The role of hope and resilience in protecting against suicidal thoughts and behaviors during the Covid-19 pandemic

James R. Knowles (orcid.org/0000-0002-0509-710X)[1], Nicola S. Gray (orcid.org/0000-0003-3849-8118)[1], Chris O'Connor (orcid.org/0000-0002-4167-877X)[2], Jennifer Pink (orcid.org/0000-0003-3043-3774)[1], Nicola J. Simkiss (0000-0002-0413-7595)[1] & Robert J. Snowden (orcid.org/0000-0001-9900-480X)[3]

[1] *Department of Psychology, Swansea University, Swansea, United Kingdom*

[2] *Aneurin Bevan University Health Board, Newport, United Kingdom*

[3] *Department of Psychology, Cardiff University, Cardiff, United Kingdom*

Correspondence concerning this article should be addressed to James Knowles, Department of Psychology, Swansea University, Swansea, SA2 8PP, UK. Contact: 968120@swansea.ac.uk

Abstract

Objective: The Covid-19 pandemic has impacted the mental health and wellbeing of populations across the world. This study aimed to examine: (1) which specific aspects of the Covid-19 pandemic were associated with the presence of suicidal thoughts and behaviors, and (2) the extent to which participants' hopelessness and resilience moderated the relationship between Covid-19 related stress and suicidal thoughts and behaviors. **Method:** We administered an online survey to 12,989 adult (16+) participants across Wales from the 9th June to the 13th July 2020. Participants completed a series of questionnaires measuring the stressors they had experienced during the Covid-19 pandemic, their levels of hopelessness over the past two weeks, their levels of resilience, and whether they had experienced suicidal thoughts or behaviors since the onset of the Covid-19 pandemic. **Results:** Our findings revealed that: (1) food insecurity, domestic abuse, relationship problems, redundancy, social isolation and financial problems were the Covid-19 related stressors most strongly associated with suicidal thoughts and behaviors, and (2) that both hopelessness and resilience moderated the relationship between Covid-19 stress and suicidal thoughts, such that the relationship between Covid-19 stress and the presence of suicidal thoughts was much stronger for individuals with high hopelessness and low resilience. **Conclusions:** These results highlight the aspects of the Covid-19 pandemic that are closely related to suicidal thoughts and behaviors and demonstrate the important role that hope for the future and resilience play in protecting individuals against the negative effects of the Covid-19 pandemic.

Keywords: Suicide, Hopelessness, Resilience, Stress, Covid-19, Survey, Wales, Wellbeing

Highlights

- Stressors caused by the pandemic are linked to increased suicidal thoughts.
- Hope protects individuals against the negative impact of the Covid-19 pandemic.
- Resilience also protects people from the negative impact of the Covid-19 pandemic.

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Introduction

The Covid-19 pandemic has profoundly affected the lives of individuals across the world. It has caused a multitude of problems ranging from fear for one's own safety, the loss of loved ones, economic uncertainty, and the challenging effects of social isolation, all of which are likely to adversely impact the wellbeing of populations worldwide.

A substantial body of research has evaluated the impact of the Covid-19 pandemic on mental health. Pierce et al. (2020) examined rates of psychological distress in 17,000 individuals across the UK one month into the Covid-19 lockdown and compared this with data collected prior to the pandemic. Their report showed that clinically significant levels of psychological distress had increased from 18.9% pre-Covid-19 to 27.3% and identified that this increase was greatest in young people and women. Gray et al. (2020) measured wellbeing and psychological distress in 12,989 adults living in Wales, three months into the UK lockdown and compared this to national data collected between 2018–2019. They found a large decrease in mental wellbeing and a 3-4 fold increase in the prevalence of severe psychological distress, with young people and women the most affected. These findings have been replicated worldwide, with studies from America (McGinty et al., 2020), Italy (Rossi et al., 2020), Spain (Rodriguez-Rey et al., 2020) and China (Qiu et al., 2020) demonstrating increases in psychological distress, anxiety and depression across their respective populations, with young people and women reliably demonstrating the greatest decrease in wellbeing. This evidence reveals a clear pattern of worsening mental health across countries affected by Covid-19.

Whilst it seems sensible to conclude that the pattern of worsening mental health should result in increased suicidal thoughts and behaviors, the evidence appears mixed. Regarding suicidal thoughts, research analysing Google search trends during the early period of the pandemic found that suicide-related search terms (previously shown to positively correlate with suicide rates; Gunn & Lester, 2013) had fallen (Halford et al., 2020). Cross-sectional research in America from April to May 2020 on over 3,000 participants found that rates of suicidal ideation remained stable and unchanged in areas with no lockdown restrictions, however rates of suicidal ideation increased every passing month in areas with lockdown restrictions (Killgore et al., 2020). Similar research conducted during the UK's national lockdown found the prevalence of suicidal ideation increased from 8% in April 2020, to 10% in May (O'Connor et al., 2020). These findings suggest an increase in suicidal thoughts during the first few months of the pandemic, in areas experiencing lockdown restrictions.

Regarding suicidal behaviors, data from psychiatric emergency departments in Spain (Hernández-Calle et al., 2020) and psychiatric centres in France (Pignon et al., 2020) revealed that suicidal behaviors decreased during the first few months of the Covid-19 outbreak, compared to the corresponding period in 2019. A living systematic review (John et al., 2020) examining suicidal behaviors during Covid-19 also reported there was no clear evidence of increased suicidal behaviors during the Covid-19 pandemic. Whilst these reports suggest a decrease in suicidal behaviors during early months of the Covid-19 pandemic, it is important to consider that many suicidal behaviors do not involve hospital attendance (Jollant et al., 2020) and these findings may represent a decrease in hospital presentations after suicide attempts, rather than an overall reduction in suicidal behaviors. Contrary to these findings, O'Connor et al. (2020) reported that the prevalence of suicide attempts in their UK sample increased from 0.1% in April 2020, to 0.7% in

May. Whilst the current evidence on the prevalence of suicidal behaviors during the Covid-19 pandemic is mixed, we must acknowledge that collecting data on suicidal behaviors in real time during a pandemic is challenging and reviews of previous epidemics and expert forecasts indicate that the profound psychological, economic, and social impact of the pandemic is likely to increase suicidal behaviors over the medium to long term future (Sher, 2020; John et al., 2020).

In addition to investigating the prevalence of suicidal thoughts and behaviors, it is important that research focuses on identifying the specific aspects of the pandemic that contribute to suicidal thoughts and behaviors. There are many consequences of the Covid-19 pandemic that have been cited as potential contributing factors towards worsening mental health. These factors include the increases in job insecurity and job losses (Sher, 2020); people experiencing bereavement (Verdery et al., 2020); financial difficulties (Prime et al., 2020); school closures and home-schooling (Van Lancker & Parolin, 2020); food insecurity (Van Lancker & Parolin, 2020); domestic abuse (Mahase, 2020); worsening physical health (Bo et al., 2020); and social isolation (Groarke et al., 2020). In order to ameliorate the deleterious impact of the Covid-19 pandemic, it is important to understand which factors are linked to an increased risk of suicidal thoughts and behaviors. Therefore, this study aimed to identify which specific Covid-19 related stressors were associated with suicidal thoughts and suicidal behaviors.

Along with identifying the factors driving the negative impact on mental health, it is also vital to understand the factors protecting individuals from the negative impact of the Covid-19 pandemic. Resilience, broadly defined here as the ability to endure difficulties and bounce back from difficult experiences (Fletcher & Sarkar, 2013), is a powerful construct that can protect those who experience adverse psychological events, from developing negative psychological outcomes. Niu et al. (2016) demonstrated that

resilience protected adolescents who experienced ostracism from developing depressive symptoms. Min et al. (2015) reported that high levels of resilience protected against severe suicidal ideation in individuals experiencing severe depression. Additionally, Nrugham et al. (2010) found the relationship between lifetime violent events and suicide attempts was stronger for individuals with low resilience relative to those with high resilience.

Likewise, it is well established that hope for the future protects individuals from suicidal thoughts and behaviors (Beck et al., 1993). Dixon et al. (1993) demonstrated that hopelessness moderated the relationship between stress and depressive symptoms, such that stress was more strongly related to depression under high levels of hopelessness. Additionally, Uncapher et al. (1998) found that depressive symptoms were more strongly related to suicidal thoughts in individuals with high levels of hopelessness. Past research indicates that resilience and hope for the future act to protect individuals from developing negative psychological outcomes after experiencing adversity. The second aim for this study was to examine the role of hopelessness and resilience in moderating the relationship between Covid-19 stress and suicidal thoughts and behaviors.

Objectives

Firstly, this study aimed to explore which specific Covid-19 related stressors were associated with suicidal thoughts and behaviors. Secondly, this study aimed to examine whether hopelessness and resilience moderated the relationship between Covid-19 related stressors and suicidal thoughts and behaviors. We predicted that: (1) hopelessness would moderate the relationship between Covid-19 related stress and suicidal thoughts; (2) resilience would moderate the relationship between Covid-19 related stress and suicidal thoughts; and (3) there would be a three-way interaction so that the interaction term between hopelessness and resilience would moderate the relationship between Covid-19

and suicidal thoughts. The same three hypotheses also applied to the presence of suicidal behaviors.

Methods

Ethics

The study was approved by the Research Ethics Committee at the College of Health and Human Sciences, Swansea University. The project is registered with ISRCTN ref: 21598625. The study protocol is published at: https://www.swansea.ac.uk/psychology/research-at-the-department-of-psychology/research-protocols/.

Participants

Participants were recruited via online snowball sampling methods. A series of social media adverts and emails advertised the survey across Wales. This included messages being sent to various organizations, asking them to provide the survey URL to their staff and service-users. Organizations that helped disseminate the survey included all seven Welsh Health Boards; the Welsh Police Forces, the Welsh Fire and Rescue Service, many large employers across Wales, including government organizations; care homes; homelessness organizations; GPs; the Welsh Farmers' Union; sports clubs and third sector partnership organizations. The survey was also advertised via newspapers, radio programmes, and celebrity tweets.

In total, 15,469 participants started the survey. Of these, 2,417 did not complete over 50% of the survey and were excluded from further analysis. The median survey completion time was 647 seconds (IQR: 510 – 863). Individuals who completed the survey in under 240 seconds were excluded from the analysis (n = 63) as we did not believe participants could provide accurate answers at such quick speeds. Our final sample consisted of 12,989 individuals, although not all participants completed every

question. The number of participants included in each analysis are stated in the appropriate place. The demographic characteristics of participants are displayed in Table 1. For context, according to the most recently available census data, the Welsh population consists of approximately 3,063,000 people, of which 95.6% are white, 50.5% are female, 16.9% are aged below 15 and 18.4% are aged over 65 (Office for National Statistics, 2012).

[Table 1 near here]

Measures

Wales Covid-19 Wellbeing Survey

The description of the full survey can be found in the study protocol referenced above. Only sections relevant to the current study are described here. In accordance with ethical considerations for mental health research during the Covid-19 pandemic (Townsend et al., 2020), participants were informed that the study would ask about their emotional wellbeing prior to consent procedures. We also included a section at the end of the survey designed to ameliorate potential distress caused by the survey and participants received a debrief form signposting them to services across Wales that offered free, confidential listening and support via the telephone, SMS messaging or email. Participants were encouraged to contact the services if they were experiencing emotional difficulties.

Demographics. Participants were asked to report their gender, age group and ethnicity.

Covid-19 stressors. This section provided participants with a list of potential stressors they may have experienced since the onset of the Covid-19 pandemic. Participants were asked to tick the box next to the listed stressor if they had experienced the stressor since the start of the Covid-19 pandemic. The list of stressors included experiencing Covid-19 symptoms, experiencing financial problems, being made redundant, experiencing food

insecurity (defined as not having enough nutritious food for one's needs, or one's family's needs), experiencing a bereavement, having responsibility to home-school a child, experiencing social isolation (defined as complete, or near complete, lack of contact with other people), being unable to stay in contact with loved ones, experiencing relationship problems, and experiencing domestic abuse. Similar measures utilising "Yes/No" responses to a list of stressors has previously demonstrated good test-retest reliability (*r*s = .78) and convergent validity (Kujawa et al., 2020).

Hopelessness. Hopelessness was assessed using a question from the Kessler Distress Scale (Kessler et al., 2002) that asked participants to rate, on a 5 point scale ranging from "None of the time" to "All of the time", the question: *"During the past two weeks, how often did you feel hopeless?"*. Similar single-item measures of hopelessness have demonstrated good convergent validity (*r* = .54; Gray et al., 2021) with gold standard hopelessness measures such as the Beck Hopelessness Scale (Beck et al., 1988) and offer a valid method of assessing hopelessness in time sensitive contexts (Yip & Cheung, 2006).

Resilience. Resilience was assessed using a single-item question adapted from the Brief Resilience Scale (Smith et al., 2008). Participants were asked to rate the statement: "*Overall, I tend to bounce back quickly after difficult times*" on a scale of 0 (Not at all) to 10 (Completely). The Brief Resilience Scale has previously demonstrated high test-retest reliability (Chmitorz et al., 2018) and good convergent, concurrent and predictive validity (Rodríguez-Rey et al., 2016). The item adapted from the Brief Resilience Scale had high factor loadings (0.70 – 0.89) with the total six item Brief Resilience Scale (Smith et al., 2008) and represents an appropriate time sensitive measure of resilience.

Suicidal Thoughts and Behaviors. To assess whether participants had experienced suicidal thoughts during the Covid-19 pandemic, participants were asked to provide a

"Yes/No" response to the question: "*Since the start of the Covid-19 pandemic, have you experienced suicidal thoughts?*". To assess whether participants had engaged in suicidal behaviors during the Covid-19 pandemic, participants were asked to provide a "Yes/No" response to the question: "*Since the start of the Covid-19 pandemic, have you harmed yourself with the intention to end your life?*". Similar single-item dichotomous questions assessing the presence of suicidal behaviors have been used in previous studies (Glashouwer et al., 2010) and single-item measures of suicidal thoughts have demonstrated strong relationships with gold standard, multi-item measurements of suicidal thoughts (Desseilles et al., 2012), making them suitable for quick, non-intrusive, screening of the general population.

Procedure

The survey was open from the 9th June 2020 to the 13th July 2020. The survey was administered online (Qualtrics software, Version June 2020, Provo, UT, USA, Copyright © 2020 Version) and was available in English and Welsh language versions. There was also a dedicated telephone line that was advertised across Wales so that hard to reach sections of the population or those without internet access could request a paper-based version of the survey. However, the vast majority of participants (>99.5%) completed the survey online.

To access the survey, participants clicked on the survey URL. Initially participants were presented with an information sheet and were asked to provide informed consent. Participants then completed the survey which was designed to take approximately 10 minutes. After completing the survey, participants received the debrief form.

Data Analytic Plan

To examine which Covid-19 stressors were related to the presence of suicidal thoughts, we conducted a chi-squared test of independence for the relationship between

each Covid-19 related stressor (e.g. food insecurity) and the presence of suicidal thoughts during the Covid-19 pandemic. The same analysis examined the relationship between each Covid-19 stressor and suicidal behaviors.

To examine whether resilience and hopelessness moderated the relationship between Covid-19 stress and suicidal thoughts, a "Covid-19 stress" variable was computed. The Covid-19 stress variable consisted of all the Covid-19 stressors that were significantly ($p < .001$) associated with an increased risk of experiencing suicidal thoughts during Covid-19 (see Table 2). Participants scored one point for every Covid-19 related stressor they experienced and scores ranged from 0 (no stressors present) to 9 (all stressors present).

As in Johnson et al. (2010), a hierarchical logistic regression analysis examined whether hopelessness moderated the relationship between Covid-19 stress and suicidal thoughts. All variables were standardized before being entered into the regression. Covid-19 stress scores and hopelessness scores were entered in the first step, and the interaction term in the second step. The same analysis structure examined whether resilience moderated the relationship between Covid-19 stress and suicidal thoughts. Further hierarchical logistic regressions examined whether the interaction term between hopelessness and resilience moderated the relationship between Covid-19 stress and suicidal thoughts and behaviors.

Results

Associations between stressors and suicidal thoughts and behaviors.

A series of chi-squared tests revealed that experiencing Covid-19 symptoms ($p < .001$, OR = 1.38, 95% CI = 1.21 – 1.57), financial problems ($p < .001$, OR = 2.87, 95% CI = 2.52 – 3.28), being made redundant ($p < .001$, OR = 3.66, 95% CI = 2.57 – 5.21), food insecurity ($p < .001$, OR = 4.86, 95% CI = 3.99 – 5.92), bereavement ($p < .001$, OR = 1.34, 95% CI = 1.13 – 1.58), social isolation ($p < .001$, OR = 3.02, 95% CI = 2.68 –

3.41), being unable to stay in close contact with loved ones ($p < .001$, OR = 1.87, 95% CI = 1.65 – 2.11), relationship problems ($p < .001$, OR = 3.86, 95% CI = 3.41 – 4.37) and domestic abuse ($p < .001$, OR = 4.69, 95% CI = 3.63 – 6.07), were all significantly associated with an increased risk of experiencing suicidal thoughts during the Covid-19 pandemic (see Table 2). It should be highlighted that food insecurity, domestic abuse, relationship problems and being made redundant were the risk factors most strongly associated with suicidal thoughts. Having responsibility to home-school a child was not significantly associated with an increased risk of suicidal thoughts ($p = 0.38$ OR = 1.06, 95% CI = 0.93 – 1.22).

The analysis of risk factors for suicidal behaviors showed a similar pattern. A series of chi-squared tests revealed that financial problems ($p < .001$, OR = 3.43, 95% CI = 2.20 – 5.35), being made redundant ($p < .01$, OR = 3.03, 95% CI = 0.95 – 9.68), food insecurity ($p < .001$, OR = 6.84, 95% CI = 4.03 – 11.62), bereavement ($p < .001$, OR = 2.97, 95% CI = 1.84 – 4.78), social isolation ($p < .001$, OR = 2.90, 95% CI = 1.88 – 4.47), being unable to stay in close contact with loved ones ($p < .01$, OR = 1.76, 95% CI = 1.13 – 2.74), relationship problems ($p < .001$, OR = 3.63, 95% CI = 2.35 – 5.60) and domestic abuse ($p < .001$, OR = 8.59, 95% CI = 4.70 – 15.72), were all significantly associated with an increased risk of engaging in suicidal behaviors during the Covid-19 pandemic (see Table 2). It should be highlighted that domestic abuse, food insecurity, relationship problems and financial problems were the risk factors most strongly associated with suicidal behaviors. Experiencing Covid-19 symptoms was not associated with an increased risk of suicidal behaviors ($p = .50$, OR = 1.18, 95% CI = 0.73 – 1.91) and having responsibility to home-school a child was negatively associated with suicidal behaviors ($p < .05$, OR = 0.51, 95% CI = 0.27 – 0.97).

[Table 2 near here]

Associations between resilience, hopelessness and suicidal thoughts and behaviors.

Spearman's correlations, means, and standard deviations for the variables are displayed in Table 3. The results show that Covid-19 stress was associated with hopelessness, resilience, suicidal thoughts and suicidal behaviors (although this effect size was small). Hopelessness was associated with resilience, presence of suicidal thoughts, and suicidal behaviors. Resilience was negatively associated with suicidal thoughts and weakly associated with suicidal behaviors (again with a small effect size).

[Table 3 near here].

Hierarchical Logistic Regression Analyses

All data met the necessary assumptions for logistic regression (e.g. no multicollinearity, linearity of independent variables).

Suicidal Thoughts

As displayed in Table 4, hopelessness significantly moderated the relationship between Covid-19 stress and suicidal thoughts. Once Covid-19 stress (β = 0.43) and hopelessness (β = 1.15) had been entered in step 1 of the regression model, the interaction term between Covid-19 stress and hopelessness (β = -0.14) entered in step 2 significantly improved the model's prediction of suicidal thoughts. Figure 1 indicates that the relationship between Covid-19 stress and suicidal thoughts was stronger for participants with high hopelessness relative to participants with low hopelessness. After excluding participants who did not complete all relevant measures (n = 287), 12,702 participants were included in this analysis.

Resilience significantly moderated the relationship between Covid-19 stress and suicidal thoughts. Once Covid-19 stress (β = 0.56) and resilience scores (β = -0.90) had been entered in step 1 of the regression model, the interaction term between Covid-19 stress and resilience (β = 0.11) entered in step 2 significantly improved the model's

prediction. Figure 1 indicates that the relationship between Covid-19 stress and suicidal thoughts was stronger for participants with low resilience relative to high resilience. After excluding participants who did not complete all relevant measures (n = 87), 12,902 participants were included in this analysis.

The interaction term between hopelessness and resilience significantly moderated the relationship between Covid-19 stress and suicidal thoughts. Once Covid-19 stress (β = 0.41), hopelessness (β = 0.91) and resilience (β = -0.52) had been entered in step 1 of the regression model, the three-way interaction term between Covid-19 stress and hopelessness and resilience (β = 0.04) entered in step 2, significantly improved the model's prediction of suicidal thoughts. In Figure 1 it appears that the relationship between Covid-19 stress and suicidal thoughts was stronger for participants with high hopelessness and low resilience. After excluding participants who did not complete all relevant measures (n = 361), 12,628 participants were included in this analysis.

[Table 4 near here]

[Figure 1 near here]

Suicidal Behaviors

As displayed in Table 5, hopelessness significantly moderated the relationship between Covid-19 stress and suicidal behaviors. Once Covid-19 stress (β = 0.38) and hopelessness scores (β = 1.38) had been entered in step 1 of the regression model, the interaction term between Covid-19 stress and hopelessness (β = -0.26) entered in step 2 significantly improved the model's prediction. Figure 2 shows that the relationship between Covid-19 stress and suicidal behaviors was stronger for participants with high hopelessness relative to low hopelessness. After excluding participants who did not complete all relevant measures (n = 287), 12,702 participants were included in this analysis.

Resilience did not significantly moderate the relationship between Covid-19 stress and suicidal behaviors. Once Covid-19 stress (β = 0.52) and resilience (β = -1.19) had been entered in step 1 of the regression model, the interaction term entered in step 2 did not improve the model's prediction. After excluding participants who did not complete all relevant measures (n = 87), 12,902 participants were included in this analysis.

The interaction term between hopelessness and resilience did not moderate the relationship between Covid-19 stress and suicidal behaviors. After excluding participants who did not complete all relevant measures (n = 361), 12,628 participants were included in this analysis.

[Table 5 near here]

[Figure 2 near here]

Discussion

This study aimed to examine risk and protective factors for suicidal thoughts and behaviors in a cross-sectional online survey administered across the Welsh adult population. Prior to the Covid-19 pandemic, prevalence of past year suicidal ideation and past year suicide attempts in 16-74 year olds in the UK were estimated to be 5.4% and 0.7% respectively (NHS Digital, 2016). In the current sample, 9.3% of participants reported experiencing suicidal thoughts and 0.6% reported engaging in suicidal behaviors. Considering that the current study measured the presence of suicidal thoughts and behaviors in the 11-16 week period since the onset of the pandemic (as opposed to past year prevalence) it seems that rates of suicidal thoughts and behaviors were elevated in the current sample.

The first aim of this study was to examine which Covid-19 related stressors were related to increased suicidal thoughts and behaviors. We found that experiencing Covid-19 symptoms, financial problems, redundancy, food insecurity, bereavement, social

isolation, being unable to stay in close contact with loved ones, relationship problems and domestic abuse were all associated with an increased risk of suicidal thoughts during the Covid-19 pandemic, with similar results for suicidal behaviors. Of all the Covid-19 related stressors examined here, particular attention should be given to the extent to which food insecurity (five-fold), domestic abuse (five-fold), relationship problems (four-fold), redundancy (four-fold), social isolation (three-fold) and financial problems (three-fold) increased the likelihood of experiencing suicidal thoughts. These findings stress the importance of groups and organizations that provide food to vulnerable groups, provide help to victims of domestic abuse, provide support to individuals experiencing redundancy or relationship difficulties and other structures designed to keep communities connected and combat loneliness during the Covid-19 pandemic. Overall, these findings confirm what previous papers (Sher, 2020) have posited: that many of the difficulties imposed by the Covid-19 pandemic are associated with increased suicidal thoughts and behaviors.

It should also be noted that having responsibility for home-schooling a child had no association with increased suicidal thoughts and was negatively associated with the presence of suicidal behaviors. Whilst previous research has indicated that parents with home-schooling responsibilities during the pandemic have reported increased stress, worry, social isolation and domestic conflict (Thorell et al., 2020), the findings here suggest that the increased stress associated with home-schooling do not increase the risk of suicidal thoughts. The negative association between home-schooling responsibilities and suicidal behaviors is consistent with the well-established notion that having children protects against suicide risk in parents (Qin & Mortensen et al., 2003). The second aim of the study was to examine whether hopelessness and resilience moderated the relationship between Covid-19 stress and the prevalence of suicidal thoughts and

behaviors. Our findings indicated that hopelessness, resilience, and the interaction between hopelessness and resilience, all moderated the relationship between Covid-19 stress and suicidal thoughts. The relationship between Covid-19 stress and the presence of suicidal thoughts was much stronger in individuals with high hopelessness and/or low resilience. For the analysis of suicidal behaviors, only hopelessness was found to moderate the relationship between Covid-19 stress and suicidal behaviors, with the relationship between Covid-19 stress and suicidal behaviors being stronger for those with high hopelessness. These findings are consistent with prior research that indicated that hope (Dixon et al., 1993; Uncapher et al., 1998) and resilience (Min et al., 2015; Nrugham et al., 2010) protect the individual from developing suicidal thoughts and behaviors in the face of adversity. The current findings build upon prior research to show the protective qualities of hope and resilience also apply in the context of the Covid-19 pandemic.

The significant three-way interaction between Covid-19 stress, hopelessness and resilience, indicates that the combination of Covid-19 stress, high hopelessness and low resilience places individuals in a particular high risk group for developing suicidal thoughts (approximately 35% prevalence). Whilst the assessment of hopelessness and social stressors already form an important part of suicide risk assessment procedures (NICE, 2011), these results stress the importance of considering how the relationship between these factors relate to the risk of suicide, rather than considering each factor in isolation.

Given the powerful protective abilities of hope and resilience demonstrated here, a logical next step is to consider how to develop these traits in our communities. Recently, researchers have moved away from the notion that resilience is a fixed and stable trait and now view resilience as a dynamic, changeable process (Stainton et al., 2019). Recent research has suggested that “resilience training” interventions can decrease stress,

anxiety, and improve quality of life (Sood et al., 2011). Likewise, hope is also considered to be a changeable state (Hernandez & Overholser, 2020) and the field of positive psychology has demonstrated that simple exercises such as writing a letter of gratitude or reflecting on one's personal strengths (Huffman et al., 2014) can substantially increase one's hope for the future. Future research must consider the most effective methods of building resilience and hope in communities during the Covid-19 pandemic and beyond.

It is also worth considering the role of depression when interpreting these findings. Given the well-established links between depression and suicide (Nock et al., 2009), the notion that stressful events can precipitate depression in vulnerable individuals (Hammen, 2005) and the fact that hopelessness is a core symptom of depression (Liu et al., 2015) it is important that future research considers the role depression plays in the relationship between stress, hopelessness, resilience and suicidal thoughts and behaviors. For individuals experiencing severe symptoms of depression, more intensive interventions may be required in addition to the resilience training and hope enhancing exercises suggested above.

Limitations

The current results must be interpreted in light of several limitations. Firstly, this research was cross-sectional which precludes us from drawing causal inferences between Covid-19 related stressors and suicidal thoughts and behaviors. Secondly, this research relied on single-item self-report measures to assess suicidal thoughts and behaviors. Whilst this offers fast, non-intrusive, assessment of suicidal thoughts and behaviors, evidence suggests that single-item assessments can result in misclassification of prior suicidal behaviors (Hom et al., 2015). Thirdly, the representativeness of the sample must be considered when interpreting the results. Whilst the large sample size is a strength of the study, it is important to acknowledge that the sample was predominantly female

(80%), white (96.6%), aged between 35-64 (66.8%), and had responsibility for home-schooling a child (77.1%). Future research should consider replicating these findings in the groups underrepresented in this study (men, BAME groups, children, adolescents and over 65 year olds). Fourthly, this research did not adjust for potential confounders such as socioeconomic status, area of residency (urban vs rural) and participant occupation. Finally, our analysis of suicidal behavior during lockdown (n = 83) was underpowered and this could explain why the moderating effects of resilience and the three-way interaction between Covid-19 stress, hopelessness, and resilience for suicidal thoughts, were not replicated for suicidal behaviors.

Conclusion

Our results demonstrated that food insecurity, domestic abuse, relationship problems, redundancy, social isolation and financial problems were the Covid-19 stressors most strongly linked to suicidal thoughts and behaviors during the Covid-19 pandemic. It is important that those in charge of government policy and decision making are aware of the relationship between these Covid-19 related stressors and suicidal thoughts and behaviors. We also found that hopelessness and resilience moderated the relationship between Covid-19 stress and suicidal thoughts, such that the relationship between Covid-19 stress and the presence of suicidal thoughts was much stronger for individuals with high hopelessness and low resilience. Future research must consider how we can promote hope and resilience in our communities during the Covid-19 pandemic and beyond.

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Declaration of Interest Statement

No potential conflict of interest was reported by the authors.

Author Notes

JK, NS and JP are PhD students in the Psychology Department at Swansea University. NG is a Professor in the Psychology Department at Swansea University and RS is a Professor in the Psychology Department at Cardiff University. CO'C is the Divisional Director for Mental Health and Learning Disabilities for the Aneurin Bevan University Health Board in Wales.

Data Availability Statement

The data that support the findings of this study are available from the corresponding author, [JK], upon reasonable request.

Author Contributions

JK, NG, CO'C and RS devised the study concept. JK, JP and NS created the online survey and monitored the data collection process. All authors contributed to the dissemination of the study. JK and RS carried out the data analysis procedures. JK wrote the manuscript and all authors contributed to editing the final version.

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Table 1

Demographic Characteristics of Participants.

	Number	Percentage
Total	12989	
Gender		
Female	10391	80.0
Male	2490	19.2
Other	25	0.2
Prefer not to say/no response	83	0.6
Age		
16-24	703	5.4
25-34	1870	14.4
35-44	2647	20.4
45-54	3254	25.1
55-64	2761	21.3
65-74	775	6.0
75+	968	7.5
Prefer not to say/no response	11	0.1
Ethnicity		
White – any	12553	96.6
Asian – any	130	1.0
Black – any	16	0.1
Mixed – any	110	0.8
Other	74	0.6
Prefer not to say/no response	106	0.8
Experienced suicidal thoughts	1205	9.3
Engaged in suicidal behaviors	83	0.6
Experienced Covid-19 symptoms	3186	24.5
Experienced financial problems	2029	15.6
Was made redundant	161	1.2
Experienced food insecurity	520	4.0
Experienced a bereavement	1581	12.2
Had responsibility to home-school a child	10016	77.1
Experienced social isolation	3792	29.2
Was unable to stay in close contact with loved ones	6186	47.6
Experienced relationship problems	2380	18.3
Experienced domestic abuse	286	2.2

Note. Prevalence rates of suicidal thoughts, suicidal behaviors and all stressors refer to the period since the start of the Covid-19 pandemic.

Table 2
Associations between stressors and suicidal thoughts and behaviors. Chi Squared Test

	Suicidal Thoughts Odds ratio (95% CI)	Suicidal Behaviors Odds ratio (95% CI)
Experienced Covid-19 symptoms	1.38 (1.21 – 1.57) ***	1.18 (0.73 – 1.91)
Experiencing financial problems	2.87 (2.52 – 3.28) ***	3.43 (2.20 – 5.35) ***
Being made redundant	3.66 (2.57 – 5.21) ***	3.03 (0.95 – 9.68) **
Experiencing food insecurity	4.86 (3.99 – 5.92) ***	6.84 (4.03 – 11.62) ***
Experiencing a bereavement	1.34 (1.13 – 1.58) ***	2.97 (1.84 – 4.78) ***
Having responsibility to home-school a child	1.06 (0.93 – 1.22)	0.51 (0.27 – 0.97) *
Experiencing social isolation	3.02 (2.68 – 3.41) ***	2.90 (1.88 – 4.47) ***
Unable to stay in close contact with loved ones	1.87 (1.65 – 2.11) ***	1.76 (1.13 – 2.74) **
Experiencing relationship problems	3.86 (3.41 – 4.37) ***	3.63 (2.35 – 5.60) ***
Experiencing domestic abuse	4.69 (3.63 – 6.07) ***	8.59 (4.70 – 15.72) ***

Results and Odds Ratios.
*$p < .05$, ** $p < .01$, *** $p < .001$.

Table 3

Means, Standard Deviations and Correlations (Spearman's) for all Variables.

* $p < .01$, ** $p < .001$.

	Mean (SD)	1	2	3	4	5
(1) Covid-19 stress (0 – 9)	1.55 (1.36)	-	.31**	-.23**	.21**	.06**
(2) Hopelessness (1 – 5)	2.04 (1.10)		-	-.49**	.35**	.11**
(3) Resilience (0 – 10)	6.83 (2.35)			-	-.28**	-.09**
(4) Presence of suicidal thoughts (0 - 1)	0.09 (0.29)				-	.22**
(5) Presence of suicidal behaviors (0 - 1)	0.01 (0.08)					-

Table 4

Hierarchical Logistic Regression Analyses Predicting Presence of Suicidal Thoughts.

Moderator variable	Step	Variable entered	β	OR	Total R^2 (Nagelkerke)	R^2 change
Hopelessness	1	Covid-19 Stress	0.43**	1.54	.303**	
		Hopelessness	1.15**	3.15		
	2	Covid-19 Stress	0.58**	1.78	.306**	.003**
		Hopelessness	1.22**	3.37		
		Covid-19 Stress X Hopelessness	-0.14**	0.87		
Resilience	1	Covid-19 Stress	0.56**	1.74	.243**	
		Resilience	-0.90**	0.41		
	2	Covid-19 Stress	0.65**	1.92	.245**	.002**
		Resilience	-0.96**	0.38		
		Covid-19 Stress X Resilience	0.11**	1.12		
Hopelessness X Resilience	1	Covid-19 Stress	0.41**	1.51	.331**	
		Hopelessness	0.91**	2.48		
		Resilience	-0.52**	0.59		
	2	Covid-19 Stress	0.46**	1.58	.332**	.001*
		Hopelessness	0.92**	2.52		

	Resilience	-0.55**	0.58
	Covid-19 Stress X	0.04*	1.04
	Hopelessness X		
	Resilience		

* $p < .01$, ** $p < .001$.

Table 5

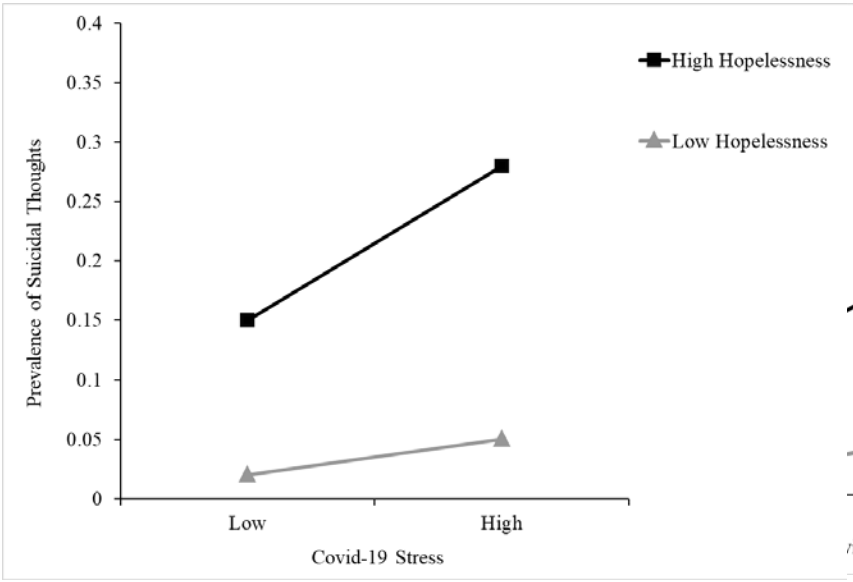
Hierarchical Logistic Regression Analyses Predicting Presence of Suicidal Behaviors.

Moderator variable	Step	Variable entered	β	OR	Total R^2 (Nagelkerke)	R^2 change
Hopelessness	1	Covid-19 Stress	0.38**	1.47	0.234**	
		Hopelessness	1.38**	3.99		
	2	Covid-19 Stress	0.83**	2.30	0.241**	0.07*
		Hopelessness	1.61**	4.98		
		Covid-19 Stress X Hopelessness	-0.26*	0.77		
Resilience	1	Covid-19 Stress	0.52**	1.68	0.205**	
		Resilience	-1.19**	0.30		
	2	Covid-19 Stress	0.70**	2.02	0.207**	0.002
		Resilience	-1.30**	0.27		
		Covid-19 Stress X Resilience	0.12	1.13		
Hopelessness X Resilience	1	Covid-19 Stress	0.37**	1.44	0.258**	
		Hopelessness	0.95**	2.57		
		Resilience	-0.72**	0.49		
	2	Covid-19 Stress	0.48**	1.62	0.260**	0.02
		Hopelessness	0.98**	2.68		
		Resilience	-0.78**	0.46		

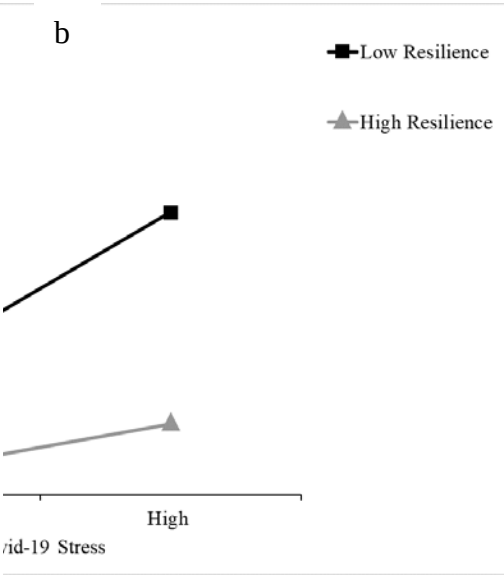
	Covid-19 Stress X Hopelessness X Resilience	0.04	1.04

* $p < .01$, ** $p < .001$.

a



b



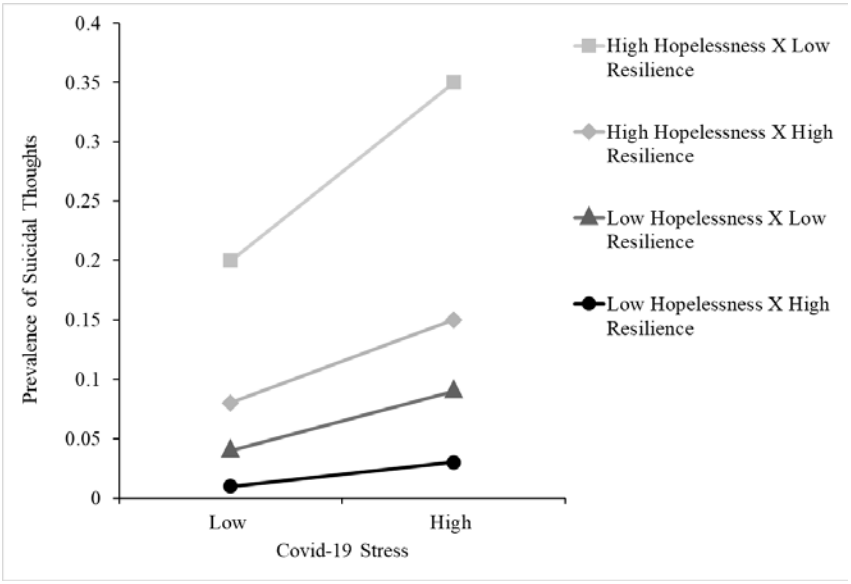


Figure 1. Three line graphs displaying the relationship between Covid-19 stress and suicidal thoughts. Graph a) displays the moderating effect of hopelessness, graph b) displays the moderating effect of resilience and graph c) displays the moderating effect of the interaction between hopelessness and resilience. Participants were considered to have "high" Covid-19 stress group (n = 7186) if they experienced 2 or more of the Covid-19 stressors and participants were considered to have "low" Covid-19 Stress group (n =

5803) if they experienced 1 of fewer of the Covid-19 stressors. Participants were considered to have “low hopelessness” (n = 8606) if they reported feeling hopeless “None of the time” or “A little of the time” and participants were considered to have “high hopelessness” (n = 4096) if they reported feeling hopeless “Some of the time”, “Most of the time” or “All of the time”. Participants were considered to have “low resilience” (n = 4933) if they scored 6 or lower on the resiliency measure and participants were considered to have “high resilience” (n = 7969) if they scored 7 or higher on the resiliency measure.

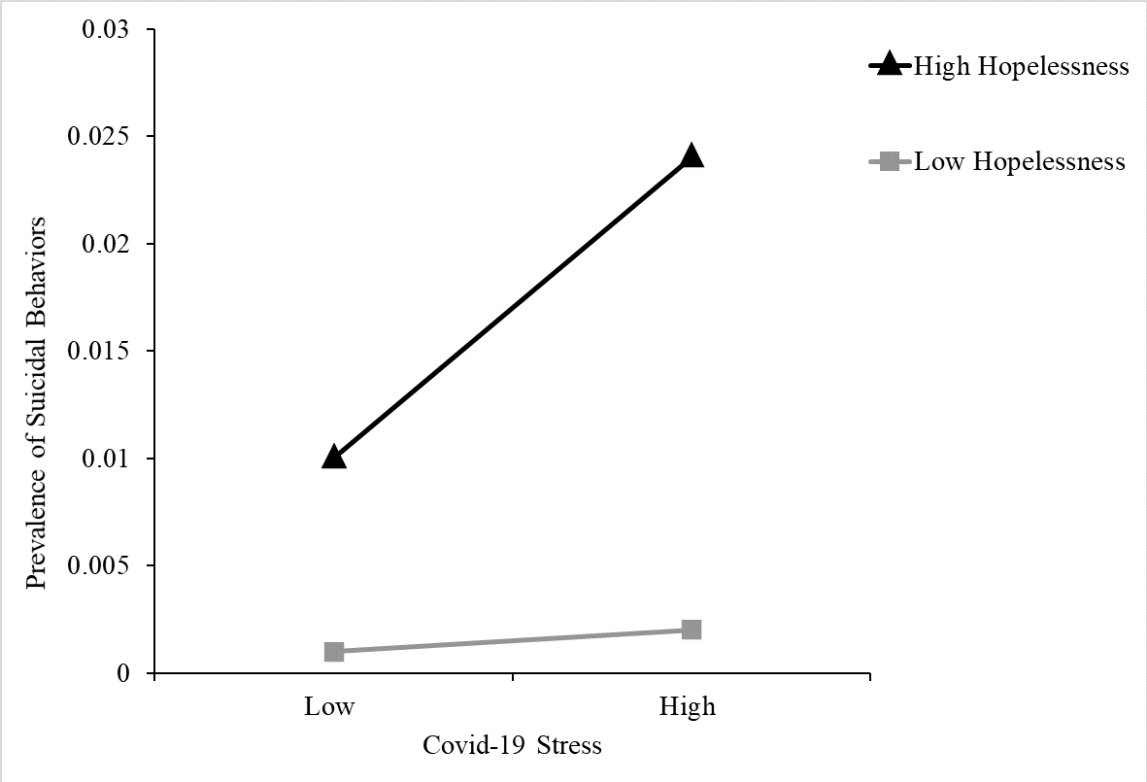


Figure 2. A line graph displaying the moderating effect of hopelessness on the relationship between Covid-19 stress and the prevalence of suicidal behaviours during the Covid-19 pandemic.