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Do team processes really have an effect on clinical performance? A systematic literature review

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Editor's key points

- This review has examined the impact of team process behaviours on clinical performance.
- Twenty-eight studies, which reported at least one relationship between team process or an intervention and outcome, were reviewed.
- Team process behaviours have been shown to influence performance.
- Training in team behaviours results in improved performance.

Summary. There is a growing literature on the relationship between team processes and clinical performance. The purpose of this review is to summarize these articles and examine the impact of team process behaviours on clinical performance. We conducted a literature search in five major databases. Inclusion criteria were: English peer-reviewed papers published between January 2001 and May 2012, which showed or tried to show (i) a statistical relationship of a team process variable and clinical performance or (ii) an improvement of a performance variable through a team process intervention. Study quality was assessed using predefined quality indicators. For every study, we calculated the relevant effect sizes. We included 28 studies in the review, seven of which were intervention studies. Every study reported at least one significant relationship between team processes or an intervention and performance. Also, some non-significant effects were reported. Most of the reported effect sizes were large or medium. The study quality ranged from medium to high. The studies are highly diverse regarding the specific team process behaviours investigated and also regarding the methods used. However, they suggest that team process behaviours do influence clinical performance and that training results in increased performance. Future research should rely on existing theoretical frameworks, valid, and reliable methods to assess processes such as teamwork or coordination and focus on the development of adequate tools to assess process performance, linking them with outcomes in the clinical setting.

Keywords: clinical competence; group processes; leadership; patient care team; patient safety

Breakdown in team processes such as coordination, leadership, or communication have frequently been associated with adverse events and patient harm[1–3] and the effectiveness of such team processes is central to the successful provision of patient care.[1 4 5] While recent reviews indicate that team processes are widely accepted as an important factor influencing clinical performance of medical teams,[1 5–8] a general framework is needed to classify and compare different studies on teamwork. In this review, we invoked McGrath's systemic input–process–output (IPO) framework[9] that has served as a foundation for numerous studies in team research[10–14] and has been adapted and used in clinical settings in recent years.[5 7 15–17]

According to this framework, *inputs* are preconditions influencing the processes in the team (e.g. team climate, task structure, leadership style). *Team processes* are defined as the cognitive, verbal, and behavioural activities going on while the team is working together (i.e. team communication, team leadership, team coordination, and team decision-making).[5 18 19] *Outputs* are the product of these processes. Either patient outcomes or team outcomes can be considered as *outputs* in a clinical setting.[5]

The IPO framework conceptualizes performance as an output that is directly influenced by team processes,[5 9] but does not provide explicit definitions of performance or a means by which to measure it. Various authors agree that there is both a process and an outcome-related aspect to performance.[20–22] The distinction between outcome and process performance measures is not always consistently used in the literature but should be borne in mind when aiming to establish an empirical evidence base on the relationships between team processes and outcomes.

Outcome performance measures such as mortality,[23] morbidity,[23] or length of stay[24] can be assessed objectively without consideration of the team process. Process performance measures, in contrast, are action-related aspects of performance embedded in the team processes.[15] Process performance measures are often more easily accessible and less influenced by other variables than outcome performance measures because they refer to directly observable behaviours executed by the team during patient treatment (e.g. measuring task execution time, rating specific behaviours according to medical guidelines).[25 26]

In the infancy of team research in medicine, the main aim was to generate a general understanding of which team processes influenced performance in which way. After qualitative studies investigating which team processes might be relevant to clinical performance,[27 28] quantitative studies were conducted to develop a clearer understanding of the impact of team processes on clinical performance. Studies investigated the association between team processes and either process performance[7 29] or outcome performance measures.[23] However, despite this improved understanding, it is still not clear how large the effect of these relationships is because in the majority of cases, no effect sizes are reported.

This systematic literature review aims to address this gap by analysing articles that investigate the relationship between team processes and clinical performance measures (i.e. process or outcome performance) and to report and compare the respective effect sizes. Furthermore, we will describe and discuss the different team processes and clinical performance measures used. This knowledge is needed to design targeted studies and effective interventions for patient care teams.

Methods

We conducted a literature search based on the recommendations of the PRISMA statement[30] consulting the databases PubMed, Science Direct, PsycINFO, PSYNDEXplus Literature, and Audiovisual Media. Additionally, a meta-search with Google Scholar was conducted; of which, only the first 50 results were examined. The search term used was PATIENT SAFETY combined with TEAMWORK, COMMUNICATION, or LEADERSHIP. In addition, a hand search was conducted based on the references of the identified articles. The literature search was conducted in May 2012.

Figure 1 provides an overview of the inclusion criteria and the five-step selection procedure. We selected English articles published in journals between January 2001 and May 2012 investigating the relationship between team processes and clinical performance. We selected articles that showed or tried to demonstrate (i) a statistical relationship between a team process variable and clinical performance (process or outcome performance) or (ii) an improvement of clinical performance (process or outcome performance) through an intervention targeting team processes.

We included only articles with performance measures. We excluded articles which used self-report data because surveys or interviews about the teams' own perception of performance can contain a self-report bias[31] and could potentially have distorted the results of this review. Intervention studies were only considered when targeting a team process behaviour (e.g. through training) and not implying structural changes (e.g. care pathways)[32] at the same time, because this would preclude distinguishing between effects of the training *vs* the structural change. We included studies using process or outcome performance measures. Since our main focus was on factors influencing patient care, we excluded studies measuring team outcomes (e.g. job satisfaction, stress, burnout).[5]

Each step was performed independently by two reviewers (J.S. and Mariel Dardel). The agreement was between 90% and 94% in each step. Any disagreement in the selection process was resolved by extensive discussion.

Rating of study quality

In order to assess the methodological quality of the selected articles, we used a rating system based mainly on the one proposed by Buckley and colleagues.[33] Since external validity is an important quality indicator, we replaced the single item by Buckley and colleagues with two items from a checklist by Downs and Black.[34] For intervention studies, three items concerning the quality of the intervention were added from Downs and Black. The question of triangulation was not applied to the intervention studies because the focus was on the effect of the intervention and we did not expect authors of intervention studies to triangulate multiple methods. The complete list and a detailed description of quality indicators can be found in Supplementary Table S3.

Each indicator was scored as '0' (not fulfilled), '0.5' (partially fulfilled), '1' (complete), or 'not mentioned' (i.e. information not explicitly provided and thus unclear whether the criterion has been fulfilled or not). Quality ratings were performed by J.S. A random sample of five studies was rated by T.M. We achieved consistency of 91%. Disagreements in the ratings were due to different interpretations of the descriptions in the articles and were resolved by discussion.

Data extraction

The following characteristics of the selected studies that were deemed most relevant were extracted, to evaluate the statistical relationships between team processes and clinical performance: team process behaviours, performance measures, participants, and results plus a description of the intervention in the case of intervention studies. Additionally, we calculated the effect size for every statistical process–output relationship reported in the selected studies based on the data provided in the articles. This enabled us to determine not only if team processes are significantly related with clinical performance but also how large this effect is and if it is large enough to be relevant for practical implications.[35] We report only significant and non-significant effects that were explicitly stated in the selected articles, although additional relationships may have been investigated but not reported.

Results

As can be seen from Figure 1, the initial search yielded 5383 articles. After excluding the irrelevant studies in stage 2, 887 articles remained. In stage 3, 784 studies were selected, of which 258 used quantitative methods and were retained for stage 4. After applying the final selection step, we identified 28 studies; of which, seven were intervention studies. Table 1 and Table 2 provide an overview of the relevant