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ORIGINAL ARTICLE

An analysis of the impact of suicide prevention messages and memorials on motorway bridges

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Abstract

Recently, there has been activity at public locations where people have died by suicide, including the erection of suicide prevention messages and memorials (decorations). This research looks at the impact of these decorations and associated media coverage of the decorations on suicidal behaviour at bridges. Incidents ($n = 160$) of suicidal behaviour on 26 bridges across motorways in England were analysed. Overall, there was no significant difference in the proportion of incidents pre-decoration versus post-decoration (p -value = .55). The incident rates were not significantly different pre- and post-decoration ($p = .46$). Only one bridge had statistically significantly more incidents post-decoration and media reporting ($p = .03$). However, following correction for multiple testing there was no significant difference in pre- and post-incident rates at any of the bridges. In total, 58% of bridges had a greater frequency of incidents when decorations were absent; however, this proportion was not statistically significant ($p = .41$). Further research is required to establish how suicide prevention messages are perceived. There does not appear to be any benefit, but it often generates media coverage which has been shown to increase risk.

KEYWORDS

bridge, media reporting, prevention, suicidal behaviour, suicide

INTRODUCTION

Over 6,500 deaths by suicide were recorded in the UK in 2018(ONS, 2018). Life events such as bereavement and loss, relationship breakdown and other life crises, as well as mental and physical illness are known to increase the risk of suicidal thoughts (Franklin et al., 2017; O'Connor & Nock,

2014). However, most people who seriously consider suicide does not engage in suicidal behaviour (Franklin et al., 2017; O'Connor & Nock, 2014).

The availability of a means of suicide and the preparatory action of selecting a method are key determinants of the progression from thought to enactment of suicidal behaviour and the risk of death (O'Connor & Kirtley, 2018). In fact,

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there is strong evidence to support the restriction of access to lethal means in suicide prevention initiatives and limited evidence indicating the viability of method substitution (the replacement of one method with another, if that method is not available) (Zalsman et al., 2016). One of the most successful approaches towards the reduction of access to means has been the construction of safety features such as barriers at high-frequency locations (Zalsman et al., 2016). However, the availability of means not only refers to access to a method of suicide, such as medication for an overdose, but also exposure to detailed information about particular methods and how they are enacted (e.g. methods of hanging). That said, restricting access to means not only involves employing measures to reduce the availability of, and access to, common methods of suicide (e.g. drugs, firearms and enhancing safety of bridges), but also reducing exposure to information about methods through social media, and other sources.

There is a strong body of evidence from at least 100 studies internationally, demonstrating that information about suicide methods and locations can lead to imitative behaviour including suicide clusters. The effect, known as the Werther effect, may be explained by social learning and modelling, whereby the type of language used to describe the death and the use of prominent photos of the deceased may serve to 'glamourise' and memorialise the death (Gould et al., 2003). People who are vulnerable may therefore identify with the deceased and may be more prone to emulate a similar act. Moreover, the availability of details about a method and location of suicide is known to increase a person's capacity to enact suicidal behaviour through a process described by Joiner (2005) as a 'acquired capability' that results in an ability to override the natural self-preservation orientation. The process involves cognitive capability whereby suicide is perceived to be a viable option. Thus, provision of information about available methods and locations may help to solidify the perceived viability of suicide. Suicidal behaviour is therefore more likely where there is an accessible method of suicide and information about that method, and where there are media reports that glamourise those who have died by suicide thus potentially increasing identification with these individuals. This is particularly the case for people with similar gender-age characteristics who may have a greater tendency to identify with the deceased, and vulnerable individuals, such as people with depression and those who have engaged in self-harm. Where the location is associated with a method of suicide that does not require equipment, such as jumping, 'impulsive' suicides may be more likely with people acting in the midst of an acute stress response which decreases their ability to process the information on signs and change their behaviour in response. Therefore, the reporting of such sites and methods can run the risk of

influencing those people most at risk of impulsive suicide, young people and people who have taken alcohol and other substances (WHO & IASP, 2017).

Interventions at public places

Jumping accounts for a minority of suicides in the UK and Ireland (Office for National Statistics, 2018; Rocos & Chesser, 2016). However, despite its rarity, this method is likely to be reported by the media as the act is often lethal, public and witnessed by others which can potentially traumatise or endanger lives.

There is also a risk that a public location, such as a bridge above a motorway, may gain notoriety if it becomes a place where several individuals take their lives which may indirectly increase the number of incidents at those locations. Examples from Bridgend in Wales show that, even when the deaths do not represent a suicide cluster, media reporting of these suicides are associated with subsequent suicidal behaviour and additional deaths (John et al., 2017; Jones et al., 2013). Conversely, there is strong evidence supporting the protective effects of appropriate media coverage and media blackouts (Sisask & Värnik, 2012; Niederkrotenthaler et al., 2012; Stack, 2015).

The evidence base to support suicide prevention interventions at public places remains equivocal. An early evaluation of crisis-line phones at the Mid-Hudson Bridge in the United States showed that 30 out of 39 people who came to the bridge with thoughts of suicide used the in-situ phone to call for help (Glatt, 1987).

As part of the approach to mitigating risk within high-frequency locations, Public Health England recommends increasing opportunities for help seeking through official signage (PHE, 2015). A comprehensive plan for suicide prevention at a frequently used location in Australia involved the installation of crisis telephones and official signage along with other preventative measures (Lockley et al., 2014). This strategy led to a decrease in suicidal behaviour which was not statistically significant; however, the number of police call-outs to negotiate with suicidal individuals did rise significantly. In southern England, significant numbers of suicides were reported at various car parks which led to the installation of crisis helpline signage. A three-year evaluation of the intervention found the numbers of suicides decreased significantly at those car parks and fewer suicides were reported in the surrounding area (King & Frost, 2005). A recent systematic review (Pirkis et al., 2015) concluded that some crisis-line signs (and phones) seem successful as one component of a broader intervention strategy.

It is also important to explore the impact of the suicide prevention messages and/or memorials commemorating

those who have died including the impact of media coverage of messages, which are invariably attached to methods and locations, on people who may have thoughts of suicide.

The current issue

Recently, there has been a range of activities on motorway bridges and other public locations where people have died by suicide. These include suicide prevention messages being erected by members of the public, some of whom may have lived experience of suicidal behaviour or who have been bereaved by suicide. Some messages serve to commemorate those who have died at that location, or those who have died by suicide in general. In other places, bridges have been 'decorated', as a means of highlighting, or raising awareness of suicide. The practice of laying memorials at the site of a fatality has become more common in recent years, and it can help the bereaved remember and cope with the death of that person. Conversely, it may also provide a constant unwanted reminder of tragedy, increase distress in those who witness the memorials and may increase likelihood of further suicidal behaviour for the reasons described above.

The risk of suicide to other members of the public may increase by means of 'social contagion' if, for example memorials are installed in public settings where a person has taken their life since public memorials often illustrate an outpouring of grief and expression of regret. It may lead a vulnerable or distressed person to believe that in death they can achieve a status they do not have in life. For some, it may reinforce the thought that ending one's life is normal and may identify that place as suitable for suicide since others have previously used that location.

In summary, it is important to examine the impact of messages and memorials in public locations and the publicisation of these messages on suicidal behaviour. There has also been some media coverage, including discussion on social media, around the messages on bridges activity and there is limited robust evidence as to the impact of this activity on vulnerable people. This research therefore set out to compare incidents of suicidal behaviour at bridges before and after decorations were erected, and subsequent media reporting of decorations.

This study set out to address two research questions:

1. Do memorials and/or suicide prevention messages (decorations) have an impact on the rates of incidents of suicidal behaviour at bridges?
2. Does media coverage of the placing of memorials and/or suicide prevention messages (decorations) impact suicidal behaviour at those bridges?

METHODS

Overall trends in incidents of suicidal behaviour

For 2018, a total of 160 Incidents of suicidal behaviour which occurred around 26 bridges across motorways in England were analysed. Incidents were investigated across months, days of the week and hours of the day to explore the overall trends in incidents.

Analysis of the impact of decorations and media on bridges

Each of these 26 bridges had a decoration installed on a particular date in 2018. For two of these bridges, media outlets published reports highlighting the installation of decorations at that bridge. For both bridges, the media reports were published the day after the decorations were erected. For the purposes of this study, the term 'decoration' is used to describe any message, memorial or note placed on a bridge in an effort to deter someone from taking their own life and does not include official crisis-line signage. This study involved linking three separate datasets obtained from Highways England, where dataset one consisted of dates when a decoration was placed on a particular bridge, dataset two comprised of incident cases that were reported on a particular bridge at a particular date and dataset three contained information on media reports that were published on decorations at bridges. These datasets were linked through geolocation (latitude, longitude) using R to determine the proximity of an incident to the nearest bridge with a decoration and/or media report. Incidents were considered to be proximal to a decoration if they occurred on the same bridge or within 300 m of the decoration location. Incidents which were proximal to a decoration were then established as a pre-decoration event if the incident occurred prior to the decoration being placed and/ or media reporting. Incidents were labelled as post-decoration if the incident occurred after the decoration was placed.

With each bridge, we determined the number of days in the year when there was a decoration and the number of days in the year when there was no decoration. Moreover, we computed the number of incidents at each bridge when a decoration was present and the number of incidents at each bridge when a decoration was absent. From these variables, we derived a normalised metric by computing the frequency of incidents, specifically the 'incidents per day when a decoration was present' and 'incidents per day when a decoration was absent'. This resulted in 52 frequencies, that is 26 frequencies representing incident rates when a decoration was present and 26 frequencies when a decoration was absent.

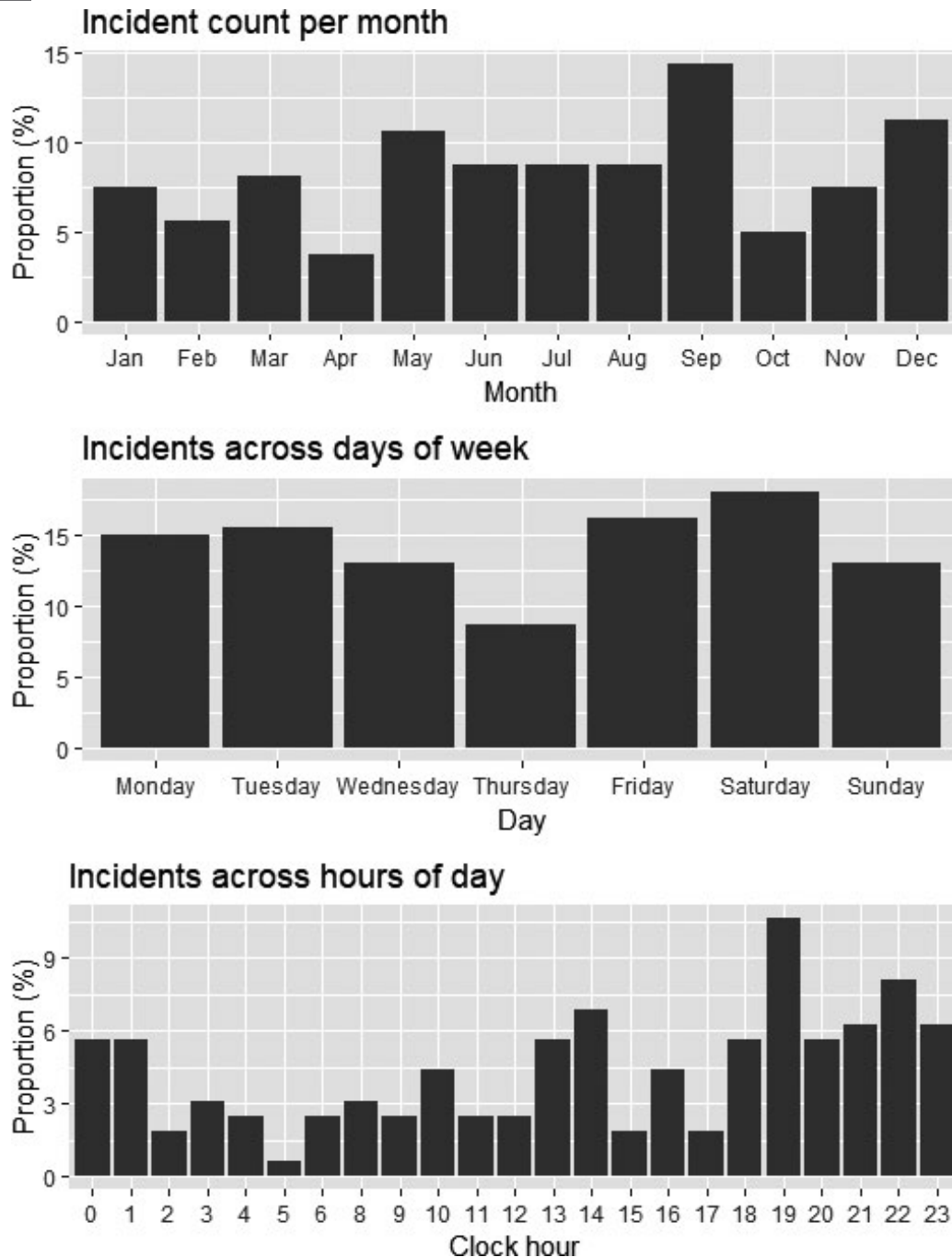


FIGURE 1 Pattern of incidents across months (top), days of the week (middle) and hours of the day (bottom)

These frequencies were tested for normality using a Shapiro test indicating that non-parametric statistics should be used for the analysis. The 'incident rate per day when a decoration was present' was compared to the 'incident rate per day when a decoration was absent' using a Mann–Whitney *U* test. Chi-squared tests were computed for each bridge to compare the proportion of incidents from days when a decoration was present on that bridge versus the proportion of incidents from days where a decoration was absent. A single chi-square test was used to compare the proportion of bridges that had lower 'incidents per day when a decoration was present' with the

proportion of bridges that had higher 'incidents per day when a decoration was present'.

RESULTS

Overall trends in incidents

In total, 160 incidents of suicidal behaviour occurred across 26 bridges that were decorated in 2018. The highest proportion of incidents took place in the month of September

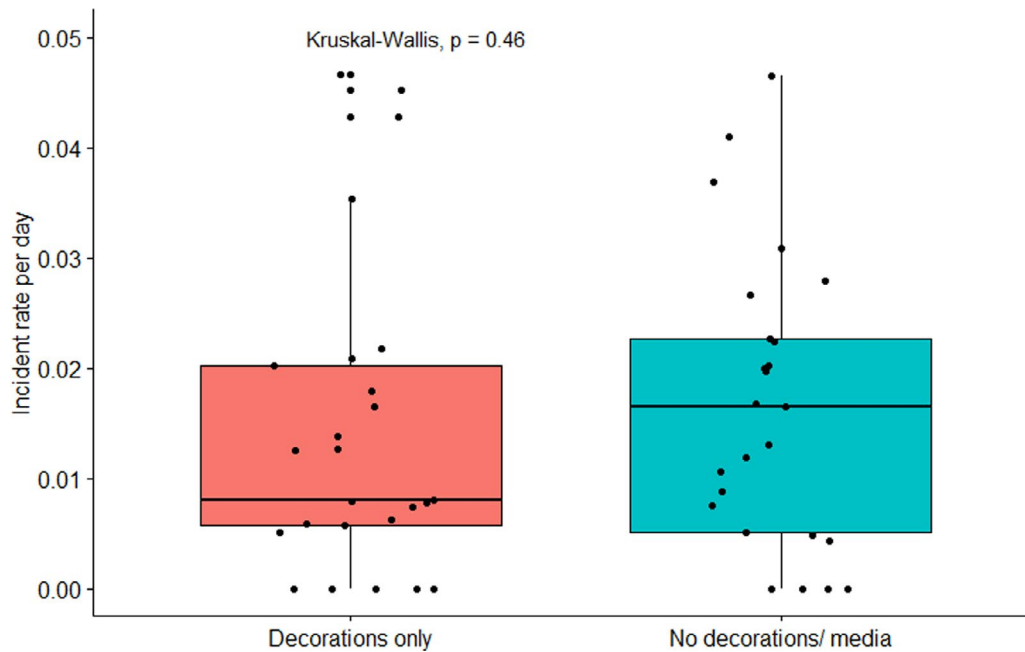


FIGURE 2 Boxplot comparing 'incidents per day when a decoration was present' with 'incidents per day when a decoration was absent'

(Figure 1). The most common day for incidents was Saturday, and the most common time was 7 pm (Figure 1).

Analysis of the impact of decorations and media on motorway bridges

Number of days with and without decorations

On average, there were 147 ± 31 (SD) days in 2018 when a bridge had a decoration versus 218 ± 31 (SD) days in 2018 when a bridge had no decoration. In total, across all 26 bridges there were 3677 days where there was a decoration present and 5448 days where there was no decoration. A total of 93 incidents occurred before any decorations were installed (pre-decoration incidents). A total of 56 incidents occurred after decorations were placed on bridges but when no media reporting occurred (post-decoration incidents). The remaining 11 incidents occurred post-decoration and media reporting. All 11 incidents which occurred post-decoration and media reporting were on one bridge. A chi-squared test indicated that there was no significant difference in the proportion of incidents on days where there was no decoration (pre-decoration) versus days after the decoration had been installed (post-decoration) (p -value = 0.55).

Incident rate comparisons

Figure 2 shows the normalised 'incidents per day when a decoration was present' and 'incidents per day when a

decoration was absent'. On average, the incident rate per day for bridges post-decoration and no media was 0.014 ± 0.014 (SD) versus 0.017 ± 0.013 (SD) when a decoration was absent (pre-decoration). A Mann–Whitney U test indicated that there was no significant difference in the incident rates pre- and post-decoration (p -value=0.46). Therefore, even though the average rate of incidents per day pre-decoration was higher, the Mann–Whitney U test failed to reach significance. Using the incident rates pre- and post-decoration for each bridge, an a priori power calculation was performed (where power = 0.85) using the effect size observed in this paper (0.16). For this small effect size, a sample size of 589 bridges would be required to achieve a statistical significance ($\alpha = 0.05$) if indeed there is a small effect to be observed. Given the sample size of bridges in our study ($n = 26$), we should have been able to detect a large effect if it was present with 0.85 power.

A chi-squared test was conducted for each of the individual bridges (26 bridges), comparing the proportion of incidents pre-decoration and post-decoration with no media. Altogether, the majority of bridges ($n = 15$) had more incidents pre-decoration than post-decoration. However, only one third ($n = 5$) of these bridges had statistically significantly more incidents pre-decoration ($p < 0.05$). Following correction for multiple testing (Bonferroni corrected $\alpha=0.0019$), none of the bridges had statistically significantly more incidents pre-decoration. A total of 11 bridges had more incidents post-decoration. Only one bridge had statistically significantly more incidents post-decoration and media reporting ($p = 0.03$). This bridge had 4 incidents pre-decoration and 11 incidents post-decoration and post-media.

Following correction for multiple testing, this bridge did not have significantly more incidents post-decoration/ media.

In total, 58% of bridges had a greater frequency of incidents pre-decoration. This proportion of 15 (pre-decoration) out of 26 bridges verses 11 (post-decoration) out of 26 bridges also did not achieve statistical significance (p -value = 0.41).

DISCUSSION

The literature on the impact of providing messages and decorations on bridges on suicidal behaviour has yielded conflicting results. In some cases, crisis-line phones have been purportedly associated with an increase in suicidal behaviour (Stack, 2015). Conversely, signs promoting help-seeking appear to have reduced the likelihood of suicidal behaviour at some locations (Pirkis et al., 2015), however the evidence to support this is weak and this intervention has not been studied in a manner that takes account of other concurrent interventions. In recent years there has also been an increase in members of the public erecting decorations and messages on bridges from which people have died by suicide in order to commemorate those who have died.

This study sought to examine the impact of those decorations and subsequent media reporting of decorations on suicidal behaviour at 26 bridges across motorways in England. The analysis indicated there was little evidence to suggest a change in incident rates of suicidal behaviour following the installation of decorations or media reporting. At one bridge there was an increase in suicidal behaviour post-decoration, however, this increase was not statistically significant. Further research is required to establish what if any variables relating to that location may account for this. There has been media coverage of the bridge pre- and post-decoration unrelated to the decorations and the bridge is well known in the local area, so findings must be taken with caution. It is important to establish whether there was a rise in other manifestations of suicidal behaviour in the surrounding area, and whether an external event, celebrity death, a prominent suicide or particular publicity campaign may be associated with the rise. It is also important to consider the duration of the time frames examined before and after installation of decorations, as there may be seasonality in incidents of suicidal behaviour at bridges. Nonetheless, this finding is important and suggests that further research is needed before recommendations can be made regarding the use of decorations and signage at locations where people have died.

It is also important to be mindful that the decorations may have been placed by people who are vulnerable themselves, and the bereaved, with the intention of preventing further deaths. Both groups may be at risk of suicidal behaviour, and the removal of the decorations could have the potential to

impact upon their mental health. Therefore, any decisions regarding the removal of decorations once they have been placed need to be conducted sensitively, and where possible, in discussion with the person who placed the decorations. The costs and benefits of such decisions need to be evaluated alongside their potential to lead to harmful or unhelpful media reporting which may in turn, lead to discussion which could itself create a contagion effect.

Intervention evidence is strongest in support of reducing access to means of suicide, and in the case of places where people die by jumping, this refers to the erection of barriers (Cox et al., 2013; Pirkis et al., 2015) which can reduce the number of deaths by over 85% (Zalsman et al., 2016). It is important to note that up to 90% of those who survive a suicide attempt do not go on to die by suicide, and the acute period in which a person will attempt suicide can be days, minutes or hours (Azrael and Millar, 2016). Therefore, interruptions may be an effective way of preventing suicide deaths. Anecdotally, people report that signs and decorations have interrupted a suicide attempt; however, one might question the degree to which an individual in acute distress, as is very frequently the case in suicidal behaviour, might be able to process the information in a message. On the other hand, decorations often attract media attention, and the media reporting of locations and methods is known to increase behaviour at those sites, and suicide attempts using those methods. Therefore, the possibility of any 'interruption effect' needs to be weighed against the deleterious effect of any media coverage of that location. In addition, there may be public safety implications of having visible decorations on bridges, depending on the nature of the items, how securely they are fixed and whether they pose a distraction to motorists. Authorities also need to consider the impact of decorations on the structure of bridges and infrastructure. Finally, visible decorations and the reporting of the decorations may also have the effect of influencing how local people, and others perceive the area. Such activities have the potential to create or contribute to attitudinal change that effects how a community views itself and this in turn influences the behaviour of individuals to create contagion. The addition of decorations could further highlight that community as an area where suicide is common and therefore a negative place to live. However, there is also the possibility that it could identify a community as caring and considerate.

Limitations

It is important to note the limitations of this study. The reliability of the data on incidents of suicidal behaviour may vary depending upon who collects the information and how it has been coded. The data on media reports and behaviour does not include social media reporting and discussion of these events therefore the impact is likely to be more widespread

than captured by the current data. In addition, the quality of media reports was not established, and we know that the impact of any report can depend on the way in which the story is presented, and the imagery used (World Health Organisation & International Association for Suicide Prevention, 2017). Decorations varied across the sites and messages at any individual site may contain different types of information. Again, these variables may impact how people behave in response. Therefore, additional research is needed to determine whether perceptions vary by message content and whether memorials and help-seeking messages are perceived differently from official crisis-line signage. Due to the nature of the data, we were unable to isolate the impact of signs alone on suicidal behaviour and therefore it is not possible to attribute changes in behaviour solely to the signs. We are not aware of any significant external events that might have impacted rates of suicidal behaviour at the time of the decorations. However, the analyses did not control for suicidal behaviour generally, and we did not include times of other external events such as media campaigns, storylines, seasonal variations and significant public events.

Another limitation is that our study was underpowered to detect a small effect in incident rates pre and post-decoration. Based on the power calculations, the present study provides evidence that there is not a large effect to be observed. As this study involved analysing real-world data retrospectively rather than collecting data as part of a trial, it was not possible to control the amount of data available for analysis. However, future work should include more samples (bridges), to ensure adequate power. The power analysis in the present study can inform future work in terms of the effect and the sample sizes required. Additionally, future studies could incorporate additional data from other regions as this analysis only explored suicidal behaviour on bridges across motorways in England. Similar interventions involving Network Rail and British Waterways should also be incorporated for future evaluations into the impact of memorials and signage on suicide incidents.

Conclusion

Further research is required to establish how people perceive messages and decorations when they are selecting a suicide method, responding to a crisis or emotional distress, and at various stages of the continuum of suicidal thoughts and behaviour. Messages may have an impact on different individuals in different ways, both positive and negative, and it is important to establish who is likely to be impacted and how. In addition, the impact of messages and decorations on the local community, and the broader impact on people who are not suicidal or who have been bereaved by suicide has not been studied. There does not appear to be any benefit

to the activity, but it often generates media coverage which has been shown to increase risk. Until further research can be carried out, a precautionary approach is recommended on the use of suicide prevention messages as an intervention at bridges.

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