizes where reported.

*NA = Not applicable.