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## Defining diabetes and assigning responsibility: how print media frame diabetes in New Zealand

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### ABSTRACT

Research has analyzed media framing of cause and solution responsibility attribution in diabetes discourse. Studies have not similarly engaged with how media frame diabetes 'effects', an integral framing component because it comprises the 'problem definition' of diabetes. Moreover, the combination of causal attribution and effects provides a 'moral evaluation' on who carries the burden of the disease. This paper asks 'how does the New Zealand print media frame diabetes definition and responsibility attribution?' We identify key frames used to discursively construct Gestational, Type 1 and Type 2 diabetes discourse. Content and thematic analysis reveal that media predominantly discuss diabetes without type-specification and with a high reference to obesity and behavioral choices as causal factors. Diabetes is defined as an individual's medical concern, which when mismanaged results in amputation, blindness, kidney disease and coronary disease. We consider the implications of media coverage on public response to diabetes as a societal concern.

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Diabetes mellitus is considered a global epidemic. One in 11 adults is thought to have either Type 1 or Type 2 diabetes and 1 in 7 births are affected by Gestational diabetes. In total, 415 million people worldwide have been diagnosed with diabetes, and the number is predicted to rise to 642 million by 2040 (International Diabetes Federation, 2015).

This paper analyses the framing of the three diabetes types within New Zealand metropolitan newspapers. Media framing plays an important role in taking complex multi-dimensional health concerns such as diabetes and anchoring these issues within the audience' underlying schemas with the possibility of bringing about community change (Flora, Maibach, & Maccoby, 1989). Investigating how diabetes-related discussions are framed within local print media is, therefore, a key step in improving diabetes awareness and sensitivity, developing better intervention strategies to meet the target audience' needs, and informing the public on diabetes-related policies and laws.

New Zealand provides a unique context to study diabetes framing. The country is in the global top quintile for Type 2 diabetes prevalence (Barnett, Pearce, & Howes, 2006)

and in the top 10% for Type 1 (Karvonen et al., 2000). Given the highly politicized environment of non-communicable diseases (NCD) attributions, we explore how New Zealand print media frame diabetes-type definition and responsibility. To achieve this objective, it is necessary to discuss the societal prevalence of diabetes types, media framing of health determinants and media framing of causal, effects and solution responsibility for type-specific diabetes issues.

## Diabetes incidence in New Zealand

New Zealand reflects the global trend of having an increasingly high rate of Type 2 diabetes (5.4% of the population) and diabetes-associated morbidity and mortality (Parliamentary research papers, 2014). The rapid increase in Type 2 is linked to migration, urbanization, a move away from traditional lifestyles and a combination of highly refined diet, physical inactivity, genetics and increasing obesity rates (Foliaki & Pearce, 2003).

Type 1 is the predominant diabetes type for the children and adolescent age group (Jefferies, Owens, & Wiltshire, 2015). Analysis over a 20-year period indicates that age at diagnosis in New Zealand is rising from <5 to 10–14 years (Derraik et al., 2012). Type 1 diabetes is associated with the destruction of pancreatic cells, resulting in insulin deficiency (Karvonen et al., 2000). While Type 1 was previously thought to be genetically based, environmental determinants are now understood to also play a crucial role (Soltesz, Patterson, & Dahlquist, 2007).

Gestational diabetes, affects 2–10% of all New Zealand pregnant women (Ministry of Health, 2016). The epidemiology of Gestational diabetes is least known of the three diabetes types, although it is commonly thought to be a product of genetics, social and environmental causes (Ben-Haroush, Yogev, & Hod, 2004).

The increase in diabetes cases has a considerable impact on national healthcare resources. In 2006, New Zealand's Parliamentary Health Select Committee set up a public inquiry into obesity and its related consequence, Type 2 diabetes, indicating the political concern about the rapid escalation of both forms of NCD and their compounded detrimental impact on the social and economic future of the country (Jenkin, Signal, & Thomson, 2011). It was estimated that Type 2 diabetes alone costs 3% of state health spending and by 2021 its cost is predicted to increase to 15% (Health committee, 2007). Likewise, the rapid escalation of Type 1 diabetes has left the public system struggling to cope (Jefferies et al., 2015).

The societal prevalence of the three diabetes types leads to our first research question and hypothesis:

**RQ1:** Does the relative frequency of diabetes type coverage in New Zealand print media between 2013 and 2014 reflect societal prevalence?

**H1:** Given that Type 2 diabetes is the most prevalent, followed by Type 1 and Gestational, we expect media coverage to reflect this pattern of societal prevalence.

## Media framing theory

The definition of frames has moved from an abstract to a more operationalized concept. Gamson and Modigliani (1989) define frames as rhetorical idea 'packages' conveyed

through (i) framing devices, such as metaphors, exemplars, themes, and (ii) reasoning devices, the causal and treatment attributions associated with these ideas. The combination of framing and reasoning devices allows for cultural interpretations about responsibilities for the issue. Entman (1993) expands the above definition by delineating the components of a frame: causal attribution (who or what is responsible for causing the issue), definition of an issue (consequences of causal agents' actions), moral judgments (evaluation of causal agents and their actions) and treatment responsibility (who or what can best resolve the issue). This study operationalizes frame analysis through the delineation of Entman's frame components as the following variables: causal attribution through 'cause', problem definition through 'effects', moral attribution through 'a combined consideration of cause and effect' and treatment responsibility through 'solution'.

Two major ways media frame an issue are episodic and thematic. The two frames have differing audience response to causal and solution responsibility attributions (Iyengar, 1990). Episodic framing individualizes an issue by using individuals as exemplars while thematic framing anchors the issue within its wider societal context. Using poverty as a case study, Iyengar demonstrated that audience response varied on exposure to the same issue through episodic versus thematic framing. When television framed poverty through the episodic frame with a high emphasis on individual exemplars, the audience attributed a high degree of responsibility to individuals and viewed their poverty as being self-induced. Correspondingly, the audience was less likely to support government policies to reduce poverty, instead attributing responsibility to individuals for solving 'their' poverty. On the other hand, when media used thematic framing, which located poverty as a widespread societal issue, the audience was more likely to support government policies to remedy the situation. Similar attributions of responsibility are associated with individualized versus societal framing of health issues (Barry, Brescoll, & Gollust, 2013; Niederdeppe, Shapiro, Kim, Bartolo, & Porticella, 2014; Sun, Krakow, John, Liu, & Weaver, 2016).

### ***Media framing of health responsibility***

Attributions of health issues derive from three framing pathways, medical, behavioral and structural. Medical and behavioral frames emphasize individualized causal and treatment attributions by using exemplars living with the issue's consequences, while the structural frame considers social and environmental determinants. A growing number of studies have demonstrated that individualized medical and behavioral frames are pervasive in health discourse, permeating media, academic reports, corporations and health campaigns (Guttman & Ressler, 2001; Jenkin et al., 2011; Kim & Anne Willis, 2007; Lawrence, 2004; Yoo & Kim, 2012). Concern with the high use of the individualized frames is that through their causal and treatment attributions, the frames are tied to the perpetuation of blame and stigma attribution.

While both medical and behavioral frames are individualized, the controllability dimension differs between the two. The behavioral frame views health issues through the lens of behavioral deviance, with high onset-controllability. Individuals are presented as being morally deviant in their health behaviors, and therefore, causing their health conditions (Lawrence, 2004). To uphold the behavioral frame, entities use a market justice

argument, which utilizes values of free choice, and personal responsibility for behavior and control (Dorfman, Wallack, & Woodruff, 2005). Suggested solutions revolve around individuals altering their health-related behaviors, such as diet, exercise and reassessing lifestyle for a more equitable life-work balance. Such arguments shift the emphasis from responsibility of manufacturers to (ir)responsible consumption behaviors of consumers, thereby providing industries with a means of distancing themselves from responsibility for an issue (Kwan, 2009).

The medical frame distances individuals from blame as it portrays health conditions as being outside the control of individuals (Conrad, Mackie, & Mehrotra, 2010). However, the decreased controllability attribution also decreases empowerment to alter genetically associated health conditions, which may in turn create self-fulfilling prophecies (Kvaale, Haslam, & Gottdiener, 2013). The medical frame also increases the risks of negative stereotypes, societal stigma attribution and discrimination against individuals who are seen to be diseased and their younger biological family members, who are perceived as carrying similar genes and a propensity for the disease (Saguy & Almeling, 2008).

Neither the medical nor the behavioral frame address systemic problems, which seek to 'eliminate root causes' of societal health issues. In contrast, the third pathway, structural frame (also referred to as societal frame (cf. Stefanik-Sidener, 2013)), takes a wider lens, situating human agency within individuals' socio-economic and environmental constraints, which impact the availability and affordability of health-related choices and may even undermine what actions individuals can take in fixing the problem (Dorfman et al., 2005).

The utilization of the individualized behavioral and medical frames versus the structural frame creates a framing contest between the food and marketing industry and the public health sector over obesity and Type 2 diabetes definition and responsibility attributions (Jenkin et al., 2011). The food and marketing industry exercises the market justice argument and perceives obesity and Type 2 diabetes as medical concerns creating a burden on the health system. On the other hand, the public health sector employs a social justice lens to define the two conditions as a growing epidemic, whose consequences are not limited to medical care but have adverse effects throughout society.

The responsibility attributions tailor to the respective frames. While the food and marketing industry emphasizes poor lifestyle choices best resolved through education, the public health sector positions causality firmly within the socio-economic environment, and the widespread marketing and availability of cheap, energy-dense but nutrient-poor foods that require increased food and marketing regulations and policy changes that consider social determinants and foster community capacity-building approaches.

Recent research indicates that the media industry's emphasis on health framing has seen a slight shift over the years, with a growing acknowledgement of structural determinants. Kim and Anne Willis (2007) demonstrate that while the behavioral frame dominates media attributions, the medical frame has significantly decreased over the years, and societal responsibility has seen an increase, though the societal frame is still the least prevalent of the three frames. Similarly, Zhang, Jin, Stewart, and Porter (2016) report that emphasis remains on individual cause and solution responsibility; however, societal solutions are attracting increased media coverage.

Indications of fluctuations in health framing of responsibility lead to our second research question and hypothesis, which explore media emphasis on individualized versus societal frames when attributing cause, effect and solution responsibility for each diabetes type:

**RQ2:** How does the utilization of individualized medical and behavioral frames compare with the structural frame in diabetes-type attributions?

RQ2a: Are medical, behavioral or structural determinants predominant in diabetes causal attribution for each diabetes type?

RQ2b: Are medical, behavioral or structural determinants predominant in diabetes effect attribution for each diabetes type?

RQ2c: Are medical, behavioral or structural determinants predominant in diabetes solution attribution for each diabetes type?

**H2:** Given the prevalence of the individualized behavioral and medical frames in societal health discourse, we expect behavioral and medical frames to be used more than structural frame in diabetes-related responsibility attributions.

Although a limited body of extant literature foregrounds framing patterns of diabetes types in print media, the research has extensively analyzed the presence of causal and solution framing elements (Gollust & Lantz, 2009; Rock, 2005; Stefanik-Sidener, 2013). Studies have not similarly engaged with how media frame type-specific diabetes effects.

There are practical implications to how media frame health issue effects. Diabetes effects may be framed as an individual's medical or behavioral problem with limited consequences for the rest of the community or as a societal concern that is detrimental for all. Given the demonstrated influence that media have on audience' perceptions (Iyengar, 1990), media framing of effects can, therefore, influence both public perceptions of the urgency of addressing diabetes and public support for individual-level or societal-level policies in addressing diabetes.

A further reason to analyze effects is that the combination of causal agency attributed to causing a disease plus disease effects provide a moral evaluation on those who carry the burden of the disease. Hence, to thoroughly analyze the framing of diabetes, consideration of cause, effect and solution framing elements is needed. This leads to our final research question and hypothesis:

**RQ3:** How do associated thematic attributions orient media more heavily towards cause, effect or solution discussions in relation to each diabetes type?

**H3:** There is no significant difference in the proportion of concordant coding of themes for each of the three frames (medical, behavioral and structural).

## Method

*Data:* The study analyses New Zealand's three largest metropolitan dailies: APN's *The New Zealand Herald* and Fairfax's *The Dominion Post* and *The Press*. For the 2014 period, *The New Zealand Herald* had a print circulation of 441,000, while *The Press* and *The Dominion Post* had a circulation of 182,000 and 180,000 respectively (The Nielsen Company, 2015). We included all three newspapers to comprehensively analyze

the national coverage of diabetes mellitus. The newspapers have differing geographical readership coverage within the country: *The New Zealand Herald*, published in Auckland covers the upper North Island, *The Dominion Post*, published in Wellington covers the lower North Island, and *The Press*, published in Christchurch covers the South Island (Gibbons, 2014).

*Data collection:* We limited the timeframe from 1 January 2013 to 31 December 2014 to coincide with the release of the New Zealand Health Survey (Ministry of Health, 2013) and the International Diabetes Federation's diabetes atlas (2013), both of which indicated an escalation in New Zealand's diabetes numbers. Our expectation was that within this period, diabetes would be a salient topic in the newspapers.

Using 'diabetes' as a search term on the academic database Newztext,<sup>1</sup> we found 781 articles for *The New Zealand Herald*, 671 articles for *The Press* and 445 articles for *The Dominion Post*. Articles were restricted to those that were at least 150 words as longer articles have the space to develop discussions on diabetes responsibility. Articles were further restricted to discussions of diabetes in humans. Articles that fell outside these criteria were: letters to the editor, advertisements, events, obituaries, duplicates within the newspaper, articles about animal diabetes and articles that mentioned diabetes in passing. Three hundred fifty-four articles were manually discarded for one or more of the above reasons and 427 articles met the selection criteria and were included in the study.

*Method:* We conducted the research in three consecutive phases of content analysis. Phase 1 was the development of the two variables: 'diabetes type' and 'year of publication'. The researchers read and classified the articles according to the first variable of 'Diabetes type'. Article discussions fell into one of the following categories: 'Type 1', 'Type 2', 'Gestational', 'Combination of types' or 'Type Unspecified'. We further classified articles by the year of publication (2013, 2014).

Phase 2 was the development of thematic codes and their attributed reasoning devices of Cause, Effect, Solution (C-E-S hereafter). We developed initial codes based on themes and their attributed reasoning devices arising in 20% of the corpus and possible C-E-S proposed in NCD-related research. We particularly took into consideration New Zealand studies to ensure that the codes remained contextualized (Kavanagh et al., 2010; Miller et al., 2009). The specificity of a New Zealand context has an impact on our structural codes. The codes include 'District Health Boards' (DHBs), government-funded bodies responsible for meeting designated geographical area community needs. Codes also include New Zealand-specific solutions, such as 'Green Prescription', an inter-sectoral approach involving DHBs, medical practitioners and government-funded community health programs.

Using open coding, we constructed 103 culturally situated thematic codes, comprised from metaphors, arguments, presence of characters, sources of information and images (Van Gorp, 2007). The thematic codes were associated with their corresponding reasoning devices (Cause, Effect or Solution). Following axial codification (Corbin & Strauss, 2008), the codes and their reasoning devices were refined to the following 30 frame packages: Type 1 diabetes causality was attributed to (1) genetics and (2) insulin production. Type 2 and Gestational diabetes causality included the above attributions and these additional themes: (3) obesity, (4) biological aging, (5) illness, (6) cesarean birth, (7) environmental determinants, (8) social determinants, (9) economic determinants, (10)

education, (11) diet, (12) lifestyle, (13) age-specific, (14) ethnicity-specific and (15) gender-specific causes. Effects attributed to all diabetes types were (16) adult morbidity, (17) adult mortality, (18) metabolic disorders in children, (19) micro-and macro-level economic impacts and (20) national-level healthcare impacts. The following attributed effects were restricted to Type 2 and Gestational diabetes: (21) age-specific, (22) ethnicity-specific and (23) gender-specific effects. Type 1 diabetes can be managed but not prevented, and as such solutions were focused on management of diabetes through (24) medical advancement and (25) lifestyle choices. Type 2 and Gestational diabetes can be both prevented and managed and recommendations included the above themes as well as: (26) community-based actions, (27) inter-sectoral approaches, (28) culturally appropriate interventions, (29) societal education and (30) medical containment of diabetes-related issues through oral or surgical treatment. Once we had exhausted all possible codes within the cohort of news stories and the wider literature, we developed and implemented the coding matrix for the remainder of the articles.

In phase 3 we assembled the initial thematic codes under the three prevalent frames in health discourse: medical, behavioral and structural. Using the example of Type 2 diabetes causality, we categorized news stories under the medical frame when they attributed causality to genetics, biological aging, obesity or illnesses. For instance, the following item attributes causality to genetics: ‘Ruby Wright is worried **her genes have got her marked out for a high risk of diabetes**, so she is doing all she can to avoid the disease’ (*The New Zealand Herald*, 2013, ‘Ruby working hard to beat her genes’; my emphasis). News stories which cited behavioral causal factors were categorized under the behavioral frame, as in: ‘The vast majority of the more than 200,000 New Zealanders with diabetes have Type two diabetes, which is **caused predominantly by poor diet and eating habits**’ (*The New Zealand Herald*, 2013, ‘Nanny state suffers big daddy of a crisis’; my emphasis). News stories were categorized as structural when they attributed causality to wider socio-economic and environmental factors, as in: ‘There’s no one reason for the growing problem, and **social issues such as poverty, housing conditions, food security, and the cost of healthy food** are contributing factors’ (*The New Zealand Herald*, 2014, ‘Govt sour on fizzy drink tax’; my emphasis). We carried out the same process to code attributions of effects and solutions.

*Inter-coder reliability:* For the three phases, two researchers independently coded 89 articles (20%) to maintain inter-coder reliability. The study used Krippendorff’s Alpha to measure reliability. An acceptable level of agreement for Krippendorff’s Alpha is  $\alpha = 0.8$  (Krippendorff, 2004). Our study achieved  $\alpha = 0.887$  across all coding. For the overall coding of diabetes types  $\alpha = 0.969$ . For each of the three frames, alpha scores were similarly high: medical  $\alpha = 0.859$ , structural  $\alpha = 0.99$ , and behavioral  $\alpha = 0.919$ .

*Data analysis:* We used QDA Miner version 4.1 for qualitative coding scheme and content analysis, and Wordstat 7 with Simstat 2 for statistical analysis. The two main purposes of content analysis are to first, make inferences and second, to predict the effects of content on audience (Berelson, 1952). We used the proportionality test in QDA Miner to make inferences about the proportion of concordant codings out of the total number of codings for major C-E-S themes analyzed above. Specifically, the proportion of C-E and C-S that were categorized as highly concordant were compared with the proportion of C-E and C-S pairs that were not highly concordant. The inspection of concordance data reveals patterns of co-dependence between the coding categories and thus can



be attributed to have a major impact on the way we describe C-E-S of diabetes. The statistical test carried out was proportion  $z$ -test on the count two codes in an article, in relation to C-E-S.

## Results

RQ1 examines the relative coverage of diabetes types in print media. Our hypothesis tests whether the frequency of coverage follows societal prevalence. Table 1 shows the relative frequency of coverage of diabetes types (Type 1, Type 2, Gestational), and an additional category, Type Unspecified. If Type 2 diabetes accounts for the highest percentage of all cases in New Zealand, we would expect it to be the primary focus of print media and should have received the majority of the media coverage. Table 1 shows that Type 2 diabetes did not account for the highest percentage of all diabetes discussion in the NZ media between 2013 and 2014. Instead, diabetes as Type Unspecified ( $n = 186$  or 57.7% of articles) has been the focus of media coverage followed by Type 2 ( $n = 98$  or 30.43%), followed by Type 1 ( $n = 21$  or 6.52%), followed by Gestational ( $n = 17$  or 5.28%).

All diabetes types other than Gestational diabetes had increased coverage between 2013 and 2014. Type 1 diabetes saw the greatest increase, followed by Unspecified and Type 2. Gestational diabetes saw a slight drop in coverage and was the least focused upon in the media ( $n = 17$ , 5.28%).

Research question 2 examines the prevalence of medical, structural and health behavioral frames in diabetes type-related responsibility attributions. Our hypothesis tests whether individualized behavioral and medical frames are more frequently utilized compared to the structural frame in diabetes-related responsibility attributions. Table 2 depicts the relative frequency of C-E-S associated with the dominant frame for each diabetes type. For Type 1, there is a high emphasis on medical effects; the medical frame appears for C-E-S (28%), (41%) and (13%), respectively. For Gestational, the emphasis is on causal responsibility (out of C-E-S) and the Medical frame is dominant overall in comparison to Health behavioral and Structural frames; the Medical frame appears for C-E-S (20%), (24%) and (2%), respectively. In contrast, for Type 2 and Unspecified, there is an emphasis on behavioral cause; the Health behavioral frame appears (19%), (2%), (18%) and (23%), (3%), (15%), respectively.

An interesting question that emerges is, do the most commonly used Medical and Behavioral frames closely correlate with the most widely recognized causes and solutions for each diabetes type? The Medical frame dominates causal ( $F = 5.10$ ,  $p = .00$ ) and effect attributions of all diabetes types ( $F = 47.15$ ,  $p = .00$ ), while the Behavioral frame dominates solution attributions of all diabetes types ( $F = 3.68$ ,  $p = .03$ ).

**Table 1.** Relative frequency of coverage of diabetes types (Type 1, Type 2, Gestational and Unspecified for Type) in NZ print Media (2013–2014).

	Type 1	Type 2	Gestational	Unspecified	Total
2013	6	44	10	83	143
2014	15	54	7	103	179
Total	21	98	17	186	322

**Table 2.** Relative frequency of reasoning devices C-E-S in NZ print media.

Frame	Unspecified	Type 1	Type 2	Gestational
	<i>Causes</i>			
Behavioral	23%	–	19%	10%
Medical	19%	28%	17%	20%
Structural	6%	–	9%	2%
	<i>Effects</i>			
Behavioral	3%	–	2%	–
Medical	11%	41%	14%	24%
Structural	13%	10%	8%	–
	<i>Solutions</i>			
Behavioral	15%	–	18%	19%
Medical	2%	13%	3%	2%
Structural	11%	8%	9%	2%

Research question 3 examines the thematic emphasis that contributes to the framing and responsibility attributions of each diabetes type. Table 3 shows the relative frequency of thematic coverage under each frame’s C-E-S in relation to causes for each diabetes type. We found that the risk of Gestational diabetes is associated with ‘obesity’, Type 2 diabetes is influenced by ‘obesity’ and ‘sugar consumption’, while Type 1 diabetes risk is influenced by ‘insulin production’ and for Type Unspecified the risk is associated with ‘carbohydrates consumption’. Spearman correlation test on themes and diabetes type indicates that

**Table 3.** Thematic coverage – causes of Type 1, 2, Gestational and Unspecified as per medical, structural and behavioral frames in NZ print media.

Causes	Frame	Type 1	Type 2	Gestational	Unspecified
Advertisements	Structural		1		1
Age	Behavioral				1
Alcohol	Behavioral		1		1
Biological aging	Medical				5
Carbohydrate consumption	<b>Behavioral</b>		4		11
Ethnicity specific	Behavioral		2	1	3
Food affordability	Structural		3		3
Food availability	<b>Behavioral</b>		12		14
Gender specific	Behavioral		3		6
Genetic predisposition	Medical		3	1	5
Government inaction	Structural		4		
High fat diet HC	Behavioral		5	1	5
Insulin production	<b>Medical</b>	11	3	1	4
Lack of exercise	Behavioral		4		10
Maternal behavior	Behavioral		1	2	
Meat consumption	Behavioral		3		2
Medication	Medical				2
Mental illness	Medical				3
Obesity	<b>Medical</b>		32	9	65
Obesity in children	<b>Medical</b>		10	2	6
Oral health	Medical				3
Poor diet	<b>Behavioral</b>		3		12
Portion size	Behavioral		1		2
Sitting	<b>Behavioral</b>		2		9
Sleep	<b>Behavioral</b>		3	1	6
Smoking	Behavioral				2
Socio-economics	<b>Structural</b>		6		11
Stress	Behavioral		1		4
Sugar consumption	<b>Behavioral</b>		19		34
Sugar consumption in children	Behavioral		4		2
Unhealthy lifestyle	Behavioral				4

obesity is strongly correlated with Type 2 and Type Unspecified (as framed) in the adult population in New Zealand ( $r = 0.116, p = .01$ ).

Table 4 shows the relative frequency of thematic coverage under each frame's C-E-S in relation to effects of each diabetes type. Under the thematic coverage of effects, Medical themes 'Amputation', 'Blindness' and 'Kidney disease' are dominant in relation to Type 1 and 2, and 'Coronary disease' for Type Unspecified. Although the Structural frame is less dominant with regards to effects of type-specific diabetes, it appears as an effect of Type Unspecified under the themes of 'Socio-economics', 'National economy', 'Healthcare facilities' and 'Ethnicity specific'.

Lastly, in Table 5, we examined the dominant themes for solutions per frame. The themes of 'Diet management', 'Exercise for management', 'Preventive diet' and 'Preventive exercise' are associated with solutions as per Behavioral frame and 'Medical advancement' for the Medical frame, while Structural solutions are associated with the themes 'District health board initiatives', 'Government directed initiatives' and 'Green Prescriptions'.

Under the null hypothesis, there is no significant difference in the proportion of concordant coding of themes for each of the three frames (medical, behavioral and structural). Across all comparisons of C-E pairs for behavioral causes (see Table 6), lack of exercise (C) and coronary diseases (E) were categorized as highly concordant, and C-E pairs for medical causes (Table 7), obesity (C) and Type 2 diabetes risks (E) were categorized as highly concordant.

**Table 4.** Thematic coverage – effects of Type 1, 2, Gestational and Unspecified as per medical, structural and behavioral frames in NZ print media.

Effects	Frames	Type 1	Type 2	Gestational	Unspecified
Alzheimer's	Medical		1		
<b>Amputation</b>	<b>Medical</b>		<b>7</b>		3
<b>Blindness</b>	<b>Medical</b>	2	<b>8</b>		<b>7</b>
Circulation	Medical	2			1
Coma	Medical	3			1
Confusion	Medical	2			1
<b>Coronary diseases</b>	<b>Medical</b>		<b>5</b>		<b>3</b>
Cut, infections, healing time	Medical	1	1		1
<b>Death</b>	<b>Medical</b>	2	<b>3</b>		<b>11</b>
Dementia	Medical		1		2
Employment	Structural	2			4
erectile dysfunction	Medical				2
<b>Ethnicity-specific effects</b>	<b>Behavioral</b>		<b>5</b>		<b>12</b>
Food affordability effects	Structural	1			
Gender-specific effects	Behavioral				4
Global economy	Structural		2		1
<b>Healthcare facilities</b>	<b>Structural</b>		<b>7</b>		<b>23</b>
Healthcare workforce	Structural		1		
Hormone production	Medical				2
Hospitalization	Medical	3	1		4
<b>Kidney disease</b>	<b>Medical</b>	1	<b>7</b>		<b>8</b>
Long-term diabetes risk in children	Medical			1	
Long-term metabolic disorders in children	Medical		1	2	
<b>National economy</b>	<b>Structural</b>		<b>12</b>		<b>31</b>
Neonatal hypoglycemia	Medical			2	
Obesity	Medical			2	
Personal/family finances	Structural	1	2		5
Stroke	Medical		1		2
Sweating	Medical				1
Type 2 diabetes risk	Medical		2	3	2
Ulceration	Medical		2		

**Table 5.** Thematic coverage – solutions of Types 1, 2, Gestational and Unspecified as per medical, structural and behavioral frames in NZ print media.

Solutions	Frames	Type 1	Type 2	Gestational	Unspecified
Age specific	Behavioral		5		3
Alcohol consumption	Behavioral				1
Breastfeeding	Behavioral		2	1	2
Community-based charity events	Structural	3			
Culturally appropriate interventions	Structural				5
Diet management	Behavioral		5	2	6
Dietary change	Behavioral		2		8
District health board initiatives	<b>Structural</b>		2		18
Education	Structural				2
Exercise for management	<b>Behavioral</b>		8	1	16
Food and beverage industry initiative	Structural		2		2
Gender specific	Behavioral		2		6
Government directed initiatives	<b>Structural</b>		6	1	10
Green prescriptions	<b>Structural</b>		5		5
Healthy lifestyle	Behavioral		1		5
Medical advancement prevention	Medical		2		3
Medical advancement treatment	<b>Medical</b>	5	3		7
Oral treatment	Medical		1	1	
Policies	<b>Structural</b>		8		10
Preventative diet	<b>Behavioral</b>		12	1	11
Preventative exercise	<b>Behavioral</b>		10	1	13
Reduced calorie intake	Behavioral		3		4
School based initiatives	Structural		3		2
Surgical treatment	Medical		3		1

Note: Themes are highlighted in bold if the total frequency count of a theme is more than 5.

**Table 6.** Concordance analysis of themes related to behavioral causes – effects (behavioral, medical and structural) in NZ print media.

Code A	Code B	Freq A	Freq B	Freq (B   A)	% of A	Freq (A   B)	% of B	% Events	z	Prob.
Ethnicity specific	Healthcare facilities SE	6	32	1	16.70%	1	3.10%	25.00%	3.06	0.087
High fat diet	Amputation ME	11	10	1	9.10%	1	10.00%	9.10%	3.32	0.075
High fat diet	Maternal diet HS	11	2	1	9.10%	1	50.00%	9.10%	7.90	0.015**
Lack of exercise	Blindness ME	14	20	2	14.30%	2	10.00%	15.40%	4.27	0.014**
Lack of exercise	National economy SE	14	53	3	21.40%	3	5.70%	23.10%	3.67	0.011**
Lack of exercise	Coronary diseases ME	14	8	2	14.30%	2	25.00%	15.40%	7.12	0.002*
Maternal behavior	Obesity ME	3	2	1	33.30%	1	50.00%	20.00%	11.82	0.007*
Maternal behavior	Type 2 diabetes risk ME	3	7	1	33.30%	1	14.30%	20.00%	6.21	0.025
Meat consumption	Amputation ME	5	10	1	20.00%	1	10.00%	33.30%	6.74	0.021
Poor diet	Amputation ME	16	10	2	12.50%	2	20.00%	14.30%	6.06	0.004*
Poor diet	Blindness ME	16	20	2	12.50%	2	10.00%	14.30%	4.08	0.016
Sugar consumption	Global economy SE	64	3	1	1.60%	1	33.30%	2.30%	3.01	0.087
Unhealthy lifestyle	Ethnicity-specific effects HE	5	18	1	20.00%	1	5.60%	16.70%	3.36	0.074
Unhealthy lifestyle	Personal/family finances SE	5	8	1	20.00%	1	12.50%	16.70%	5.26	0.033**

Notes: HE: health behavioral effects; ME: medical effect; SE: structural effects. \* refers to high concordance at 1% level of significance; \*\* refers to moderate concordance at 5% level of significance.

**Table 7.** Concordance analysis of themes related to medical causes – effects (behavioral, medical and structural) in NZ print media.

Code A	Code B	Freq A	Freq B	Freq (B   A)	% of A	Freq (A   B)	% of B	% Events	z	Prob.
Obesity	Type 2 diabetes risk ME	79	7	3	3.80%	3	42.90%	4.20%	4.48	0.005*
Obesity in children	National economy SE	18	53	3	16.70%	3	5.70%	16.70%	2.89	0.028
Insulin production	Confusion ME	22	3	1	4.50%	1	33.30%	6.70%	5.43	0.031**
Genetic predisposition	Hospitalization ME	12	8	1	8.30%	1	12.50%	12.50%	4.50	0.044
Genetic predisposition	Amputation ME	12	10	1	8.30%	1	10.00%	12.50%	3.98	0.055
Obesity	Ethnicity-specific effects HE	79	18	3	3.80%	3	16.70%	4.20%	2.22	0.062
Obesity	Kidney disease ME	79	18	3	3.80%	3	16.70%	4.20%	2.22	0.062
Insulin production	Hospitalization ME	22	8	1	4.50%	1	12.50%	6.70%	3.15	0.082
Obesity	Amputation ME	79	10	2	2.50%	2	20.00%	2.80%	2.12	0.090
Obesity in children	Personal/family finances SE	18	8	1	5.60%	1	12.50%	5.60%	2.82	0.097

Note: HE: health behavioral effects; ME: medical effect; SE: structural effects.

**Table 8.** Concordance analysis of themes related to structural causes – effects (behavioral, medical and structural) in NZ print media.

Code A	Code B	Freq A	Freq B	Freq (B   A)	% of A	Freq (A   B)	% of B	% Events	Z	Prob.
Socio-economics	Ethnicity-specific effects HE	19	18	2	10.50%	2	11.10%	12.50%	4.01	0.017**
Food availability	Amputation ME	28	10	2	7.10%	2	20.00%	6.70%	3.9	0.019
Government inaction	Coronary diseases ME	5	8	1	20.00%	1	12.50%	12.50%	4.5	0.044
Food availability	Ethnicity-specific effects HE	28	18	2	7.10%	2	11.10%	6.70%	2.64	0.056
Food affordability	Coronary diseases ME	8	8	1	12.50%	1	12.50%	8.30%	3.59	0.066
Food availability	Blindness ME	28	20	2	7.10%	2	10.00%	6.70%	2.44	0.067
Food availability	Gender-specific effects HE	28	4	1	3.60%	1	25.00%	3.30%	3.15	0.081
Food affordability	Amputation ME	8	10	1	12.50%	1	10.00%	8.30%	3.15	0.082
Government inaction	Kidney disease ME	5	18	1	20.00%	1	5.60%	12.50%	2.83	0.097
Government inaction	Blindness ME	5	20	1	20.00%	1	5.00%	12.50%	2.66	0.108

Note: HE: health behavioral effects; ME: medical effect; SE: structural effects.

Because our analysis demonstrates that Type 2 diabetes is the most frequently occurring of the three diabetes types in print media, in Table 8 we further explored media’s presentations of medical and behavioral solutions for Type 2. Specifically, we analyzed code similarity related to behavioral causes and solutions for Type 2. We conducted similar analysis using the medical frame, which has frequently appeared as a cause of Type 2. We find that, as per medical frame, ‘Surgical treatment’ and ‘Oral treatment’ were highly concordant with codes for obesity, one of the main attributed causes of Type 2. In the case of the behavioral frame, ‘Reduced calorie intake’ and ‘Stop smoking’ were the main behavioral solutions for Type 2 diabetes.

## Discussion

Frames are important in how the public view causality of an issue and what policies they support to rectify the problem. Empirical evidence establishes a correlation between media use of individualized versus structural frames and public attribution of causal and treatment responsibilities (Coleman, Thorson, & Wilkins, 2011; Scheufele & Tewksbury, 2007), evaluation and decision-making (Barry, Jarlenski, Grob, Schlesinger, & Gollust, 2011). Analyzing major metropolitan newspapers in New Zealand we explored diabetes type-related coverage, framing of diabetes responsibility attributions and the predominant themes associated with diabetes discourse.

### Media coverage of diabetes in relation to societal prevalence

Our findings suggest that New Zealand print media do not fully convey the complexity of diabetes. The predominant group consisted of articles using the term ‘Diabetes’ Type Unspecified. The ratio of Type Unspecified versus Type 2 was 1.9:1. That is, media

discussed diabetes as Type Unspecified almost 2 times to 1 mention of Type 2, the second highest group of articles. The findings are in contrast to the USA, where Type 2 diabetes coverage accounts for 90–95% of diabetes-related discussions, and Type Unspecified constitutes only a third of diabetes discussions (Stefanik-Sidener, 2013).

A possible contextualized explanation for the high use of the generic term ‘Diabetes’ is that New Zealand does not currently distinguish types in its national diabetes register and media is reflecting the official discourse. The low coverage of Type 1 diabetes compared to Type 2 is understandable in relation to prevalence. However, Type 1 diabetes is increasing in New Zealand with concerns raised about provisions of appropriate intervention and care (Jefferies et al., 2015). Explanations attributed to the lack of media attention on Gestational diabetes are that Gestational diabetes is considered temporary and its causality is less understood than Types 1 and 2. Moreover, there are no officially available statistics on national prevalence of Gestational diabetes.

### ***Framing responsibility attributions in diabetes discourse***

The study extends responsibility attribution literature. Prior analysis examined cause versus solution prevalence across the three diabetes types and found that the predominant discourse was on causality. Moreover, where solution discussion was high as in Type 2, it was comparable to causal discussions (Stefanik-Sidener, 2013). Our findings support the emphasis on cause but using the added framing element of problem definition in the form of ‘effects’, we find that newspapers have a high presence of cause and effects at the expense of solutions for type-specific and generic diabetes discussions. Media emphasis is on causes for the two largest categories of diabetes discussions, Type Unspecified and Type 2, while for Type 1 and Gestational diabetes, emphasis is on effects.

The study also supports prior research that finds individual frames’ moral overtones on causality, responsibility and blame dominate media health framing (Kwan, 2009) since individual frames are dominant over the structural frame in diabetes discourse. Our results indicate that in framing causality and solutions, health behavior is the predominant frame across all diabetes types except Type 1, where the medical frame is dominant. The results are in keeping with prior studies that indicate if causality is individualized than solution will also be individualized (Iyengar, 1990).

The study further extends diabetes-framing literature through the exploration of media’s framing of effects. We found that the medical frame is dominant across all diabetes effects discussions. The results suggest that media promote diabetes as an individual’s burden of disease, which when mismanaged results in amputation, blindness, kidney disease and coronary disease. A minority of articles defined diabetes as a societal problem, mentioning the detrimental effects on indigenous ethnic communities, lower socio-economic sectors, national economy and healthcare facilities.

A possible explanation for the emphasis on cause and effects using individualized frames is that the media are addressing what they see as a need to raise public awareness of behavioral actions that contribute to diabetes, and more specifically, to Type 2 diabetes. One plausible reason might be media presumption that a general awareness among the public exists about the causes of Type 1 diabetes but less awareness of the medical consequences of unregulated Type 1 and Gestational diabetes. On the other hand, for Unspecified and Type 2 diabetes, media attention is predominantly on behavioral causes of

diabetes. The lack of emphasis on solutions correlates with recent findings that indicate New Zealand is a treatment-focused rather than prevention-focused society, as reflected in the national health expenditure of 54% on rehabilitation compared to 6% on prevention and public health services (World Health Organization, 2014).

### ***Framing contests through thematic associations***

The findings add to research identifying framing contests on health issues (Jenkin et al., 2011; Saguy & Riley, 2005). Our study as a whole indicates that the media industry is utilizing the market justice argument of the food and marketing industry rather than the social justice discourse of the public health sector to define diabetes as an individualized medical concern and to attribute high causal and solution responsibility to individuals. Messages about ways to address diabetes focused on lifestyle changes involving diet and exercise. Other dominant solutions included medical advancements and treatment and macro-level political initiatives. Interestingly, calls for changes in food industry regulations was not a dominant theme, despite public health correlations between food consumption patterns and Type 2 diabetes (Jenkin et al., 2011), and the global debate at the time on sugar-sweetened beverage tax (Niederdeppe, Gollust, Jarlenski, Nathanson, & Barry, 2013). A possible explanation is the common journalistic practice of using exemplars, since the storied lives of individuals' health-changing behavior create audience' interest and makes a story newsworthy (Hinnant, Len-Ríos, & Young, 2013).

Another important consideration of framing decisions is commercial pressure, particularly when structural determinants involving the food industry are high in empirical literature but not in media coverage. While on the one hand, media have been critical of the food industry's role in creating an obesogenic climate (Lawrence, 2004) media companies rely on the food marketing industry as a major funding source in an increasingly competitive environment (Picard, 2004). Within the Pacific context, Australian media regulatory bodies are discontinuing their monitoring of children's food marketing exposure (Swinburn & Wood, 2013) adding further weight to the argument that media companies have a vested interest in health framing (Lang & Heasman, 2004; Nestle, 2013).

The high use of the individualized behavioral frame for cause and solutions has implications for policy support for societal solutions. Evidence indicates that when issues are presented with an individualized frame, the public is likely to attribute causality to individuals, hold individuals responsible for their actions, and to view issues being resolved through a change in individual behavior (Iyengar, 1990; Weiner, 1991). In contrast, when the same issue is presented with an emphasis on structural determinants, the public is more supportive of policy changes at the societal level to rectify the issue (Niederdeppe et al., 2014). The presence of the structural frame in media diabetes definitions points to the success of public health and social justice movements in gaining coverage that moves beyond individualized responsibility and blame for causing and fixing diabetes-related issues (Dorfman et al., 2005).

The results also suggest that the current media hype around obesity overshadows diabetes as a complex, type-specific health issue. We find that media place high thematic association between obesity causality and 3 out of the 4 diabetes categories: Unspecified for type, Type 2 and Gestational diabetes. These findings have implications for diabetes stigma. Prior research has established a high association of obesity with lack of behavioral



control, and the subsequent attribution of stigma to being overweight (Kwan, 2009; Weiner, 1991). The primary reference to diabetes without type-specification correlated with obesity causality and a behavioral frame for solution extends stigma towards people living with diabetes, with adverse consequences for health-seeking behaviors (Schaubert, Browne, Mosely, & Speight, 2013; Teixeira & Budd, 2010). Such a highly personalized responsibility also negates public attention from structural solutions for diabetes.

### ***Practical implications***

The findings of this study can help better tailor diabetes-related intervention messages within the New Zealand context and to meet the needs of those most at risk. The study provides the following recommendations:

Media can increase diabetes type-specific information. Our findings indicate that New Zealand media do not fully convey the complexity of diabetes. The high emphasis on the generic use of the term 'diabetes' is a concern because there is a blurring of distinction between the causal factors associated with Types 1, 2 and Gestational. This need for the differentiation between types is a crucial step in meeting the needs of persons with diabetes and their caregivers (Ministry of Health, 2015).

Media can also increase Gestational diabetes coverage, which is an important consideration given the association between Gestational diabetes and the increased likelihood of Type 2 diabetes in mother and child. Given that New Zealand media health intervention messages have been found to have a substantial impact on increasing healthy lifestyles amongst the general public (Bauman et al., 2003), the study identifies preventative measures against Gestational diabetes as an area that can be improved upon in media reporting.

More attention needs to be on presenting diabetes as a 'societal' concern, rather than the current emphasis, which is diabetes as a disease of the individual. The structural framing of diabetes will contribute to a reduction in the stereotyping of individuals and populations through the attribution of a genetic cause for diabetes over social determinants (Barnes et al., 2005).

Finally, increased public discourse on societal preventative measures are needed, particularly for at-risk populations. As indigenous people who are socio-economically disadvantaged are considered most at risk of Type 2 and Gestational diabetes in New Zealand, more measures need to be addressed that work with the indigenous people's holistic view of health. In addition, community-based interventions can be emphasized in media discussions of prevention and management of diabetes, in particular, Type 2 and Gestational diabetes.

### ***Limitations and future research***

This study has several limitations. The data set consisted of metropolitan newspapers. While news is recycled between the smaller regional newspapers and the larger metropolitan newspapers, future research could explore the ethnic-specific and socio-economic deviations of diabetes framing. Such research could investigate how diabetes type-specific coverage, definition, and responsibility attribution are distributed across localized and ethnic-language-specific newspapers.

Empirical evidence suggests that media's responsibility framing influences societal behavior modifications around health issues (Iyengar, 1990). The audience not only

equates cause and solution to the same societal or individual pathways, but these attributions then influence audience' behavior (Sun et al., 2016). Future research building on this study needs to examine how exposure to individualized versus structural frames of type-specific cause, effect and solution affect audience perceptions and attitudes towards diabetes and people with diabetes.

Research has also demonstrated the impact that cause and solution responsibility attributions can have on societal behavior modifications around health issues. For instance, Sun et al. (2016) found that not only do participants equate cause and solution to the same societal or individual pathways but also that these attributions then influence participants' behavior. Further research could investigate if the exposure to individualized versus structural effects have a similar impact on behavior modification.

Media framing of causality and solutions impacts audience perceptions of who is responsible for diabetes and support for targeted policies to alter causal elements (Niederdeppe et al., 2013). Media framing of effects provides a different and important dimension of analysis on public's perceptions of diabetes as having detrimental consequences for society or as being a disease with individual level consequences. Further research could analyze the impact of framing diabetes effects as an individual versus societal concern on audience' response towards societal-level policies to solve diabetes.

## Conclusion

The research utilizes frame analysis and adds value to the study of mediated health communication. Our study offers an analysis of how media frame the problem definition and responsibility attribution when discussing diabetes types. The study found media are lacking in their understanding of the complexities of diabetes. This is evidenced both by the media's inability to differentiate between the types of diabetes, and by the media's focus on individual solutions for diabetes treatment. Furthermore, recent media concerns with obesity overshadow diabetes as a major health issue in its own right.

The study's findings have implications for societal behaviors towards diabetes and people living with diabetes. How diabetes is defined may be central to creating awareness about diabetes type-specific issues. Moreover, whether diabetes is defined as an individual or societal concern may be central to participants' support for policies aimed at altering societal and environmental determinants to address NCD.

## Note

1. <http://www.knowledge-basket.co.nz/databases/newztext/>.

## Disclosure statement

No potential conflict of interest was reported by the authors.

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