Assessing the usefulness of systematic reviews for policymakers in public health: A case study of overweight and obesity prevention interventions

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\textbf{A B S T R A C T}

Objective: Systematic reviews (SRs) should include policy-relevant information in order to more readily inform policy and practice. We investigated whether SRs of overweight and obesity prevention interventions are framed in such a way that maximises their usefulness for policymakers. Method: We conducted a systematic review of SRs of overweight and obesity prevention interventions published in 4 databases any time up to December 2014. We analysed the SRs for their usefulness to policymakers, using a coding frame developed based on literature around what policymakers want and need from systematic reviews. Systematic reviews were assessed for a) policy links and framing; b) quality assessment and conflict of interest statements; and c) discussion of policy implications. Results: Of the 153 SRs that met the inclusion criteria, very few (7%) had authors from policy-based organisations, 48% had funding from such organisations, and almost a third (31%) framed their introduction or aims around policy. Most (69%) discussed issues affecting generalisability of the SR findings but only a quarter (24%) discussed cost or cost-effectiveness of the intervention under investigation. Less than a third (29%) of SRs discussed the policy implications of their findings. SRs that were policy-framed were significantly more likely to discuss costs (PR = 1.8, 95%CI 1.0–3.0) and policy implications (PR = 2.5, 95%CI 1.5–4.0). Conclusion: SRs should discuss the policy and practice implications of their findings to maximise the influence of SRs on policy making. It is recommended that SR guidelines are updated to include generalisability and discussion of policy and practice implications as a requirement.

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\textbf{Introduction}

Systematic reviews (SRs) aim to identify, synthesise, and critique the available evidence on a given question to inform policy, practice, and research (Mulrow, 1994). Policymakers are a key audience for SRs, using them as an important source of evidence when formulating or reviewing policies and programmes (Bero and Jadad, 1997; Milat et al., 2014; Perrier et al., 2011). They can be an important source of evidence in fields like public health, where SRs synthesise evidence from a complex range of interventions with varying study designs, intervention components, and outcomes (Jackson and Waters, 2005).

Up to date indexing of articles in electronic databases has made SRs significantly easier to prepare as search techniques can be automated (at least to an extent) and coverage is more comprehensive compared to manual, paper-based searches. That said, the comparative ease of conducting a SR may mean that many are being conducted without considering the needs of intended audiences. In this way, SRs may have become akin to the fable of the ‘Emperor’s new clothes’ (Anderson, 1837), which in this context represents a pretence that there is a match between researcher objectives and policymaker or practitioner needs when in reality there is a mismatch (Brownson et al., 2006).

There is recognition amongst both policymakers and researchers of the need to build and maintain strong linkages between research and public policy (Brownson and Jones, 2009; Macintyre, 2012). Despite this, in an analysis of SRs of childhood obesity interventions, Wolfenden and colleagues concluded that they generally provide limited policy-relevant information (Wolfenden et al., 2010). It is not surprising then that often policymakers feel that researchers do not sufficiently consider the policy implications of their results or present results in a useful way (Campbell et al., 2009; Petticrew et al., 2004) even though the discussion on how to make SRs policy-relevant is not new (Mulrow, 1994; Bero and Jadad, 1997; Innvaer et al., 2002; Lavis, 2009).

The question then is what do authors need to include when preparing SRs in order to truly maximise their usefulness to policymakers? Previous research with policymakers and analyses of SRs has suggested a number of factors: policymakers should be part of SR development; SRs must have a clear purpose and be relevant to policy; SRs should draw upon good quality research, necessitating an assessment by SR authors of...
research quality; SRs should provide contextual information that affects the generalisability of the SR’s findings, as well as information on likely costs; and SRs should wherever possible include clear recommendations for policy-related action (Milat et al., 2014; Wolfenden et al., 2010; Campbell et al., 2009; Invaera et al., 2002; Lavis, 2009; Higgins and Green, 2011; Lavis et al., 2005). In addition, conflicts of interest (perceived or real) should be declared, given previous research has shown that research findings and conclusions can be influenced by funding and other potential conflicts of interest (Lundh et al., 2012).

This paper investigated whether SRs are designed and/or structured in such a way that maximises their usefulness for policymakers, using SRs of overweight and obesity prevention, physical activity, and nutrition interventions as a case study. Specifically, we aimed to answer the following questions: (1) have policymakers had the opportunity to influence (through, for example, authorship, funding, or priority-setting processes) the design, conduct, and/or reporting of SRs?; (2) do SRs include a conflict of interest statement and an assessment of the research quality of the included primary studies?; (3) do SRs include (or attempt to include) information about intervention costs or cost effectiveness and/or generalisability of their results?; and (4) do SRs consider policy implications of the review in the introduction, hypothesis/aim/research question, and discussion/conclusion?

Methods

Search strategy and article review

We conducted a search of overweight and obesity, physical activity, and nutrition intervention SRs in 4 databases: Medline; Cochrane Database of Systematic Reviews; Database of Abstracts of Reviews of Effects; and PsycINFO. We aimed to have a representative sample of SRs, rather than an exhaustive list of all SRs in these areas and so did not examine reference lists for additional SRs. Search terms used were restricted to the abstract and title only and included 'Obesity' or 'obese' or 'obesity' or 'weight' or 'physical activity' or 'walk' or 'diet' or 'nutrition' AND 'intervention' AND 'effect' or 'efficacy' AND 'systematic review' or 'meta-analysis'.

Articles were considered eligible if they were systematic reviews of obesity prevention, physical activity, or nutrition interventions in healthy populations, published in a peer-reviewed journal any time up to and including December 2014. Articles were excluded if they were non-systematic reviews; clinically-based interventions in primary care; focused on unwell published in a peer-reviewed journal any time up to and including December 2014. Articles were excluded if they were non-systematic reviews; clinically-based interventions in primary care; focused on unwell populations, settings, or private organisation that focused on policy development, implementation, or advocacy. Universities and other research-focused institutions were not deemed to be ‘policy-based’. Organisations unknown to the authors were searched to confirm their functions. Additionally, the SR was coded for whether it was framed around policy, either through explicit mention of policy in the introduction or whether its aims, hypothesis, or research questions explicitly addressed policy (Campbell et al., 2009; Invaera et al., 2002).

Information of relevance to policymakers

We recorded the presence or absence of an assessment of the quality of the included primary studies and, if such an assessment was conducted, whether it used clearly defined criteria (Invaera et al., 2002; Higgins and Green, 2011). Similarly, we noted whether a conflict of interest statement was present in the SR (Lundh et al., 2012). Additionally, we assessed whether the SR discussed issues around generalisability of their findings, whether it made an effort to discuss the costs of the intervention and/or its cost-effectiveness, whether it explicitly discussed the implications of the SRs findings for policy, and whether the SR's findings provided sufficient evidence to draw policy-relevant conclusions; that is, conclusions as to the effectiveness of the interventions examined by the SR that could be used by policymakers, regardless of whether the authors explicitly discussed the implications of the findings for policy (Milat et al., 2014; Wolfenden et al., 2010; Invaera et al., 2002; Lavis, 2009).

Statistical analysis

All data was coded on an Excel spreadsheet that was read into SPSS version 22.0 and analysed for basic frequencies. We also calculated prevalence ratios (PR) and conducted chi-squared tests for associations between policy links and framing and provision of policy-relevant information and discussion of policy implications.

In addition, we conducted simple linear regression using a 3-year rolling average to explore any linear increases in the average number of SRs published over time and, due to the non-normal distribution of the data, a non-parametric test (Wilcoxon rank-sum test) to determine if there was a difference in the median number of primary studies included in the SR between those SRs that had sufficient evidence to be able to draw policy-relevant conclusions and those that had insufficient evidence.

Results

The initial search yielded 2042 records, which, after removal of duplicates and abstract and title review, was reduced to 184 articles eligible for full text review (Fig. 1). A further 31 articles were excluded following full text review, leaving 153 SRs included in the final analysis (Aalbers et al., 2011; Aguiar et al., 2014; Aje and Chapman-Novakofski, 2014; Anderson et al., 2009; Aneni et al., 2014; Arbesman and Mosley, 2012; Ashford et al., 2010; Atkin et al., 2011; Ayliffe and Clayville, 2010; Barr-Anderson et al., 2013; Barr-Anderson et al., 2011; Beets et al., 2009; Benedict and Arterburn, 2008; Bird et al., 2013; Bleich et al., 2013; Bond et al., 2011; Bonell et al., 2013; Branscum and Sharma, 2011; Bravata et al., 2003; Bravata et al., 2007; Broekhuizen et al., 2012; Broekhuizen et al., 2014; Brown et al., 2012; Brown et al., 2009; Brown and Summerbell, 2009; Buchholz et al., 2013; Buckland et al., 2008; Camacho-Minano et al., 2011; Campbell et al., 2001; Campbell and Hesketh, 2007; Chapman et al., 2013; Chau et al., 2010; Chillon et al., 2011; Gama et al., 2010; Giliska et al., 2000; Clandel et al., 2012; Clandel et al., 2013; Clemen and Hayman, 2004; Clifton et al., 2014; Collins et al., 2014; Connelly et al., 2007; Cushing et al., 2014; da Silveira et al., 2013; De Bourdeaudhuij et al., 2011; De Leon et al., 2014; de Sa and Lock, 2008; Dobbins et al., 2013; Downs et al., 2013; Eakin et al., 2007; Engbers et al., 2005; Escaron et al., 2013; Everson-Hock et al., 2013; Fogelholm and Kukkonen-Harjula, 2000; Foster and Hillsdon, 2004; Fraser and Lock, 2011; Friedrich et al., 2012; Fry and Neff, 2009; Gao et al., 2008; Geaney et al., 2013; Geraerts et al., 2013; Goode et al., 2012; Groeneveld et al., 2010; Grosso et al., 2014; Gudzune et al., 2013; Hamel and Robbins, 2013; Hamel et al., 2011; Hardeman et al., 2000; Harris et al., 2009; Hebden et al., 2012; Hesketh and Campbell, 2010; Hieftje et al., 2013; Hingle et al., 2010; Hobbs et al., 2013; Holub et al., 2013; Hooper et al., 2012; Hutchesson et al., 2013; Ikkes et al., 2013; Jago and Baranowski, 2004; Jaime and Lock, 2009; Kamath et al., 2008; Katz et al., 2008; Kelly et al., 2013; Kesten
Fig. 1. Flow chart of search results.

None of the SRs were published before 2000, with the greatest number of articles (37) published in 2013. The rolling 3-yearly average

Descriptive characteristics

Fig. 2. Rolling average number of reviews published in each 3-year period.
number of SRs published each year increased over time in a linear fashion ($β = 1.93$, $R^2 = 0.87$; Fig. 2).

As shown in Table 1, most SRs focused on a particular population, with the most common being children or adolescents, adults, and minority or disadvantaged populations. Conversely, most SRs did not focus on a specific setting or mode of intervention delivery. Of those that did specify a setting, the most common were schools and workplaces. The most common modes of delivery were internet or computer-based interventions and telephone or SMS-based interventions. The most common reason given by authors for conducting an SR was that previous reviews were insufficient, which encompasses reasoning such as methodological concerns and a belief that an important population, setting, and/or mode of delivery has not been addressed adequately. The median number of included primary studies in the SRs was 19 (minimum 4, maximum 818; data not shown).

Very few of the included SRs had authors from policy-based organisations but nearly half reported funding or other support from a policy-based organisation. Additionally, nearly a third framed their introduction around policy, while only 11% of SRs framed their findings for policy. This is concerning but changing the translation of research into policy and practice (Barker, 2007).

Policymakers’ funding or otherwise supporting a review is a clear signal that it is a policy priority. Interestingly, however, our study found no evidence that having authors or funding from a policy-based organisation increased the likelihood of policy-relevant information being included in the review. This runs counter to previous research that emphasised the importance of researchers and policy makers co-producing research to ensure its policy relevance (Innvaer et al., 2002; Oliver et al., 2014; Milat et al., 2013a). Although it is understandable that policymakers would want to avoid the appearance of unduly influencing a SR’s findings, they should not be afraid to demand that researchers include information of relevance to them. At the same time, researchers receiving support from policy-based organisations should ensure that policy-relevant information is considered in all SRs. Indeed, we found that SRs that were framed around policy were more likely to include information about costs and to discuss the policy implications of their findings, suggesting that authors who considered policy up-front included information of relevance to policymakers.

One barrier to improving the policy-relevance of SRs, and other research outputs, may be that although researchers agree that making research accessible to policymakers is important, doing so is not often seen as a high personal priority (Campbell et al., 2009). This is reflected in the fact that less than a third of the SRs in our study discussed the implications of their findings for policy. This is concerning but changing this attitude may require a re-assessment of the value of contributions to policy by universities and funding agencies, as evidence from Canada has shown that members of academic promotions committees consider work with policy as being considerably less important than peer-reviewed publications (Phaneuf et al., 2007). This may be counter-productive given the ultimate aim of all research should be to influence policy and practice, not merely to produce research outputs for the sake of them.

Discussion

Our analysis of SRs in overweight and obesity, physical activity, and nutrition interventions shows that many lack important information of relevance to policymakers. While policymakers are not the only audience for SRs, it is essential that SRs include policy-relevant information more often in order to encourage the use of evidence to inform policy and, ultimately, to improve outcomes within public health. Such moves are consistent with recent efforts by funding agencies to increase the translation of research into policy and practice (Barker, 2007).

Table 1

<table>
<thead>
<tr>
<th>Characteristics of included systematic reviews (n = 153).</th>
<th>n (%)</th>
<th>n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Children/adolescents</td>
<td>62 (41)</td>
<td>Internet/computer-based</td>
</tr>
<tr>
<td>Adults</td>
<td>43 (28)</td>
<td>Telephone/SMS</td>
</tr>
<tr>
<td>Minority or disadvantaged populations</td>
<td>9 (6)</td>
<td>Other</td>
</tr>
<tr>
<td>Other</td>
<td>11 (7)</td>
<td>Not specified</td>
</tr>
<tr>
<td>Not specified</td>
<td>28 (18)</td>
<td>Rationale</td>
</tr>
<tr>
<td>Setting</td>
<td></td>
<td>Previous reviews insufficient</td>
</tr>
<tr>
<td>School</td>
<td>32 (21)</td>
<td>No previous reviews</td>
</tr>
<tr>
<td>Workplace</td>
<td>13 (8)</td>
<td>Update of previous review(s)</td>
</tr>
<tr>
<td>Other</td>
<td>14 (9)</td>
<td>Synthesis of existing reviews</td>
</tr>
<tr>
<td>Not specified</td>
<td>94 (61)</td>
<td>None stated</td>
</tr>
<tr>
<td>Policy links—authorship or support*</td>
<td></td>
<td>Policy framing – introduction or research aims*</td>
</tr>
<tr>
<td>Authorship</td>
<td>11 (7)</td>
<td>Introduction</td>
</tr>
<tr>
<td>Funding or other support</td>
<td>73 (48)</td>
<td>Aims</td>
</tr>
<tr>
<td>Neither</td>
<td>79 (52)</td>
<td>Neither</td>
</tr>
<tr>
<td>Includes a conflict of interest statement</td>
<td>107 (71)</td>
<td>Makes an assessment of research quality</td>
</tr>
<tr>
<td>Discusses generalisability of SR findings</td>
<td>105 (69)</td>
<td>Discusses cost or cost-effectiveness</td>
</tr>
<tr>
<td>Discusses policy implications</td>
<td>44 (29)</td>
<td>Sufficient evidence to draw policy-relevant conclusions</td>
</tr>
</tbody>
</table>

* Categories are not mutually exclusive so totals may not add to 153 or 100%.
Another finding from our study that suggests that research outputs may be valued more highly than policy relevance is that the most common reason given by authors for conducting the SR was that previous reviews were insufficient. This may represent a form of ‘salami slicing’; producing repetitive or redundant publications, which can distort the scientific literature (Johnson, 2006). Updating SRs has recently been highlighted as an important issue in encouraging the use of research in policy and practice (Hopewell, 2015) but researchers need to ensure that such updates do not duplicate or overlap with recent efforts (Lavis, 2009). For example, we found 14 SRs examining school-based physical activity interventions, 10 of which had been published between 2011 and 2014 (Broekhuizen et al., 2014; Brown and Summerbell, 2009; De Bourdeaudhuij et al., 2011; Dobbins et al., 2013; Harris et al., 2009; Ickes et al., 2013; Jago and Baranowski, 2004; Kriemler et al., 2011; Lai et al., 2014; Lee et al., 2008; Lonsdale et al., 2013; Parrish et al., 2013; Sun et al., 2013; Van Lippevelde et al., 2012). Although these SRs did have subtly different inclusion and exclusion criteria, they inevitably included many of the same primary studies and so came to the same or very similar conclusions. We highlight these SRs not to denigrate the authors or any research group but rather to emphasise that the drivers of SR production may need to be re-evaluated and priorities adjusted to increase the focus on the policy and practice-relevance of research outputs. This should be addressed as a matter of priority given our finding that the average number of SRs published every year is increasing.

Improving the usefulness of SRs will undoubtedly require improved reporting in primary studies. One of the key considerations for policymakers is the cost of interventions and their return on investment (Milat et al., 2013b). In our study, over half of the SRs that made an effort to include this information and thus cost effectiveness, contextual information, and a greater focus on the generalisability and policy relevance of findings. However, our coding frame was based on a careful reading of the literature on what policymakers want and need from SRs (Milat et al., 2014; Wolfenden et al., 2010; Campbell et al., 2009; Invaer et al., 2002; Lavis, 2009; Higgins and Green, 2011; Lavis et al., 2005; Lundh et al., 2012). Additionally, the application of the coding frame was initially tested by 3 authors (JK, DI, and SM) on a subsample of the included SRs and modifications were made where items were unclear or where significant variations in coding existed. Every review was rated by 2 authors independently (JK and DI) for the final analysis, with differences in rating between assessors discussed or referred to a third coder (SM) before a final assessment made.

**Conclusion**

Our analysis of systematic reviews of overweight and obesity, physical activity, and nutrition interventions suggests that many SRs lack crucial information of relevance to policy makers. In order to improve the relevance of SRs to policy decision making, SRs should discuss the policy and practice implications of their findings. Improving the usefulness of SRs to policy and practice will also require improved reporting in primary studies of factors such as costs and cost effectiveness, contextual information, and a greater focus on the generalisability and policy relevance of findings. Both the PRISMA and CONSORT statements should be updated to reflect this and journals should consider their role in promoting policy-relevant SRs.

**Conflict of interest statement**

The authors declare that they have no conflicts of interest.

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