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The psychosocial and health effects of workplace reorganisation. 1. A systematic review of organisational-level interventions that aim to increase employee control

Matt Egan, Clare Bambra, Sian Thomas, Mark Petticrew, Margaret Whitehead, Hilary Thomson

Objective: Systematic review of the health and psychosocial effects of increasing employee participation and control through workplace reorganisation, with reference to the “demand–control–support” model of workplace health.

Design: Systematic review (QUORUM) of experimental and quasi-experimental studies (any language) reporting health and psychosocial effects of such interventions.

Data sources: Electronic databases (medical, social science and economic), bibliographies and expert contacts.

Results: We identified 18 studies, 12 with control/comparison groups (no randomised controlled trials). Eight controlled and three uncontrolled studies found some evidence of health benefits (especially beneficial effects on mental health, including reduction in anxiety and depression) when employee control improved or (less consistently) demands decreased or support increased. Some effects may have been short term or influenced by concurrent interventions. Two studies of participatory interventions occurring alongside redundancies reported worsening employee health.

Conclusions: This systematic review identified evidence suggesting that some organisational-level participation interventions may benefit employee health, as predicted by the demand–control–support model, but may not protect employees from generally poor working conditions. More investigation of the relative impacts of different interventions, implementation and the distribution of effects across the socioeconomic spectrum is required.

Observational epidemiological studies have provided fairly consistent evidence that workplace control may be associated with health, but findings have been more mixed with regard to the full DCS model. Some commentators have emphasised the interactive effects of these psychosocial characteristics, suggesting that the combination of high demand and low control (and low support) adversely affects health, whilst the inverse of these combined characteristics enhances health. Some have prioritised specific parts of the model (e.g. suggesting that control may have stronger associations with health than demands). In addition, researchers have highlighted potentially important individual factors not considered by the model (e.g. personal modes of coping and need to control), and alternative models such as “effort–reward imbalance” have been advanced. The degree to which workplace psychosocial factors explain health outcomes independently of variables such as status in the community, income and health behaviours has also been questioned.

Intervention evaluations have been advocated as a means of testing the validity and applicability of psychosocial theories. Such evaluations have been called “the bullet that psychosocial epidemiology has to bite” to provide evidence for this purpose and influence policy. Evaluations of interventions to improve workplace control may help us identify ways not only to improve employee health, but also to reduce health inequalities, as some evidence suggests a social gradient in exposure to work control (i.e. lower occupation groups may experience less control).

ORGANISATIONAL INTERVENTIONS

Karasek (a theorist in this field) categorised workplace psychosocial interventions by distinguishing “organisational-level” interventions, aimed at changing the psychosocial environment, from “individual-level” interventions that focus on how individuals behave and cope with that environment. He argued that organisational interventions were preferable as preventative measures because they addressed the causes of unhealthy working environments.

The systematic review presented here focuses on site-specific (rather than area-wide legal or socioeconomic transitions) organisational interventions designed to increase employees’ opportunities to make decisions or participate in decision-making processes at work. As managerial structures may change to facilitate employee...
participation and control, Karasek describes these as “macro-level” interventions that cut across workplace hierarchies. In a companion systematic review we investigate the health effects of more localised “micro-level” organisational interventions that affect workers’ daily task structures (C Bamba et al, unpublished data).

We know of no other systematic review that focuses on participation interventions. Existing reviews tend to broadly scope workplace intervention evaluations, to include studies that report relatively few data on either health or psychosocial outcomes or to focus on individual-level interventions.4 15–21

Systematic reviews are increasingly advocated for identifying and synthesising evaluative evidence on the wider determinants of health and health inequalities.22 25 Employment has been highlighted as a policy area in need of such reviews.23 In this systematic review we ask whether organisational-level interventions designed to increase employee participation/control lead to health effects predicted by the DCS model.

METHODS

Inclusion and exclusion

We included experimental, prospective and retrospective studies evaluating organisational-level interventions (single or multiple interventions) intended to increase employees’ opportunities to make decisions or participate in decision-making.

We included only studies that evaluated both the psychosocial and health effects of such interventions, so we could explore the relationship between these effects. Psychosocial outcomes included self-reported demand, control and support or related measures (e.g. work complexity, autonomy, satisfaction with colleagues). Health outcomes included self-reported physical health, mental health, absenteeism and physical measures. We excluded studies that focused exclusively on workplace injuries, or which did not report workplace psychosocial characteristics beyond general job satisfaction.

Search strategy

We searched for documents of any type, language or nationality. We developed a sensitive electronic search strategy using lists of terms associated with workplace reorganisation, psychosocial outcomes and health (see our protocol: http://www.msoc.mrc.gla.ac.uk/Evidence/Research/Research_MAIN.html), and searched databases from start date to November 2006 (see box 1). We also searched SIGLE, PAIS, Dissertation Abstracts and other Internet resources, manually searched bibliographies and contacted experts.

We initially located 65 282 titles and abstracts, and retrieved 733 for detailed examination. All empirical studies of organisational-level employee participation interventions were independently assessed by two reviewers (CB and ME) for relevance and methodological quality (tables 1–4).

Data extraction, appraisal and synthesis

Critical appraisal criteria were adapted from the systematic review methodological literature and existing systematic reviews of complex interventions.24–27 Data were abstracted by one reviewer (ST) and checked by another (ME). We calculated effect sizes and 95% confidence intervals (CIs) where possible, but it should be noted that these sometimes differed from p values reported in the original articles, possibly because our calculations relied on summarised final sample size data reported in journals, rather than original datasets. Heterogeneity in interventions, study designs, comparison groups, outcome measures and reporting of data made meta-analysis and comparisons of effect sizes between studies problematic. Therefore, we used narrative synthesis: categorising and tabulating data by intervention type, methodology, setting and outcome, and describing studies in a narrative that emphasised more methodologically robust (e.g. prospective, controlled) studies.24 25 28 29

RESULTS

We identified 18 studies (published between 1981 and 2006) that examined both the health and psychosocial impacts of organisational interventions aimed at increasing employee participation/control.30–48 Four were identified through manual searches,30 34 40 42 the rest electronically.

Most included studies evaluated interventions involving “participatory” or “problem-solving” committees of employee representatives. These were usually established to identify ways of tackling workplace stressors, although one had wider powers concerning budgeting and human resources.32 Some participatory interventions were implemented in combination with individual-level interventions,38–41 ergonomic improvements,42 43 or organisational downsizing (tables 1–4).34–44

We identified 12 prospective studies with non-randomised comparison groups.30–44 Comparison groups typically consisted of employees from similar departments or workplaces to the intervention groups. Key findings from these prospective controlled studies are summarised in the text. We also identified three uncontrolled prospective47 45 46 and three retrospective47 48 studies (one of which was qualitative48). Tables 1–4 summarise findings and methodological details from all the studies.

Single-intervention studies

Six of the seven studies evaluating single participatory interventions were prospective with comparison groups.30–36 (table 1). Apart from one study of employees given more control over their working hours,36 the interventions took the form of employee committees to identify workplace stressors and ways to reduce them. One committee’s role was semi-managerial.32

Two cohort studies with comparison groups had civil service settings. One examined the effects of establishing problem-solving committees comprising managers, elected employee representatives and an external consultant at two regional public health departments in the USA.35 After 12 months, neither employees’ adjusted mean depression scores nor rates of self-reported sleeping problems had changed significantly. There was little change (p>0.05) in self-reported demand, control or support (Job Contents Questionnaire (JQO)).

The other examined a UK central government office where a workers’ committee of volunteer employee representatives, moderated by a consultant psychologist, was established.31 After 12 months, mean scores for “sense of control” increased in the intervention group from 10.31 (95% CI 9.65 to 10.97) to 12.70 (95% CI 11.96 to 13.44) (p<0.0001) and decreased in the comparison group from 10.86 (95% CI 10.16 to 11.56) to 10.65 (95% CI 9.40 to 11.90). Mean Occupational Stress Indicator scores for mental ill health improved from 57.56 (95% CI 54.19

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<table>
<thead>
<tr>
<th>Study</th>
<th>Design and methods appraisal*</th>
<th>Setting and participants</th>
<th>Intervention</th>
<th>Implementation</th>
<th>Psychosocial outcomes (p&lt;0.05)†,‡</th>
<th>Health outcomes (p&lt;0.05)‡</th>
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<tbody>
<tr>
<td>Landsbergis and Vivano-Vaughan (1993)*</td>
<td>Prospective cohort study with comparison group</td>
<td>Two local government agencies, USA Managers, professionals and clerical staff</td>
<td>Problem-solving committees moderated by external consultant for elected employee representatives and managers</td>
<td>Authors report support for the intervention from employers and employees, and that some of the committees’ proposals were implemented</td>
<td>Mental health (Job Content Questionnaire) †</td>
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<td>Bond and Bunce (2001)*</td>
<td>Prospective cohort study with comparison group 12-month follow-up Final sample: n=53 Methods appraisal: 1, 2, 3, 4, 6, 7, 10</td>
<td>Central government office, UK Civil servants: various grades</td>
<td>Participative action research: workers’ steering committee of volunteer employee representatives, set up by external consultant (psychologist)</td>
<td>Few reported details. Committee’s proposals for more feedback opportunities in the workplace were adopted by management</td>
<td>Mental ill health (OSI score): Occupational Stress Indicator †</td>
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<tr>
<td>Coutte et al (1987)*</td>
<td>Prospective cohort study with comparison group 3- and 6-month follow-up Final sample: n=99 Methods appraisal: 1, 2, 3, 7, 8, 10</td>
<td>Hospital, USA Nurses</td>
<td>Participative management intervention: committees of nurses given control over personnel, work scheduling, training and some budgeting</td>
<td>Three of the four committees were reportedly well implemented, but the fourth was hindered by “power struggles”. Many nurses preferred the traditional, hierarchical model</td>
<td>Mental health (OSI score): Occupational Stress Indicator †</td>
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<td>Bourbonnais et al (2006)*</td>
<td>Prospective repeat cross-sectional study with comparison group 12-month follow-up Final sample: 613 Methods appraisal: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10</td>
<td>Hospital, Canada Nurses, orderlies and auxiliary nurses</td>
<td>Participatory intervention based on the German ‘Health Circles’ model. Small groups of different types of employee representatives, led by an external moderator, met every 2 weeks to identify psychosocial stressors and recommend solutions to employees and management</td>
<td>Intervention developed by researchers in consultation with nursing representatives, following assessment and observations of the workplace. Evidence of corporation from management</td>
<td>Psychological distress (Psychiatric Symptom Index) †, Sleep problems (Nottingham Health Profile) †</td>
<td></td>
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<tr>
<td>Park et al (2004)*</td>
<td>Prospective, controlled, repeat-cross-sectional study Baseline 6 months prior to intervention. Follow-up 1 year after intervention Final sample: n=1463 Methods appraisal: 1, 2, 3, 6, 7, 8, 9, 10</td>
<td>Retail store workers, USA All employees</td>
<td>Action teams created in each intervention store in which employee representative liaised with management and employees to improve team communication and cooperation, work scheduling, conflict resolution and recognition of good work</td>
<td>Implementation took place during a period of recession and uncertainty (no explicit references to redundancies). Authors were looking for a buffering effect rather than positive improvements. Assisted by a professional facilitator, who helped build skills amongst team members</td>
<td>Psychological demands (D) †, Decision latitude (C) †, Supervisor support (S) †, Co-worker support (S) †, Reward (O) †, Effort-reward imbalance (O) †</td>
<td></td>
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<tr>
<td>Smith et al. (1998)*</td>
<td>Prospective, repeat cross-sectional study with nested cohort study with comparison groups 6-month follow-up Final sample n=62 Methods appraisal: 1, 3, 4, 7, 8, 9, 10</td>
<td>Police station, UK Police officers</td>
<td>Flexible working hours, compared with more rigid 12-hour shift schedules</td>
<td>Few reported details on effectiveness of implementation or commitment of employees. Around 50% of employees supported the intervention</td>
<td>Organisational support (S) †, Co-worker support (S) †, Involvement with others (S) †, Involvement with supervisors (S) †, Communication (O) †, Safety and health climate (O) †</td>
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<tr>
<td>Wall and Clegg (1981)*</td>
<td>Prospective cohort study 6- and 18-month follow-ups Final sample n=29 Methods appraisal: 1, 2, 4, 5, 7, 9, 10</td>
<td>Factory, UK Manual workers</td>
<td>Immediate control over production transferred to employee work groups with a steering group of representatives overseeing change</td>
<td>Authors suggest that both employees and employers supported the intervention as a means of improving employees’ morale</td>
<td>Workload (D) †, Mental health (GHQ12 mean score) †, Physical health (Physical Health Questionnaire) †</td>
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</table>

*Methods appraisal: 1 = prospective; 2 = representative sample; 3 = appropriate comparison group; 4 = baseline response >60%; 5 = follow-up >80% in cohort, >60% in cross-section; 6 = adjustment for non-response and drop-out; 7 = conclusions substantiated by data; 8 = adjustment for confounders; 9 = all intervention group exposed, non-contaminated comparison group; 10 = appropriate statistical tests; †D, demand; ‡C, control; †S, social support; †O, other psychosocial outcome measures. †† = improvement; ‡‡ = worsening; ††† = little change/inconclusive (with reference to the DCS hypothesis that reduced demands and increased control and support are “improvements”).
Table 2  Participatory and individual-level interventions

<table>
<thead>
<tr>
<th>Study</th>
<th>Design and methods appraisal*</th>
<th>Setting and participants</th>
<th>Intervention</th>
<th>Implementation</th>
<th>Psychosocial outcomes (p&lt;0.05)†‡</th>
<th>Health outcomes (p&lt;0.05)†‡</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mikkelsen et al. (2000)</td>
<td>Prospective cohort with comparison group Follow-up 1 week after completion of intervention Final sample n = 82 Methods appraisal: 1, 2, 3, 4, 5, 7, 8, 9, 10</td>
<td>Two hospitals, Norway Various health professionals, clerical, technical and managerial staff</td>
<td>Workers’ steering committees moderated by external consultant. Individual-level stress management and physical training</td>
<td>Mixed support for intervention from managers and staff. Intervention was dropped after evaluation</td>
<td>Job demands (D) ↑% Role harmony (D) ↑% Decision authority (C) ↔ Autonomy (C) ↔ Opportunity to develop (C) ↑% Social support (S) ↑% Team style (S) ↔ Contentedness (O) ↑%</td>
<td>Mental health (Job Content Questionnaire) ↑% Self-reported ‘health complaints’ ↔</td>
</tr>
<tr>
<td>Maes et al. (1998)</td>
<td>Prospective cohort with comparison group 1-, 2- and 3-year follow-up Individual-level interventions in year 1 Organisation changes after year 1 Final sample: n = 264 Methods appraisal: 1, 2, 3, 4, 6, 7, 9, 10</td>
<td>Factory, The Netherlands Manual workers and other staff</td>
<td>Consultative committee (employees, managers and researchers) to discuss organisational change. Concurrent health promotion programme (smoking cessation and physical activity) and psychosocial skills training</td>
<td>Authors provide few details on implementation although employees were said to have been consulted and participation was voluntary</td>
<td>Psychological demands (D) ↑ Control (C) ↑ Social support (S) ↔ Ergonomic conditions (O) ↑</td>
<td>Serum cholesterol levels in men ↑ Absenteeism ↑ Mental health (5 Symptom Checklist-90) ↔ Healthy lifestyles (smoking, exercise, alcohol, diet, sleep, BMI) ↔</td>
</tr>
<tr>
<td>Orth-Gomeré et al. (1994)</td>
<td>Prospective cohort with comparison group 3- and 8-month follow-up (8-month only for comparison group) Final sample: n = 121 Methods appraisal: 1, 2, 3, 5, 7, 8, 9, 10</td>
<td>Five work groups of civil servants, Sweden Specific job details not reported</td>
<td>2-day educational course (on work stress, lifestyle factors and relaxation techniques). Employee work groups to increase control and support and reduce strain in the work environment</td>
<td>‘In many cases’ managers allocated extra time for this intervention. However, work group members often met during breaks and in their own time. The work groups were largely autonomous, but were assisted in monthly follow-up sessions by researcher-trained health workers</td>
<td>Stimulation from and autonomy over work (C) ↑ Perceived support from supervisors (S) ↔ Other factors contributing to ‘work strain’ and social support (details not reported) (O/S) ↔</td>
<td>Net changes in total serum cholesterol ↔ Serum triglycerides ↔ Serum apolipoprotein Al to apolipoprotein B ratio ↑ Lifestyle factors (smoking, exercise, weight, diet and alcohol) ↔</td>
</tr>
<tr>
<td>Bunce and West (1996)</td>
<td>Prospective cohort comparing two interventions in two sites with a “no intervention” comparison site 3- and 12-month follow-up Final sample: n = 117 Methods appraisal: 1, 2, 4, 6, 7, 8, 9, 10</td>
<td>Hospital, UK Health professionals and clerical staff</td>
<td>Site A: individual-level stress management training and sessions for employees to propose stress reducing innovations to their work Site B: stress management training only</td>
<td>Authors provide few details on the degree to which proposed innovations were accepted by management. They refer to organisational constraints impeding the innovation group</td>
<td>Individual innovation (C) ↑ Propensity to innovate (C) ↔</td>
<td>Mental health (GHQ12) ↔</td>
</tr>
</tbody>
</table>

*Methods appraisal: 1 = prospective; 2 = representative sample; 3 = appropriate comparison group; 4 = baseline response >60%; 5 = follow-up >80% in cohort, >60% in cross-section; 6 = adjustment for non-response and drop-out; 7 = conclusions substantiated by data; 8 = adjustment for confounders; 9 = all intervention group exposed, non-contaminated comparison group; 10 = appropriate statistical tests; †D, demand; C, control; S, social support; O, other psychosocial outcome measures. †↑ = improvement; ↓ = worsening; ↔ = little change/inconclusive (with reference to the DCS hypothesis that reduced demands and increased control and support are ‘improvements’). §Short-term effect (1 week after intervention).
The psychosocial and health effects of workplace reorganisation

Study Design and methods appraisal

- Setting and participants
- Intervention
- Implementation
- Psychosocial outcomes
- Health outcomes

### Setting and participants

- Factory, Japan
- Hospital, USA

### Intervention

- More and smaller teams
- New procedures and training for heavy lifting and mechanical aids
- Stated aim was to improve on-the-job training, commit employers or supervisors to support, and implement new procedures

### Implementation

- Participation and individual-level interventions
- Multi-intervention studies
- Participation and individual-level interventions

### Psychosocial outcomes

- Mean depression (Zung SDS score)
- Work overload (D)
- Problems with co-workers (S)
- Social support (S)
- Job satisfaction (O)
- Chance to learn (O)
- Combined measures (C)
- Social support (S)
- Job satisfaction (O)

### Health outcomes

- Mean blood pressure
- Diastolic blood pressure

### Methods appraisal

1. prospective
2. representative sample
3. appropriate comparison group
4. baseline response on 5 November 2009 jech.bmj.com Downloaded from jech.bmj.com on 5 November 2009
<table>
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<tr>
<th>Study</th>
<th>Design and methods appraisal*</th>
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<th>Intervention</th>
<th>Implementation</th>
<th>Psychosocial outcomes [p &lt; 0.05];‡</th>
<th>Health outcomes [p &lt; 0.05]</th>
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<tbody>
<tr>
<td>Mikalsen and Saksvik (1999)**</td>
<td>Prospective cohort study with two intervention groups and two comparison groups. 1-week and 12-month follow-up. Final sample: n = 125</td>
<td>Post office depot, Norway. Manual and clerical workers.</td>
<td>Conference on working conditions followed by supervisor and employee workshops meeting for 2 hours each week (nine times in total). Intervention was moderated by consultants. Intervention took place during period of company downsizing.</td>
<td>Authors report that union and management helped design intervention. In one department, the intervention was not successfully implemented because steering group members lost interest and personnel were relocated or made redundant.</td>
<td>Job demands (D) ↔</td>
<td>Self-reported job stress ↔</td>
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<td>Skill discretion (C) ↔</td>
<td>Self-reported health complaints ↔</td>
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<td>Decision authority (C) ↔</td>
<td>Self-reported trait anxiety ↔</td>
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<td>Laissée-faire (C) ↓</td>
<td>Mean emotional exhaustion (Maslach Burnout Inventory) ↓</td>
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<td>Social support (S) ↔</td>
<td>Mean anxiety (10-item State Anxiety Scale) ↓</td>
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<td>Individual consideration (S) ↑</td>
<td>Mean depression (10-item scale) ↓</td>
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<td>Woodward et al. Prospective, cohort study 1-year and 2-year follow-up. Final sample: n = 346</td>
<td>Post office depot, Norway. Manual and clerical workers.</td>
<td>Management-employee design teams set up to implement &quot;re-engineering&quot; of hospital, including a merger and (mostly management) redundancies. Staff required to reapply for posts.</td>
<td>Few reported details an effect on workload and management helped design intervention.</td>
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<td>Demands (D) ↓</td>
<td>Combined mean score: anxiety-contentment, depression-enthusiasm (all ↓) ↓</td>
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<td>Role clarity (D) ↓</td>
<td>Combined mean score: anxiety-contentment, depression-enthusiasm (management)↑</td>
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<td>Parker et al. Prospective, cohort study 4-year follow-up. Final sample: 139</td>
<td>Factory: UK Managerial, clerical, manual employees.</td>
<td>&quot;Empowerment initiative&quot;: multiskilling, management restructuring, work teams and greater emphasis on employee development. Company downsizing at all levels, but particularly for clerical and managerial workers.</td>
<td>Few reported details an effect on workload and management helped design intervention.</td>
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<td>Demands all (D) ↓</td>
<td>Combined mean score: anxiety-contentment, depression-enthusiasm (all ↓) ↓</td>
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<td>Role clarity all (D) ↓</td>
<td>Combined mean score: anxiety-contentment, depression-enthusiasm (management)↑</td>
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<td>Decision latitude (C) ↓</td>
<td>Mean emotional exhaustion (Maslach Burnout Inventory) ↓</td>
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<td>Job influence (C) ↓</td>
<td>Mean anxiety (10-item State Anxiety Scale) ↓</td>
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<td>Co-worker support (S) ↓</td>
<td>Mean depression (10-item scale) ↓</td>
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<td>Supervisor support (S) ↓</td>
<td>Mean emotional exhaustion (Maslach Burnout Inventory) ↓</td>
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<td>Teamwork (S) ↓</td>
<td>Mean anxiety (10-item State Anxiety Scale) ↓</td>
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<td>Job insecurity (O) ↓</td>
<td>Mean depression (10-item scale) ↓</td>
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<td>Satisfaction all (O) ↓</td>
<td>Combined mean score: anxiety-contentment, depression-enthusiasm (all ↓) ↓</td>
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<td>Particpative climate (C) ↔</td>
<td>Combined mean score: anxiety-contentment, depression-enthusiasm (management)↑</td>
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<td>Participation all (C) ↔</td>
<td>Combined mean score: anxiety-contentment, depression-enthusiasm (all ↓) ↓</td>
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<td>Participation manual (C) ↑</td>
<td>Combined mean score: anxiety-contentment, depression-enthusiasm (management)↑</td>
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<td>Participation supervi (C) ↓</td>
<td>Combined mean score: anxiety-contentment, depression-enthusiasm (all ↓) ↓</td>
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<td>Satisfaction all (O) ↓</td>
<td>Combined mean score: anxiety-contentment, depression-enthusiasm (all ↓) ↓</td>
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<td>Heaney et al. (1993)**</td>
<td>Retrospective, cohort study 6-year follow-up. Final sample: n = 277.</td>
<td>Factory: USA. Manual employees and supervisors.</td>
<td>Participatory action research committee (representing management, union and researchers) helped establish a stress and wellness committee (made up of employees representatives). Downsizing and creation of hierarchical management structure in one department (site 1), whilst another (site 2) maintained a more &quot;co-operative&quot;, less hierarchical structure.</td>
<td>Authors report a lack of support from higher management and union representatives, especially in site 1.</td>
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<td>Hering et al. (2005)**</td>
<td>Qualitative, retrospective panel study based on a series of in-depth interviews. A randomly selected sample of six secretaries received three interviews each over time. T1 = 3 months after restructuring, T2 = 15 months after, T3 = 27 months after Final sample: n = 6</td>
<td>Hospital: Sweden Clerical staff.</td>
<td>Restructuring prompted by government cost-cutting. Degree to which managers supported the participatory intervention is not clear. Mixed response from clerical workers to the intervention.</td>
<td>Respondents report that they have too much work (D ↓) ↓</td>
<td>Mental health: respondents report feeling “close to tears”, “lacking motivation”, becoming “irritable” and “snappy”; poor sleep; lack of energy; feelings of shame and frustration ↓</td>
<td></td>
</tr>
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</table>

*Methods appraisal: 1 = prospective; 2 = representative sample; 3 = appropriate comparison group; 4 = baseline response >60%; 5 = follow-up >80% in cohort, >60% in cross-section; 6 = adjustment for non-response and drop-out; 7 = conclusion substantiated by data; 8 = adjustment for confounders; 9 = all intervention groups exposed, non-contaminated comparison group; 10 = appropriate statistical tests; 11 = demand; C, control; S, social support; O, other psychosocial outcome measures. † † = improvement; ↓ = worsening; ↔ = little change/inconclusive (with reference to the DCS hypothesis that reduced demands and increased control and support are ‘improvements’). ‡ Short-term effects. *All = manual, clerical and managerial staff; Manual = Manual staff (for whom separate figures are given because their mental health appeared to improve following the intervention).
A prospective Norwegian hospital study examined the impact of stress management and physical training sessions combined with an externally moderated workers’ steering committee to improve health and organisational performance. After adjusting for demographic characteristics, mean JCQ scores were found to have decreased after a week for “job demands” (from 13.99 to 13.77, relative to the comparison group (in which the JCQ score increased from 12.29 to 14.86); ANCOVA, p < 0.05). “Opportunity to develop” improved (from 32.34 to 32.68) relative to the comparison group (36.50 to 32.58) (p < 0.05), as did mean Work Appar Tag questionnaire scores for “social support” (from 18.43 to 19.84) relative to the comparison group (20.64 to 19.21) (p < 0.05) and “role harmony” (3.86 to 4.43) relative to the comparison group (4.88 to 3.93) (p < 0.05). “Work-related stress” (JCQ) fell from 6.55 to 5.95 relative to the comparison group (4.07 to 7.36) (p < 0.05).

A similar package of interventions (plus smoking restrictions) was evaluated in a Dutch prospective cohort study. Individual-level interventions were implemented in a factory between baseline (T1) and follow-up at 12 months (T2). Organisational interventions occurred between T2 and follow-up at 24 (T3) and 36 (T4) months. Mean scores for “control” (Work Stress Questionnaire) increased significantly in the intervention group (from 2.34 (95% CI 2.27 to 2.41) to 2.53 (95% CI 2.48 to 2.58)) but not in the comparison group (from 2.50 (95% CI 2.44 to 2.56) to 2.54 (95% CI 2.48 to 2.60)) between T2 and T3 (p < 0.01). Mean scores for “psychological demands” changed little in the intervention group (from 1.49 (95% CI 1.43 to 1.55) to 1.53 (95% CI 1.46 to 1.60)) but increased significantly in the comparison group (from 1.49 (95% CI 1.43 to 1.55) to 1.64 (95% CI 1.57 to 1.71)) between T3 and T4 (p < 0.01). Serum cholesterol levels improved in men between T1 and T2 (men: p = 0.02; women: p = 0.09).

Four groups of civil servants in Sweden participated in a 2-day course on dealing with stress, healthy lifestyles and relaxation techniques. Over the following 8 months, employees in the group met to identify and recommend solutions to workplace stressors. A prospective cohort study with comparison group found that stimulation from and autonomy over work improved significantly in the intervention group (in which the JCQ score increased from 12.29 to 14.86); ANCOVA, p < 0.05). “Opportunity to develop” improved (from 32.34 to 32.68) compared with employees receiving no intervention (36.50 to 32.58) (p < 0.05), as did mean Work Appar Tag questionnaire scores for “social support” (from 18.43 to 19.84) relative to the comparison group (20.64 to 19.21) (p < 0.05) and “role harmony” (3.86 to 4.43) relative to the comparison group (4.88 to 3.93) (p < 0.05). “Work-related stress” (JCQ) fell from 6.55 to 5.95 relative to the comparison group (4.07 to 7.36) (p < 0.05).

Health inequalities

Studies reporting differential effects by social group could potentially shed light on how participation interventions might help tackle health inequalities. Only one included study reported a differential effect of an intervention by gender, finding that serum cholesterol levels improved for men but not women (T1–T2: men, p = 0.02; women, p = 0.09). One controlled study reported that participation interventions preceded psychosocial improvements (p < 0.05) for black and Hispanic, but not white, employees, but similar interactions were not observed for overall health status and job stress. Several studies looked at particular occupational groups—manual workers, clerical staff, health professionals, police or managers—and found health improvements following some of the interventions reviewed here. Only one (uncontrolled) study compared an intervention’s effects across two or more occupational groups. It found improvements in mean scores for strain (anxiety–contentment and depression–enthusiasm 5-point scales) for manual factory workers (from 2.71 to 2.45; p < 0.01), but not managers or clerical staff (p > 0.05), 4 years after a participation intervention implemented during company downsizing.

Psychosocial factors and health

Eight (including four controlled) studies reported post-intervention improvements in measures of control/participation. Seven of these also reported health improvements, whilst one uncontrolled study reported little change in health. Two studies of participation interventions during downsizing reported declines in employee control: one also reported worsening health, whilst the other reported no significant health effects.

Reductions in demands were reported in three controlled studies and an uncontrolled study and at least one health outcome improved each time. Two controlled and two uncontrolled studies reported improvements in both support and health. One controlled study found little change in health despite improvements in support and another found limited health improvements when support
from colleagues improved but supervisor support worsened. Reduced support was reported along with worsening health in two uncontrolled studies and little health impact was observed in another.

Regarding the hypothesis that decreased demands and increased control and support interact to enhance health, this combination was reported in only two studies reviewed here (one of which was uncontrolled, while the other followed up outcomes for only 1 week), whilst a third study reported decreased demands, increased control and little change in support. All three reported improvements in at least one health outcome. This evidence broadly fits the above hypothesis but is insufficient to validate it.

The corollary of the above hypothesis is suggested by a qualitative study reporting that increased demands and decreased control and support occurred with worsening health indicators. However, one controlled study reported health improvements despite increased demands and little change to control or support. In two uncontrolled studies, health improved alongside increased demands and improved control and support.

**DISCUSSION**

**Evidence quality and availability**

This systematic review identified 18 studies that evaluated both the health and psychosocial impacts of organisational-level interventions intended to increase employee participation in workplace decision-making. None of the 12 controlled studies found evidence of health deterioration, whilst eight found evidence of health improvements.

Some of the reported health measures might more properly be considered proxies (e.g. some “burnout” measures and biomarkers). Most measures were self-reported and the length of follow-up ranged from 1 week to 4 years. Adjustments for confounding were often poorly reported, absent or limited to demographic rather than health variables. Evaluations of multiple interventions tended not to identify effects specific to the organisational-level interventions most relevant to this review.

However, evaluations of the health effects of complex social interventions are relatively rare (e.g. compared with individual-level and therapeutic interventions) and often take the form of “natural experiments” requiring pragmatic methodological designs. Although we identified no randomised controlled trials, the number of prospective studies with comparison groups in this review compares favourably with the evidence available for many other types of sociostructural interventions affecting health.

**Demand, control and support**

To establish whether health outcomes are conditional on psychosocial improvements resulting from the interventions, we suggest that future prospective studies should distinguish between employees (from both the intervention and control groups) who do and do not experience psychosocial improvements in demand, control or support. If an intervention influences health through a psychosocial pathway, greater health improvements would be expected amongst intervention group participants who report psychosocial improvements in the work environment (compared with other participants).

The evidence we identified does not report data in this way, but our findings do broadly fit health outcomes hypothesised by the DCS model. Interventions that improved workplace control and/or support did tend to improve employee health. Health improvements did not occur when control or support worsened, except in one case where limited health improvements occurred when colleagues’ support improved but supervisor support worsened.

Interventions that reduced demands also improved health (as hypothesised by the model). However, sometimes health improved even when the intervention appeared to increase demands.

We identified limited and somewhat inconsistent evidence to support the hypothesis that low demands and high control (and support) combine to enhance health. The evidence also sheds little light on how other psychosocial models may compare with the DCS model (one study reported improvements in work burnout, improved effort–reward model measures and mixed effects on DCS measures). In an accompanying review of “micro-level” organisational interventions affecting employees’ task structures, we also found the DCS model to be a useful (but not infallible) predictor of health outcomes (C Bambra et al., unpublished data). However, these “micro-level” interventions tended to increase demand, decrease control and negatively affect health.

In contrast, the participation interventions reviewed here usually had benign or beneficial, but not adverse, health effects (unless accompanied by redundancies).

**LIMITATIONS**

There are several limitations to the interpretation of the studies reviewed here. First, in many of the original papers the reporting of the interventions was generally poor or difficult to assess, even with the help of implementation evaluation tools. There is a lack of evidence that the interventions were actually implemented in full, or at all. In the tables we have tried to summarise reported details of intervention implementation, but many papers offered few clues about this. These issues will form the basis of a future paper on implementation. Obviously, it strikes at the core of evaluation practice – what are the authors measuring if the intervention was little more than a paper exercise?

Second, several of the organisational interventions aimed at changing the psychosocial environment took place alongside individual-level health education or ergonomic initiatives. It is generally not possible to separate out the health effects of the different types of intervention, though some reported health outcomes, such as reductions in injuries and changes in lifestyles such as smoking and diet, could plausibly be attributed to the intervention more directly aimed at these outcomes.

Third, five of the interventions are reported to have taken place while companies were undergoing downsizing and redundancies. In such cases, an absence of negative health effects may indicate a protective effect from increased participation, counteracting the negative psychosocial impacts of downsizing. A controlled study is required to test this.
hypothesis. The only one we identified found no evidence of health protection. Perhaps it is unrealistic to expect the relatively modest interventions of establishing participatory committees to protect workers from substantial deteriorations in workplace conditions. Nor are they necessarily responsible for observed health improvements amongst employees who believe they have survived a downsizing period.

The hypotheses and methodological issues discussed here should be taken into account, both in the interpretation of existing studies and in the design of future intervention evaluations.

CONCLUSION

This systematic review of “participatory” interventions has identified evidence of some health benefits occurring when employee control improved or (less consistently) demands decreased or support increased. This finding fits with evidence from some observational epidemiological studies and is compatible with policy directives on participation at work. More robust prospective studies along the lines described above, with improved reporting of intervention implementation and differential impacts for different socioeconomic groups, are required to provide a stronger evidence base. The evidence we did identify suggests that the strategy of reorganising workplaces to facilitate employee participation and control offers a potential means of improving employee health and well-being, although the most effective means of implementing this strategy needs to be better understood.

CONTRIBUTORS

ME planned the study, collected and analysed data and is lead author and guarantor. CB, MP, ST, MW and HT assisted in all aspects of the study including writing-up.

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Authors’ affiliations

Matt Egan, Sian Thomas, Mark Petticrew, Hilary Thomson, Medical Research Council Social and Public Health Sciences Unit, University of Glasgow, UK

Clare Bambra, Centre for Public Policy and Health, School for Health, University of Durham, UK

Margaret Whitehead, Division of Public Health, University of Liverpool, UK

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