

The Language of Diabetes Complications: Communication and Framing of Risk Messages in North American and Australasian Diabetes-Specific Media

Linda J. Beeney¹⁻³ and Elizabeth J. Fynes-Clinton⁴

■ IN BRIEF Reducing the risk of diabetes complications requires the delivery of accurate and constructive information for people with diabetes to make informed self-management choices. This article reports on a study assessing the language and framing of risk messages about long-term complications featured in publications produced by North American and Australasian diabetes organizations. Findings highlight problems with the language, content, and framing of messages about risk of long-term diabetes complications presented by diabetes-specific media. These poorly communicated messages may be contributing to distorted perceptions of complications risk and diabetes distress and may interfere with optimal self-management.

Reducing the risk of long-term complications underpins the efforts of patients, families, and clinicians to manage diabetes on a daily basis (1). People with diabetes take primary responsibility for implementing their own treatment; therefore, clear, objective, accurate, and evidence-based information is essential to equip their informed decision-making toward the goal of reducing complications risk (2).

People with type 1 diabetes (3) or type 2 diabetes (4,5) have been shown to significantly overestimate their risk for major complications when compared with published prevalence data. The use of terminology and framing of health communications (6), particularly gain- or loss-framing of risk messages (7), shapes and influences the effectiveness of such messages on attitudes, intentions, and behaviors. Gain-framing of health messages highlights the benefits of a specific behavior or other risk factor, whereas loss-framing focuses on the losses associated with a risk factor or failing to engage in a specific behavior (7).

A meta-analysis review reported gain-framed messages to be superior to loss-framed messages in encouraging health behavior change (7). There is clear potential for emotive, confusing, or negatively framed complications information to interfere with the capacity of people with diabetes to make objective self-management decisions regarding their diabetes.

Choice of message wording and terminology has been shown to exert a significant influence on patients with cancer (8), treatment decision-making by health professionals in addiction medicine (9), and pain perception (10). Yet, there has been very little research into language, risk message framing, and terminology used in communicating with people with diabetes, despite claims that negative diabetes language is demotivating and harmful (11–13).

Health-related media messages and images are powerful and have been shown to override guidelines from authoritative sources for body weight goals and other health indices (14). People with diabetes and their

¹Sydney Medical School, The University of Sydney, Sydney, Australia

²Researching Media in Diabetes (ReMinD) Program, Sydney, Australia

³Medical Psychology Services, Sydney, Australia

⁴University of the Sunshine Coast, Maroochydore, Australia

Corresponding author: Linda J. Beeney, linda.beeney@sydney.edu.au

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families are known to actively search for information about complications through various forms of media (15,16). Diabetes-specific media produced by not-for-profit national diabetes organizations are promoted and seen as reliable and trusted sources of information about diabetes management and related topics and have greater penetration and higher credibility than mass media among people with diabetes (17,18). Previous research evaluating information about blood glucose targets suggests that the quality of information presented in diabetes-specific media about glycemic targets is inadequate and confusing (19). This study extends the available research by evaluating the language and communication of information about long-term diabetes complications presented in diabetes-specific media sources.

The prospect of developing long-term diabetes-related complications is a primary source of diabetes distress and significant anxiety for people with diabetes of all ages, as well as their parents, partners, and families (20–22). A recent study of U.S. mass media coverage of diabetes identified confusing information and framing of messages that could be contributing to high levels of reported stigma and distress for people with either type 1 or type 2 diabetes (23). Hence, this study also investigates how diabetes-specific media sources communicate about the psychological distress associated with the diagnosis or progression of complications.

The study aimed to evaluate the quality of complications language, the framing used to present messages about the risk of complications, and the quality of information associated with psychological distress presented in North American and Australasian diabetes-specific media.

Research Design and Methods

Study Design and Materials

The content analysis approach used in this study was adapted from methodology previously used to analyze media messages about diabetes glycemic

targets (19). The theoretical framework underpinning this approach is derived from Prospect Theory and message-framing literature applied in many health communication settings (6,24,25). According to Prospect Theory (25), people respond differently to information about the consequences of a behavioral decision depending on whether the same consequences are presented as gains or losses.

Four online and print publications specifically targeting people with type 1 or type 2 diabetes and produced by North American and Australasian national diabetes organizations were selected for analysis: *Diabetes Forecast* (American Diabetes Association) (17), *Diabetes Dialogue* (Canadian Diabetes Association) (26), *Circle* (Diabetes Australia) (18), and *Diabetes Magazine* (Diabetes New Zealand) (27). These were selected on the basis of language and cultural consistency and similar national standards for diabetes management. Hard copies and access to online issues were obtained for the 2015–2017 editions, where available. A total of 25 published magazine issues were obtained for analysis. The publications, circulation, and details of relevant articles retrieved from each are presented in Table 1.

Procedures

Each issue was searched manually from front to back covers to identify any text references to complications of type 1 or type 2 diabetes. All references to non-specified complications plus specific mentions of four main long-term complications of diabetes—retinopathy, nephropathy, neuropathy, and cardiovascular disease (CVD)—regardless of terms used to define them were included in the coding process. Other complications of diabetes such as cancer and cognitive impairment were excluded from analysis.

Coding Framework

References to diabetes complications were analyzed at two levels:

1. Each mention of complications was coded for the language and terminology used to define them.

2. The subset of references containing a risk message linking the development or progression of complications to other variables, including glycemic factors, diabetes treatment, self-management behaviors and genetics, was assessed for the following variables:
 - a. Diabetes type: whether the complications risk message was linked to type 1 diabetes, type 2 diabetes, both, or unspecified
 - b. Gain or loss framing: whether the risk message was framed as a loss or gain
 - c. Risk-reduction strategies: suggested strategies to reduce the likelihood of the complication(s) that accompanied the risk message
 - d. Quality of evidence to support the risk association: risk messages about complications were coded for the quality of explanation to support the implied or overt link between the risk factor and risk of complications. The levels of quality were defined as:
 - No explanation: the link between the risk factor and complications was presented with no explanation for the association with risk
 - Minimal explanation: linked the risk factor to complications with a minor level of explanation or a reference to published data
 - Evidence-based explanation: includes reference to published data or research findings to demonstrate how modifying the risk factor contributes to complications risk elevation or reduction
 - e. Mention of related psychological issues: whether any mention was made of the psychological issues associated with the risk, diagnosis, or progression of diabetes complications

TABLE 1. Characteristics of Publications and Articles Including Complications References

Country Publication (Number Issues in Sample) Frequency Publication Type Circulation	Number of Articles With Complications References	Number of Articles With Complications References in Each Issue, mean (SD)	Number of Articles With Complications References in Each Issue, range
United States <i>Diabetes Forecast</i> (6) Bimonthly Print/online 500,000	45	7.5 (1.8)	5–9
Canada <i>Diabetes Dialogue</i> (6) Quarterly Print/online >91,000	31	5.2 (3.0)	2–11
Australia <i>Circle</i> (6) Quarterly Print 140,000	24	4.0 (0.9)	3–5
New Zealand <i>Diabetes Magazine</i> (7) Quarterly Print/online 45,000	25	3.6 (2.4)	2–11
Total sample (25 issues)	125	5.0 (2.4)	2–11

Data Analysis

Intercoder reliability was assessed via two coding exercises. The first examined the inclusion or exclusion of references to test the reliability of decisions regarding items meeting criteria for inclusion. To confirm the viability of the coding framework and address any coding difficulties, the two raters initially coded a sample of publications independently and then met to discuss interpretation of the coding variables. Agreement was initially lower between the two coders on whether a reference met criteria for being a reference to diabetes complications, mainly due to the second coder being diabetes naive. After clarification of differences

by discussion, consistency improved between the coders on these variables.

A second exercise assessed reliability of framing decisions on a sample of 10% of all references included in the coding analysis, with inter-rater reliability assessed using Cohen’s κ test of agreement. One author (L.J.B.) coded all articles, with the second author (E.J.F.-C.) reviewing a 10% sample to establish intercoder reliability. Assessment of intercoder reliability using Cohen’s κ produced scores of 0.91 for gain or loss framing of a risk message and 0.89 for quality of evidence, indicating excellent agreement (28).

Results

In total, 125 articles that included references to the major long-term complications of diabetes were identified for the study period in feature articles ($n = 77, 61\%$), brief pieces ($n = 35, 28\%$), advertisements ($n = 10, 8\%$) and advice columns ($n = 4, 3\%$). Every issue included at least two articles with complications references, with an overall mean of five references per issue ($SD = 2.4, \text{range } 2\text{--}11$). The highest mean number of articles including references to complications was found in United States–based *Diabetes Forecast* (7.5 ± 1.8).

Complications Language

References to CVD were the most frequent (37%), followed by references to retinopathy (31%), nephropathy (28%), neuropathy (25%), and unspecified complications (25%). Table 2 shows the detailed terminology most frequently used to refer to each category of complications.

Of the 125 articles that included references to major diabetes complications, most ($n = 82, 66\%$) contained a risk message, and these were included in further analysis of the nature of complications risk language, framing, and psychological distress.

References to complications without risk messages occurred in articles such as personal stories of living with diabetes, for example “Looking back, Keisha Cooper . . . should have known type 2 was something to worry about. Her grandmother died of the disease, after losing five fingers and both of her legs to complications. And her mother was diagnosed with type 2 in 1989” (*Diabetes Forecast* January/February 2016, p. 48).

More than half the articles ($n = 70, 56\%$) did not indicate whether the complications information applied to type 1 diabetes, type 2 diabetes, or both, using the generic term diabetes or no defining term. Complications information was explicitly linked to type 2 diabetes ($n = 32, 25\%$), type 1

TABLE 2. Terminology Used to Describe Complications

Complications Categories	Terms and Phrases*	n (%)
Unspecified complications	• Complications of/from/related to diabetes	35 (70)
	• Damage/serious/burden/biggest health threat/life-threatening problems	15 (30)
Retinopathy	• Vision loss/blindness	24 (33)
	• Retinopathy/diabetic retinopathy/severe proliferative diabetic retinopathy	24 (33)
	• Eye damage/eye problems/eye complications	20 (28)
Nephropathy	• Kidney disease/damage	24 (60)
	• Dialysis/transplant	8 (20)
	• Kidney failure	7 (18)
Neuropathy	• Amputations/nontraumatic amputations	17 (29)
	• Nerve damage/nerve disease	16 (28)
	• Neuropathy	11(19)
	• Loss of sensory function/gangrene/erectile dysfunction	3 (7)
CVD	• Heart disease	18 (26)
	• Heart attack	13 (19)
	• CVD	10 (14)
	• Heart gave way/heart failure	3 (4)

*Only the most frequently used terms/groups of terms are included in this table. Other, less frequent terms were also identified for each of the complications categories; therefore, the percentages do not all total 100%.

diabetes ($n = 10$, 8%), or both ($n = 14$, 11%) in the remaining 44% of articles.

Risk factors associated with increased or decreased likelihood of long-term complications were coded into categories and are presented in Table 3. The most frequently cited risk factor for the development of complications was “having diabetes” (66%). Many of the variables linked to the development or progression of diabetes complications were described briefly and lacked detail, for example “high blood glucose levels” or “staying a health weight.”

Loss-framed messages dominated in the communication about the risk of diabetes complications. That is, a focus on losses or negative complications outcomes was used in almost two-thirds of the risk messages compared with gain-framed messages that focused on the benefits to complications outcomes (loss-framed, $n = 52$, 63%; gain-framed, $n = 30$, 37%).

The majority of risk messages ($n = 57$, 65%) were presented without any explanation of how the risk factors linked to complications development

or progression or any supporting evidence such as data from published research. A minimal level of supporting evidence was provided for 17% ($n = 15$) of the complications risk messages, and 18% of risk messages ($n = 16$) were accompanied by related research evidence. One in five risk messages ($n = 17$, 21%) were presented without a suggested strategy to manage the complication risk. Table 4 shows the broad categories and subcategories of risk-reduction strategies that accompanied the majority ($n = 65$, 79%) of risk messages. These were typically presented as brief statements or instructions (e.g., “See an endocrinologist early after diagnosis”).

Reference to emotional or psychosocial implications associated with the risk or diagnosis of complications or the progression of long-term complications of diabetes occurred in only three (4%) of the coded messages. The three context quotes included:

- “Many people report that they worry about the future and possible complications and that they feel guilt and anxiety when they

go off track with their diabetes management.”

- “Finally, in consultation with his doctor and his wife Anna, he decided that removing his entire leg would give him the best chance of living a quality life.”
- “Depression affects diabetes control, the risk of complications, and their impact.”

Conclusion

This study investigated the language and framing of references to long-term diabetes complications presented in North American and Australasian online and print diabetes-specific media. Its findings indicate problems with the language, content, and framing of complications risk messages that may help explain misunderstandings regarding complications risk and related distress among people with diabetes seen in previous research (3–5,20,21).

Blindness, amputations, and kidney damage represent the more severe end of the spectrum for retinopathy, neuropathy, and nephropathy and were the

TABLE 3. Categories of Risk Factors Linked to Diagnosis or Progression of Complications

Categories of Risk Factors	n*	Sample Context Quotes (Loss/Gain Framing)
Aspects of having diabetes		<ul style="list-style-type: none"> • "Having diabetes is the leading cause of blindness in American adults." (Loss)
Having diabetes	34	<ul style="list-style-type: none"> • "Diabetes is the leading cause of blindness in working-age Australians." (Loss)
Having type 2 diabetes	6	<ul style="list-style-type: none"> • "... 20 times more likely to land in hospital for amputation than those without diabetes" (Loss)
Having type 1 diabetes	3	<ul style="list-style-type: none"> • "People with type 2 diabetes are at high risk for heart disease." (Loss)
Duration of diabetes	3	<ul style="list-style-type: none"> • "About 30% of people with type 1 will develop kidney disease." (Loss)
Undiagnosed/poorly managed	3	<ul style="list-style-type: none"> • "The longer you have it [diabetes], the higher the risk of complications." (Loss)
Treatment		<ul style="list-style-type: none"> • "Early diagnosis and treatment of diabetic retinopathy can help prevent up to 98% of severe vision loss." (Gain)
Unspecified	2	
Medications	5	<ul style="list-style-type: none"> • "... insulin reduces the risk of diabetes-related complications" (Gain)
Insulin	1	
Behaviors		<ul style="list-style-type: none"> • "Swapping... saturated fat daily with the same amount of unsaturated fat... reduced the heart disease risk by 15–25%." (Gain) • "Taking an eye test every 2 years can dramatically reduce the risk of vision loss, through early identification." (Gain)
Dietary factors (e.g., fat or sugary drinks)	4	
Healthy lifestyle	1	
Screening activities	1	
Smoking	1	
Physical parameters		<ul style="list-style-type: none"> • "Staying a healthy weight... will cut the risk of diabetic peripheral neuropathy by up to 60%." (Gain)
Blood pressure	3	
Weight	2	
Cholesterol	1	
Glycemic factors		<ul style="list-style-type: none"> • "High blood glucose levels over a period of time lead to complications." (Loss)
Blood glucose levels, normal range, looking after blood glucose levels	9	
Poor glycemic control	1	
Health professionals		<ul style="list-style-type: none"> • "Without proper care, diabetes can lead to complications including retinopathy, and potentially, blindness." (Loss)
Seeing general practitioner	1	
Not following medical advice	1	<ul style="list-style-type: none"> • "Canadians with diabetes who see their family doctor or health care team at least three times a year are 33% less likely to have a limb amputation." (Gain)

*Each complications reference may have included one or multiple risk factors.

TABLE 4. Categories of Risk-Reduction Strategies Linked to Risk Messages in Diabetes-Related Media

Categories of Risk-Reduction Strategies	n*	Sample Context Quote
Patient health behaviors	39	
Screening (e.g., eyes, kidneys)	13	"annual eye exam"
Eating	12	"more high-fiber carbohydrates"
Exercise	5	"brisk walking"
Foot care	5	"inspect feet"
Control/lose weight	3	"healthy weight"
Not smoking	1	"don't smoke"
Control physiological parameters	25	
Blood glucose	14	"achieving blood glucose targets"
Blood pressure	8	"keep blood pressure <140/90 mmHg"
Cholesterol	2	"control cholesterol"
A1C	1	"tight levels of A1C"
Obtain more information or assistance	16	
Ask doctor or health professional	7	"see an endocrinologist early after diagnosis"
Seek treatment	5	"take up treatment advances"
Directed to website address	4	
Treatment	9	
Medications	8	"ask your doctor about Lyrica"
Insulin pump	1	"using insulin pump"
Healthy lifestyle	6	"be proactive with your diabetes"

*Each complications reference may have included one or multiple risk-reduction strategies.

terms most frequently used by diabetes media to refer to specific diabetes complications. Published editorials, expert opinion papers, and consensus statements from the 1970s to present day (11,12,29,30) have argued that negative diabetes language generates emotional distress for people with type 1 or type 2 diabetes. Furthermore, fear of complications is associated with significant diabetes distress and compromised quality of life (20–22,31). Therefore, it is highly likely that frequent exposure to emotive complications language in diabetes media, without context or clarifying information, is generating higher levels of diabetes distress, which are associated with compro-

mised self-management behaviors and poorer diabetes outcomes (32). Similar emotive health terminology has been shown to generate potentially damaging anxiety and distress in experimental research with pain populations (10), impact the course of postoperative pain (33), and lead to poorer patient outcomes in addiction medicine (34).

Experimental data evaluating the emotional impact of negative diabetes language are yet to be published in the diabetes context (11). However, if future research demonstrates that negative diabetes language generates increased diabetes distress, this may help explain the link between emo-

tional distress and poorer diabetes outcomes via physiological stress responses (32) and provide evidence to support recommendations regarding language change.

The most commonly cited risk factor linked to the development or progression of complications was simply having diabetes. Phrasing of this sort may suggest to readers that development of these complications is inevitable and may help explain the development or maintenance of distorted complications risk perceptions reported in the literature (3–5). People with diabetes view the media analyzed in this study as highly credible sources of diabetes information and are therefore likely to take these messages seriously. Those readers who perceive complications as inevitable may develop a sense of hopelessness about the impact of their actions and reduce their self-care efforts as a result.

The majority of risk factors were described in general terms and with a lack of detail (e.g., "high blood glucose levels over a period of time" or "staying a healthy weight"). Risk-reduction strategies accompanying risk messages also tended to be brief, general, and lacking in a level of detail necessary for implementation. In addition, only 35% of risk messages were accompanied by supportive evidence, and fewer than 50% of risk messages were linked to type of diabetes, consistent with studies of the mass media in the United States (23) and the United Kingdom (35).

This study found that loss-framing was more prevalent than gain-framing in communication about complications risk messages. Diabetes media's use of loss-framing is at odds with health communication research showing that positively framed (gain) messages are more effective when applied to behaviors that prevent the onset of disease, such as managing the risk of diabetes complications (7,36). Strong links between health message framing, health decisions, and outcomes have been demonstrated in experimental studies in the

cancer prevention context (37,38). For example, gain-framed messages about cancer patients' prognosis were associated with less psychological distress and a greater sense of hope in patients compared to individuals who heard negatively framed messages about prognosis (37). This study revealed that loss-framed risk messages dominate in diabetes media, potentially reducing the usefulness and efficacy of communication efforts to assist people with diabetes in self-management decisions to reduce complications risk.

Diabetes-specific media rarely mentioned the psychological impact of major long-term complications. This lack of acknowledgment of emotional distress is at odds with research clearly showing that people with diabetes identify fear of complications, especially those that threaten eyesight and mobility, as a major source of diabetes distress and anxiety (20,21). Readers of these publications exposed to repeated references to complications with little or no acknowledgment of the psychological impact of these complications may receive the message that feeling distressed about complications is unusual or abnormal, which may limit their willingness to disclose diabetes distress to health professionals and therefore hinder the provision of appropriate intervention.

The study findings have several implications for the not-for-profit national diabetes organizations that produce these publications and benefit from higher levels of credibility compared to mass media outlets. First, these findings translate to a greater responsibility to present sensitive and important complications risk information shaped by evidence-based communication research (39). Editorial policy needs to focus on the possible negative conclusions readers draw from complications-related content and to take steps to mitigate potentially damaging consequences. The substantial effort of daily diabetes self-management is geared toward reducing complications risk and requires people with diabetes to

be equipped to make informed decisions to effectively manage risk. Part of helping people with diabetes discern high-quality information may be via media literacy training to enhance skills in evaluating the information quality and reliability of sources, including all forms of media.

Second, individualized targets and personalized treatment plans (40,41) represent a strong trend in diabetes care. This raises the question of whether diabetes-specific media should be presenting messages on risk factors for complications and strategies for risk reduction when it is difficult to provide more than generalized information and advice. This study also has implications for the clinical practice of diabetes health professionals, who need to be aware that their patients may have been exposed to distorted and skewed messages about the risk of diabetes complications in media outlets targeting people with diabetes.

The study represented diabetes media from four English-speaking Western nations; however, the total sample was too small to reliably assess differences in risk message communication across the four countries represented. Including online and print publications from other cultures with different health systems and primary languages in future research would help in assessing the generalizability of the findings.

A particular strength of this study is the theoretical basis for the coding framework, providing a strong foundation for interpretation and organization of existing data, as well as a guide for future research.

Although there has been an overall shift upward in the proportion of Americans who report using social media to obtain news content, people continue to obtain much of their information about health-related issues from traditional print and online news media sources (42). Taken together, these findings indicate overall poor quality of risk communication in media publications targeting individuals with type

1 or type 2 diabetes and their families that may be unintentionally increasing diabetes distress and interfering with self-management efforts and better health outcomes. The data have important implications for the editorial policy decisions of diabetes media providers, the clinical practice of diabetes health professionals, and efforts to equip people with diabetes to critically evaluate media content. Further research is needed, using experimental and other study designs, to clarify how people with diabetes interpret these media messages and implications for their diabetes distress levels, self-care decisions, and behaviors.

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Prior Publication

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Duality of Interest

No potential conflicts of interest relevant to this article were reported.

Author Contributions.

L.J.B. designed the study, collected and analyzed the data, interpreted the results, and wrote the manuscript. E.J.F.-C. collected and analyzed the data and reviewed and edited the manuscript. L.J.B. is the guarantor of this work and, as such, had full access to all the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis.

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