Review

Pan American Journal of Public Health

Interventions that facilitate sustainable jobs and have a positive impact on workers' health: an overview of systematic reviews

Michelle M. Haby,[1] *Evelina Chapman,*[2] *Rachel Clark,*[3] *and Luiz A. C. Galvão*[4]

Suggested citation Haby MM, Chapman E, Clark R, Galvão LAC. Interventions that facilitate sustainable jobs and have a positive impact on workers' health: an overview of systematic reviews. Rev Panam Salud Publica. 2016;40(5):332–40.

ABSTRACT

Objective. *To identify interventions that facilitate sustainable jobs and have a positive impact on the health of workers in health sector workplaces.*

Methods. *This overview utilized systematic review methods to synthesize evidence from multiple systematic reviews and economic evaluations. A comprehensive search was conducted based on a predefined protocol, including specific inclusion criteria. To be classified as "sustainable," interventions needed to aim (explicitly or implicitly) to 1) have a positive impact on at least two key dimensions of the integrated framework for sustainable development and 2) include measures of health impact. Only interventions conducted in, or applicable to, health sector workplaces were included.*

Results. *Fourteen systematic reviews and no economic evaluations met the inclusion criteria for the overview. The interventions that had a positive impact on health included 1) enforcement of occupational health and safety regulations; 2) use of the "degree of experience rating" feature of workers' compensation; 3) provision of flexible working arrangements that increase worker control and choice; 4) implementation of certain organizational changes to shift work schedules; and 5) use of some employee participation schemes. Interventions with negative impacts on health included 1) downsizing/restructuring; 2) temporary and insecure work arrangements; 3) outsourcing/home-based work arrangements; and 4) some forms of task restructuring.*

Conclusions. *What is needed now is careful implementation, in health sector workplaces, of interventions likely to have positive impacts, but with careful evaluation of their effects including possible adverse impacts. Well-evaluated implementation of the interventions (including those at the pilot-study stage) will contribute to the evidence base and inform future action. Interventions with negative health impacts should be withdrawn from practice (through regulation, where possible). If use of these interventions is necessary, for other reasons, considerable care should be taken to ensure an appropriate balance between business needs and human health and well-being.*

Key words Sustainable development; employment; workers; health; review, systematic; Americas.

Sustainable development is generally thought of as development that balances social, environmental, and economic objectives or needs. It has been defined as "development which meets the needs of the present without compromising the ability of future generations to meet their own needs" (1, p. 41). Prior to the 2012 United Nations (UN) Conference on Sustainable Development held in Rio de Janeiro (commonly referred to as "Rio+20"), the UN System Task Team working on the Post-2015 UN Development Agenda proposed an integrated framework for sustainable development (2, p. 24). The framework informed the 2030 Agenda for Sustainable Development ("Agenda 2030") and the

[1] Department of Chemical and Biological Sciences, Universidad de Sonora, Hermosillo, Sonora, Mexico. Send correspondence to: Michelle Haby, haby@unimelb.edu.au

[2] Health Systems and Services, Pan American Health Organization, Brasília, DF, Brazil.

[3] Centre of Excellence in Intervention and Prevention Science, Melbourne, Victoria, Australia.

[4] Sustainable Development and Health Equity, Pan American Health Organization, Washington, District of Columbia, United States of America.

17 Sustainable Development Goals (SDGs) agreed upon by the UN in September 2015, designed to build on the Millennium Development Goals that expired in 2015 (3). The framework includes the core values of human rights, equality, and sustainability, plus four key dimensions: 1) inclusive social development; 2) inclusive economic development; 3) environmental sustainability; and 4) peace and security.

"Ensuring decent work and productive employment" is a key component of the inclusive economic development dimension of the framework. Following from this, decent work and productive employment were included as part of Goal 8 of the 17 SDGs ("Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all"), to be achieved by 2030 (3). Furthermore, the concept of "decent work," as defined by the International Labour Organization (ILO) and endorsed by the international community (4), and the four strategic pillars of the ILO Decent Work Agenda (5), are consistent with the intent of sustainable development represented in the integrated framework and are crucial for human health (2, p. 24).

Protecting human health is a key aspect of the "inclusive social development" dimension of the integrated framework for sustainable development and an outcome of, and precondition for, the other three dimensions (inclusive economic development, environmental sustainability, and peace and security). Therefore, the health sector has a significant role in producing evidence on the health impact of the sustainable development strategies and in encouraging intersectoral action to protect human health (6).

This overview of the systematic review and economic evaluation literature (along with three other, related overviews) was carried out by the Pan American Health Organization (PAHO) to inform the development of the new SDGs, including, but not limited to, the provision of evidence for its member states on the possible health impact(s) of policies and programs in non-health sectors (e.g., employment).

The objective of this overview was to use the best available evidence to answer the following question: "What are the interventions that facilitate sustainable jobs and have a positive impact on workers' health in health sector workplaces?" Sub-questions included: 1) "What is their impact on health inequalities?"; 2) "What evidence is there for their cost-effectiveness?"; and 3) "Which dimensions of the integrated framework are affected by the intervention, and how?"

Interventions that aimed (explicitly or implicitly) to have a positive impact on at least two dimensions of the integrated framework for sustainable development were classified as interventions that could facilitate sustainable jobs. Examples of interventions that fit these criteria included those related to precarious employment, such as temporary work, outsourcing, home-based work, and downsizing, which can have both health and economic impacts (7). A healthy workforce is a prerequisite for social and economic development and for productivity (8). Due to the large volume of literature available, this overview focused on interventions conducted in or applicable to health sector workplaces.

MATERIALS AND METHODS

This overview 1) used systematic review methodology to locate and evaluate published systematic reviews of interventions and 2) adhered to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement (9). A systematic review protocol was written and registered prior to undertaking the searches (10).

Inclusion criteria for studies

Studies were selected based on the inclusion criteria described below.

Types of studies. Studies included systematic reviews of studies of effectiveness, including reviews of randomized controlled trials (individuals or clusters); quasi-randomized controlled trials; controlled before-and-after studies; interrupted time series; and analytic observational studies (cohort, case-control, and cross-sectional studies). Economic evaluations (cost-effectiveness, cost–utility, and/or cost–benefit) and systematic reviews of economic evaluations were included.

Types of participants. Study participants included individuals, groups, communities, countries, or regions. Studies from both developed and developing countries were included.

Types of interventions. Interventions included programs, policies, strategies, legislation, and other courses of action to promote and/or provide fair terms of employment and decent working conditions. To be classified as "sustainable," interventions needed to aim (explicitly or implicitly) to have a positive impact on at least two dimensions of the integrated framework for sustainable development (e.g., inclusive economic development and inclusive social development (which includes health) or environmental sustainability and inclusive economic development but where impact on health was also measured). Health promotion interventions delivered by the health sector were excluded unless they specifically aimed to improve the terms of employment of workers and/or working conditions. Though not part of the original protocol, after the initial search and review of titles/abstracts, the funders and authors of this overview agreed to focus on interventions conducted in or applicable to health sector workplaces. This decision was made due to the large quantity of potentially relevant systematic reviews found in the literature search, which, if all included, would have made the overview unmanageable given time and budget constraints.

Types of comparisons. Comparisons included "no intervention," "another intervention," or "current practice."

Types of outcome measures. Primary outcomes included health measures at the level of the individual, group, community, country, region, and/or globally, including disease incidence, prevalence, and burden; mortality; morbidity; symptoms and signs of disease; health service use; quality of care[5]; health-related costs; and health inequalities, including by gender, age, socioeconomic status, area of residence, etc.

Publications in English, Spanish, or Portuguese and published in the last 17 years (from 1997 to the day of the search) were included. Both grey and peer-reviewed literature were sought and included.

Sources of systematic reviews and economic evaluations

A comprehensive search of 17 databases and 10 websites was conducted. The databases searched for systematic reviews

[5] Quality of care was added as a primary outcome when the funders and authors of the overview agreed to focus on interventions conducted in or applicable to health sector workplaces.

were PubMed; EMBASE®; CINAHL; ASSIA; PsycINFO; ScienceDirect; LILACS; SciELO; GreenFILE; The Cochrane Library (including Cochrane Reviews, the Database of Abstracts of Reviews of Effects (DARE), and the Health Technology Assessment Database (HTA)); The Campbell Library; and Health-Evidence™.

The websites that were searched included specialized sources for systematic reviews and other websites: Effective Public Health Practice Project, Evidence for Policy and Practice Information and Coordinating Centre (EPPI-Centre), National Institute for Health and Clinical Excellence (NICE), The Community Guide (Centers for Disease Control and Prevention (CDC)), International Initiative for Impact Evaluation ("3ie"), the Sax Institute Evidence Check Library (for rapid reviews), WHO (including the library database (WHOLIS) and the Institutional Repository for Information Sharing (IRIS)), Google, and the ILO. The reference list of included systematic reviews was also searched.

For economic evaluations, two specialized databases were searched: EconLit (American Economic Association abstracting database) and the NHS Economic Evaluation Database (NHS EED).

Search strategy

Searches were conducted from 14 to 16 January 2014. Databases were searched using the key words shown in Table 1, searched for in the title and abstract, except when noted otherwise. Key word areas were joined using 'AND'. Searches were limited to human research with a publication date between 1 January 1997 and the day of the search. A sample search strategy for EMBASE using the Ovid interface (Ovid Technologies, New York, NY, United States) is also shown in Table 1. Results were downloaded into the EndNote reference management program (version X7) (Thomson Reuters, New York, NY) and duplicates removed.

Screening, data collection, and analysis

Searches were conducted and screened according to the selection criteria by one review author (MH). The full text of any potentially relevant papers was retrieved for closer examination. The inclusion criteria were applied to the papers independently by two reviewers (MH and RC). Disagreements regarding eligibility of studies were resolved by discussion and consensus. All studies that initially appeared to meet the inclusion criteria but on inspection of the full-text paper did not were listed in a table ("Characteristics of excluded systematic reviews") with the reasons for their exclusion. One reviewer (MH) extracted all relevant data from the included papers using a standard form. A second reviewer (RC) verified the extracted data. Differences were resolved by discussion and consensus. Data/information extracted from systematic reviews included objectives, inclusion criteria for the systematic review, date of search, number of studies included, country or region of included studies, details of interventions studied, the integrated framework dimensions targeted by the individual studies (implicitly or explicitly), summary of findings in relation to health, impact on any of the key dimensions of sustainable development, impact on health inequalities, impact on secondary outcomes, impact on human rights, limitations of the systematic review, research gaps, and critical success factors for the interventions.

Findings from the included publications and their methodological quality were synthesized using tables and a narrative summary. Meta-analysis was not possible because included studies were heterogeneous in terms of the type of intervention studied and outcomes measured.

Assessment of methodological quality

The methodological quality of included systematic reviews was assessed independently by two reviewers using AMSTAR: A MeaSurement Tool to Assess Reviews (11). For this overview, reviews that achieved AMSTAR scores of 8 to 11 were considered "high-quality"; scores of 4 to 7 "medium-quality"; and scores of 0 to 3 "low-quality". These cut-offs are commonly used in Cochrane Collaboration overviews. The review quality assessment was used to interpret the results of reviews when synthesized in this overview and in the formulation of conclusions.

RESULTS

Search results

Fourteen systematic reviews (and no economic evaluations) met the inclusion criteria for the overview (7, 12–24). The selection process for systematic reviews and the number of papers found at each stage are shown in Figure 1. Eleven

TABLE 1. Key word areas and sample search strings used to identify studies for an overview of systematic reviews on interventions that facilitate sustainable jobs and have a positive effect on workers' health, 1997–2014

Key word area	Details
Jobs	*"Occupational health" OR occupation$ OR worker$ OR employment OR workplace OR "occupational health[MESH Term]*
Interventions	*program OR policy OR policies OR strategy OR legislation OR law$ OR intervention OR technique OR regulation OR procurement OR incentive OR prevention*
Outcomes	*disease OR injury OR burden OR incidence OR prevalence OR mortality OR morbidity OR health$*
Systematic reviews	*"systematic review" OR "meta-analysis" (OR "review"[a] as subject)*

Sample search string for EMBASE (Ovid interface)
("occupational health" or occupation* or worker* or workplace or employment or "work* conditions").kw. or "occupational health".sh. AND
(program or policy or policies or strategy or legislation or law* or intervention or technique or regulation or procurement or incentive or prevention).kw. AND
("systematic review" or "meta-analysis").mp. AND
(disease or injury or burden or incidence or prevalence or mortality or morbidity or health*).mp.
limit to (human and yr="1997-Current")

Source: Prepared by the authors based on the literature search process.
[a] This key word was used for non-health databases only.

papers were excluded at the full-text stage because they were not systematic reviews (n = 3), did not include health sector workers (n = 1), did not look at interventions related to sustainable jobs in health sector workplaces (n = 4), and/or did not measure (or aim to measure) the relevant health outcomes (n = 7) (Supplementary Material File 1, Table A1a). One additional systematic review was located through the search of the reference list of included systematic reviews (7), one through communication with Professor Clare Bambra (Durham University, United Kingdom) regarding her included systematic reviews (16), and one through a search by the funders (17).

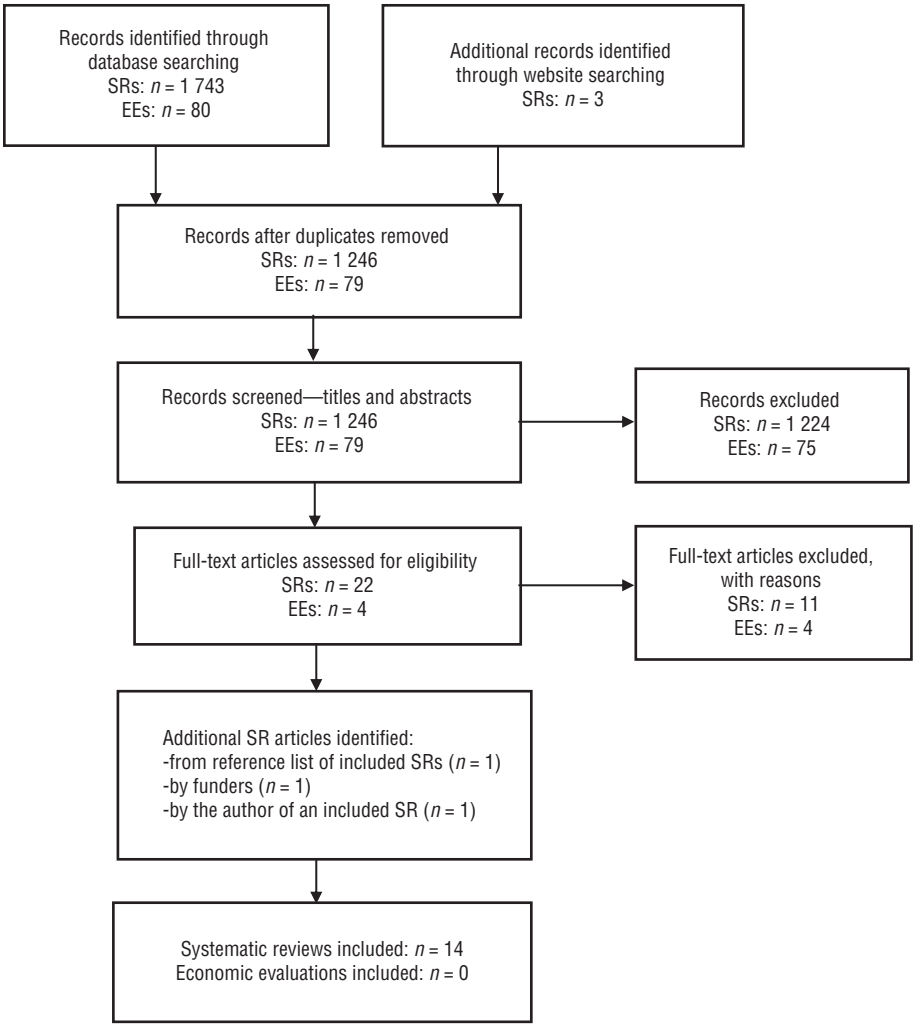
The selection process for economic evaluations and the number of papers found at each stage are also shown in Figure 1. After examination of the full-text papers, all four potential economic evaluations were excluded for the reasons given in Supplementary Material File 1 (Table A1b).

Characteristics of included studies and quality assessment

Interventions studied in the included systematic reviews are shown in Box 1. No systematic reviews or economic evaluations were found that looked specifically at the impact on health of 1) informal work; 2) the application of occupational health and safety (OHS) policies and programs among informal workers; 3) secure work and a living wage (one that takes into account the real and current cost of living) in both the formal and informal sectors; 4) measures that strengthen the capacity of the health sector to promote the inclusion of workers' health in other sectors' policies; 5) consideration of workers' health in trade policies; 6) employment policies; 7) consideration of workers' health in multilateral environmental agreements and mitigation strategies, environmental management systems, and plans for emergency preparedness and response; 8) addressing workers' health in sectorial policies for different branches of economic activity, particularly those with the highest health risk; and 9) consideration of workers' health in primary, secondary, and higher-level education and vocational training (25, 26).

The types of interventions studied, quality of the evidence, and impact on health are shown in Table 2. Additional details about the characteristics of the included systematic reviews can be found in Supplementary Material File 2. AMSTAR scores ranged from 3 to 10, with five systematic reviews rated as "high-quality" (scores between 8 and 11) (12, 16, 18, 20, 24); six rated as "medium-quality" (scores between 4 and 7) (13–15, 19, 21, 22); and three rated as "low-quality" (scores between 0 and 3) (7, 17, 23). The AMSTAR scores are shown in Supplementary Material File 2 (Table A2a). All three systematic reviews covering precarious employment / production system rationalization were rated as low-quality, so their results should be interpreted with care.

FIGURE 1. Flow diagram of the number of records identified, included, and excluded in the search for systematic reviews (SRs) and economic evaluations (EEs) of interventions designed to facilitate sustainable jobs and have a positive impact on workers' health, 1997–2014



Source: Prepared by the authors based on the study selection process; flow diagram adapted from (9).

Effectiveness

The most promising interventions included in this overview and applicable to health sector workplaces in terms of their impact on health were 1) enforcement of OHS regulations with inspections; 2) use of the degree of experience rating in workers' compensation insurance; 3) flexible working arrangements that increase worker control and choice; 4) organizational changes to shift work schedules (positive for switching from slow to fast rotation, changing from backward to forward rotation, and self-scheduling of shifts); and 5) some employee participation schemes[6] (Table 2).

[6] These schemes did not, however, protect employees from generally poor working conditions.

BOX 1. Interventions conducted in, or applicable to, health sector workplaces that were studied in the included systematic reviews, 1997–2014[a]

Occupational health and safety (OHS)
- Voluntary OHS management system interventions
- Regulation
- Enforcement of OHS regulation (e.g., inspections, citations, or fines)
- Workers' compensation features—introduction of experience rating[b]; degree of experience rating

Precarious employment/production system rationalization
- Downsizing/restructuring
- Lean practices
- High performance work systems
- Outsourcing/home-based work
- Small business/self-employment
- Temporary workers
- Part-time workers

Flexible work arrangements
- Temporal flexibility (self-scheduling of shift work, flextime, overtime)
- Contractual flexibility (gradual retirement, involuntary part-time work, fixed-term contract)
- Spatial flexibility (teleworking)

Shift work—changes at the organizational level
- Compressed working week (e.g., four 12-hour shifts).
- Changes to the shift schedule (e.g., direction of rotation,[c] self-scheduling)

Task restructuring
- Task variety (e.g., in primary nursing where each patient is assigned to an individual nurse who takes 24-hour responsibility for the patient, including planning and quality of care)
- Team working
- Autonomous groups—combines aspects of job enrichment and team working as well as increased worker participation

Employee participation—interventions at the organizational level
- Employee committees
- Giving employees more control over their working hours

Professional nursing practice

Paying for performance to improve the delivery of health interventions

In-work tax credits for families

Source: Prepared by the authors based on the overview of systematic reviews.

[a] There is overlap between some of these intervention types (e.g., some flexible work arrangements, such as shift work, with irregular hours, employment on call, temporary agency work, and involuntary part-time work, can also be classified as precarious employment).

[b] When insurance providers (public or private) attempt to encourage prevention efforts by tying a firm's insurance premiums to its claims activity (e.g., lower premiums for lower claims).

[c] Direction of rotation of shifts can change from backward (night, afternoon, morning) to forward (morning, afternoon, night) or vice versa.

Negative health impacts were found for 1) precarious employment/production system rationalization (downsizing/restructuring, temporary work, outsourcing/home-based work), except in Scandinavian welfare state regimes,[7] and 2) autonomous groups—a form of task restructuring.

No evidence was found for teleworking, a form of flexible working. For all other interventions, evidence on the impact on health was either insufficient or mixed (Table 2). The cost-effectiveness of the included interventions is not known.

Impact on health inequalities

The impact of interventions on health inequalities is largely unknown. Five of the systematic reviews included health inequalities as explicit outcomes (12–14, 16), and another four attempted to report socioeconomic and/or gender differences (7, 15, 17, 20). However, where impact on health inequalities was assessed it was done in few of the included primary studies, and the findings were mostly inconclusive. However, the results indicated that employee participation schemes might benefit lower-grade workers and those belonging to ethnic minority groups (based on one study) (15). For precarious employment, five out of eight studies that examined gender found that women were especially vulnerable to adverse health effects (7), while another systematic review on the same topic found more nuanced results (17).

[7] The two included systematic reviews on this topic were rated as low-quality, however, so these results should be interpreted with care.

TABLE 2. Interventions studied,[a] quality of the evidence, and results (impact on workers' health), 1997–2014

Intervention	Type of countries	Number and quality of systematic reviews	Impact on health
Occupational health and safety (OHS) • Voluntary OHS management system interventions	Developed	1 medium-quality SR[b]	Insufficient evidence (21)
• Regulation • Enforcement	Developed	1 high-quality and 2 medium-quality SRs	Regulation—insufficient, mixed evidence (21, 22) Enforcement—limited evidence that inspections are effective (18, 22); insufficient high-quality evidence that fines and penalties are effective (18, 22)
• Workers' compensation features	Developed	1 medium-quality SR	Mixed evidence for introduction of experience rating; some evidence of positive impact for the degree of experience rating (22)
Precarious employment / production system rationalization • Downsizing/restructuring • Lean practices • High performance work systems • Outsourcing/home-based work • Small business/self-employment • Temporary workers • Part-time worker	Developed and developing[c]	3 low-quality SRs	Negative health impact of downsizing/restructuring, particularly for the health sector (7, 23) Negative health impact for temporary workers and outsourcing/home-based work (7) Mixed results for other practices (7, 23) In Scandinavian countries, precarious workers report better or equal health status when compared to their permanent counterparts. All other welfare regimes showed negative health impacts (17).
Flexible working arrangements • Temporal flexibility (self-scheduling of shift work, flextime, overtime) • Contractual flexibility (gradual retirement, involuntary part-time work, fixed-term contract) • Spatial flexibility (teleworking)	Developed	1 high-quality SR	Some evidence that flexible working interventions that increase worker control and choice (such as self-scheduling of shifts or gradual/partial retirement) are likely to have a positive effect on health outcomes The evidence for flextime, overtime, involuntary part-time work, fixed-term contract is insufficient No primary studies were found for teleworking (16)
Shift work—changes at the organizational level • Compressed working week (CWW) • Changes to the shift schedule	Developed	2 medium-quality SRs	CWW—no consistent positive impact on health, though no detrimental effects (13) Positive health impact of switching from slow to fast rotation, changing from backward to forward rotation, and self-scheduling of shifts. No health impact for other changes (14).
Task restructuring • Task variety • Team working • Autonomous groups	Developed	1 high-quality SR	Task variety—no effect (nursing) or limited positive effect Team working—no clear health impact Autonomous groups—adverse health effects (12)
Employee participation—interventions at the organizational level • Employee committees • Giving employees more control over their working hours	Developed	1 medium-quality SR	Some interventions may benefit employee health but may not protect employees from generally poor working conditions (15)
Professional nursing practice	Mostly developed	1 medium-quality SR	Insufficient evidence of health impact (19)
Paying for performance to improve the delivery of health interventions	Developing	1 high-quality SR	Evidence too weak to draw conclusions (24)
In-work tax credits for families	Developed	1 high-quality SR	Weak evidence of no health impact, though some studies suggest that rates of smoking in adult women may be reduced (20)

Source: Prepared by the authors based on the overview of systematic reviews.

[a] All interventions were conducted in or applicable to health sector workplaces.

[b] SR: systematic review.

[c] In the systematic review by Quinlan et al. (7) all included studies were conducted in developed countries; the systematic review by Kim et al. (17) included at least one study in a developing country; in the systematic review by Westgaard & Winkel (23) the country in which the studies were conducted is not specified.

The fact that precarious employment can lead to poorer health is in itself evidence of employment-related health inequalities (7, 17, 23).

Dimensions of the integrated framework for sustainable development that were affected

Given the inclusion criteria, all interventions that were studied aimed to have an impact on inclusive social development, which includes health. Most of the interventions that were reviewed also aimed to have an impact on inclusive economic development (although the economic effects of the interventions were not well assessed). OHS regulations led to an increase in workplace productivity (based on one study) (21). No effect on workplace productivity was found for the use of inspections to enforce regulations (based on two studies) (18). According to the reviewers, none of the interventions in the included studies had the potential to affect environmental sustainability or peace and security.

DISCUSSION

The sustainable jobs interventions conducted in or applicable to health sector workplaces that had a positive impact on

health included 1) enforcement of OHS regulations; 2) use of the "degree of experience rating" feature of workers' compensation; 3) flexible working arrangements that increase worker control and choice (e.g., gradual/partial retirement); 4) some organizational changes to shift work schedules (e.g., self-scheduling of shifts); and 5) some employee participation schemes (e.g., employee committees). Interventions with negative impacts on health included 1) downsizing/restructuring; 2) temporary and insecure (precarious) work; 3) outsourcing/home-based work; and 4) some forms of task restructuring (autonomous groups). Evidence for all other interventions studied was insufficient or mixed.

Several of the systematic reviews included in this overview supported the hypothesis that level of employee control is important in improving employee health (12, 14–16). This included "micro-level" organizational interventions that affect workers' daily task structures (12); self-scheduling of shift work (14, 16); organizational-level interventions intended to increase employees' opportunities to make decisions or participate in decision-making (15); and flexible working interventions that increase worker control and choice, such as self-scheduling of shift work or gradual/partial retirement (16). However, the authors of one systematic review suggested that participation interventions that increase employee control are unlikely to protect employees from generally poor working conditions (15). For example, two studies of participatory interventions occurring alongside redundancies reported worsening employee health (15). Qualitative evidence suggests that this may be due to job insecurity and communication barriers associated with workplace hierarchies hindering participation interventions (15).

For task restructuring interventions, change in the level of control tended to be a more important factor than change in support (12). In all but one study, interventions that increased support while demands were increased and control decreased still reported adverse health consequences (12).

The motivation for implementation of the intervention was also very important. Studies in which the motivation for implementing the intervention was employee well-being tended to have more positive psychosocial, health, and work–life balance effects, whereas the effects of those that were the most overtly driven by economics (e.g., fixed-term contracts, involuntary part-time employment, etc.) were negative or negligible in relation to health outcomes (12, 13, 16). This included task restructuring interventions (12); compressed working week (CWW) interventions (13); and flexible work interventions such as self-scheduling or gradual/partial retirement (16).

While precarious employment can take many forms, evidence from two low-quality systematic reviews showed that downsizing/restructuring, temporary work, and outsourcing/home-based work in particular had negative effects on workers' health, especially in developed countries (7, 23). It was hypothesized by the authors of one of the systematic reviews that, compared to their more secure counterparts, workers in many precarious jobs are subject to high demands / low rewards and have limited decision latitude, even in the case of self-employed and home-based workers (7). Possible reasons for the negative impacts on health include 1) economic and reward pressures on precarious workers; 2) the association of precarious employment with more disorganized work processes or settings (inadequate supervision, training etc.); and 3) inadequacy in regulation or compliance practices (7). This is likely to be an even bigger problem in developing countries where the regulatory regimes are less strong.

Strengths and limitations

A key strength of this overview was the use of high-quality systematic review methodology (27). Publication bias could not be assessed quantitatively in this overview because the authors were unable to conduct a meta-analysis and no clear methods are available for assessing publication bias qualitatively (28). The quality of the included systematic reviews was generally good, with the majority (11/14) receiving a score of medium to high.

One limitation of this overview was that the included interventions were limited to systematic reviews and economic evaluations, even if primary studies were available. Furthermore, to be included in the overview, a systematic review had to report health outcomes, precluding systematic reviews that only reported changes in environmental, economic, or peace and security outcomes.

Another limitation was the lack of primary studies in developing countries, which restricted the generalizability of the overview to developed countries. Also, only primary studies in the public domain were locatable (the majority of commercial studies were not). Finally, as noted by several of the authors of the systematic reviews included in this overview, the interventions tested in primary studies were not always well described, which made it difficult to fully understand important details about the intervention that was delivered (e.g., whether the employees or managers were supportive of the intervention (12) and whether the intervention was delivered as intended (15)). These limitations have been taken into account when presenting and interpreting the results of the systematic reviews.

Implications for policy

Interventions that increase workers' autonomy or decision latitude and lead to greater alignment between employee needs and the work environment are likely to increase job satisfaction and be good for the work–life balance and health of the worker (16). In contrast, the effects of employer-oriented forms of flexibility, such as casual employment and labor hire, are likely to play out differently, with the worker lacking job security, protection, and choice and control (29). Thus, certain types of worker-oriented flexible working arrangements represent a plausible means through which policy-makers and employers can promote healthier workplaces and improve work practices (16). Policy-makers should also promote and support further research in the areas where gaps were found (described in more detail below), especially in developing countries and for interventions in the informal sector.

Implications for research

More research is needed on the intervention types for which no systematic reviews or economic evaluations were found. This might require more primary studies (until a systematic review is attempted it is difficult to determine if this is necessary). Based on the systematic reviews that were conducted it is clear that primary studies in the health sector (preferably with an appropriate control group) are needed in the following areas: 1) flexible working interventions—teleworking, annualized hours, job sharing; 2) interventions in developing / low- middle-income countries; and 3)

interventions in the informal sector. This research must be rigorous and well designed, with credible control groups and objective outcome measures, and must 1) measure, where possible, the organizational or economic effects of the intervention, as well as the health outcomes, and the impact on health inequalities; 2) describe the background and motivation for the intervention (i.e., the study context) as well as details on how the intervention was delivered and the extent to which workers and managers supported the arrangements; 3) include a process evaluation, to ensure the intervention is implemented as intended (i.e., ensure the fidelity of the intervention) and that it does not have unintended consequences; 4) include long-term measures (12 months or more), to measure the sustainability of the results; and 5) assess the cost-effectiveness of the interventions. Where multiple interventions are studied, the research design must allow for the measurement of the relative impacts of each intervention studied.

In the case of precarious employment, a new, high-quality systematic review would be helpful to overcome the limitations of the three low-quality systematic reviews already conducted (7, 17, 23). This is particularly important for developing countries, where precarious employment has significant implications for national economies and workers. This type of systematic review should take advantage of the large number of studies in this area and include not only a meta-analysis but also a meta-regression to determine the factors that affect the relationship between precarious employment and health (e.g., gender, type of precarious employment, job security, welfare state regime, etc.).

Conclusions

What is needed now is careful implementation in health sector workplaces of interventions that are likely to have positive impacts. In turn, the implementation of these interventions must be carefully evaluated, including possible adverse impacts. Well-evaluated implementation of the interventions (including those at the pilot-study stage) will contribute to the evidence base and inform future action. Interventions with negative health impacts should be withdrawn from practice (through regulation, where possible). If use of these interventions is necessary, for other reasons, considerable care should be taken to ensure an appropriate balance between business needs and human health and well-being.

Acknowledgments. The authors thank the two reviewers who critically reviewed an earlier and longer version of this manuscript and provided very helpful comments.

Funding. This work was funded by PAHO. Apart from the input of the two PAHO authors (EC and LG), the funders did not influence the methods or content of the overview.

Conflicts of interest. None.

Disclaimer. Authors hold sole responsibility for the views expressed in the manuscript, which may not necessarily reflect the opinion or policy of the *RPSP/PAJPH* or the Pan American Health Organization (PAHO).

REFERENCES

1. World Commission on Environment and Development. Our common future (Brundtland Report). Oxford: Oxford University Press; 1987. 400 pp.
2. United Nations System Task Team. Realizing the future we want for all. Report of the UN System Task Team on the Post-2015 Development Agenda. New York: UN; 2012. Available from: http://www.un.org/en/development/desa/policy/untaskteam_undf/report.shtml
3. United Nations General Assembly. Transforming our world: the 2030 agenda for sustainable development. Resolution adopted by the General Assembly on 25 September 2015. New York: UN; 2015. (A/RES/70/1). Available from: https://sustainabledevelopment.un.org/post2015/transformingourworld
4. World Health Organization. Health in the green economy—occupational health. Initial findings from a WHO Expert Consultation, 17–18 May 2012, Rio de Janeiro. Geneva: WHO; 2012. Available from: http://www.who.int/hia/green_economy/en/
5. International Labour Organization. Decent work [Internet]. Geneva: ILO; 2013. Available from: http://www.ilo.org/global/topics/decent-work/lang--en/index.htm Accessed on 8 November 2013.
6. Pan American Health Organization. Health, environment and sustainable development: towards the future we want. A collection of texts based on the PAHO Seminar Series 'Towards Rio+20' that occurred in the period between 8 February and 13 June 2012. Washington: PAHO; 2013. Available from: http://www.paho.org/hq/index.php?option=com_docman&task=doc_view&gid=22825&
7. Quinlan M, Mayhew C, Bohle P. The global expansion of precarious employment, work disorganization, and consequences for occupational health: a review of recent research. Int J Health Serv. 2001;31(2):335–414.
8. World Health Organization. Health indicators of sustainable jobs in the context of the Rio+20 UN Conference on Sustainable Development. Initial findings from a WHO Expert Consultation, 17–18 May 2012, Rio de Janeiro. Geneva: WHO; 2012. Available from: http://www.who.int/hia/green_economy/indicators_jobs.pdf
9. Moher D, Liberati A, Tetzlaff J, Altman DG; PRISMA Group. Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. PLoS Med. 2009;6(7):e1000097.
10. Haby M, Chapman E, Clark R, Galvão L. Interventions that have a positive impact on worker's health and facilitate sustainable development: an overview of systematic reviews [protocol]. PROSPERO. 2014;CRD42014008944. Available from: http://www.crd.york.ac.uk/PROSPERO/display_record.asp?ID=CRD42014008944
11. Shea BJ, Grimshaw JM, Wells GA, Boers M, Andersson N, Hamel C, et al. Development of AMSTAR: a measurement tool to assess the methodological quality of systematic reviews. BMC Med Res Methodol. 2007;7:10.
12. Bambra C, Egan M, Thomas S, Petticrew M, Whitehead M. The psychosocial and health effects of workplace reorganisation. 2. A systematic review of task restructuring interventions. J Epidemiol Community Health. 2007;61(12):1028–37.
13. Bambra C, Whitehead M, Sowden A, Akers J, Petticrew M. "A hard day's night?" The effects of Compressed Working Week interventions on the health and work–life balance of shift workers: a systematic review. J Epidemiol Community Health. 2008;62(9):764–77.
14. Bambra CL, Whitehead MM, Sowden AJ, Akers J, Petticrew MP. Shifting schedules: the health effects of reorganizing shift work. Am J Prev Med. 2008;34(5):427–34.
15. Egan M, Bambra C, Thomas S, Petticrew M, Whitehead M, Thomson H. The psychosocial and health effects of workplace reorganisation. 1. A systematic review of organizational-level interventions that aim to increase employee control. J Epidemiol Community Health. 2007;61(11):945–54.
16. Joyce K, Pabayo R, Critchley JA, Bambra C. Flexible working conditions and their effects on employee health and wellbeing. Cochrane Database Syst Rev. 2010;2:CD008009.

17. Kim IH, Muntaner C, Vahid Shahidi F, Vives A, Vanroelen C, Benach J. Welfare states, flexible employment, and health: a critical review. Health Policy. 2012;104(2):99–127.
18. Mischke C, Verbeek Jos H, Job J, Morata TC, Alvesalo-Kuusi A, Neuvonen K, et al. Occupational safety and health enforcement tools for preventing occupational diseases and injuries. Cochrane Database Syst Rev. 2013;8:CD010183.
19. Pearson A, Porritt K, Doran D, Vincent L, Craig D, Tucker D, et al. A systematic review of evidence on the professional practice of the nurse and developing and sustaining a healthy work environment in healthcare. Int J Evid Based Healthc. 2006;4(3):221–61.
20. Pega F, Carter K, Blakely T, Lucas PJ. In-work tax credits for families and their impact on health status in adults. Cochrane Database Syst Rev. 2013;8:CD009963.
21. Robson LS, Clarke JA, Cullen K, Bielecky A, Severin C, Bigelow PL, et al. The effectiveness of occupational health and safety management system interventions: a systematic review. Safety Science. 2007;45(3): 329–53.
22. Tompa E, Trevithick S, McLeod C. Systematic review of the prevention incentives of insurance and regulatory mechanisms for occupational health and safety. Scand J Work Environ Health. 2007;33(2):85–95.
23. Westgaard RH, Winkel J. Occupational musculoskeletal and mental health: significance of rationalization and opportunities to create sustainable production systems—a systematic review. Appl Ergon. 2011;42(2):261–96.
24. Witter S, Fretheim A, Kessy FL, Lindahl AK. Paying for performance to improve the delivery of health interventions in low- and middle-income countries. Cochrane Database Syst Rev. 2012;2:CD007899.
25. Commission on Social Determinants of Health. Closing the gap in a generation: health equity through action on the social determinants of health. Final Report of the Commission on Social Determinants of Health. Geneva: World Health Organization; 2008.
26. World Health Organization. Resolution 60.26. Workers' health: global plan of action. Sixtieth World Health Assembly, 13–23 May 2007, Geneva, Switzerland. Geneva: WHO; 2007.
27. Higgins JP, Green S, editors. Cochrane handbook for systematic reviews of interventions. Version 5.1.0 [updated March 2011]. London: The Cochrane Collaboration; 2011. Available from: www.handbook.cochrane.org
28. Song F, Parekh S, Hooper L, Loke YK, Ryder J, Sutton AJ, et al. Dissemination and publication of research findings: an updated review of related biases. Health Technol Assess. 2010;14(8):iii, ix–xi, 1–193.
29. Employment Conditions Knowledge Network. Employment conditions and health inequalities. Final Report to the WHO Commission on Social Determinants of Health. Geneva: World Health Organization; 2007. Available from: http://www.who.int/social_determinants/resources/articles/emconet_who_report.pdf

Manuscript received on 21 August 2015. Revised version accepted for publication on 21 December 2015.

ABSTRACT

Intervenciones que facilitan el empleo sostenible y tienen un impacto positivo en la salud de los trabajadores: una síntesis de revisiones sistemáticas

Objetivo. Determinar las intervenciones que facilitan el empleo sostenible y tienen un impacto positivo en la salud de los trabajadores del sector de la salud.

Métodos. En esta síntesis se utilizaron métodos de revisión sistemática a fin de resumir los datos de múltiples revisiones sistemáticas y evaluaciones económicas. Se realizó una amplia búsqueda de acuerdo con un protocolo predefinido, que incluyó criterios de inclusión específicos. Para que se clasificaran como "sostenibles" las intervenciones debían estar dirigidas (explícitamente o implícitamente) a: 1) tener una repercusión positiva en al menos dos dimensiones clave del marco integrado para el desarrollo sostenible y 2) incluir mediciones de los efectos de salud. Solo fueron incluidas las intervenciones realizadas en los lugares de trabajo del sector de la salud, o aplicables a este entorno.

Resultados. Catorce revisiones sistemáticas reunieron los criterios de inclusión en la síntesis, pero ninguna evaluación económica los reunió. Las intervenciones que tuvieron un impacto positivo en la salud fueron, entre otras: 1) cumplimiento de los reglamentos en materia de salud y seguridad ocupacionales; 2) inclusión del factor de "ajuste por frecuencia siniestral" del sistema de aseguramiento de los riesgos del trabajo; 3) introducción de modalidades de trabajo flexibles que aumentan el control y la elección de los trabajadores; 4) adopción de determinados cambios organizativos para modificar los horarios de trabajo y 5) establecimiento de algún mecanismo de participación de los empleados. Las intervenciones que tuvieron una repercusión negativa en la salud incluyeron 1) reestructuración y recortes; 2) contrato de trabajo temporal y precario; 3) contratación externa y trabajo desde el domicilio y 4) algunas formas de reestructuración de tareas.

Conclusiones. Es necesario ejecutar cuidadosamente en los lugares de trabajo del sector de la salud las intervenciones con más probabilidades de tener un impacto positivo y evaluar cuidadosamente la ejecución de dichas intervenciones, incluidos los posibles efectos adversos. La ejecución apropiadamente evaluada de las intervenciones (incluidas aquellas en la etapa de prueba piloto) contribuirá a ampliar la base empírica y sustentar la acción futura. Las intervenciones que repercuten negativamente en la salud deberían ser eliminadas de la práctica (en lo posible, mediante la reglamentación). Si por alguna razón esas intervenciones fueran necesarias, se debería tener el suficiente cuidado de garantizar un equilibrio adecuado entre las necesidades institucionales y la salud y el bienestar humanos.

Palabras clave Desarrollo sostenible; empleo; trabajadores; salud; revisión; Américas.