The association between suicide deaths and putatively harmful and protective factors in media reports

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ABSTRACT

BACKGROUND: Exposure to media reporting on suicide can lead to suicide contagion and, in some circumstances, may also lead to help-seeking behaviour. There is limited evidence for which specific characteristics of media reports mediate these phenomena.

METHODS: This observational study examined associations between putatively harmful and protective elements of media reports about suicide in 13 major publications in the Toronto media market and subsequent suicide deaths in Toronto (2011–2014). We used multivariable logistic regression to determine whether specific article characteristics were associated with increases or decreases in suicide deaths in the 7 days after publication, compared with a control window.

RESULTS: From 2011 to 2014, there were 6367 articles with suicide as the major focus and 947 suicide deaths. Elements most strongly and independently associated with increased suicides were a statement about the inevitability of suicide (odds ratio [OR] 1.97, confidence interval [CI] 1.07–3.62), about asphyxia by a method other than car exhaust (OR 1.72, CI 1.36–2.18), about suicide by jumping from a building (OR 1.70, CI 1.28–2.26) or about suicide pacts (OR 1.63, CI 1.14–2.35), or a headline that included the suicide method (OR 1.41, CI 1.07–1.86). Elements most strongly and

independently associated with decreased suicides were unfavourable characteristics (negative judgments about the deceased; OR 1.85, CI 1.20–2.84), or mentions of railway (OR 1.61, CI 1.10–2.36) and cutting or stabbing (OR 1.59, CI 1.19–2.13) deaths, and individual murder-suicide (OR 1.50, CI 1.23–1.84).

INTERPRETATION: This large study identified significant associations between several specific elements of media reports and suicide deaths. It suggests that reporting on suicide can have a meaningful impact on suicide deaths and that journalists and media outlets and organizations should carefully consider the specific content of reports before publication.

Suicide is a major, global public health issue that accounts for at least 800 000 deaths per year worldwide.[1] A substantial body of literature shows that media reports relating to suicide can influence some people to end their lives.[2–12] This phenomenon, known as the Werther effect, is thought to occur via social learning, whereby a vulnerable person identifies with someone portrayed in the media and copies his or her behaviour.[5–7,13–21] Studies in Australia, Austria and the United States have identified potentially harmful elements of media reporting associated with increased rates of subsequent suicide.[5,6,21] These include repetitive reporting, front-page story placement, reports about suicides by jumping, suicide death (rather than ideation or attempts), suicide pacts, including the word "suicide" or the suicide method in the headline, accompanying photos, "monocausal" (single cause and effect) explanations for suicide, and reports that included misinformation

("public myths") about suicide.[5,6,21] However, these elements were not tested or significant in all studies.

A second phenomenon, called the Papageno effect, has been proposed whereby protective factors in reports on suicide may lead readers to initiate adaptive behaviours, resulting in fewer suicide deaths.[5] In Austria, newspaper articles depicting "mastery of suicide," in which people experienced suicidal ideation but found solutions other than suicidal behaviour, were associated with decreased subsequent suicides.[5]

Responsible media reporting is one of a limited number of strategies, which also include restriction of means and school-based awareness programs, that may affect suicide rates at a population level.[22–24] Worldwide, numerous guidelines have been developed to advise the media on best practices.[25–29] Journalists and media organizations can modify their content and are tasked with the challenge of balancing concerns about contagion with the

public's right to be informed.[30] A detailed understanding of the specific aspects of media reports that may provoke suicide contagion is needed to help the media make these decisions; however, evidence identifying the "active ingredients" in media reporting that may mediate suicide contagion or adaptive behaviour remains limited. The studies above have established an evidentiary starting point from which the relative harmful or protective contributions of specific elements in media reports may begin to be unpacked. However, replication of findings across regions and cultures is also needed. The aim of this study is a comprehensive examination of the impact of putatively harmful and protective content of suicide reporting in print and online media on suicide death in Toronto, Canada's largest urban centre.

Methods

Media data

Print and online media reports relating to suicide in the Toronto media market from 2011 to 2014 were the exposure of interest. We identified the 12 major Canadian publications that account for the large majority of traditional news circulation in the Toronto market, and 1 US newspaper with high circulation in Toronto (Box 1). Because of the large volume of articles, we hired Infomart, Canada's leading media consultancy; the study investigators trained Infomart personnel to identify and code articles using an electronic database (for full details, see Appendix 1, available at www.cmaj.ca/lookup/suppl/doi:10.1503/cmaj.170698/-/DC1).

Coding and abstraction strategy

Articles were coded for content (Appendix 1). We explicitly derived putatively harmful and protective elements from 2009 Canadian Psychiatric Association reporting guidelines for media.[29]

We coded all variables independently of each other. That is, an article could be coded as being about suicide in both men and women if both were described. Likewise, an article that included both a statement of approval of suicide and a message of hope

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Box 1: Publications included in the analysis (n = 13)

Canadian newspapers and their online platforms:
- *The Globe & Mail*: theglobeandmail.com
- *The National Post*: nationalpost.com
- *The Toronto Star*: thestar.com

Two other Canadian newspapers:
- *The Toronto Sun*
- *24 Hours Toronto*

One magazine:
- *Maclean's*

Three websites:
- CBC.ca
- canada.com
- financialpost.com

One US newspaper:
- *The New York Times*

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would have been coded as having both. Given the potential subjectivity inherent to some of these categorizations (e.g., whether an article included glorified or romanticized reasons for the suicide), we conducted inter-rater reliability tests, all of which included both a scientific content expert and an expert in journalism. We corresponded and held regular meetings throughout the process of abstraction to clarify points of uncertainty. We performed reliability tests initially, after every approximately 1000 articles coded, and at completion (for κ values, see Appendix 2, available at www.cmaj.ca/lookup/suppl/doi:10.1503/cmaj.170698/-/DC1).

Suicide deaths

The population of suicide deaths includes a consecutive list of people whom the Office of the Chief Coroner of Ontario determined to have died by suicide in the city of Toronto between Jan. 1, 2011 and Dec. 31, 2014, inclusive. Detailed methods of data abstraction of the Office of the Chief Coroner have been published previously (Appendix 1).[31]

Statistical analysis

We conducted analyses only on "major focus" articles (Appendix 1) from 2011 to 2014. The primary outcome variable of interest was the difference (Δ) between the number of suicide deaths in the week after publication (this post-item period included the date of publication — "day 0" — and 6 subsequent days) compared with a pre-item control window with a 1-week lag (d –14 to –8) to ensure separation from other media reports of the same event that might have occurred just before day 0. We tested the impact of the volume of reports by including a continuous variable — a count of all articles relating to suicide published between day –14 and day 0.

We first conducted bivariate analyses under 2 conditions. Following previously established methods,[5,6] article characteristics were compared for Δ > 0 (i.e., periods in which there were more suicide deaths after the article) versus Δ ≤ 0 (i.e., periods where there were the same number or fewer deaths after the article). We did this to test for a potential harmful effect. We conducted a second set of bivariate comparisons to test for a potential protective effect, this time comparing Δ < 0 to Δ ≥ 0, to identify article characteristics associated with fewer suicide deaths subsequent to publication.

The primary analyses involved 2 multivariable logistic regressions to determine the independent predictive contributions of media content characteristics on bivariate change in suicide deaths, the first for harmful and the second for protective associations. We included the variables that were significant in their respective bivariate analyses. We determined multicollinearity via tolerance (< 0.40) and variance inflation factor (< 2.5) values. We performed sensitivity analyses to test the impact of print versus online publications, as well as early (2011–2012) versus late (2013–2014) publication.

Significance was determined at a threshold of 0.05 for all variables.

Ethics approval

This study was approved by the Sunnybrook Health Sciences Centre research ethics board (ID# 199–2012).

Results

From 2011 to 2014, there were 16 845 articles relating to suicide across the 13 publications, including 6367 (37.8%) in which suicide was the major focus of the article (41.9% of these were online). Of the major focus subset, 314 (4.9%) appeared on the front page and 1736 (27.3%) included the word "suicide" in the headline. Over the same span, there were 947 suicide deaths (mean deaths per year ± standard deviation: 236.8 ± 22.6) in Toronto (demographic and suicide-specific characteristics shown in Table 1).

Bivariate comparisons

Tables 2 and 3 show bivariate analyses testing for increases and decreases in suicide frequencies in the week following publication of articles with different general content and putatively harmful or protective elements, respectively, from 2011 to 2014. Elements associated with more suicides in both harmful and protective comparisons were articles that focused on older adults, suicide pacts, jumping from a building, firearm death, and asphyxia other than by car exhaust, as well as those that identified the deceased as a celebrity. Mention of the suicide method in the headline and in the text, as well as a statement that suicide is inevitable, were all associated with increased suicides in the harmful effect analysis.

A higher number of recent articles related to suicide was associated with decreased suicides in both the harmful effect (odds ratio [OR] 0.995, 95% confidence interval [CI] 0.994–0.996) and protective effect (OR 0.997, 95% CI 0.995–0.998) analyses. Other elements associated with fewer suicides in both comparisons were articles that focused on youth, a specific person's suicidality or death, public policy, railway deaths and cutting or stabbing deaths. Articles about a specific person's suicide death, articles about murder-suicide, articles with monocausal explanations for suicide, articles highlighting unfavourable characteristics of the deceased (i.e., characterological or personal flaws or criminality) and articles including interviews with bereaved people were all associated with a subsequent decrease in suicides in the protective effect analysis.

Regression analyses

For multivariable logistic regression, Hosmer–Lemeshow tests showed good model fit ($p < 0.05$) for the protective effect regression model with all variables included and for the harmful effect model only if the continuous measure of number of articles was removed. Independent predictors in the harmful and protective effect models are shown in Table 4 and Table 5, respectively. Elements significantly independently associated with increased suicides in the harmful effect model were articles that contained a statement that suicide is inevitable (OR 1.97, CI 1.07–3.62); that were about asphyxia other than by car exhaust (OR 1.72, CI 1.36–2.18), suicide by jumping from a building (OR 1.70, CI 1.28–2.26), suicide pacts (OR 1.63, CI 1.14–2.35), firearm suicide (OR 1.28, CI 1.08–1.51), or older adults (OR 1.25, CI 1.03–1.52); that included the suicide method in the headline (OR 1.41, CI 1.07–1.86); or that identified the deceased as a celebrity (OR 1.27, CI 1.08–1.49). Elements significantly independently associated with decreased suicides in the protective effect model were unfavourable characteristics (OR 0.54, CI 0.35–0.83), railway (OR 0.62, CI 0.42–0.91) and

cutting or stabbing (OR 0.63, CI 0.47–0.84) deaths; individual murder-suicide (OR 0.67, CI 0.54–0.82); or articles about a specific person's suicide or suicidality (OR 0.77, CI 0.66–0.89), public policy (OR 0.84, CI 0.72–0.97) and youth (OR 0.85, CI 0.75–0.96).

Sensitivity analyses stratifying by media type and publication era are presented in Appendices 3 and 4 (available at www.cmaj.ca/lookup/suppl/doi:10.1503/cmaj.170698/-/DC1). Although these yielded some variability in elements that met the threshold for statistical significance, odds ratios were generally similar in direction and size between print and online articles, as well as 2011–2012 and 2013–2014 articles. An exception was articles about jumping from a building, which in 2011–2012 were associated with increased suicides in the harmful effect analysis (OR 2.47, 95% CI 1.71–3.57), but not in 2013–2014 (OR 0.83, 95% CI 0.51–1.34).

Interpretation

This study of the association between media reporting and suicide death found that several media item characteristics were associated with changes in suicides. Consistent with previous literature, articles about suicide in celebrities;[4,12,16–20,32–35] by asphyxia other than by car exhaust (i.e., by plastic bag or helium gas, but not hanging or car exhaust)[36–41] or by jumping;[5,16] suicide pacts;[21] and that included the method in the headline[21] were each independently associated with post-item increases in suicides. It is

Table 1: Suicide deaths in Toronto by age and gender (2011–2014 combined)		
	Total suicides $n = 947$	
Characteristic	No. of men (%)	No. of women (%)
Age, yr		
10–24	74 (7.8)	24 (2.5)
25–44	205 (21.6)	80 (8.4)
45–64	261 (27.6)	123 (13.0)
65+	130 (13.7)	50 (5.3)
Total	670 (70.7)	277 (29.3)
Method of suicide		
Hanging	251 (26.5)	73 (7.7)
Non-hanging asphyxia	58 (6.1)	14 (1.5)
Fall or jump from height	158 (16.7)	76 (8.0)
Overdose	96 (10.1)	88 (9.3)
Subway, train or car collision	38 (4.0)	11 (1.2)
Firearm	30 (3.2)	–*
Cutting or stabbing	20 (2.1)	–*
Drowning or hypothermia	14 (1.5)	–*
Fire, burns or electrocution	–*	–*
Poisons: toxins	–*	–*
Unknown	–*	–*

*Values suppressed owing to small numbers (< 5 deaths).

particularly noteworthy that articles emphasizing the inevitability of suicide were associated with increased subsequent deaths.

Articles describing suicide in older adults were also positively associated with subsequent suicides. This may be because this population is more likely to be exposed to and therefore influenced by newspaper reports.[42,43] Older adults are also over-represented among suicide deaths, accounting for nearly twice as many as youth (see Table 1), which may make a media effect easier to detect.

Reporting of firearm suicides, among the methods with the highest lethality, was associated with increased subsequent suicides, consistent with previous findings.[36] Notably, although firearm suicides account for less than 5% of all deaths in Toronto,[31] firearms were described as a method of suicide in 13% of articles. Furthermore, emerging evidence suggests that novel methods of asphyxia, such as helium inhalation, may be particularly prone to contagion,[37–41] and the results here would seem to support that.

Table 2: Characteristics of articles focusing on suicide in major publications in Toronto media (2011–2014) and their association with increases or decreases in suicides after publication

Characteristics of media item	Total (%) n = 6367	No. of articles followed by increased suicides (%)	No. of articles followed by no change in suicides (%)	No. of articles followed by decreased suicides (%)	Harmful effect analysis* Increased v. no change or decreased suicides OR (95% CI)	Protective effect analysis† No change or increased v. decreased suicides OR (95% CI)
Item location						
Front page	314 (4.9)	134 (42.7)	50 (15.9)	130 (41.4)	0.95 (0.76–1.20)	1.03 (0.82–1.30)
Online	2667 (41.9)	1191 (44.7)	367 (13.8)	1109 (41.6)	1.06 (0.96–1.18)	1.04 (0.94–1.15)
Age focus						
Youth	2014 (31.6)	836 (41.5)	268 (13.3)	910 (45.2)	0.87 (0.79-0.97)	0.83 (0.75–0.93)
Adult	2029 (31.9)	913 (45.0)	288 (14.2)	828 (40.8)	1.08 (0.97–1.20)	1.08 (0.97–1.21)
Older adults	458 (7.2)	232 (50.7)	67 (14.6)	159 (34.7)	1.35 (1.11–1.63)	1.40 (1.15–1.71)
Gender focus						
Male	3417 (53.7)	1465 (42.9)	438 (12.8)	1514 (44.3)	1.05 (0.94–1.16)	0.94 (0.85–1.04)
Female	2501 (39.3)	1076 (43.0)	360 (14.4)	1065 (42.6)	0.95 (0.86–1.05)	0.97 (0.88–1.08)
Suicide focus						
Ideation	1547 (24.3)	659 (42.6)	244 (15.8)	644 (41.6)	0.94 (0.84–1.05)	1.03 (0.92–1.16)
Attempt	1079 (16.9)	467 (43.3)	158 (14.6)	454 (42.1)	0.98 (0.86–1.11)	1.00 (0.88–1.15)
Death	4764 (74.8)	2062 (43.3)	650 (13.6)	2052 (43.1)	0.92 (0.83–1.04)	0.86 (0.77–0.97)
Article focus						
Specific person's death or suicidality	5199 (81.7)	2245 (43.2)	708 (13.6)	2246 (43.2)	0.88 (0.77–1.00)	0.79 (0.69-.90)
Suicide research	1220 (19.2)	549 (45)	176 (14.4)	495 (40.6)	1.06 (0.94–1.21)	1.08 (0.96–1.23)
Suicide public policy	1050 (16.5)	412 (39.2)	155 (14.8)	483 (46)	0.80 (0.70–0.92)	0.83 (0.73–0.95)
Assisted death	1123 (17.6)	519 (46.2)	169 (15.0)	435 (38.7)	1.13 (0.99–1.28)	1.19 (1.04–1.36)
Individual murder-suicide	483 (7.6)	202 (41.8)	40 (8.3)	241 (49.9)	0.92 (0.76–1.11)	0.71 (0.59–0.86)
Mass murder-suicide	131 (2.1)	63 (48.1)	24 (18.3)	44 (33.6)	1.19 (0.85–1.69)	1.45 (1.01–2.09)
Suicide pact	131 (2.1)	75 (57.3)	18 (13.7)	38 (29.0)	1.74 (1.23–2.47)	1.81 (1.23–2.64)
Legal issues related to suicide	2929 (46.0)	1298 (44.3)	452 (15.4)	1179 (40.3)	1.04 (0.94–1.15)	1.16 (1.05–1.28)
Suicide as institutional protest	80 (1.3)	36 (45)	14 (17.5)	30 (37.5)	1.05 (0.68–1.64)	1.22 (0.77–1.92)
Suicide in fiction	289 (4.5)	128 (44.3)	48 (16.6)	113 (39.1)	0.90 (0.68–1.19)	1.07 (0.81–1.41)
Article type						
Opinion column	952 (15.0)	434 (45.6)	144 (15.1)	374 (39.3)	1.09 (0.95–1.25)	1.15 (1.00–1.32)
Advice column	28 (0.4)	10 (35.7)	1 (3.6)	17 (60.7)	0.71 (0.33–1.55)	0.47 (0.22–1.01)

Note: CI = confidence interval, OR = odds ratio.
*Harmful effect = comparisons of proportion of articles followed by increased suicides v. proportion of articles followed by no change or decreased suicides; ORs > 1 show a harmful effect.
†Protective effect = comparisons of proportion of articles followed by decreased suicides v. proportion of articles followed by no change or increased suicides; ORs < 1 show a protective effect.

Table 3: Putatively harmful and protective characteristics of articles focusing on suicide in major Toronto publications (2011–2014) and their association with increases or decreases in suicides after publication

Characteristics of media items	Total (%) n = 6367	No. of articles followed by increased suicides (%)	No. of articles followed by no change in suicides (%)	No. of articles followed by decreased suicides (%)	Harmful effect analysis* Increased v. no change or decreased suicides, OR (95% CI)	Protective effect analysis† No change or increased v. decreased suicides, OR (95% CI)
Putatively harmful						
Word "suicide" in the headline	1736 (27.3)	754 (43.4)	234 (13.5)	748 (43.1)	0.98 (0.88–1.10)	0.95 (0.85–1.06)
Suicide method (in headline)	225 (3.5)	115 (51.1)	29 (12.9)	81 (36)	1.36 (1.04–1.77)	1.31 (0.99–1.72)
Suicide method (in text)	3153 (49.5)	1420 (45.0)	439 (13.9)	1294 (41.0)	1.11 (1.00–1.22)	1.10 (0.99–1.21)
Hanging	758 (11.9)	328 (43.3)	130 (17.2)	300 (39.6)	0.98 (0.84–1.14)	1.13 (0.97–1.32)
Self-poisoning	590 (9.3)	265 (44.9)	74 (12.5)	251 (42.5)	1.05 (0.89–1.25)	0.98 (0.83–1.17)
Jumping (from building)	219 (3.4)	123 (56.2)	28 (12.8)	68 (31.1)	1.68 (1.28–2.20)	1.64 (1.23–2.20)
Jumping (from bridge)	248 (3.9)	110 (44.4)	41 (16.5)	97 (39.1)	1.03 (0.79–1.32)	1.14 (0.88–1.48)
Railway	113 (1.8)	39 (34.5)	15 (13.3)	59 (52.2)	0.67 (0.46–0.99)	0.66 (0.46–0.96)
Asphyxia by car exhaust	30 (0.5)	9 (30)	9 (30)	12 (40)	0.55 (0.25–1.20)	1.09 (0.53–2.27)
Asphyxia other than by car exhaust	346 (5.4)	183 (52.9)	58 (16.8)	105 (30.3)	1.47 (1.19–1.83)	1.72 (1.36–2.17)
Firearm	824 (12.9)	404 (49.0)	99 (12.0)	321 (39.0)	1.28 (1.10–1.48)	1.16 (1.00–1.35)
Cutting or stabbing	201 (3.2)	74 (36.8)	23 (11.4)	104 (51.7)	0.74 (0.55–0.99)	0.67 (0.51–0.89)
Drowning	78 (1.2)	26 (33.3)	11 (14.1)	41 (52.6)	0.64 (0.40–1.03)	0.65 (0.42–1.02)
Burning or electrocution	126 (2.0)	52 (41.3)	23 (18.3)	51 (40.5)	0.90 (0.63–1.29)	1.07 (0.75–1.54)
"Suicide by cop"	27 (0.4)	13 (48.1)	6 (22.2)	8 (29.6)	1.19 (0.56–2.54)	1.73 (0.76–3.97)
Assisted death	132 (2.1)	62 (47.0)	10 (7.6)	60 (45.5)	1.14 (0.81–1.61)	0.87 (0.62–1.23)
Other	212 (3.3)	100 (47.2)	23 (10.8)	89 (42.0)	1.15 (0.88–1.52)	1.01 (0.76–1.33)
Method described in detail	812 (12.8)	377 (46.4)	100 (12.3)	335 (41.3)	1.13 (0.98–1.31)	1.04 (0.90–1.21)
Photo (deceased)	1220 (19.2)	525 (43.0)	162 (13.3)	533 (43.7)	0.96 (0.85–1.09)	0.93 (0.82–1.05)
Photo (of someone looking sad)	257 (4.0)	118 (45.9)	40 (15.6)	99 (38.5)	1.09 (0.85–1.41)	1.17 (0.91–1.51)
Favourable characteristic (deceased)‡	669 (10.5)	296 (44.2)	95 (14.2)	278 (41.6)	1.02 (0.87–1.20)	1.03 (0.87–1.21)
Identifies deceased as a celebrity	747 (11.7)	367 (49.1)	102 (13.7)	278 (37.2)	1.28 (1.10–1.49)	1.26 (1.08–1.48)
Statement that suicide is inevitable	44 (0.7)	26 (59.1)	4 (9.1)	14 (31.8)	1.86 (1.02–3.41)	1.57 (0.83–2.96)
Exciting reporting	151 (2.4)	60 (39.7)	19 (12.6)	72 (47.7)	0.84 (0.61–1.17)	0.79 (0.58–1.10)
Glorified or romanticized suicide	47 (0.7)	16 (34.0)	6 (12.8)	25 (53.2)	0.66 (0.36–1.21)	0.64 (0.36–1.14)
Monocausal explanation for suicide	941 (14.8)	386 (41.0)	128 (13.6)	427 (45.4)	0.88 (0.76–1.01)	0.86 (0.75–0.99)
Statement of approval of suicide	164 (2.6)	75 (45.7)	23 (14.0)	66 (40.2)	1.09 (0.80–1.48)	1.08 (0.79–1.49)
Interview with the bereaved	1199 (18.8)	499 (41.6)	152 (12.7)	548 (45.7)	0.90 (0.79–1.02)	0.84 (0.74–0.95)
Putatively protective						
Unfavourable characteristic (deceased)‡	91 (1.4)	32 (35.2)	7 (7.7)	52 (57.1)	0.69 (0.45–1.07)	0.54 (0.36–0.82)
Alternatives to suicide	1194 (18.8)	502 (42.0)	196 (16.4)	496 (41.5)	0.92 (0.81–1.04)	1.03 (0.91–1.17)
Community resources	123 (1.9)	48 (39.0)	14 (11.4)	61 (49.6)	0.82 (0.57–1.18)	0.74 (0.52–1.05)
Positive outcome of a suicide-related crisis	85 (1.3)	37 (43.5)	11 (12.9)	37 (43.5)	0.99 (0.64–1.53)	0.95 (0.61–1.46)
Warning signs of suicidal behaviour	67 (1.1)	32 (47.8)	9 (13.4)	26 (38.8)	1.18 (0.73–1.91)	1.15 (0.70–1.89)
How to approach someone	13 (0.2)	7 (53.8)	1 (7.7)	5 (38.5)	1.50 (0.50–4.47)	1.17 (0.38–3.57)
Message of hope	282 (4.4)	119 (42.2)	46 (16.3)	117 (41.5)	0.94 (0.74–1.19)	1.03 (0.81–1.31)

Note: CI = confidence interval, OR = odds ratio.
*Harmful effect = comparisons of proportion of articles followed by increased suicides versus proportion of articles followed by no change or decreased suicides; ORs > 1 show a harmful effect.
†Protective effect = comparisons of proportion of articles followed by decreased suicides versus proportion of articles followed by no change or increased suicides; ORs < 1 show a protective effect.
‡Favourable and unfavourable characteristics refer to statements in an article expressing positive or negative value judgments, respectively, about a person's character, personality or behaviour.

Table 4: Independent associations of characteristics of media articles in major Toronto publications (2011–2014) with increased suicide deaths versus no change or decreased suicide deaths after article publication*

Characteristics of media items	OR (95% CI)
Statement that suicide is inevitable	1.97 (1.07–3.62)
Asphyxia other than by car exhaust	1.72 (1.36–2.18)
Jumping (from building)	1.70 (1.28–2.26)
Suicide pact	1.63 (1.14–2.35)
Suicide method (in headline)	1.41 (1.07–1.86)
Firearm	1.28 (1.08–1.51)
Identifies deceased as a celebrity	1.27 (1.08–1.49)
Older adults	1.25 (1.03–1.52)
Suicide public policy	0.80 (0.70–0.94)
Specific person's death or suicidality	0.78 (0.68–0.90)
Cutting or stabbing	0.70 (0.52–0.94)

Note: CI = confidence interval, OR = odds ratio.
*Multivariable logistic regression.

Table 5: Independent associations of characteristics of media articles in major Toronto publications (2011–2014) with decreased suicide deaths versus no change or increased suicide deaths after article publication*

Characteristics of media items	OR (95% CI)
Unfavourable characteristic†	0.54 (0.35–0.83)
Railway	0.62 (0.42–0.91)
Cutting or stabbing	0.63 (0.47–0.84)
Individual murder-suicide	0.67 (0.54–0.82)
Specific person's death or suicidality	0.77 (0.66–0.89)
Suicide public policy	0.84 (0.72–0.97)
Youth	0.85 (0.75–0.96)
No. of articles‡ (per additional 1)	1.004 (1.002–1.005)
Legal issues related to suicide	1.16 (1.03–1.31)
Firearm	1.28 (1.09–1.51)
Older adults	1.31 (1.05–1.63)
Identifies deceased as a celebrity	1.32 (1.11–1.57)
Suicide pact	1.71 (1.16–2.54)
Jumping (from building)	1.78 (1.32–2.39)
Asphyxia other than by car exhaust	1.93 (1.51–2.48)

Note: CI = confidence interval, OR = odds ratio.
*Multivariable logistic regression
†Unfavourable characteristics refer to statements in an article expressing negative value judgments about a person's character, personality or behaviour.
‡Number of articles refers to a count of all articles relating to suicide published between day –14 and day 0.

In contrast, the protective effect model confirmed previous findings that describing the suicide deceased negatively, via unfavourable characteristics or as the perpetrator of murder-suicide, was associated with fewer subsequent suicides.[14] Cutting is a relatively low-lethality method of suicide. Therefore, contagion may be less likely to result in death, and possibly more likely to result in injuries that lead to accessing care. Interviews with people who have attempted suicide show that some may be dissuaded by depictions of certain methods,[44] perhaps because they are painful or gruesome, which may explain the protective effects of reports about cutting and railway suicide.

The literature on media contagion of suicide in youth is mixed, with some studies supporting contagion[21,45–49] and others showing a weaker association.[11] The protective effect model showed that reports related to youth, as well as a specific person's suicidality or suicide and public policy, were independently associated with fewer suicide deaths. We speculate that articles about each may be more likely to contain positive messages about awareness and change, which could mediate protective effects.

A difference between the findings of this study and previous research relates to suicidal ideation. The 2 large previous studies conducted in Austria and Australia found that articles about suicidal ideation were negatively associated with subsequent suicide,[5,6] whereas no such relationship was seen here.

None of the putatively protective factors we measured were significant even in bivariate comparisons. This may partially be a result of the low base rate of these elements overall, which appear in only 1%–4% of all articles, except for alternatives to suicide, such as seeking treatment, which were included in 18.8% of articles. The 1 other large study that examined similar factors in an Austrian population generally had higher base rates of protective elements than those seen in the present Canadian study.[5] Whether these elements may have an impact if they become more frequently used or whether there are any longer-term effects on suicide rates is beyond the scope of the present study.

Limitations

This study had several key advantages in that it examined both a large number of media articles (nearly 17 000 across 13 publications over 4 years) and suicide deaths within a geographically small area with a large population and a well-defined media market. It also tested for both harmful and protective effects. This makes it one of the largest studies to date.

However, it also has several limitations. The most important is that the study could not control how many people were actually exposed to the media items in question; nor could we control the level of exposure. The broad circulation of these publications means we are able to assume that a large proportion of the entire population of Toronto was exposed. However, suicide is a highly complex phenomenon and because this is a large, uncontrolled experiment, we cannot rule out the possibility that the observed associations are a proxy for another kind of exposure. For example, we would expect newspaper reports of suicide to be frequently associated with television news reports or social media activity about the same stories that were not examined as part of this study. Therefore, the relative contribution of each of these exposures is unknown. Additionally, although stories that resulted in more articles were reflected in a larger sample size in the analysis, the study design did not identify or distinguish specific suicide narratives or clusters of articles that may have had more impact.

Media recommendations generally emphasize an itemized list of elements that should and should not be included in suicide-related reports.[25–29] Accordingly, this study was designed to identify the

independent association of each specific element with suicides. This approach is scientifically valuable because it supports existing recommendations asserting that, for example, articles that include information about celebrity suicide or about suicide by firearm may be harmful irrespective of potentially harmful or protective elements within the same or other contemporaneous articles. However, a previous study has identified that certain overarching narrative arcs of an article may have differing impacts,[5] and the same may be the case for clusters of stories about a specific news event.[4,12,14,16,20,21,32] This study design did not test either phenomenon, both of which are relevant for future recommendations and should be the focus of further research in Canada. Moreover, the fact that sensitivity analyses that compared year of publication as well as print and online articles yielded subtle differences (Appendices 3 and 4) underscores the importance of format as well as other contextual factors, not all of which could be controlled for, and some of which may have influenced the results of this study.

Furthermore, most suicides are detected by the Office of the Chief Coroner, but coroner data are imperfect. It is likely that at least 10% of suicide deaths went unrecognized or were misclassified as being a result of accident or natural causes.[50]

The study examined a single, large Canadian city, and a question remains about the degree to which these results can be generalized to other cities or regions. Likewise, it did not test whether non–suicide-related articles had any association with suicide rates. Furthermore, this study examined the independent effects of specific media elements on suicide death, but it did not test for interactions between elements (e.g., whether having protective elements in an article might have attenuated the impact of harmful ones). Finally, this study examined only the impact of articles on deaths within 1 week of publication. We chose this method because it is the established standard in the literature[5,6] and because it provides the best opportunity to observe a potential, acute cause-and-effect relationship. Nonetheless, it may be reasonable to postulate that media reporting could have an impact on suicide deaths months or even years later.[51,52] Therefore, increases or decreases in suicides shown here may underestimate the full impact of these or other media reports. Likewise, it may be that some elements of the media reports do have effects on suicides, but that these effects are downstream and cannot be detected with this design. For example, it may be that putatively protective factors, such as messages of hope that suicidal thoughts can be overcome, do have a subsequent impact that is not detected within 1 week.

Finally, this study design did not address the question of whether different media reporting characteristics had differing effects on specific demographic groups. Overall associations are of much greater practical importance because journalists formulate their reporting for and disseminate it to the entire public. Nevertheless, investigating differences by subpopulation would add to our understanding and is an important avenue of further study.

Conclusion

Suicide is a complex phenomenon that is influenced by many factors, of which the media is only one. This large study augments an evolving literature showing that certain elements of media reports highlighted as harmful in Canadian guidelines are associated with increased suicide deaths. The content of media reports — particularly those relat-

ing to celebrity suicide, suicide by asphyxia other than by car exhaust, suicide by jumping, suicide pacts and suicide in older adults — may lead to suicide contagion. However, most putatively protective factors had low base rates in the media we analyzed and were not associated with fewer deaths in the following week. Media reporting guidelines have been developed in Canada[29] and elsewhere[23–27] to help journalists report respectfully and with attention to concerns about contagion. Future guidelines should take into account these results and those from similar studies in order to provide journalists with the best available evidence on which to base their decisions. Finally, physicians should be mindful of the importance of public messaging about suicide in their interactions with both journalists and patients.

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