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RESEARCH ARTICLE

Requirement for front-of-pack warning labels in South African porridges and cereals varies depending on preparation method and grain type

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Objectives: To determine the proportion of breakfast products requiring front-of-pack labels (FOPLs) according to R.3337 regulations and to compare nutritional content and FOPL requirements across grain types (modern grains, oats, and other ancient grains) and preparation method (ready-to-eat, instant, and cooking required).
Design: A cross-sectional analysis of 271 products from leading South African supermarkets was conducted. Nutrient values per 100 g, including total energy, protein, carbohydrates, fats, dietary fibre, and sodium, were extracted from nutritional information tables. Ingredient lists identified grain types. Products were assessed against R.3337 FOPL thresholds for sugar, saturated fat, sodium, and artificial sweeteners.
Setting: Products available from March to July 2024 were identified through online shopping platforms, supplemented by in-store visits where necessary.
Results: Breakfast products requiring cooking exhibited superior nutrient profiles (including higher protein and dietary fibre, and lower total sugar and sodium) compared with instant and/or ready-to-eat options ($p < 0.010$). Products containing ancient grains, particularly oats, showed more favourable nutritional profiles than those with modern grains ($p < 0.050$). While 73.5% of products required FOPLs, this varied by preparation method: 75.2% for ready-to-eat, 83.5% for instant, and none for cooking-required products. Similarly, FOPL requirements varied by grain type, with 50.0% of oat-based products requiring FOPLs compared with 81.9% of modern grain products and 75.4% of products containing other ancient grains.
Conclusions: Most porridges and cereals in South Africa required FOPLs due to high sugar, saturated fat, salt, and artificial sweeteners. However, products requiring cooking and those containing oats were less likely to need these warning labels.

Keywords: breakfast products, front-of-pack warning labels, grains, nutrient density

Introduction

In South Africa, the prevalence of diabetes increased from 4.5% in 2010 to 7.2% in 2024.[1,2] While biological factors, including genetics, contribute to noncommunicable disease (NCD) risk, modifiable lifestyle factors, including diet, are crucial as they offer potential for public health intervention.[3] One such intervention by the South African Department of Health (DOH) involves various public health measures for reducing high intake of unhealthy fats, salt, and sugar.[4] Central to these efforts is nutritional labelling, which enables consumers to make more informed and healthier dietary choices.[5]

In 2010, the DOH published regulations (R.146) on the labelling and advertising of foodstuffs.[6] Recognising the need for more comprehensive regulations, the DOH published a draft for comment in April 2023 (R.3337) proposing mandatory front-of-pack warning labels (FOPLs) for pre-packaged foodstuffs containing added saturated fat, sugar, and sodium that exceed specified cutoff values, as well as warning labels for artificial sweeteners.[7] These labels are designed to capture the attention of consumers and promote healthier food choices, encouraging the food industry to reformulate products.[8] Several countries—including Chile, Mexico, and Brazil—have already adopted similar FOPLs.[9,10]

In South Africa, commercially available breakfast products such as cereals and porridges are widely consumed across all age groups, driven by their convenience, affordability, and increasing availability in both urban and rural markets.[11,12] Their popularity is reflected in the growing market share of ready-to-eat and instant breakfast items, with revenue in the breakfast cereals market amounting to approximately R5.64 billion in 2025. The market is expected to grow annually by 7.40% between 2025 and 2030, underscoring their significance in shaping national dietary patterns.[13] However, many of these products are high in added sugars, unhealthy fats, and refined carbohydrates, contributing to poor dietary quality and increased NCD risk.[12] Given their widespread consumption and nutritional variability, breakfast products represent a strategic category for front-of-pack (FOP) nutrition labelling interventions aimed at guiding healthier consumer choices. The preparation method, whether ready-to-eat, instant, or requiring cooking, reflects the degree of food processing, with more heavily processed products (i.e. instant and ready-to-eat) typically retaining fewer nutrients compared with minimally processed or cooked alternatives.[14]

Incorporating nutrient-rich grains, particularly wholegrains, is a valuable intervention for improving their nutritional value.[15] Ancient grains like oats and sorghum, which have remained largely unchanged over centuries, provide even greater nutritional benefits and are an excellent choice for enhancing dietary quality.[16] This is because, while ancient grains are often wholegrains, they tend to be consumed in minimally processed forms, preserving native phytochemicals, dietary fibre, and essential micronutrients that are often lost during refining.[17] In contrast, the displacement of whole or ancient grains by refined grains in processed foods has been associated with a measurable decline in nutrient adequacy and overall diet quality. Refined grains typically lack the bran and germ components, resulting in lower levels of fibre, B vitamins, iron, and antioxidants, and leading to higher glycaemic responses and reduced satiety.[18] Conversely, even modern wholegrains, although structurally complete, may undergo greater mechanical processing including rolling and cutting that can diminish their nutritional integrity.[19] In sub-Saharan Africa, maize is the most popular modern grain,[20] but ancient grains like oats are increasingly included in breakfast products for their superior nutritional profiles.[21] Despite the known benefits of ancient grains, there is limited research comparing commercially available breakfast products containing ancient grains with those without. To fill this gap, we compared the nutritional content of breakfast products containing ancient grains with those containing modern grains.

The primary aim of the study was to determine the proportion of breakfast products requiring FOPLs according to draft R.3337 labelling regulations. Additionally, we compared the nutritional content and FOPL requirements across grain types (modern grains, oats, and other ancient grains) and preparation method (ready-to-eat, instant, and cooking required) of the breakfast products.

This assessment will serve as a baseline for monitoring nutritional content changes over time and evaluating the effectiveness of the labelling policy proposed in the R.3337 document.

Methods

Study design and identification of the leading supermarkets in South Africa

This cross-sectional study included a total of 271 breakfast products from 35 brands, identified through online shopping websites. All data were collected between March and July 2024. Products were selected based on their availability in the top-performing South African supermarkets, which were identified in the 2023 Deloitte financial performance report.[22] According to the 2023 Deloitte report, the major supermarkets in South Africa included Pick n Pay, SPAR, Shoprite, and Checkers.[22] SPAR was excluded due to the absence of a functional online shopping platform. Attempts to use the SPAR2U app on 28–29 March 2024 were unsuccessful.

Selection of the breakfast products

The official websites of Pick n Pay, Shoprite, and Checkers were utilised to compile a comprehensive list of cereals and porridges from their 'Breakfast and Porridge' sections. Although retailers offer both websites and mobile apps, using websites alone was sufficient because major supermarkets share a unified product catalogue across platforms via centralised Product Information Management (PIM) systems. This ensures consistent product data and a seamless shopping experience. Differences are limited to platform-specific promotions, which affect price studies rather than product availability.[23] To ensure that data collection was not limited to a single store, the 'browse all shops' feature was used, allowing for the inclusion of products available across multiple store locations. Breakfast biscuits, energy bars, liquid, and infant products were excluded. Initially, 725 breakfast products were identified across the three supermarkets: Pick n Pay ($n = 161$), Shoprite ($n = 295$), and Checkers ($n = 269$) (Figure S1). Many products were available in multiple supermarkets, resulting in the removal of 386 duplicates. This process resulted in a final sample size of 339 unique breakfast products.

Extraction of ingredient lists and nutritional information

Of the 339 products, 144 had complete online data, while 195 lacked sufficient information, primarily due to the absence of official brand websites. To address this, the data were collected in person at the supermarket. Of the 195 products missing online data, 127 were found in store and their data were collected. The remaining 68 products were excluded after confirmation from the supermarkets' online platforms that these products were no longer sold in the Gauteng province, leaving a final total of 271 products for analysis (see Figure S1).

The ingredient lists were used to identify the grains, added salt, saturated fat, sugar, and the presence of artificial sweeteners, while the nutritional information was used to determine the nutrient content. Nutritional information was collected per 100 g and included total energy (kJ), protein (g), glycaemic carbohydrates (g), sugar (g), total fat (g), saturated fat (g), dietary fibre (g), and sodium (mg), in accordance with the Regulations Relating to the Labelling and Advertising of Foodstuffs (R.146), which mandate the disclosure of these data for all food products that display nutritional information. To minimise human error, two independent reviewers extracted all nutritional data, with a third resolving any discrepancies.

Identification of products requiring front-of-pack warning labels

The criteria used to identify products high in salt, saturated fat, and sugar were based on the newly proposed DOH regulations (R.3337).[7] Specifically, products with added sodium and total sodium of $\geq$ 400 mg/100 g were classified as 'Requiring a warning label for high salt'. Products with added saturated fat and total saturated fat of $\geq$ 4.0 g/100 g were classified as 'Requiring a warning label for high saturated fat', and those with added sugar and total sugar of $\geq$ 10.0 g/100 g were classified as 'Requiring a warning label for high sugar'. Additionally, any products indicating the presence of non-nutritive sweeteners (as listed in the R.3337 document) in their ingredient lists were classified as 'Requiring a warning label for artificial sweeteners'.

Breakfast product grouping

The breakfast products were first classified into three categories based on the preparation required before consumption. 'Ready-to-eat' were those that could be consumed as is, without any additional preparation. Examples included cereals like muesli, granola, cornflakes, and bran flakes. 'Instant' were those that required only the addition of hot or boiling water/milk to be ready for consumption. Examples included instant oats and instant maize porridges. 'Cooking required' were those that needed full cooking before consumption. Examples included traditional hot cereals like steel-cut oats. The presence of ancient grains was identified from the list of ingredients and cross-referenced with those listed in published literature.[17] Given that > 25% of products included oats, often considered an ancient grain, three grain categories were compared, namely: products with only modern grains, those containing oats, and those with other ancient grains.

Data analysis

All data analysis was performed using R version 4.2.3 R Foundation for Statistical Computing, Vienna, Austria). The normality of continuous variables (nutrient values per 100 g) was assessed with a Shapiro–Wilk test. Because the data were not normally distributed, the Wilcoxon rank-sum test was used for statistical comparisons between two groups: (1) cooking required vs. instant or ready-to-eat, and instant vs. ready-to-eat; and (2) with modern grains only vs. with oats or other ancient grains, and with oats vs. other ancient grains. Continuous outcome variables were presented as medians and interquartile ranges (IQRs). Categorical data were shown as the number of observations (N) and percentages. A p-value < 0.05 was considered significant.

Results

Nutrient content variations based on preparation methods

Figures 1 and 2 compare nutrient content per 100 g for cooking-required, instant, and ready-to-eat breakfast products, including energy, protein, glycaemic carbohydrates, sugar, fat, saturated fat, fibre, and sodium.

Figure 1 shows that cooking-required products had lower energy (1 558 kJ) but higher protein (11.5 g) than ready-to-eat (1 594 kJ; 8.8 g; $p = 0.001$). They also had less sugar (1.0 g) than instant (16.5 g) and ready-to-eat (16.8 g; $p < 0.0001$). Energy and protein were similar between cooking-required and instant; protein and sugar did not differ between instant and ready-to-eat. Glycaemic carbohydrates were similar across groups.

Figure 2 shows that ready-to-eat products had more fat than instant (5.3 g vs. 4.1 g; $p = 0.001$) and more saturated fat (1.6 g) than instant (1.0 g; $p = 0.003$) and cooking-required (0.9 g; $p = 0.027$). Fat and saturated fat were similar between cooking-required and instant. Fibre was higher in cooking-required (10.4 g) than instant (6.4 g; $p < 0.0001$) and ready-to-eat (7.5 g; $p < 0.0001$). Sodium was lowest in cooking-required (4.5 mg), higher in ready-to-eat (132 mg), and highest in instant (217 mg; $p < 0.0001$).

Nutrient content variations among grain categories

Figures 3 and 4 compare nutrient content per 100 g for products with modern grains only, oats, and other ancient grains.

Figure 3 shows that products with oats had higher energy (1 603 kJ) and protein (11.5 g) than those with modern grains (1 485 kJ; 7.9 g) and other ancient grains (1 575 kJ; 8.8 g; all $p < 0.001$). Glycaemic carbohydrates and sugar were lower in oats (61.0 g; 14.4 g) than modern grains (76.0 g; 20.0 g; $p < 0.0001$). Sugar was highest in modern grains; oats and ancient grains were similar.

Figure 4 shows that oats had more fat (8.4 g) and saturated fat (2.7 g) than modern grains (1.9 g; 0.5 g) and ancient grains (4.1 g; 1.0 g; all $p < 0.0001$). Fibre was highest in oats (9.2 g), followed by ancient grains (8.0 g), and lowest in modern grains (5.2 g). Sodium was lowest in oats (47 mg), higher in ancient grains (157 mg), and highest in modern grains (197 mg; $p < 0.0001$).

Proportion of breakfast products requiring warning labels

Figure 5 illustrates the proportion of all breakfast products with high sugar, sodium, and saturated fat, as well as those requiring warning labels and containing artificial sweeteners. Overall, 70.1% of products had high sugar content (≥ 10%), yet only 64.2% required a sugar warning label. Ready-to-eat products accounted for the largest share of high-sugar items (39.9%), followed by instant products (29.9%), while cooking-required products rarely exceeded thresholds. High saturated fat was present in 21.8% of products, with 15.5% requiring a warning label; most were ready-to-eat items. Sodium exceeded the

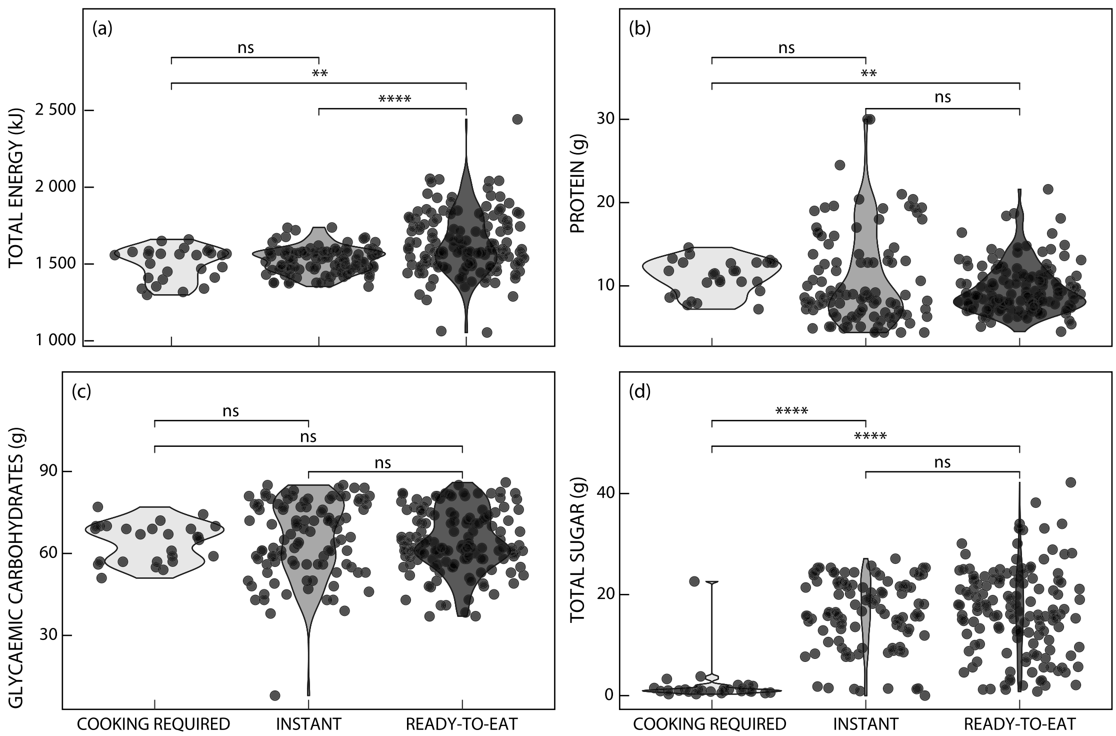

Figure 1: Comparison of (a) total energy, (b) protein, (c) glycaemic carbohydrate, and (d) total sugar content per 100 g between Cooking required (n = 27), Instant (n = 103), and Ready-to-Eat (n = 141) breakfast products. A Wilcoxon rank-sum test was used to statistically assess differences between two groups. ns: no sufficient evidence of a difference ($p > 0.050$); **$p < 0.010$; ****$p < 0.0001$.

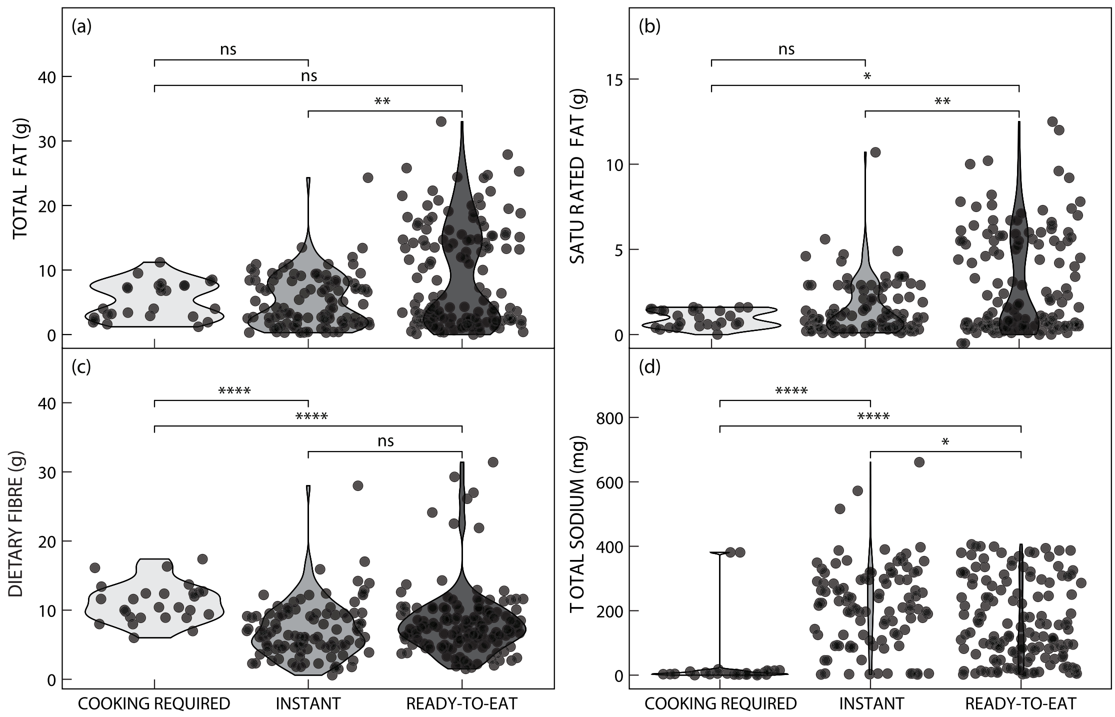

Figure 2: Comparison of (a) total fat, (b) saturated fat, (c) dietary fibre, and (d) total sodium. content per 100 g between Cooking required ($n = 27$), Instant ($n = 103$), and Ready-to-eat ($n = 141$) breakfast products. A Wilcoxon rank-sum test was used to statistically assess differences between two groups. ns: no sufficient evidence of a difference ($p > 0.050$); *$p < 0.050$; **$p < 0.010$; ****$p < 0.0001$.

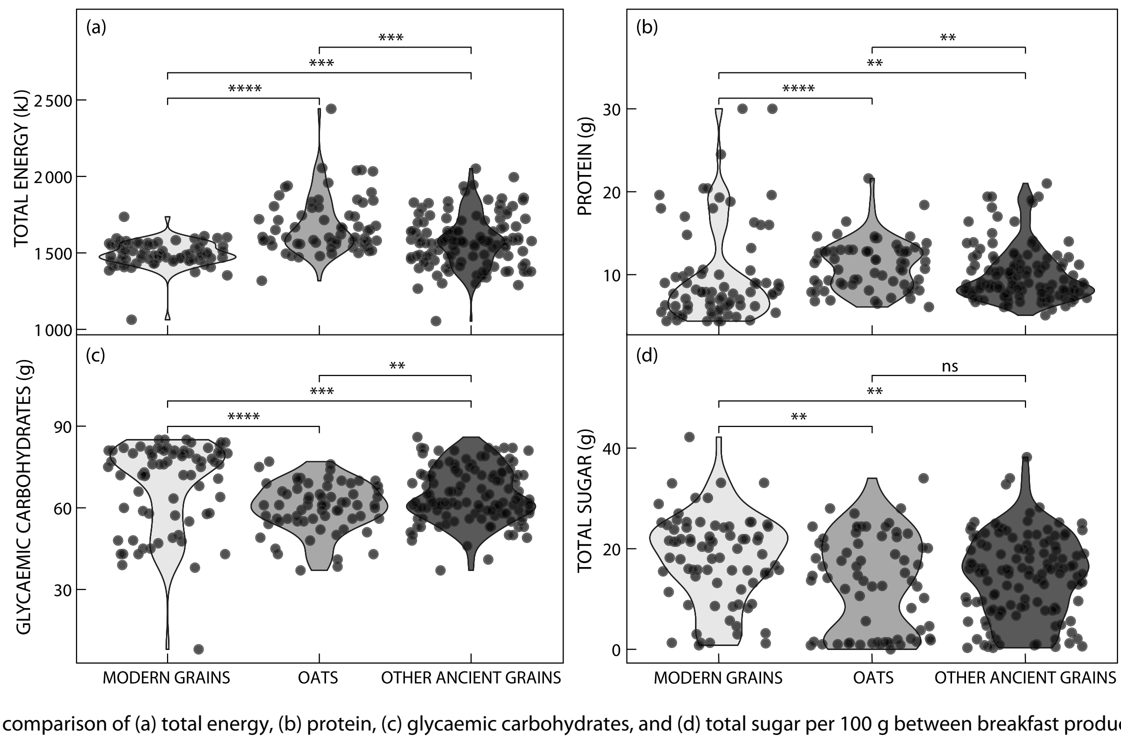

Figure 3: A comparison of (a) total energy, (b) protein, (c) glycaemic carbohydrates, and (d) total sugar per 100 g between breakfast products with only modern grains ($n = 77$), oats ($n = 68$), and other ancient grains ($n = 126$). A Wilcoxon rank-sum test was used to statistically assess differences between two groups. ns: no sufficient evidence of a difference ($p > 0.050$), *$p < 0.050$; **$p < 0.010$; ***$p < 0.001$; ****$p < 0.0001$.

400 mg/100 g threshold in only 2.2% of products, all from instant or ready-to-eat categories. Artificial sweetener warnings applied to 13.3% of products, predominantly instant. Overall, 73.5% of products required at least one warning label, and 21.8% required two, with instant products showing the highest proportions.

Grain type influenced these patterns. Among products with modern grains, nearly all instant (97.9%) and ready-to-eat (93.1%) items contained added sugar, and most required sugar warnings (Figure 5). Added sodium was common in these categories, though few exceeded the threshold for a warning label. Saturated fat warnings were less frequent, and

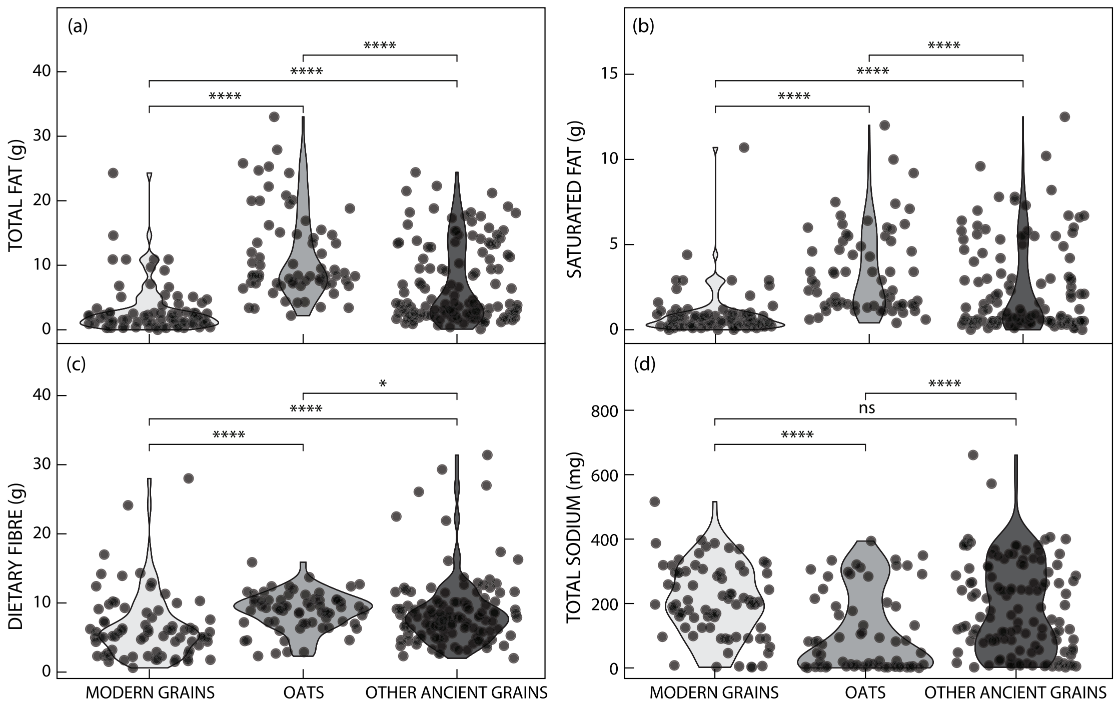

Figure 4: A comparison of (a) total fat, (b) saturated fat, (c) dietary fibre, and (d) total sodium per 100 g between breakfast products with only modern grains ($n = 77$), oats ($n = 68$), and other ancient grains ($n = 126$). A Wilcoxon rank-sum test was used to statistically assess differences between two groups. ns: no sufficient evidence of a difference ($p > 0.050$), *$p < 0.050$; **$p < 0.010$; ***$p < 0.001$; ****$p < 0.0001$.

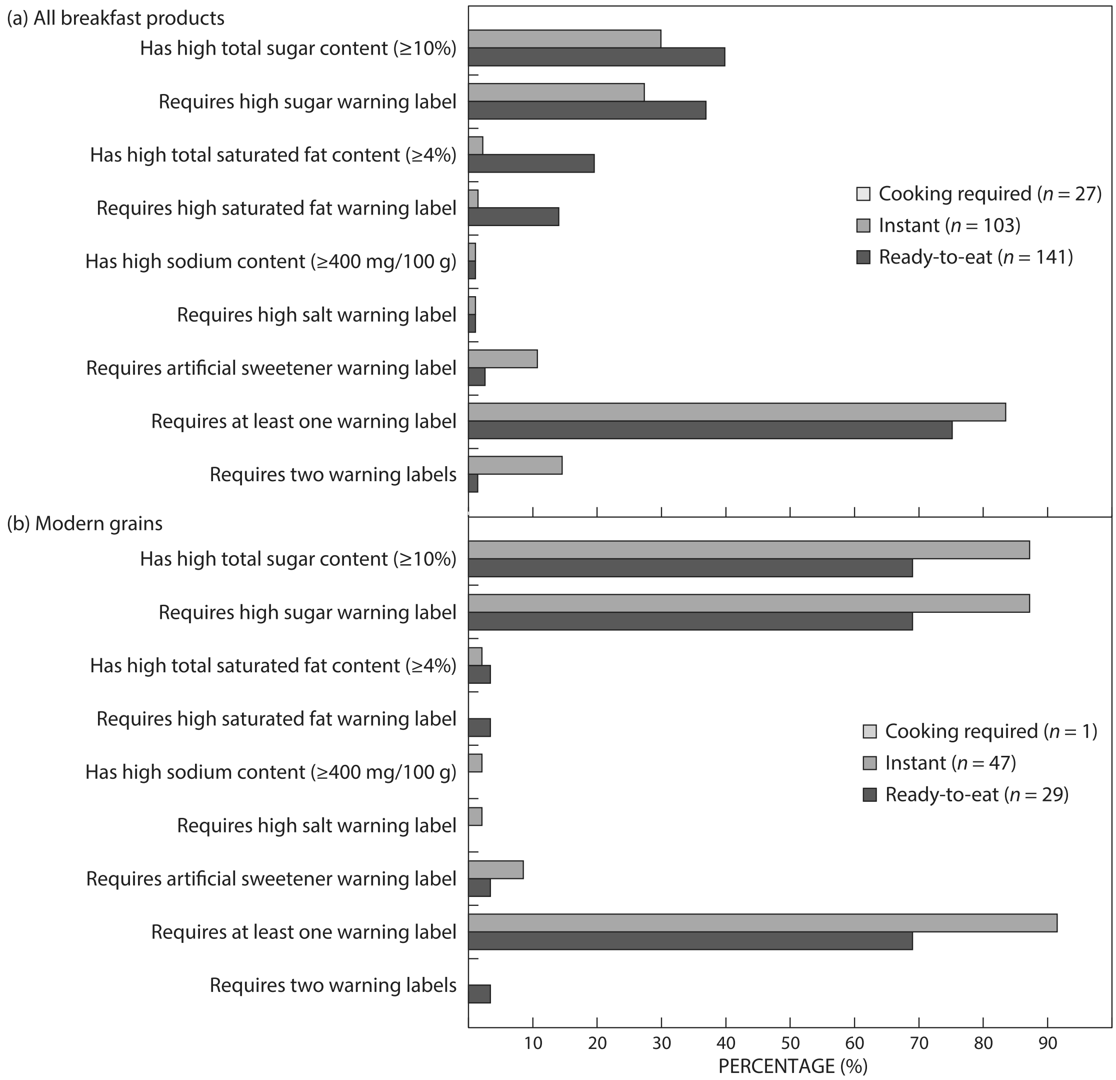

Figure 5: Proportion of (a) all breakfast products and (b) those containing only modern grains that require warning labels for high levels of sugar, salt, and saturated fat, as well as the presence of artificial sweeteners

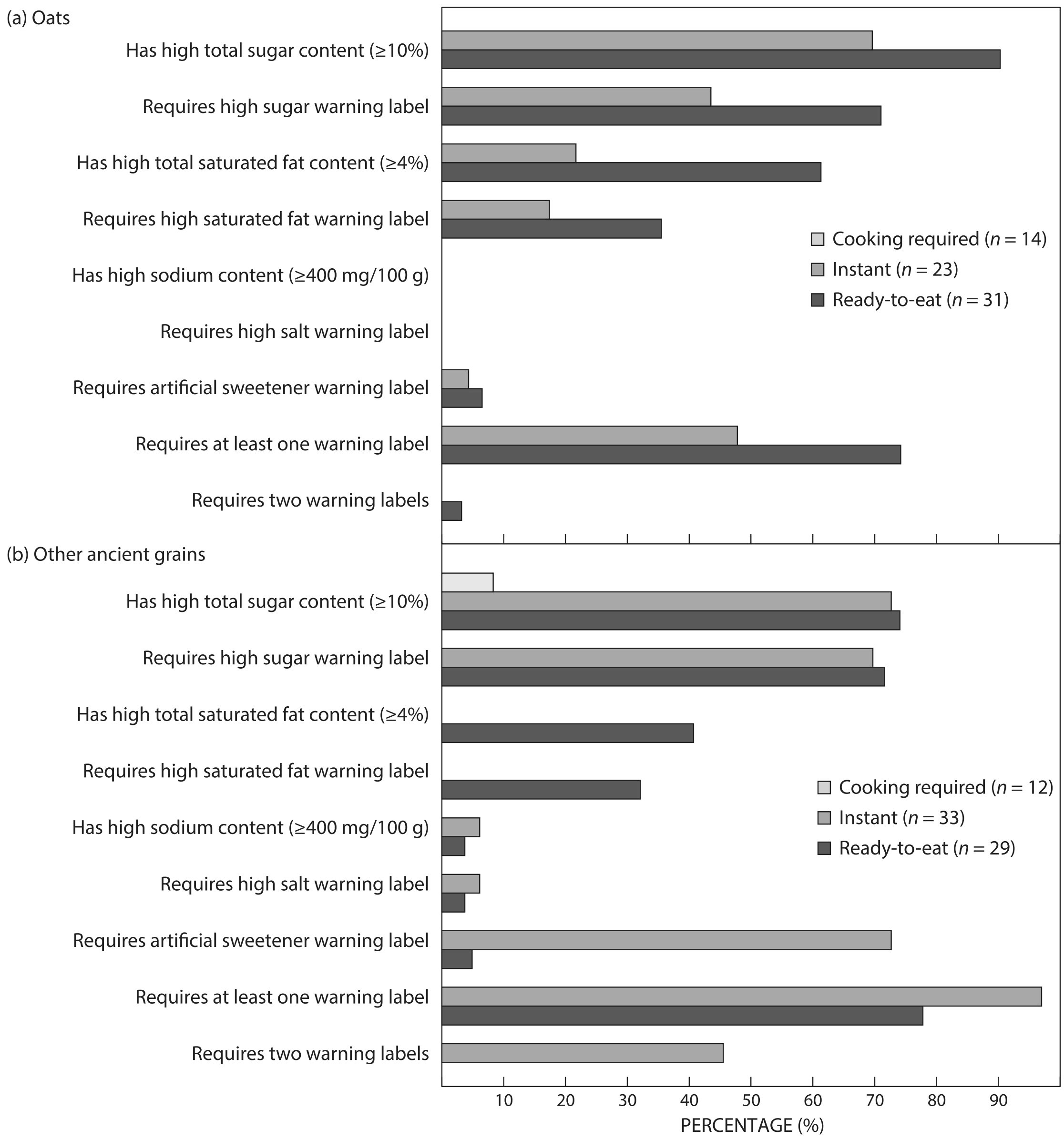

Figure 6: Proportion of breakfast products containing (a) oats and (b) those with other ancient grains that require warning labels for high levels of sugar, salt, and saturated fat, as well as the presence of artificial sweeteners

artificial sweetener warnings appeared in 8.5% of instant and 3.4% of ready-to-eat products.

For oats-based products, added sugar was found in 43.5% of instant and 71.0% of ready-to-eat items, with high sugar content observed in 69.6% and 90.3%, respectively (Figure 6). Saturated fat was also notable, with 61.3% of ready-to-eat oats products requiring a warning label. Sodium was added in over half of instant and two-thirds of ready-to-eat oats products, though none exceeded the threshold. Artificial sweetener warnings were slightly more common in ready-to-eat oats products (6.5%) than instant (4.3%). In contrast, cooking-required oats products contained none of these added nutrients.

Products with other ancient grains showed distinct trends. Ready-to-eat items had the highest proportion of high sugar (74.1%) and saturated fat (40.7%), with 71.6% requiring sugar warnings and 32.1% requiring saturated fat warnings (Figure 6). Instant products in this category had the highest proportion of artificial sweetener warnings (72.7%) and were most likely to require multiple warnings, including for sodium. Cooking-required products in this group rarely required any warnings. Overall, nearly all instant products with ancient grains (97%) required at least one warning label, compared twith 77.8% of ready-to-eat products, while 45.5% of instant products required two warnings.

Discussion

FOPLs are essential for ensuring transparency and helping consumers make informed choices concerning the nutritional content of breakfast products.[7] The nutritional quality of these products depends on the types of grains used and the extent of processing, with minimally processed ingredients generally exhibiting superior nutritional profiles.[14] This is the first study to examine how preparation methods and grain types specifically influence the nutritional quality of breakfast products in South Africa, comparing which types are most likely to be impacted by the introduction of FOPLs. First, this study demonstrated that breakfast products requiring cooking exhibited superior nutrient profiles (e.g. higher protein and dietary fibre, and lower total sugar and sodium) compared with instant and ready-to-eat options. Second, we found that products containing ancient grains generally had enhanced nutritional profiles compared with those without. While most breakfast products necessitate FOPLs, this requirement varied based on the preparation method, such that products that required cooking did not need warning labels. Additionally, the type of grains used influenced this requirement, with oats (a common ancient grain) being the least likely to need warning labels.

Overall, our findings align with previous research, demonstrating that minimally processed foods tend to retain more nutrients compared with highly processed ones.[24] For example, we have shown that cooking-required breakfast products have lower total energy, but higher protein content compared with ready-to-eat products. This is consistent with findings from previous studies.[25,26] For example, traditional rolled oats, which require cooking, tend to have lower glycaemic index compared with instant oats, which are pre-cooked and dried.[25] Similarly, ready-to-eat cereals often undergo extensive processing, including extrusion and the addition of sugars and preservatives, which can diminish their nutritional value by reducing the fibre content, destroying heat-sensitive vitamins.[26]

The presence of added sugars, saturated fats, and sodium in many instant and ready-to-eat products significantly impacts their nutritional quality. Our study found that many of these products contain added sugars, sodium, and artificial sweeteners, all of which are linked to NCD risk, necessitating warning labels for these specific nutrients. In contrast, cooking-required products had minimal added ingredients, which likely contributed to their enhanced nutritional profiles, with none of them requiring warning labels. Minimally processed foods retain their natural composition, making them more likely to meet nutrient profiling thresholds. These observations are supported by studies from countries like China, which found that minimally processed foods generally have fewer added ingredients and superior nutritional quality.[27] The observation that more processed breakfast products would require warning labels supports the effectiveness of these labels in classifying unhealthy products.[7] This aligns with findings from other countries, such as Chile, where FOPLs have led to significant reductions in the purchase of products high in sugar, salt, saturated fat, and energy content.[28]

In the South African context, a recent study found that over 80% of pre-packed products would require the proposed FOPLs if the R3337 regulations were implemented.[29] This high percentage indicates the poor nutritional quality of many pre-packed foods available in South Africa. Therefore, by promoting transparency and encouraging healthier choices, FOPLs can play a crucial role in addressing diet-related health issues in South Africa.[4] Our observation that most (about 74%) of breakfast products would require warning labels aligns with the above-mentioned previous study, which suggested that almost 83% of cereals and cereal products (a category that included breakfast products) would require warning labels in South Africa.[29] However, we have demonstrated for the first time that whether a breakfast product requires a warning label or not depends on the type of grain in the product or the preparation method used, with products requiring cooking and those containing oats being less likely to require warning labels.

The observation that breakfast products containing ancient grains generally had a superior nutritional profile compared with those containing modern grains was in line with previous research from various countries.[30,31] For instance, studies done in Italy found that ancient grains such as spelt and farro retain more of their original nutrient content, compared with modern wheat, due to minimal processing.[30] Similarly, research in the United States highlighted that ancient grains are often consumed in their whole form, preserving essential nutrients such as fibre, vitamins, and minerals, which are typically lost during the refining process of most modern grains.[31]

The specific observation that breakfast products with ancient grains had higher fibre and protein content is also in line with previous research. A study conducted in Brazil demonstrated that replacing rice flour and starch mixtures with ancient grains like millet and sorghum significantly improved the nutritional profile of bread by increasing protein and fibre content.[32] Another study conducted in the United States demonstrated that wholewheat bread made from ancient wheat varieties had higher soluble dietary fibre compared with bread made from modern wheat varieties.[33] The high levels of protein and dietary fibre observed in products with ancient grains could be attributed to minimal processing associated with these grains. As dietary fibre is primarily located in the bran, and proteins are concentrated in the aleurone and subaleurone layers,[34] removing the bran in refined grains significantly reduces these nutrient levels. Another anticipated finding was the lower sodium content in breakfast products with ancient grains, as these grains undergo minimal processing and do not include the added sodium or preservatives commonly used in modern processed grains to enhance flavour and prolong shelf life.[35]

In this study, oats-based breakfast products exhibited higher nutritional value compared with products containing other ancient grains. This was also expected because oats are known for their balanced nutrient profile, particularly in terms of energy, protein, glycaemic carbohydrates, sodium, and fibre.[36] However, it is important to distinguish between oat types: traditional rolled oats, which require cooking, generally retain more nutrients and have a lower glycaemic index than instant oats, which are pre-cooked and more processed. Oats provide a high-quality source of protein, containing a good balance of essential amino acids.[37] They have a lower glycaemic index compared with many other grains and are rich in dietary fibre, especially soluble fibre like beta-glucan.[38] Furthermore, the sodium content in oats is naturally low.[36] Additionally, many oats-based breakfast products are sold in pure form, while products with other ancient grains often contain a mix of grains, including modern grains.[39] This mixture can dilute the nutritional benefits of the ancient grains, contributing to oats showing superior nutritional profiles compared with products containing other ancient grains. This is why the addition of oats to breakfast products, as well as the availability of oats as standalone breakfast options, has become increasingly popular.[21] The widespread availability of oats in the South African food market was evident in our study, as we estimated that over 25% of breakfast products contained oats.

Limitations

Our study had several limitations. The information used was from brand websites and packaging could not be verified for accuracy. Hence, it was assumed that the provided data were accurate and reliable. The cross-sectional design does not allow for the inference of causality, meaning we cannot determine whether the inclusion of ancient grains directly resulted in better nutritional content in breakfast products. Regardless, this cross-sectional design offers an opportunity to monitor breakfast product reformulations through repeated analyses, providing insights into whether warning labels positively impact public health in South Africa. Another limitation was the inability to quantify the exact proportion of ancient grains in the products. While standardising values per 100 g was essential, variations in serving suggestions were overlooked. Future research should evaluate these differences and compare them with the actual quantities of breakfast products consumed by individuals.

Furthermore, our findings are limited to cereals and porridges, and it remains uncertain whether similar trends would be observed for excluded products like breakfast biscuits, energy bars, liquid, and infant products. These excluded categories might exhibit significantly different patterns in terms of nutrient content, impacting the overall assessment of the breakfast product market. Additionally, some brands were excluded due to unavailable data, which may affect the generalisability of our findings across the broader market of breakfast products. Furthermore, by focusing exclusively on selected major supermarkets (and excluding SPAR), we may have introduced bias, as smaller independent shops and convenience stores could offer a different variety of breakfast options.

Finally, the study focused solely on basic nutrients, which are the mandatory nutritional information required when a product presents nutritional data. Other important nutrients, such as vitamins and trans fats, were not included in the analysis. Vitamins are often added to commercially available products to enhance their nutritional value. In addition, while food processing level is an important determinant of dietary quality, this study did not assess the degree of processing or classify products according to ultra-processed food frameworks. As such, broader food-processing trends—including the rise in ultra-processed foods and the increased availability of refined grains—were beyond the scope of this analysis. Future research could explore these dimensions to provide a more comprehensive understanding of the nutritional landscape of breakfast products in South Africa.

Conclusions and implications

The study indicates that most commercially available breakfast products in South Africa require FOPLs due to high levels of sugar, saturated fat, salt, and presence of artificial sweeteners. However, the need for FOPLs varies depending on the type of grain in the breakfast product or preparation method used, with those requiring cooking and those containing oats being less likely to need warning labels. Minimally processed breakfast cereals, particularly those requiring cooking, generally exhibited more favourable nutrient profiles—higher protein and dietary fibre and lower sugar and sodium—compared with instant and ready-to-eat options. Products containing ancient grains, especially oats, also performed better nutritionally than those made solely with modern grains. Implementing FOPLs in South Africa will significantly impact the breakfast product industry, providing a roadmap for reformulating products to improve nutritional quality. Findings from this study can guide manufacturers in reformulating their products by focusing on less processed breakfast items and incorporating ancient grains such as oats. Public health campaigns and consumer education should highlight the benefits of minimally processed foods and ancient grains to encourage healthier consumer choices. Future research should explore other breakfast categories and monitor the long-term effects of FOPLs on consumer behaviour and health outcomes in South Africa. Repeated cross-sectional analyses could also track whether product reformulations to improve nutritional profiles occur after the implementation of FOPLs.

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Authorship – MKM, MM, and SND were involved in the conception and planning of the study. MKM and SND were responsible for oversight of data collection. MKM, NS, and SND conducted data analyses. MKM, NS, FC, and SND were involved in the initial drafting of the manuscript. All authors were involved in interpretation of the results and revising the manuscript.

Ethical standards disclosure – All data were extracted from publicly available sources (online websites and in-store information). An ethics waiver was obtained from the University of the Witwatersrand Human Ethics Research Committee (Medical), Johannesburg, South Africa (reference no: W-PR-240220-01).

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