Perspective

The Health Star Rating system – is its reductionist (nutrient) approach a benefit or risk for tackling dietary risk factors?

Mark A Lawrence[a,d], Christina M Pollard[b], Helen A Vidgen[c] and Julie L Woods[a]

[a] Institute for Physical Activity and Nutrition, Faculty of Health, Deakin University, Geelong, VIC, Australia
[b] Faculty of Health Science, School of Public Health, Curtin University, Perth, WA, Australia
[c] School of Exercise and Nutrition Sciences, Faculty of Health, Queensland University of Technology, Brisbane, Australia
[d] Corresponding author: lawrence@deakin.edu.au

Article history

Key points

- In principle, the Health Star Rating (HSR) system could be a positive activity for tackling dietary risk factors
- In practice, the HSR system has been dominated by a reductionist (nutrient) world view of nutrition science, resulting in it inadvertently contradicting recommendations in the Australian Dietary Guidelines (ADG), and promoting discretionary and ultraprocessed food marketing
- Nutrition science–informed reforms are suggested to help the HSR system complement the ADG to be more fit for purpose in tackling dietary risk factors

Abstract

The Australian Government's voluntary Health Star Rating (HSR) system has potential to provide a user-friendly approach to help shoppers choose healthier packaged food options. However, despite evidence that it is dietary imbalances and excesses that are the predominant causes of diet-related noncommunicable diseases and obesity, the star-rating system's design is based on a reductionist (nutrient) world view of nutrition science which is not a fit-for-purpose solution to the cause of the problem. As a result, the HSR system frequently is inadvertently contradicting Australian Dietary Guidelines (ADG) recommendations, and promoting the marketing of discretionary and ultraprocessed foods. This perspective article looks at how the HSR system could be reformed to complement the ADG and stresses the overriding priority is to position it within, and not be a distraction from, a comprehensive national nutrition policy if dietary risk factors are to be effectively tackled.

Introduction

Dietary risk factors are a leading contributor to Australia's burden of disease.[1] Australians consume too much dietary energy generally, and too much discretionary and ultraprocessed foods specifically, as well as inadequate amounts of nutritious foods from the five food groups.[1] The Australian Dietary Guidelines (ADG)[2] and the evidence base that informs them seek to tackle prominent dietary risk factors by providing "guidance on foods, food groups and dietary patterns that protect against chronic disease and provide the nutrients required for optimal health and wellbeing". Ideally, the ADG will be implemented within the context of a comprehensive national nutrition policy. Such a policy needs to incorporate evidence based actions that improve health and wellbeing in an equitable and sustainable manner.[3] Nutrition policy must be supported by a dynamic nutrition information infrastructure, encompassing dietary and food-supply monitoring and surveillance, as well as regular revision of the guidelines.

In principle, front-of-pack labelling (FOPL) schemes can be one policy action within a national nutrition policy to tackle dietary risk factors. Australia's FOPL scheme, the voluntary Health Star Rating (HSR) system, has potential to provide a user-friendly approach to help shoppers choose healthier packaged food options within a food category. The HSR system determines a food product's health star rating based on demerit points for 'negative' content (total kilojoules, saturated fat, total sugar and sodium) and bonus points for 'positive' content (fruit, nut, vegetable, legume, protein and fibre). Manufacturers self-assess their product against a nutrient scoring algorithm to determine ratings from 0.5 to 5 health stars.

In this issue of the journal, Maganja et al. describe the development and performance of the HSR system.[4] However, despite its potential, there is concern among a number of stakeholders that the current design and nutrient algorithm of the HSR system have misrepresented nutrition science. Notably, the Public Health Association of Australia's 2018 Policy Position Statement on the HSR system seeks "immediate reform of HSR's governance, design, implementation, monitoring, ongoing independent evaluation and review against the ADG".[5] In this paper, we take a nutrition science perspective to discuss the public health benefits and risks of the HSR system.

The difference between nutrients, foods and dietary patterns

Over the past century, the nature and scope of nutrition science have evolved. Modern nutrition science initially focused primarily on nutrient deficiency diseases and the explanatory role of individual nutrients in their aetiology. Now nutrition science is focused significantly more on diet-related noncommunicable diseases and the explanatory role of foods and dietary patterns in their aetiology.[6] Yet, there are a number of policy actions that still retain a reductionist or nutrient-oriented approach, rather than holistic, food and dietary pattern–oriented approaches, to combat diet-related noncommunicable diseases and obesity.

Nutrition science helps us understand the differences between nutrients, foods and dietary patterns in their relationships to a range of health outcomes. For instance, a food's 'healthiness' is more complex than the sum of the actions of individual nutrients within that food, due to the multiple interactions and synergies among nutrients, non-nutrients and the physical structure of the food.[7] These nutrition science understandings have underpinned the development of food-based dietary guidelines, including the ADG (see Box 1 for abridged version), as reference standards for nutrition policy activities in more than 100 countries.[8] Consistent with dietary patterns, all recommendations in the ADG are to be considered equally and together, to improve the diet-related health of the population.

Box 1. Abridged version of the Australian Dietary Guidelines (ADG)

Guideline 1[a]

To achieve and maintain a healthy weight, be physically active and choose amounts of nutritious food and drinks to meet your energy needs

Guideline 2

Enjoy a wide variety of nutritious foods from the following five groups every day:

- Plenty of vegetables, including different types and colours, and legumes/beans
- Fruit
- Grain (cereal) foods, mostly wholegrain and/or high cereal fibre varieties, such as breads, cereals, rice, pasta, noodles, polenta, couscous, oats, quinoa and barley
- Lean meats and poultry, fish, eggs, tofu, nuts and seeds, and legumes/beans
- Milk, yoghurt, cheese and/or their alternatives, mostly reduced fat (reduced fat milks are not suitable for children under the age of 2 years).

And drink plenty of water.

Guideline 3[a]

Limit intake of foods containing saturated fat, added salt and added sugars, and alcohol

Guideline 4

Encourage, support and promote breastfeeding

Guideline 5

Care for your food, and prepare and store it safely

[a] Several bullet points elaborating on implementing these dietary guidelines have been removed without affecting the substance of the guidelines.

Nutrient- and diet-based indices of a food's healthiness

The discrepancy between the nutrition science that underpins the ADG and the algorithm informing the HSR system is more than a theoretical curiosity. It has implications for the benefits and risks associated with each approach in tackling dietary risk factors. The ADG were formulated using rigorous evidence synthesis and translation procedures across five different evidence sources identifying dietary pattern and health outcome relationships.[2] Conversely, the algorithm informing the HSR system is restricted to criteria specifying a small number of nutrients and ingredients, and fruit, vegetable, nut and legume content – all with arbitrary cut-off levels – to ascertain a food's HSR.[9] Unlike the

ADG recommendations, there is no evidence that HSR nutrient profiling is predictive of any diet-related disease outcomes.

The HSR system is not able, nor intended, to directly support the implementation of ADG Guideline 1 (see Box 1), since it is problematic to expect a food label to communicate the concept of choosing an amount of food or drink to match energy needs. In principle, the HSR system could help implement ADG Guidelines 2 (enjoy five-food-group foods) and 3 (limit discretionary foods) (see Box 1). However, in practice, it appears that the HSR system contributes to public health risks by inadvertently promoting rather than discouraging discretionary food selection. More than half (57%) of new discretionary foods and drinks that entered the market that displayed an HSR in the 3 years after the HSR launch displayed 2.5 or more 'health' stars.[10] Additionally, in a study of supermarket own-brand foods, Pulker et al.[11] found that 39% of discretionary foods and 84% of mixed products high in fat, salt or sugar scored an HSR of 2.5 or more. This begs the question, should foods and drinks that the ADG advise Australian consumers to limit be marketed with *any* health stars?

Using a nutrient-based scoring algorithm to rate the healthiness of individual foods obscures the ability to discriminate between nutritious and discretionary foods. All 'negative' and 'positive' nutrients/components are scored equally regardless of whether they are derived from a nutritious or discretionary food. Exacerbating this problem is a lack of specification around the nature of the nutrient/component being rated. For example, the addition of fibre extracts and protein powders to a discretionary food, such as many breakfast drinks and protein formulas, bars and shakes, will attract the same number of points as an equal amount of naturally occurring fibre and protein in intact nutritious foods.

It is not only discretionary foods that the HSR system is inadvertently promoting. Health star ratings are disproportionately being applied to ultraprocessed foods, which themselves are associated with adverse health outcomes.[12] One study found that 77% of ultraprocessed food products that entered the Australian marketplace that displayed an HSR in the 3 years after the HSR system was introduced displayed an HSR of 2.5 or more.[13]

Claims that the HSR system is performing well

In spite of concerns about the reductionist world view dominating the HSR system, it has been reported in some studies that it is performing well. However, such studies often have the following limitations regarding how performance is measured.

Performance measured in terms of processes rather than outcomes

Upon its establishment, the Food Regulation Secretariat Front-of-Pack Labelling Project Committee[14] developed two sets of objectives. One objective was for the outcome of the scheme itself – "to guide consumer choice towards healthier food options" by "enabling direct comparison between individual foods that, within the overall diet, may contribute to the risk factors of various diet related chronic diseases". The second objective was for the process, which aimed to "undertake a collaborative design process with industry, public health and consumer stakeholders, with a view to reaching a broad consensus". To date, it has been process measures – such as the consensus process, industry compliance and the number of food products displaying an FOPL – that have been the predominant focus of departmental, academic and industry monitoring and reporting, rather than outcome measures. When outcome measures of consumer's HSR understanding and use are reported, they tend to be based on self-report or simulation approaches rather than actual purchasing behaviours.

Performance measured using overly generous cut-off levels

Shortly after the HSR system launch, a non–peer reviewed NSW Health Report[15] determined that an HSR cut-off point of 3.5 stars was an acceptable demarcation between five-food-group foods and discretionary foods, having found 14% of discretionary foods scored 3.5 or more stars. This cut-off point was used to restrict the sale of these discretionary foods in school canteens. Despite its use for this purpose and lack of validity testing, this cut-off has subsequently been adopted by a number of researchers as a de facto reference standard. A cursory glance at the HSR on foods in the marketplace finds numerous examples of discretionary foods such as fruit straps and jellies displaying 3 health stars. Accepting such discretionary food products as having an appropriate score is concerning; the only peer-reviewed published study of consumer perceptions reports that "products with a rating of 2 or fewer stars were generally considered unhealthy, whereas those with 3 or more stars were seen as healthier options".[16]

In 2018, the HSR Technical Advisory Group prepared a report, *Alignment of the HSR system with the Australian and New Zealand Dietary Guidelines*[17], to support the consultation process for its 5-year review of the HSR system. The report set an HSR cut-off point of 3.0 stars, and found that 39% of discretionary foods scored at or above this cut-off. A study by Lawrence et al. set an HSR cut-off point of 2.5 stars and reported that 57% of new discretionary foods scored 2.5 or more stars.[10]

Although there were some methodological differences among the three studies[15,16,10], their substantial variation in findings illustrates that the arbitrary application of an HSR cut-off point will influence conclusions about HSR risks in terms of whether or not the system is aligned with the ADG. The HSR cut-off of 2.5 stars in the study by Lawrence et al. was arbitrarily set, however it was informed by a performance measurement logic. Displaying a number of stars at or above this cut-off represents a 'pass' mark for the food's healthiness potential (and should exclude any discretionary food), and displaying a number of stars below this cut-off represents a 'fail' mark for the food's healthiness potential (and should exclude any nutritious five-food-group food).

Aligning the HSR system with the ADG

The Australian Government Health Department's 5-year review of the HSR system is to be commended for reaffirming the importance of aligning a revised HSR system with the ADG. We suggest the following nutrition science–informed conceptual and technical (algorithm) reforms as the top priority actions to strengthen the nutrition science underpinnings of the HSR system and enhance its alignment with the ADG. This will promote the system's potential benefits and reduce its existing risks.

Conceptual reforms

Strengthening the HSR's alignment with the ADG requires overlaying the nutrient profiling indices with ADG recommendations to demarcate between discretionary and five-food-group foods. Implicit in this is the requirement for an improved system for consistently identifying discretionary foods. A conservative option would involve demarcating five-food-group and discretionary foods by capping the minimum and maximum number of health stars available to each respectively (with capping levels based on evidence from research into consumer understanding of stars and 'healthiness').

A more progressive option would involve discretionary foods being ineligible to display health stars and instead replacing their positive star ratings with nutrient-based warning symbols. This would avoid the prospect of these foods benefiting from a health 'halo' effect. For example, Khandpur et al.[18] have proposed an innovative option in which warning labels are placed on discretionary foods to retain an incentive for product reformulation. This would mean a reverse orientation to the current system, that is, there would be an incentive to reformulate discretionary foods to avoid negative symbols, rather than to garner positive symbols for marketing opportunities.

Technical (algorithm) reforms

Within the context of the suggested conceptual reforms, a number of technical reforms to the algorithm would help provide a more authentic assessment of a food's healthiness in accordance with the ADG. Two particular reforms stand out. First, there needs to be a higher number of negative points for added sugar. Second, points for protein and fibre should only be awarded for that which is instrinsic in the food, rather than that added in the form of extracts/powders that provide negligible health benefits and yet are exploited by manufacturers to garner additional points to boost their product's HSR.

Conclusion

The current HSR system is dominated by a reductionist (nutrient) world view of nutrition science, despite evidence indicating that it is dietary imbalances and excesses that are the predominant causes of diet-related noncommunicable diseases and obesity. This mismatch between the cause of diet-related noncommunicable diseases and obesity and solutions to the problem has resulted in the HSR system inadvertently contradicting recommendations from the ADG and helping to market many discretionary and ultraprocessed foods. These risks posed by the HSR system will likely be exacerbated if the attention and resources committed to the system distract from action to formulate a national nutrition policy. A reformed HSR system – drawing on nutrition science principles and positioned within a comprehensive national nutrition policy – is required if this policy action is to fulfil its potential to complement the ADG and help tackle dietary risk factors for diet-related noncommunicable diseases and obesity.

Acknowledgements

Peer review and provenance

Externally peer reviewed, commissioned.

Competing interests

ML serves committee roles with the: Food Standards Australia New Zealand Board, National Health and Medical Research Council, Cochrane Nutrition Field, World Health Organization Nutrition Guidance Expert Advisory Group committees, and International Union of Nutrition Sciences Taskforce on 'Sustainable diets'.

The views expressed in this manuscript do not necessarily represent the views, decisions or policies of the institutions with which he is affiliated.

CP works as a policy advisor for the East Metropolitan Health Service in Western Australia and serves committee roles with the Public Health Association of Australia Board. The views expressed in this manuscript do not necessarily represent the views, decisions or policies of the institutions with which she is affiliated.

Author contributions

ML led the preparation of the manuscript. All authors contributed perspectives, and to drafting and editing.

References

1. Australian Institute of Health and Welfare. Nutrition across the life stages. Canberra: AIHW; 2018 [cited 2018 Oct 31]. Available from: www.aihw.gov.au/getmedia/fc5ad42e-08f5-4f9a-9ca4-723cacaa510d/aihw-phe-227.pdf.aspx?inline=true

2. National Health and Medical Research Council. Australian Dietary Guidelines. Canberra: Commonwealth of Australia; 2013 [cited 2019 Jan 23]. Available from: nhmrc.gov.au/about-us/publications/australian-dietary-guidelines

3. Lee A, Baker P, Stanton R, Friel S, O'Dea K, Weightman A. Scoping study to inform the development of the new National Nutrition Policy for Australia. Canberra: Australian Department of Health and Ageing; 2013 [cited 2019 Jan 31]. Available from: www.health.gov.au/internet/main/publishing.nsf/Content/D309AF86C0D09DBDCA257F7F0077E0CE/$File/1%20-%20Final%20Report%20-%20National%20Nutrition%20Policy%20Scoping%20Study%20%28Report%20and%20Appendices%29.PDF

4. Maganja D, Buckett K, Stevens C, Flynn E. Consumer choice and the role of front-of-pack labelling: the Health Star Rating system. Public Health Res Pract. 2019;29(1):e2911909.

5. Public Health Association Australia. Health Star Rating system policy position statement. Canberra: PHAA; 2017 [cited 2018 Oct 31]. Available from: www.phaa.net.au/documents/item/2843w

6. Mozaffarian D, Rosenberg I, Uauy R. History of modern nutrition science—implications for current research, dietary guidelines, and food policy. BMJ. 2018;361:k2392.

7. Tapsell LC, Neale EP, Satije A, Hu FB. Foods, nutrients, and dietary patterns: interconnections and implications for dietary guidelines. Adv Nutr. 2016;7(3):445–54.

8. Food and Agriculture Organization of the United Nations. Rome: FAO; 2019. Food-based dietary guidelines; [cited 2018 Oct 31]. Available from: www.fao.org/nutrition/education/food-based-dietary-guidelines/en/

9. HSR Technical Advisory Group. Five year review of the health star rating (HSR) system: history and development of the HSR algorithm; [cited 2018 Nov 13]. Available from: www.mpconsulting.com.au/wp-content/uploads/2018/10/History-and-development-of-the-HSR-algorithm.pdf

10. Lawrence M, Dickie S, Woods JL. Do nutrient-based front-of-pack labelling schemes support or undermine food-based dietary guideline recommendations? Lessons from the Australian Health Star Rating system. Nutrients. 2018;10(1):E32.

11. Pulker C, Trapp G, Scott J, Pollard C. Alignment of supermarket own brand foods' front-of-pack nutrition labelling with measures of nutritional quality: an Australian perspective. Nutrients. 2018;10:1465.

12. Monteiro C, Cannon G, Moubarac J-C, Bertazzi Levy R, Louzada ML, Jaime PC. The UN decade of nutrition, the NOVA food classification and the trouble with ultra-processing. Public Health Nutr. 2017;21:5–17.

13. Dickie S, Woods JL, Lawrence M. Analysing the use of the Australian Health Star Rating system by level of food processing. Int J Behav Nutr Phys Act. 2018;15:128.

14. Food Regulation Secretariat. Canberra: Commonwealth of Australia; 2015. Front of pack labelling project committee - objectives and principles for the development of a front-of-pack labelling (FoPL) system; 2016 Nov 21 [cited 2018 Nov 6]; [about 5 screens]. Available from: foodregulation.gov.au/internet/fr/publishing.nsf/Content/frontofpackobjectives

15. Dunford E, Cobcroft M, Thomas M, Wu J. Technical Report: Alignment of NSW Health Food Provision Policy with the Health Star Ratings system. Sydney: NSW Ministry of Health; 2015 [cited 2018 Sep 23]; Available from: www.health.nsw.gov.au/heal/Publications/health-star-rating-system.pdf

16. Talati Z, Pettigrew S, Ball K, Hughes C, Kelly B, Neal B, et al. The relative ability of different front-of-pack labels to assist consumers discriminate between healthy, moderately healthy, and unhealthy foods. Food Qual Prefer. 2017;59:109–13.

17. HSR Technical Advisory Group. Five year review of the Health Star Rating (HSR) system. Alignment of the HSR system with the Australian and New Zealand Dietary Guidelines: analysis of alignment and identification of outliers; [cited 2019 Feb 7]. Available from: www.mpconsulting.com.au/wp-content/uploads/2018/10/Alignment-of-the-HSR-system-with-the-Australian-and-New-Zealand-Dietary-....pdf

18. Khandpur N, Swinburn B, Monteiro C. Nutrient-based warning labels may help in the pursuit of healthy diets. Obesity. 2018;26(11):1670–1.