

COVID-19 Research: 2020 - 2021

THE INFLUENCE OF THE COVID-19
PANDEMIC ON MENTAL WELLBEING
AND PSYCHOLOGICAL DISTRESS: A
COMPARISON ACROSS TIME

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Authored by: Chris O'Connor, James Knowles,
Nicola S. Gray, Jennifer Pink, Nicola Simkiss &
Robert J. Snowden



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Executive Summary

The COVID-19 pandemic has caused profound physical, social and economic changes across the world. Ongoing difficulties such as financial uncertainty, unemployment, health anxiety, social and physical isolation are likely to have negatively impacted the mental health and wellbeing of populations worldwide. Research monitoring the mental health and wellbeing of the population is essential in providing the understanding necessary to plan for a successful recovery process.

This research administered a series of online surveys to the Welsh population to examine levels of psychological wellbeing and the prevalence of clinically significant mental distress in the Welsh population. The first survey took place between the 9th of June 2020 to the 13th of July 2020 (11-16 weeks into the Welsh lockdown) and the second survey took place between the 18th of January 2021 to the 7th of March 2021 (4-11 weeks into the second Welsh lockdown). This data was also compared to data from April 2018-March 2019 gathered by the National Survey for Wales (ONS, 2019) to evaluate how wellbeing levels compared to pre-pandemic levels. Psychological wellbeing was indexed via the Warwick-Edinburgh Mental Wellbeing Scale (WEMWBS), and psychological distress was indexed via the K10. The second survey also attempted to identify the factors driving psychological distress, along with the factors protecting individuals from poor wellbeing and psychological distress over the course of the pandemic.

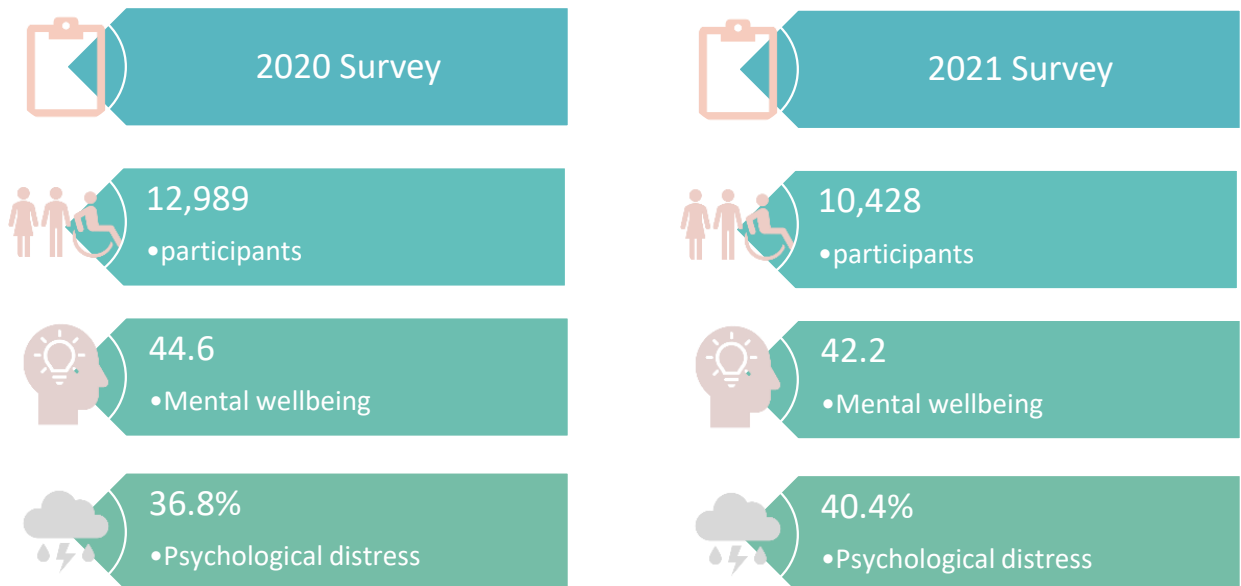
Levels of wellbeing were lower in the second survey (2021) compared to the first survey (2020), which were already low compared to pre-pandemic data (2019). Rates of clinically significant psychological distress were found in 40.4% of the 2021 sample representing a 9.8% increase in prevalence from the first survey. As found in the first survey, mental health continues to be worse in women, young adults and individuals living in deprived areas and the gap in mental health and wellbeing between young and old adults continues to broaden. The second survey also identified that food insecurity, domestic abuse, prior history of mental health problems, social isolation, financial problems, and difficulties accessing necessary healthcare were the factors most strongly associated with psychological distress. Analysis of protective factors found that hope, resilience, and social connectedness were the most

important factors in protecting against poor wellbeing and psychological distress during the pandemic.

Organisations with responsibility for supporting the wellbeing of the population throughout the pandemic, need to be aware of the increasing mental health difficulties experienced within the population. Extra consideration should also be given to (1) how younger adults can be supported, (2) how we can prevent exposure to the factors driving psychological distress and provide support to individuals experiencing these difficulties and, (3) how we can instill hope, build resilience, and keep individuals socially connected over the course of the COVID-19 pandemic and beyond.

Key points:

- Population mental wellbeing scores dropped from an average of 44.6 points (out of 70) in the 2020 survey, to 42.2 points in the 2021 survey.
- Rates of clinically significant psychological distress were found in 36.8% of the 2020 sample and 40.4% of the 2021 sample.



Authors

Dr Chris O'Connor, Divisional Director for Mental Health and Learning Disabilities, Aneurin Bevan University Health Board

James Knowles, PhD student, College of Human and Health Sciences, Swansea University

Professor Nicola Gray, Clinical & Forensic Psychologist, College of Human and Health Sciences, Swansea University and Swansea Bay University Health Board

Jennifer Pink, PhD student, College of Human and Health Sciences, Swansea University

Nicola Simkiss, PhD student, College of Human and Health Sciences, Swansea University

Professor Robert Snowden, Professor of Psychology, Cardiff University

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Background

Purpose and aims

The COVID-19 pandemic has caused profound social and economic changes across the world. It has caused a wide range of problems ranging from fear for one's own safety, the loss of loved ones, economic uncertainty, and the challenging effects of physical and social isolation, all of which are likely to negatively impact the mental health and wellbeing of populations worldwide. This research used data from the first and second national lockdown periods¹ to:

1. Monitor the mental health and wellbeing of the Welsh population.
2. Build an understanding of the factors affecting mental health and wellbeing during the pandemic.
3. Identify factors that protected individuals against the stressful effects of the COVID-19 pandemic.

The COVID-19 pandemic in Wales

The aim of the present research was to monitor the mental health and wellbeing of the Welsh population from the first and second lockdown periods¹. This research administered two surveys to the Welsh population. The first survey took place during the first national lockdown, from the 9th of June 2020 to the 13th of July 2020 (more details on the lockdown restrictions during the first survey can be found in [our previous report](#)). The second survey took place between the 18th of January 2021 to the 7th of March 2021. At the start of the first survey (9th of June 2020) Wales was under the UK wide lockdown implemented from the 23rd of March 2020, with all people required to stay at home except for very limited purposes. By

¹ For the purposes of this report, the 'first' lockdown refers to the lockdown implemented across Wales from the 23rd of March 2020 until the 6th of July 2020 and the 'second' lockdown refers lockdown restrictions implemented across Wales from the 19th of December 2020 until the 12th of March 2021 (Senedd Research, 2021). This does not include the "fire-break" lockdown that occurred across Wales from the 23rd of October until the 9th of November 2020.

the 19th of June 2020, some lockdown restrictions were eased in Wales, with non-essential retail business, childcare facilities, and the housing market re-opening. By the 29th of June 2020, Welsh schools began to re-open and by the 6th of July 2020, lockdown restrictions were further eased across Wales, with people allowed to travel more than 5 miles from their home, although the other restrictions remained in place. At the start of the second survey (18th of January 2021), Wales was under another period of lockdown restrictions that had been put in place from the 19th of December 2021, with all people required to stay at home except for very limited purposes. These lockdown restrictions were in place until the end of the survey (7th March 2021). During the period of the second survey, the Welsh Government was starting to roll out Wales' vaccination programme (Senedd Research, 2021).

Previous UK studies

Literature on population wellbeing after disasters

Previous research into community mental health recovery after acute, chronic, natural and human-caused disasters has demonstrated that recovery is not a straightforward process and the effects of disasters can last several years (The King's Fund, 2020; DeWolfe, 2000). Traditional models of recovery (DeWolfe, 2000) suggest that there is often a sharp decrease in emotional wellbeing immediately after the onset of a disaster (impact phase), followed by a temporary period of increased wellbeing and altruistic optimism as communities pull together (heroic and honeymoon phases). This is typically followed by a time where individuals recognise the scale and reality of the disaster, fatigue sets in and wellbeing declines (disillusionment phase), before a period where wellbeing is slowly reconstructed over a period of many years (reconstruction phase). Whilst the COVID-19 pandemic has been an ongoing, multifaceted and unpredictable series of events rather than one single event, drawing on past research into population recovery from disasters, can help us make sense of the patterns displayed in current research investigating how the mental health and wellbeing of populations have been affected over the course of the COVID-19 pandemic.

Initial response

During the initial stages of the COVID-19 pandemic, reports indicated an increase in the prevalence of population psychological distress. During April 2020, one month after the WHO declared the COVID-19 outbreak a pandemic (11th March 2020; WHO, 2020) investigations

across the UK (Pierce et al., 2020) reported large increases in the rates of clinically significant psychological distress compared to levels prior to the COVID-19 pandemic. Similar findings during the initial months of the pandemic have been replicated across the world. Xiong et al., (2020) found that high rates of anxiety, post-traumatic stress disorder, depression, psychological distress and stress had been reported in general populations in China, Spain, Italy, Iran, America, Turkey, Nepal and Denmark, with young people (<40), women, presence of chronic and psychiatric illness, students and unemployed individuals amongst the most negatively impacted.

Our first survey investigated the mental health and wellbeing of the Welsh population during the first national lockdown and compared it to population-based data collected in 2019, prior to the COVID-19 pandemic (Gray et al., 2020). The research revealed a large decrease in population wellbeing, with wellbeing levels across the population decreasing from an average of 51.2 (out of 70) in 2019, to 44.6 in 2020, a decrease of 6.6 points. The research also observed an increase in psychological distress, with women, young people and those living in deprived areas the most adversely affected. This sharp decline in population mental health and wellbeing following the onset of the pandemic is consistent with the “impact phase” trajectory outlined in traditional models of post-disaster population recovery (DeWolfe, 2000).

After the initial response

Further research has examined the mental health and wellbeing of the UK population in the months following the onset of the COVID-19 pandemic. Fancourt et al. (2020) found that the highest levels of depression and anxiety occurred in the early stages of lockdown, with symptoms steadily improving from March 2020 to August 2020. Shevlin et al., (2021) conducted a longitudinal survey of UK adults measuring anxiety and depression levels, in March 2020 (Time 1), April 2020 (Time 2) and July 2020 (Time 3). They found that the prevalence of anxiety and depression remained stable across the three time points. Pierce et al., (2021) also reported that by October 2020 the mental health of most UK adults returned to pre-pandemic levels. Studies in Korea (Choi et al., 2021) and Australia (Pieh et al., 2021) have also demonstrated similar effects, with population wellbeing showing signs of improvement in the months after the onset of the pandemic. This research indicates that after the initial decline in population mental health and wellbeing during March and April

2020, the mental health of the population has either stabilised or started to improve. This pattern of stabilising and improving mental health in the months after the onset of the pandemic is consistent with the ‘heroic’ and ‘honeymoon phases’ outlined in traditional disaster recovery models (DeWolfe, 2000), where population wellbeing temporarily increases as communities pull together after the onset of a crisis.

Whilst this research paints an optimistic picture, there are still reasons to be concerned for the wellbeing of the population over the course of the pandemic. Firstly, since August 2020, within the UK there has been a second surge in COVID-19 cases and deaths, the introduction of COVID-19 variants, and a prolonged period of lockdown restrictions (Senedd Research, 2021), resulting in increased feelings of uncertainty, economic difficulties, continued health anxiety, and increased loneliness. Therefore, it seems likely that the second set of lockdown restrictions announced in December 2020 will have had a detrimental impact on population wellbeing. Secondly, post-disaster wellbeing recovery models (DeWolfe, 2000) indicate that a period of recovery after the initial onset of the disaster is typically followed by a time where the reality of the disaster sets in and wellbeing declines (disillusionment phase). Considering this model, it may be short-sighted to interpret the recovery demonstrated in the UK population between April and October 2020 (Pierce et al., 2021) as evidence of a completed recovery path. Whilst the COVID-19 pandemic is unpredictable in many ways, it is likely that the impact on the mental health of the population will endure for many years and the recovery will not be a straight-forward or linear process.

The Present Study

Monitoring the mental health and wellbeing of the population

Given the unpredictable and ongoing difficulties associated with the COVID-19 pandemic, it is important that research continues to monitor the wellbeing of the population. A comprehensive understanding of the wellbeing needs of the population facilitates the development of effective interventions and recovery strategies (The King’s Fund, 2020). Whilst a great deal of research examined the wellbeing of the population in the initial weeks and months after the onset of the pandemic, less research has focused on how population wellbeing has progressed one year later. This project aimed to understand the mental health and wellbeing of the Welsh population using data from the first UK lockdown the second UK lockdown.

Previous research has focused primarily on mental health difficulties experienced in populations throughout the COVID-19 pandemic. However, there is a growing emphasis in the mental health literature that mental wellness is not simply the absence of mental illness (Suldo & Shaffer, 2008). Mental health difficulties can be defined as “a pattern of behaving, thinking, and feeling that causes a person significant distress or impairment of functioning”, whereas mental wellbeing is a construct that represents happiness and a sense of purpose which can remain even in the presence of distress, or suffering (Weich et al., 2011). This research acknowledges the importance of both decreasing mental health difficulties and promoting positive mental wellbeing in the population. Therefore, this project places focus on measuring both mental health difficulties and mental wellbeing.

In addition to examining the overall wellbeing of the population throughout the COVID-19 pandemic, it is also vital to understand the wellbeing of different groups within the population. Identifying the groups most adversely affected by the pandemic can help authorities develop targeted interventions that provide help to those who need it most. Prior research has indicated that factors such as gender (Xiong et al., 2020), age (Gray et al., 2020), and socioeconomic deprivation (Pierce et al., 2020) have influenced the degree to which individuals were negatively impacted by the COVID-19 pandemic. Therefore, this study will also investigate the effects of gender, age, and socioeconomic deprivation on mental health and wellbeing throughout the pandemic. Moreover, as different regions across Wales have been differently impacted by rates of COVID-19 and COVID-19 restrictions, we will also examine the levels of wellbeing and psychological distress across the seven Health Board regions in Wales.

Identifying factors causing psychological distress

As well as understanding the mental health of the population, it is also vital to build an understanding of the factors driving any changes in mental health. If we can identify specific aspects of the COVID-19 pandemic that are causing mental health difficulties in the population, we can work towards preventing them and better protecting the mental health of our communities.

There are many aspects of the COVID-19 pandemic that are likely to have negatively impacted the mental health of the population. 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); increased domestic abuse (Mahase, 2020); worsening physical health (Bo et al., 2020); increased health anxiety (Jungmann et al., 2020) and social isolation (Groarke et al., 2020). Therefore, this study will also investigate the extent to which these stressors have impacted the mental health of the population.

Identifying protective factors

Understanding the factors that are causing distress in the population is important. However, it is not possible to eliminate all stressors during a global pandemic. Having large portions of the population experience adversity is an unfortunate reality of a pandemic. Nonetheless, not all individuals that undergo adversity experience mental health difficulties (PeConga et al., 2020). There are many individuals who maintain their wellbeing and mental health during periods of severe adversity. In fact, some research has indicated that resilience is the most common human response to adversity (Shevlin et al., 2021; PeConga et al., 2020). This means that when people experience extreme stressors, such as first responders to the 9/11 world trade centre attacks (Pietrzak et al., 2014) or health care workers in China during the SARS outbreak (Wu et al., 2009), most do not go on to experience or develop clinically significant mental health difficulties (PeConga et al., 2020).

Therefore, it is important to identify factors that help our communities withstand the stressful events caused by the COVID-19 pandemic. If we can understand the factors that help buffer against the stressful effects of the COVID-19 pandemic, we can develop strategies that help build resilience in our communities throughout the pandemic and beyond. Past research has indicated that psychological resilience (Smith et al., 2008), hope for the future (Gallagher et al., 2020), social connectedness (Nitschke et al., 2021), stress immunity (Pink et al., 2021), and reality acceptance (McCracken & Vowles 2006) all help protect individuals who experience adversity from developing mental health difficulties. Therefore, this project also investigated whether these protective factors help individuals maintain their mental health and wellbeing during the COVID-19 pandemic.

Key study aims

This project aimed to use data from the first and second Welsh lockdown periods to:

1. Monitor the mental health and wellbeing of the overall Welsh population. This also includes an examination the effects of gender, age, socioeconomic deprivation, Health Board and Local Authority region on mental health and wellbeing.
2. Build an understanding of the factors driving poor wellbeing and psychological distress in the population.
3. Identify the factors that help individuals maintain their mental health and wellbeing during the stressful events of the COVID-19 pandemic.

Research 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:

http://psy.swansea.ac.uk/staff/gray/Protocol_Impact_of_COVID19_on_Mental_Health_July2020.pdf

Participants

Participants were recruited via two online surveys. The first survey took place in between June and July 2020 and the second survey took place between January and March 2021. The recruitment methods for each survey are described below.

2020 survey

The participant recruitment procedures for the 2021 survey were the same as the 2020 survey described below. More details on the 2020 survey participant recruitment procedures can also be found in [our previous report](#). In total, 15,469 participants started the 2020 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 for the 2020 survey consisted of 12,989 individuals.

2021 survey

Participants for the 2021 survey were recruited via online snowball sampling. The survey was advertised via a series of social media advertisements and emails designed to cover the population of Wales. This included emails and tweets being sent to organisations across Wales asking them to publicise the existence of the survey giving the URL of the survey website for participants to be able to access the survey. Many organisations agreed to support the research and to advertise and disseminate the survey. This included all seven Health Boards in Wales; the four police forces in Wales; the Welsh Ambulance Service Trust; the three Fire & Rescue services in Wales; many large employers across Wales, including large government organisations; care homes; homelessness organisations; GPs; the Welsh Farmers' Union; sporting organisations and third sector organisations (e.g., charitable organisations supporting specific sectors of the community). The survey was also advertised via newspapers, radio broadcasts, and celebrity tweets.

To make sure the survey recruited individuals from all areas across Wales, we ensured that a minimum number of participants (n = 250) were recruited from each of the 22 Local Authorities across Wales (Merthyr Tydfil (n = 176) and Wrexham (n = 180) were the only exceptions to this). The survey was open from the 18th of January 2021 to the 7th of March 2021. During this period, Wales was in a period of “lockdown”, with individuals instructed not to leave their homes other than for essential reasons.

In total, 13,283 participants took part in the survey. Of these, 2,767 did not complete over 50% of the survey and were excluded from further analysis. Analysis of the time taken to complete the survey found the median completion time was 829s (IQR: 653–1103) and people (n = 26) who completed the survey in under 240s were excluded from the survey as such fast completion times were not commensurate with carefully answering the questions. Participants who reported that they did not currently live in Wales were also excluded (n =

62) to ensure all participants were under the same lockdown conditions. Our final sample for the '2021 survey' consisted of 10,428 participants.

Measures

The survey was administered online (Qualtrics software, Version June 2020, Provo, UT, USA, Copyright © 2020Version) for the vast majority of participants (> 99%) and was available in both English and Welsh language versions. We also had a dedicated telephone line that was widely advertised so sectors of the population with limited access to the internet could request a paper-based survey (with stamped addressed envelope) and thus were able to engage with the survey. The survey was designed to take around 10 minutes to complete.

The 2020 and 2021 survey were largely the same. All measures described below appeared in both surveys, unless stated otherwise. The first section contained an information sheet and a consent form. The second section asked for demographic information that included questions on participants' age, gender, ethnicity and postcode (used to calculate the deprivation index). The third section included questions related to levels of wellbeing and psychological distress. The fourth section asked about the COVID-19 related stressors that participants were experiencing, and the final section enquired about participants levels of hope for the future, psychological resilience, social connectedness, stress immunity and reality acceptance.

Wellbeing

Current mental wellbeing (over the past two weeks) was assessed via the Warwick-Edinburgh Mental Wellbeing Scale (WEMWBS; Tennant et al., 2007). The WEMWBS contained 14 items covering issues such as positive affect, level of functioning, and relationships over the past two weeks. Items are answered on a five-point Likert scale with respect to frequency (from "none of the time" to "all of the time") to give a score ranging from 14 to 70, with greater scores indicating greater wellbeing. The internal consistency of the WEMWBS was high in the 2021 sample (Cronbach $\alpha = 0.94$).

Psychological distress

Current level of psychological distress was assessed by the Kessler Distress Scale (K10; Kessler, et al., 2002). The standard K10 asks people to rate their distress over the past 30 days.

However, we chose to amend this to over the past two weeks to match the time period of the WEMWBS. The K10 contains 10 items measuring current psychological distress and, in particular, symptoms of anxiety and depression. Items are rated on a five-point Likert scale with respect to frequency (from “none of the time” to “all of the time”) to give a score from 10 to 50, with greater scores indicating greater levels of psychological distress. The internal consistency of the K10 was high in the 2021 sample (Cronbach $\alpha = 0.93$).

Welsh Index of Multiple Deprivation

The Welsh Index of Multiple Deprivation (WIMD) is produced by the Welsh Government (2019) and is a measure of relative deprivation for 1,909 areas of Wales (1 = most deprived, 1909 = least deprived), with each area containing an average of 1,600 people. It defines deprivation as “the lack of access to opportunities and resources which we might expect in our society”, p 14). Participants’ WIMD rank was calculated using their postcode information.

COVID-19 stressors

This set of questions aimed to understand the COVID-19 related stressors that participants had experienced. 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 that 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, experiencing domestic abuse, having to cancel important upcoming events², experiencing increased difficulties in caring for someone² and

² This was only asked about in the 2021 survey.

being unable to access necessary healthcare². Similar measures utilising “Yes/No” responses to a list of stressors has previously demonstrated good test-retest reliability and convergent validity (Kujawa et al., 2020).

Hope²

Participants’ levels of hope were assessed via 4 statements taken from Beck’s Hopelessness Scale (Beck et al., 1979). Participants were asked to rate whether the following statements were true or false: *“In the future I expect to succeed in what concerns me most”*, *“My future seems dark to me”*, *“I just don’t get the breaks and there is no reason to believe I will in the future”* and *“I have great faith in the future”*. Participants answers to these questions were calculated to give a score ranging from 0 (very hopeless) to 4 (very hopeful). Past research has demonstrated that participants’ answers on these four items were very highly correlated with their total scores on the full 20-item Beck’s Hopelessness Scale (Aish et al., 2001), a widely used clinical tool used to assess clinical levels of hopelessness. The internal consistency for the hope questionnaire was high in the 2021 sample (Cronbach $\alpha = 0.80$).

Resilience²

Participants’ resilience was measured using the Brief Resilience Scale (BRS) developed by Smith et al., (2008). The BRS asks people to rate a series of six statements such as *“I tend to bounce back quickly after hard times”* on a five-point Likert scale from “strongly disagree” to “strongly agree”. Responses on the 6 BRS items are totalled up to give a score ranging from 6 (low resilience) to 30 (high resilience). The BRS has previously proven to be a valid and reliable measure of resilience (Smith et al., 2008). The internal consistency of the BRS was high in the 2021 sample (Cronbach $\alpha = 0.90$).

Stress Immunity

² This was only asked about in the 2021 survey.

This set of questions looked to examine participants levels of stress-immunity, i.e., the extent to which they could withstand stressful occurrences. The stress immunity sub-scale from the Triarchic Psychopathy Measure (TriPM; Patrick, 2010) was used to assess levels of stress immunity. The six questions within the sub scale asked participants to rate a series of statements on a four-point Likert scale from “true” to “mostly true”, to “mostly false” to “false”. Participants responses on the 6 items are totalled up to give a score ranging from 4 (low stress immunity) to 24 (high stress immunity). The six items in the questionnaire assessed levels of fear, self-confidence, embarrassment and overcoming trauma. This six-item scale indexes a stable personality trait measuring how immune the individual is to stress and trauma. The internal consistency of the TriPM Stress Immunity Subscale was good in the 2021 sample (Cronbach $\alpha = 0.77$).

Social Connectedness²

Social connectedness was measured using the UCLA Three-Item Loneliness Scale (Russell, 1996). The UCLA Three-Item Loneliness Scale asks participants 3 questions that measure relational connectedness: “*How often do you feel that you lack companionship?*”, social connectedness: “*How often do you feel left out?*” and self-perceived isolation “*How often do you feel isolated from others?*”. Participants respond to each question on a scale of 1 “Hardly ever” to 3 “Often”. The scores for each individual question are then added together to give a possible range of scores from 3 to 9. The UCLA Three-Item Loneliness scale has previously been shown to be a valid and reliable measure of social connectedness (Russell, 1996). The internal consistency of the UCLA Three-Item Loneliness Scale was high in the 2021 sample (Cronbach $\alpha = 0.85$).

Reality Acceptance²

This set of questions aimed to measure the degree to which participants had accepted the reality of the current COVID-19 pandemic. The Reality Acceptance Questionnaire (RAQ) asks participants to rate a series of six statements such as “*I have accepted the changes that COVID-19 has had on my life*” or “*I accept that the Covid-19 pandemic is a real threat to many*”

² This was only asked about in the 2021 survey.

people’s health” on a five-point Likert scale from “strongly disagree” to “strongly agree”. The scores for each individual question are then added together to give a possible range of scores from 6 (low reality acceptance) to 30 (high reality acceptance). The internal consistency for the Reality Acceptance Questionnaire was acceptable in the 2021 sample (Cronbach $\alpha = 0.69$).

Research Findings

Demographics

Demographic from the 2020 survey and the 2021 survey are displayed in Table 1. Relative to the demographics of the population of Wales (ONS, 2011) the current sample underrepresented men, young individuals (aged 16-24) and older individuals (aged 75+). Therefore, all statistical analyses were stratified by gender and by age, so that any differences due to gender or age would not affect the results reported.

Table 1: Demographic information for the 2020 and the 2021 sample

		2020 sample (%)	2021 sample (%)
Total		12,989 (100.0)	10,428 (100.0)
Gender	<i>Male</i>	2,490 (19.2)	1460 (14.0)
	<i>Female</i>	10,391 (80.0)	7893 (75.7)
	<i>Other</i>	25 (0.2)	17 (0.2)
	<i>Prefer not to say/no response</i>	83 (0.6)	1058 (10.1)
Age	<i>16-24</i>	703 (5.4)	506 (4.9)
	<i>25-34</i>	1870 (14.4)	1359 (13.0)
	<i>35-44</i>	2647 (20.4)	2055 (19.7)
	<i>45-54</i>	3254 (25.1)	2498 (24.0)
	<i>55-64</i>	2761 (21.3)	2381 (22.8)
	<i>65-74</i>	1356 (10.4)	1302 (12.5)
	<i>75+</i>	398 (3.1)	327 (3.1)
Deprivation Rank	<i>1 (most deprived)</i>	1994 (15.4)	1575 (15.1)
	<i>2</i>	1998 (15.4)	1515 (14.5)

	3	2015 (15.5)	1480 (14.2)
	4	2004 (15.4)	1531 (14.7)
	5 (least deprived)	2006 (15.4)	1655 (15.9)
	Prefer not to say/no response	2972 (22.9)	2672 (25.6)
Ethnicity	White - any	12,553 (96.6)	10110 (96.9)
	Asian - any	130 (1.0)	62 (0.6)
	Black - any	16 (0.1)	16 (0.2)
	Mixed - any	110 (0.8)	79 (0.8)
	Other	74 (0.6)	57 (0.5)
	Prefer not to say/no response	106 (0.8)	104 (1.0)
Relationship status	Single	1847 (14.2)	1435 (13.8)
	Married/civil partnership	7101 (54.7)	5830 (55.9)
	Co-habiting with partner	1880 (14.5)	1418 (13.6)
	Partner non-cohabiting	753 (5.8)	539 (5.2)
	Separated	198 (1.5)	173 (1.7)
	Divorced	652 (5.0)	534 (5.1)
	Widowed	406 (3.1)	343 (3.3)
	Other	69 (0.5)	63 (0.6)
	Prefer not to say/no response	83 (0.6)	93 (0.9)
Employment*	Paid employment	8533	6332
	Self-employed	502	444
	Student	480	607
	Apprentice	31	10
	Unemployed	149	108
	Long term sick/disability	413	405
	Retired	1945	1955
	Furloughed	574	300
	Stay at home parent	228	214
	Full time carer	42	163
	Other	2	305
	Prefer not to say/no response	90	38

** Percentages not given for the employment demographics as participants could select multiple options.*

2021 survey

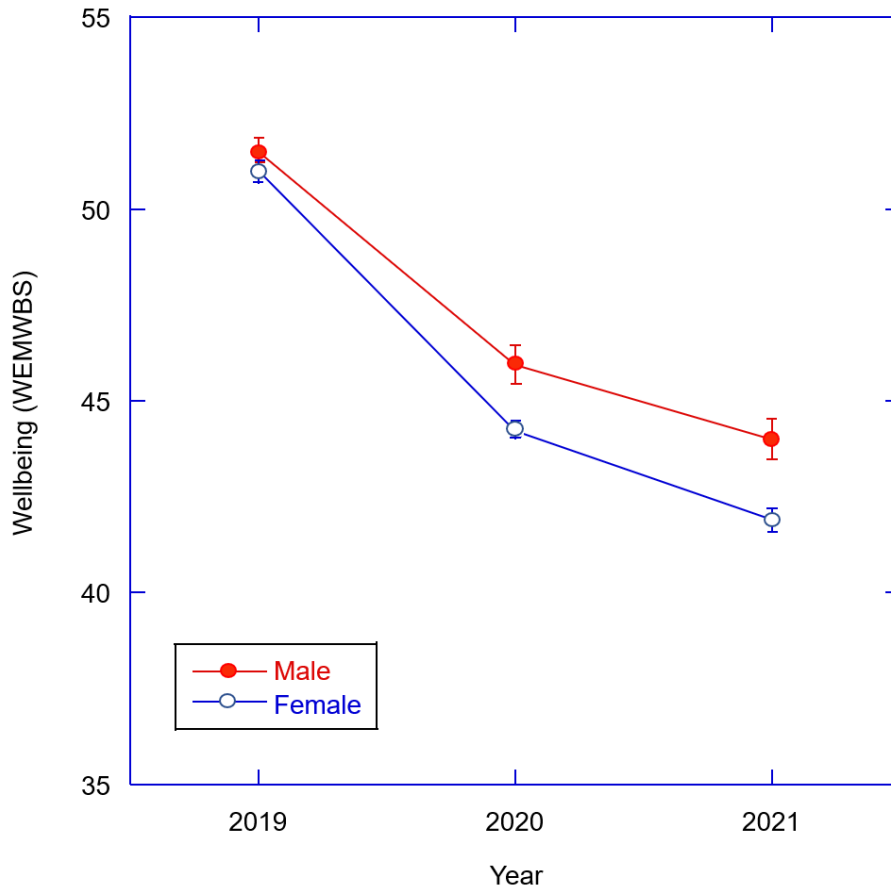
An examination of the data from the 2021 survey showed a similar pattern of results to the 2020 survey (see Table S1 in supplementary materials). Levels of mental wellbeing were lower in women, younger people, and in those from the more deprived areas (all $ps < .001$). Levels of psychological distress (see Table S2 in supplementary materials) were also greatest in women, younger people, and those from more deprived areas (all $ps < .001$).

Conclusion: Across both the 2020 survey and the 2021 survey, wellbeing was lower and psychological distress was higher for women, young adults, and individuals from deprived areas.

Comparison of the 2020 and 2021 surveys: Wellbeing

Figure 1 compares the mean scores on the wellbeing measure (WEMWBS) for the 2020 sample and the 2021 sample, it also includes national wellbeing data from the 2018-2019 National Survey for Wales (ONS, 2019) for comparison purposes. Descriptive statistics are also displayed in Table S1 (supplementary materials). Participants' wellbeing scores were significantly lower during the 2021 survey ($M = 42.2$), compared to the 2020 survey ($M = 44.6$), $t(23399) = 17.70$, $p < .001$, representing a 2.4 points reduction or an effect size of $d = 0.23$. It should be noted that this decrease in wellbeing is on top of the detriment of the 6.6 points reduction from 2019 to 2020.

Figure 1. Mean scores for men and women on the WEMWBS for the 2020 sample and the 2021 sample.



To understand if this reduction in mental wellbeing was influenced by gender, age or socioeconomic deprivation, a series of Analysis of Variance (ANOVA) tests were performed examining each of these factors.

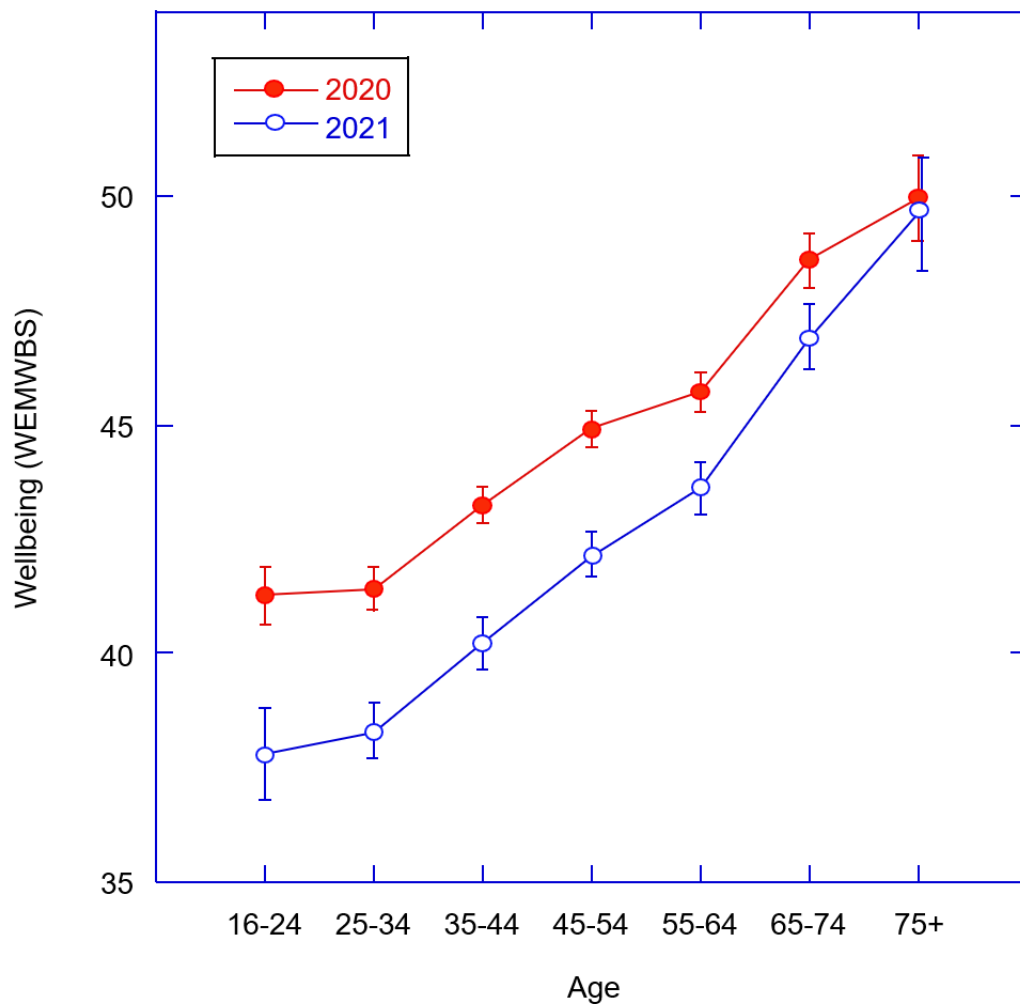
Gender

There were no gender differences in the change in wellbeing over time, with both men and women experiencing a similar decrease in wellbeing from the 2020 survey to the 2021 survey. On average, scores on the WEMWBS decreased by 2.0 points for men and 2.4 points for women, from the 2020 survey to the 2021 survey. Whilst it appears the reduction in wellbeing may have been slightly larger for women compared to men, this effect was not statistically significant.

Age

We found that age did influence change in wellbeing over time $F(1, 23387) = 4.24, p < .001, \eta p^2 = .001$. Follow up tests revealed that younger age groups showed a more pronounced decline in wellbeing from the 2020 survey to the 2021 survey (see Table S1 in supplementary materials & Figure 2 below). For the youngest age group (16-24), WEMWBS scores reduced by 3.5 points on average from the 2020 survey to the 2021 survey, whereas for the older group (75+) WEMWBS scores only reduced by 0.3 points.

Figure 2. Mean scores for each age group on the WEMWBS (wellbeing) for the 2020 sample and the 2021 sample.



Socioeconomic Deprivation

There was no difference in the change in wellbeing over time between the five deprivation groups. All of the different deprivation groups experienced a similar decrease in wellbeing from the 2020 survey to the 2021 survey. On average, scores on the WEMWBS reduced by 2.8 points for the most deprived group and 2.1 for the least deprived group, from the 2020 survey to the 2021 survey. Whilst it appears the reduction in wellbeing may have been slightly larger for the most deprived group, this effect was not statistically significant.

Conclusion: Levels of wellbeing have reduced significantly from the 2020 survey to the 2021 survey. This reduction in wellbeing was steeper for younger individuals relative to older individuals. The drop in wellbeing was the same across genders and across different socioeconomic deprivation groups.

Health Board

Table S3 (supplementary materials) shows the average wellbeing scores for each of the seven Health Boards across Wales in both the 2020 and 2021 survey. Most Health Boards experienced a significant decline in population wellbeing from the 2020 to 2021 survey. Betsi Cadwaladr University Health Board and Powys Teaching Health Board were the only exceptions to this, with no statistically significant reduction in population wellbeing occurring between the 2020 and 2021 surveys. Aneurin Bevan University Health Board (decrease of 4.2 points) and Cardiff & Vale University Health Board (decrease of 3.5 points) experienced the largest decline in population wellbeing from the 2020 to the 2021 survey. During the 2021 survey, the highest levels of wellbeing were observed in Powys Teaching Health Board³ (44.6) and Hywel Dda Health Board (43.3) and the lowest levels of wellbeing were observed in Aneurin Bevan University Health Board (41.1) and Cardiff & Vale University Health Board (41.9).

³ Only 251 participants from Powys took part in the survey. This is quite a small number and therefore we are less confident that this number accurately captures population wellbeing in Powys.

Conclusion: Most Health Boards and Local Authorities experienced a decrease in population wellbeing. Aneurin Bevan University Health Board and Cardiff & Vale University Health Board experienced the sharpest decline in population wellbeing and Betsi Cadwaladr University Health Board and Powys Teaching Health Board were the only Health Boards to have no significant decline in population wellbeing.

Local Authority

An examination of the wellbeing within each of the 22 Local Authorities within Wales shows that the mental health of certain areas within Wales were more affected than others during the COVID-19 pandemic. Data from the 22 Local Authorities are listed in Table S4 (supplementary materials). It shows that most Local Authorities experienced a significant reduction in population wellbeing, with Caerphilly (-4.5 points), Monmouthshire (-4.5 points), Torfaen (-4.5 points), Bridgend (-3.9 points), Newport (-3.7 points), Cardiff (-3.6 points), Vale of Glamorgan (-3.4 points) and Ceredigion (-3.3 points) experiencing the sharpest decline in population wellbeing.

The only Local Authorities that saw an improvement in population wellbeing was Anglesey (+1.6 points), Gwynedd (+1.4 points) and Pembrokeshire (+0.2 points), though these improvements were not statistically significant. Conwy showed no change in population wellbeing from the 2020 survey to the 2021 survey. During the 2021 survey, the highest levels of wellbeing were observed in Pembrokeshire (44.7), Powys (44.6), Gwynedd, Carmarthenshire and Anglesey (all 43.8). The lowest levels of population wellbeing were observed in Caerphilly (40.3), Blaenau Gwent (40.5) and Newport (40.8). When analysing these findings, it is important to acknowledge that the number of participants within some of the Local Authorities were quite small and therefore the results must be interpreted with some degree of caution.

Conclusion: Caerphilly, Monmouthshire, and Torfaen were the Local Authorities to experience the sharpest decline in population wellbeing. The only Local Authorities not to experience a decline in population wellbeing were Anglesey, Gwynedd, Pembrokeshire, and Conwy.

Comparison of the 2020 and 2021 surveys: Psychological Distress

The K10 was included in this study because of its well-established ability to categorise people in terms of clinically significant levels of mental distress. The K10 can be used to classify people as “psychologically well (0-19)”, “mild mental distress (20-24)”, “moderate mental distress (25-29)”, and “severe mental distress (30+)”. For the purposes of analysing levels of distress in the population, we used the cut-off of 25 or more to define people who had a “moderate or severe level of mental distress”. Past research has demonstrated that individuals scoring above 25 on the K10 have a 69.4% chance of meeting the criteria for a DSM-IV mental disorder in the past year (Andrews & Slade, 2001).

Overall, 40.4% of the sample were suffering from moderate to severe distress in the 2021 sample, compared to 36.8% in the 2020 sample, an increase of 3.6 percentage points representing a 9.8% increase in prevalence. This was statistically significant, $\chi^2(1) = 30.53, p < .001$, Nagelkerke $R^2 = .002$. $\beta = 0.15$, $SE = 0.03$, $Wald = 30.5, p < .001$, $Exp(B) = 1.16$.

To understand if this increase in rates of psychological distress was influenced by gender, age or socioeconomic deprivation, a series of logistic regressions examined which demographic factors influenced increases in rates of psychological distress. Table S2 (supplementary materials) displays the rates of moderate to severe psychological distress for each demographic group during the 2020 and the 2021 survey.

Gender

In terms of *change* in psychological distress from the 2020 to the 2021 survey, there were no differences between men and women. Rates of moderate to severe psychological distress increased equally for both genders from the 2020 to the 2021 survey.

Age

Our analysis showed that age influenced the increase in rates of psychological distress from the 2020 to the 2021 survey, $\beta = -0.04$, $SE = 0.01$, $Wald = 6.15, p < .05$, $Exp(B) = 1.04$. Our analysis showed that the younger age groups showed a larger increase in psychological distress compared to the older groups. Indeed, in the 2020 sample, an individual aged 16-24 was 6.7 times more likely to experience moderate to severe psychological distress compared

to an individual aged 75 or older, but this has risen to 10 times more likely in the 2021 sample (see Table S2 in supplementary materials).

Socioeconomic deprivation

In terms of *change* in psychological distress from the 2020 to the 2021 survey, there were no differences between the five deprivation groups, with the rates of moderate to severe psychological distress increasing equally for all groups.

Conclusion: Rates of moderate to severe psychological distress have risen significantly from the 2020 survey to the 2021 survey. This increase in psychological distress was larger for younger individuals relative to older individuals. The increase in rates of psychological distress was the same across genders and across different socioeconomic deprivation groups.

Health Board

Table S5 (supplementary materials) shows the proportion of participants experiencing moderate to severe psychological distress for each of the seven Health Boards across Wales in both the 2020 and 2021 survey.

Most Health Boards experienced some degree of increase in population psychological distress from the 2020 to 2021 survey. The only exceptions to this were Betsi Cadwaladr University Health Board and Swansea Bay University Health Board, who saw decreases in the rates of moderate to severe psychological distress of 13.0% and 4.7% respectively. The largest increases in rates of moderate to severe psychological distress were seen in Aneurin Bevan University Health Board (29.9% increase) and in Cardiff & Vale University Health Board (27.0% increase). Increases in rates of psychological distress were also observed in Cwm Taf Morgannwg Health Board (15.3% increase), Powys Teaching Health Board (1.9% increase) and Hywel Dda Health Board (2.0% increase).

During the 2021 survey, the highest rates of moderate to severe psychological distress were observed in Aneurin Bevan University Health Board (44.7%) and Cardiff & Vale University Health Board (26.6%), and the lowest rates of distress were found in Powys Teaching Health

Board³ (32.1%), Hywel Dda Health Board (36.1%) and Swansea Bay University Health Board (36.3%).

Conclusion: Most Health Boards experienced an increase in rates of moderate to severe psychological distress. Aneurin Bevan University Health Board and Cardiff & Vale University Health Board experienced the sharpest increase in population psychological distress and Betsi Cadwaladr University Health Board and Swansea Bay University Health Board were the only Health Boards to observe a decrease in rates of psychological distress.

Local Authority

An examination of the rates of psychological distress within each of the 22 Local Authorities within Wales, shows that the mental health of certain areas within Wales were more affected than others during the COVID-19 pandemic. Data from the 22 Local Authorities are listed in Table S6 (supplementary materials). It shows that Monmouthshire, Cardiff, Ceredigion, Caerphilly, Newport, Torfaen and the Vale of Glamorgan all experienced significant increases in rates of psychological distress from the 2020 to the 2021 survey. Pembrokeshire, Gwynedd and Anglesey were the only Local Authorities to observe a significant decline in rates of psychological distress from the 2020 to the 2021 survey.

During the 2021 survey, the highest rates of psychological distress were observed in Blaenau Gwent (49.1%), Caerphilly (48.2%), Torfaen (46.8%), Ceredigion (46.2%) and Newport (44.8%). The lowest rates of psychological distress were observed in Carmarthenshire (33.7%), Monmouthshire (34.9%), Gwynedd (36.1%), Anglesey (36.2%) and Conwy (36.3%). When analysing these findings, it is important to acknowledge that the number of participants within some of the Local Authorities were quite small and therefore the results must be interpreted with some degree of caution.

³ Only 251 participants from Powys took part in the survey. This is quite a small number and therefore we are less confident that this number accurately captures population psychological distress in Powys.

Conclusion: Monmouthshire, Torfaen, the Vale of Glamorgan and Ceredigion were the Local Authorities to experience the sharpest increase in rates of clinically significant psychological distress from the 2020 to the 2021 survey. Pembrokeshire, Gwynedd and Anglesey were the only Local Authorities to observe a significant decline in rates of psychological distress from the 2020 to the 2021 survey.

Factors increasing psychological distress

In our previous Wales Wellbeing report (O'Connor et al., 2020), we described how factors such as living alone, experiencing mental health difficulties, being a key worker, experiencing COVID-19 symptoms and having financial problems influenced the likelihood of someone experiencing moderate to severe psychological distress. Please refer to our previous report ([O'Connor et al., 2020](#)) to read about the factors that increased psychological distress within our 2020 sample.

The analysis below refers to the 2021 sample only. We wanted to understand how factors such as living alone, having previous mental health difficulties, being a key worker, COVID-19 symptoms, financial problems, being made redundant, food insecurity, bereavement, home-schooling a child, social isolation, being unable to stay in contact with loved ones, relationship problems, domestic abuse having to cancel important upcoming events, increased difficulties in caring for someone and being unable to access necessary healthcare, influenced the likelihood of someone experiencing moderate to severe psychological distress in the 2021 sample.

To examine whether the presence of each of these risk factors increased the chances of an individual experiencing moderate to severe psychological distress, we calculated odds ratio(s) for each risk factor (see Table 2 below). An odds ratio of 1 means there was no difference between the groups, and hence the exposure to that factor had no effect on the likelihood of experiencing moderate to severe psychological distress. An odds ratio of 1.30 can be seen as a 30% increase in the odds of being mentally distressed due to this exposure, whilst an odds ratio of 2 means there was a 100% increase in the odds of an individual experiencing moderate to severe psychological distress given exposure to that factor (essentially doubling of the odds of experiencing distress). When we calculated the odds ratios, we also factored in

other key predictors. For each odds ratio calculated, we adjusted them to account for the effects of age, gender, and deprivation index. These adjusted odds ratios can be seen as the effect of exposure to each risk factor, after considering the influence of the other covariates (age, gender, and deprivation).

Along with the adjusted odds ratios, we also present the 95% confidence interval. When we calculate the odds ratio for each risk factor, we are making an ‘estimate’ based on the data we collected, and there is always a degree of error involved in this process. The 95% confidence interval represents the range in which we are 95% sure the ‘true value’ lies. For example, if the odds ratio for the risk factor of ‘experiencing financial problems’ was 3.0 with a 95% confidence interval of 2.6 – 3.4, this would mean that we are 95% sure that the ‘true value’ for the odds ratio lies between 2.6 and 3.4.

Table 2. Odds ratios for each risk factor in the 2021 survey.

Risk Factor	N exposed to risk factor (Out of 10428)	Adjusted Odds Ratio (95% CI)
Food insecurity	353	3.7 (2.7 – 4.9)**
Domestic abuse	212	3.4 (2.3 – 5.0)**
History of mental health difficulties	3129	3.2 (2.9 - 3.6)**
Social isolation	3796	2.8 (2.5 – 3.1)**
Relationship problems	2035	2.6 (2.3 – 2.9)**
Financial problems	1593	2.3 (2.0 – 2.7)**

Difficulty Accessing Necessary Healthcare	1645	2.3 (2.0 – 2.6)**
Increased Caring Difficulties	1460	1.9 (1.7 – 2.2)**
Major COVID-19 symptoms	382	1.7 (1.3 – 2.2)**
Being Unable to Stay in Contact with Loved Ones	5706	1.6 (1.4 – 1.8)**
Living alone	1524	1.3 (1.1 - 1.5)**
Bereavement	2398	1.2 (1.1 – 1.4)**
Redundancy	232	1.2 (0.9 – 1.7)
Cancellation of important upcoming events	3600	1.0 (0.9 – 1.1)
Responsibility for home-schooling a child	2853	1.0 (0.9 – 1.1)
Key worker status	4330	0.9 (0.9 - 1.0)*

** $p < .01$, * $p < .05$

Conclusion: Most of the risk factors explored here significantly increased the chances of someone experiencing moderate to severe psychological distress. Of all the factors we explored, food insecurity, prior history of mental health difficulties, domestic abuse, relationship problems, social isolation, financial problems and difficulty accessing necessary healthcare were the most highly associated with psychological distress.

Protective factors

This analysis aims to look at the factors that protect against the negative impact of the pandemic. To examine the extent to which each protective factor ‘protected’ against poor wellbeing, we conducted a series of correlations that looked at the relationship between wellbeing scores and scores on each of the protective factors (hope, resilience, stress immunity, social connectedness and reality acceptance). If the factor protected against poor wellbeing, we would hope to see a positive relationship between the protective factors and wellbeing.

To examine the extent to which each protective factor ‘protected’ against the development of moderate to severe psychological distress, we split participants into two groups based on their score on each protective factor. For example, when we examined the protective factor of hope, participants who reported high hope were put into the ‘high hope’ group and participants who reported low hope were put in the ‘low hope’ group. We then examined whether the ‘low hope’ group had more of a chance at experiencing moderate to severe psychological distress compared to the ‘high hope’ group. We then calculated the odds ratios for this (described previously). This analysis was completed for each protective factor. Table 3 below describes how each protective factor was related to participant’s wellbeing along with the degree to which that protective factor protected individuals from experiencing psychological distress.

Table 3. Protective factors relationships with wellbeing and psychological distress in the 2021 survey.

Protective Factor	Relationship with Wellbeing (Correlation Coefficient: <i>r</i>)	Adjusted Odds Ratio for Psychological Distress (95% CI)	What it Means
Hope	.61*	7.8 (7.0 – 8.9)*	The more hope someone had, the higher their wellbeing. People with low levels of hope were 7.8 times more likely to experience moderate to severe psychological distress.
Resilience	.56*	4.8 (4.3 – 5.3)*	The more resilience someone had, the higher their wellbeing. People with low levels of resilience were 4.8 times more likely to experience moderate to severe psychological distress.
Stress immunity	.42*	2.7 (2.4 – 3.0)*	The higher a person’s stress immunity, the higher their wellbeing. People with low levels of stress immunity were 2.7 times more likely to experience moderate to severe psychological distress.
Social connectedness	.58*	5.7 (5.1 – 6.4)*	The more social connectedness someone had, the higher their wellbeing. People with low levels of social connectedness were 5.7 times more likely to experience moderate to severe psychological distress.
Reality acceptance	.37*	2.2 (2.0 – 2.5)*	The more accepting of reality someone was, the higher their wellbeing. People with low levels of reality acceptance

			were 2.2 times more likely to experience moderate to severe psychological distress.
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* $p < .01$

Conclusion: All protective factors were positively correlated with wellbeing levels and were linked to smaller rates of psychological distress. Levels of hope, resilience and social connectedness appeared to be the most powerful factors for maintaining good mental health and wellbeing during the COVID-19 pandemic.

Summary and Conclusions

General summary

The major findings from this survey are that the Welsh population has experienced a further reduction in mental wellbeing from the first survey (June-July 2020) to the second survey (January-March 2021). This is on top of the large decline in population that was observed between pre-pandemic levels and the first lockdown period (Gray et al., 2020). Rates of clinically significant psychological distress were found in 40.4% of the 2021 sample representing a 9.8% increase in prevalence from the first survey. Overall, population wellbeing was lower, and rates of clinically significant psychological distress were higher in the 2021 sample compared to the 2020 sample.

Population mental health and wellbeing

In the 2021 survey, the mental wellbeing of the population was 2.4 points lower than the 2020 survey. This is on top of the 6.6 reduction in population wellbeing that was observed between pre-pandemic wellbeing levels and the 2020 survey. When viewed altogether, this displays a pattern of continually declining population wellbeing as lockdown restrictions persist. As found in the first survey, wellbeing continues to be lower in women, young adults and individuals living in deprived areas. When examining the change in wellbeing over time,

we found that the decline in wellbeing was steeper for the younger age groups compared to the older age groups. In terms of wellbeing by region, the largest decline in wellbeing from 2020 to 2021 was observed in Aneurin Bevan University Health Board and Cardiff & Vale University Health Board.

The findings relating to psychological distress tell a similar story. In the 2021 survey, rates of clinically significant psychological distress had increased by 9.8% compared to the 2020 survey, with 40.4% of the population experiencing clinically significant psychological distress. This suggests that rates of mental health difficulties in the populations have increased between the 2020 survey (June-July 2020) and the 2021 survey (January-March). Rates of psychological distress were higher for women, younger people and those from deprived areas and the increase in rates of psychological distress was much steeper for the younger age groups relative to the older age groups, with 66.3% of younger individuals (16-24) experiencing psychological distress in the 2021 survey compared to 16.4% in the oldest age group (75+).

Alongside this survey, other groups across the UK have also conducted research into the mental health of UK populations over the course of the pandemic. Research immediately after the onset of the pandemic showed a sharp, immediate decline in population mental health (Pierce et al., 2020; Gray et al., 2020). Research in the months after the onset of the pandemic, but prior to the second lockdown period, suggested that the mental health of the UK population was improving and recovering (Fancourt et al., 2020; Pierce et al., 2021). Our research adds to this picture and suggests that, whilst population mental health was recovering prior to the second set of lockdown restrictions, population mental health and wellbeing has decreased following the second surge in COVID-19 cases, increased number of deaths, and associated lockdown restrictions. These findings are also corroborated by recent research from Public Health Wales (2021) who reported that the number of adults worried about their mental health increased and the proportion of adults feeling happy in Wales decreased during the second period of lockdown restrictions in January 2021. This trajectory of mental health and wellbeing aligns with the disaster recover model outlined by DeWolfe (2000) in the sense that recovery from disasters is not a straightforward linear process and can take many years.

Recommendation: These findings indicate that the wellbeing of the Welsh population has decreased from the first to the second lockdown period. The rates of psychological distress in the 2021 sample relative to the 2020 sample, suggests there will be an increase in the number of people in the population experiencing mental health difficulties. Policy makers and those responsible for the planning and delivery of mental health and wellbeing support should anticipate a rise in the number of individuals in need of new, or additional, support for their mental health. Special consideration should be given towards the growing number of young people experiencing clinically significant levels of psychological distress.

Geographical influences on wellbeing and psychological distress

We also examined the levels of wellbeing and psychological distress within each of the seven Health Boards across Wales in both the 2020 and 2021 survey. We found that the majority of Health Boards experienced a decrease in population wellbeing, with Aneurin Bevan University Health Board and Cardiff & Vale University Health Board experiencing the sharpest decline in population wellbeing. Betsi Cadwaladr University Health Board and Powys Teaching Health Board were the only Health Boards to have no significant decline in population wellbeing levels. With regards to psychological distress, our findings showed that most Health Boards experienced an increase in rates of psychological distress. We found that Aneurin Bevan University Health Board and Cardiff & Vale University Health Board experienced the sharpest increase in population psychological distress. Betsi Cadwaladr University Health Board and Swansea Bay University Health Board were the only Health Boards to observe a decrease in rates of psychological distress.

The finding that predominantly urban geographic areas such as Aneurin Bevan University Health Board and Cardiff & Vale University Health Board experienced a decline in population mental health and wellbeing, whilst more rural geographic areas such as Betsi Cadwaladr University Health Board and Powys Teaching Health Board saw no decline or a slight increase in mental health and wellbeing, may suggest that the local environment has an important impact on population wellbeing. It is possible that individuals living in more rural areas have increased access to environments (beaches, mountains, countryside) and activities that are more beneficial for wellbeing.

The variation in population wellbeing in each of the seven Welsh Health Boards across both the 2020 and 2021 survey demonstrated that the COVID-19 pandemic has not impacted all regions of Wales in the same manner. This emphasises the importance of continuing to monitor the impact of COVID-19 on different geographic areas within Wales. An in depth understanding of the mental health and wellbeing in each of the seven Welsh Health Boards can help facilitate the development of population interventions and support structures that target the specific needs of each population. Future research must continue to monitor the mental health and wellbeing across the different regions within Wales, and COVID-19 recovery plans must take a community-specific approach.

Recommendation: Whilst most regions within Wales have experienced a decline in population mental health and wellbeing, there is a lot of variation in the mental health and wellbeing of different regions within Wales. We recommend that organisations with responsibility for supporting the wellbeing of the population throughout the pandemic engage in conversations with the different communities across Wales, along with the groups and agencies who support those communities, and co-design recovery plans that target the specific needs identified within each community.

Factors driving psychological distress

In the 2021 survey, we looked at whether specific aspects of the COVID-19 pandemic increased the chances of an individual experiencing clinically significant psychological distress. We found that prior history of mental health difficulties, being a key worker, experiencing COVID-19 symptoms, financial problems, redundancy, food insecurity, bereavement, home-schooling, social isolation, being unable to stay in close contact with loved ones, relationship problems, domestic abuse, increased caring difficulties, cancelling important events and difficulties accessing necessary healthcare were all linked with an increased risk of experiencing clinically significant psychological distress. Amongst these factors, we found that food insecurity (OR = 3.7), domestic abuse (OR = 3.4), prior history of mental health difficulties (OR = 3.2), relationship problems (OR = 2.6), social isolation (OR = 2.8), financial problems (OR = 2.3) and difficulty accessing necessary healthcare (OR = 2.3) were the factors most highly associated with rates of psychological distress.

Recommendation: Careful consideration should be given to both (1) how we can prevent exposure to the stressors listed above as the COVID-19 pandemic continues, as well as (2) how we can provide additional support to individuals experiencing these difficulties.

Protective factors

Our research into protective factors examined how factors like hope, resilience, social connectedness, stress immunity and reality acceptance could protect individuals from poor wellbeing or psychological distress during the COVID-19 pandemic. Our findings showed that all of these protective factors were linked to improved wellbeing levels and lower rates of psychological distress. Of particular note, levels of hope, social connectedness, and resilience were especially associated with improved mental health and wellbeing.

Recommendation: Individuals with high levels of hope, resilience and feelings of social connectedness were much less likely to experience mental health and wellbeing difficulties. Policy makers and those responsible for the planning and delivery of mental health and wellbeing support should consider ways in which we can instill hope, build resilience, and keep individuals socially connected in order to protect our communities from the negative psychological effects from the pandemic.

Limitations

It is important that this research is considered in light of its limitations. Firstly, as the 2020 survey took place in the summer months and the 2021 survey took place in winter/spring months, there is a chance that seasonality could explain some of the observed reduction in mental wellbeing. Whilst previous research has indicated that seasonality affects mood, with rates of depression slightly higher in winter relative to summer (Harmatz et al., 2000), other studies have found no effect of seasonality on mood (Winthorst et al., 2020). To investigate the possible effect of seasonality on our results, we examined the database for a very similar sample (ONS, 2019) taken during 2019. There was a small, decrease of around 0.5 wellbeing points (50.9 to 51.4) from January-February to June-July on the WEMWBS scores, which is

roughly a quarter of the difference (of 2.4 points) found in the present study. Hence, it is unlikely that seasonality effects could fully explain the magnitude of the present findings.

Secondly, due to the methods used in this study, it is that it is likely that some members of the community, such as people with a significant learning disability or individuals with significant dementia, would have found it very difficult to participate. We were also unable to recruit participants under the age of 16 due to ethical considerations. We recommend, therefore, that further research is undertaken to explore the impact of the ongoing COVID-19 pandemic on the mental health within these populations.

Thirdly, participants in both waves of the study were recruited using online convenience sampling methods. Whilst this method facilitated the recruitment of many participants, this sampling method often attracts volunteers who are already engaged with and interested in the topic and excludes those with difficulty accessing the internet, which means that the sample cannot be considered to be fully representative of the Welsh population (Pierce et al., 2020). Relative to the demographics of the population of Wales (ONS, 2011) the current sample underrepresented men, young individuals (aged 16-24) and older individuals (aged 75+). However, these characteristics were present in both the 2020 and 2021 samples. Thus, the findings of a further decline (and the moderating effects of age) in mental wellbeing alongside an increase in psychological distress, cannot be attributed to the sampling method.

Conclusion

The present data indicate there has been a further reduction in the mental health and wellbeing of the Welsh population during the second national lockdown as compared to the first, with younger age groups continuing to be more adversely affected by the COVID-19 pandemic. The overall picture aligns with the disaster recovery model proposed by DeWolfe (2000) in the sense that recovery from such disasters is not a straightforward linear process and can take many years. Our findings also demonstrated that food insecurity, domestic abuse, prior history of mental health problems, social isolation, financial problems, and difficulties accessing necessary healthcare were the factors most strongly associated with psychological distress. Our analysis of protective factors found that hope, resilience, and

social connectedness were the most important factors in protecting against poor wellbeing and psychological distress during the pandemic.

Continual monitoring of population wellbeing and psychological distress levels, alongside investigations into the causes of poor mental wellbeing is required to inform the development of effective interventions and recovery strategies. Individuals responsible for the planning and delivery of mental health and wellbeing support will need to prepare for an increased number of individuals in need of new, or additional, support for their mental health. Special consideration should also be given to (1) how younger adults can be supported, (2) how we can prevent exposure to the factors driving psychological distress and provide support to individuals experiencing these difficulties and, (3) how we can instill hope, build resilience, and keep individuals socially connected over the course of the COVID-19 pandemic and beyond.

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Supplementary Materials

Table S1. Mean scores on the WEMWBS (wellbeing measure) for the 2020 and 2021 samples.

Sample		2020 Sample [95% CI]	2021 Sample [95% CI]	Decrease from 2020 to 2021 sample
All		44.6 [44.4 – 44.8]	42.2 [42.0 – 42.4]	2.4 *
Gender	Male	46.0 [45.5 – 46.4]	44.0 [43.4 – 44.6]	2.0 *
	Female	44.2 [44.0 – 44.4]	41.9 [41.6 – 42.1]	2.4 *
Age	16-24	41.3 [40.6 – 42.0]	37.8 [37.0 – 38.6]	3.5 *
	25-34	41.4 [41.0 – 41.8]	38.3 [37.8 – 38.8]	3.1 *
	35-44	43.2 [42.9 – 43.6]	40.2 [39.8 – 40.6]	3.0 *
	45-54	44.9 [44.6 – 45.3]	42.1 [41.8 – 42.5]	2.8 *
	55-64	45.7 [45.3 – 46.1]	43.6 [43.2 – 44.0]	2.1 *
	65-74	48.6 [48.1 – 49.1]	46.9 [46.3 – 47.5]	1.7*
	75+	49.9	49.6	0.3

		[49.0– 50.9]	[48.4 – 50.8]	
WIMD Rank	1 (most deprived)	43.5 [43.0 – 43.9]	40.7 [40.2 – 41.2]	2.8 *
	2	44.7 [44.2 – 45.1]	42.5 [42.0 – 43.0]	2.2 *
	3	45.2 [44.8 – 45.7]	43.4 [42.9 – 43.9]	1.8 *
	4	45.4 [45.0 – 45.9]	43.3 [42.8 – 43.8]	2.1 *
	5 (least deprived)	46.3 [45.9 – 46.7]	44.2 [43.7 – 44.7]	2.1 *

* $p < .01$

Table S2. Prevalence of low to mild psychological distress (K10 ≤ 24) and moderate to severe psychological distress (K10 ≥ 25) in the 2020 and 2021 samples.

		2020 Sample			2021 Sample		
		K10 ≤ 24 (%)	K10 ≥ 25 (%)	Odds ratio	K10 ≤ 24 (%)	K10 ≥ 25 (%)	Odds ratio
Overall Sample		63.2	36.8	-	59.6	40.4	-
Gender	Male	70.1	29.9	1.00	65.2	34.8	1.00
	Female	61.5	38.5	1.47	58.5	41.5	1.33
Age	16-24	43.1	56.9	6.67	33.7	66.3	10.00
	25-34	47.8	52.2	5.52	42.8	57.2	6.76
	35-44	59.9	40.1	3.38	53.9	46.1	4.33
	45-54	66.1	33.9	2.59	59.9	40.1	3.38
	55-64	68.0	32.0	2.38	67.4	32.6	2.44
	65-74	78.2	21.8	1.41	75.5	24.5	1.64
	75+	83.6	16.4	1.00	83.3	16.7	1.00

WIMD	1 (most deprived)	59.2	40.8	1.63	52.0	48.0	2.18
	2	64.2	35.8	1.32	60.1	39.9	1.56
	3	64.4	35.6	1.30	64.4	35.6	1.30
	4	65.2	34.8	1.25	65.8	34.2	1.22
	5 (least deprived)	72.1	27.9	1.00	67.8	32.2	1.00

Table S3. Average WEMWBS scores for each of the Health Boards across the 2020 and 2021 surveys.

Health Board	Number of Participants	Average WEMWBS 2020	Average WEMWBS 2021	Decrease from 2020 to 2021
Aneurin Bevan University Health Board	2020: 2439 2021: 3526	45.3 [44.9 – 45.6]	41.1 [40.8 – 41.5]	-4.2*
Betsi Cadwaladr University Health Board	2020: 2455 2021: 1833	42.9 [42.5 – 43.3]	42.8 [42.3 – 43.3]	-0.1
Cardiff & Vale University Health Board	2020: 1601 2021: 1201	45.4 [45.0 – 45.9]	41.9 [41.3 – 42.5]	-3.5*
Cwm Taf Morgannwg Health Board	2020: 905 2021: 781	45.1 [44.4 – 45.7]	42.5 [41.8 – 43.2]	-2.6*
Hywel Dda Health Board	2020: 2921 2021: 1533	44.8 [44.5 – 45.2]	43.3 [42.7 – 43.8]	-1.5*

Powys Teaching Health Board	2020: 308	45.7	44.6	-1.1
	2021: 251	[44.7 – 46.8]	[43.3 – 45.9]	
Swansea Bay University Health Board	2020: 1871	44.3	42.9	-1.4*
	2021: 1206	[43.8 – 44.7]	[42.3 – 43.4]	

$p < .01$

Table S4. Wellbeing in each of the 22 Welsh Local Authorities in the 2020 and 2021 survey

Local Authority	2020 Survey		2021 Survey		Change from 2020 to 2021
	N	Wellbeing Score	N	Wellbeing Score	
Anglesey	305	42.2	315	43.8	Increase of 1.6
Blaenau Gwent	301	42.5	397	40.5	Decrease of 2.0**
Bridgend	308	46.5	286	42.6	Decrease of 3.9**
Caerphilly	544	44.8	909	40.3	Decrease of 4.5**
Cardiff	1189	45.0	869	41.4	Decrease of 3.6**
Carmarthenshire	1352	45.2	736	43.8	Decrease of 1.4**
Ceredigion	597	44.5	441	41.2	Decrease of 3.3**
Conwy	492	43.4	346	43.4	No change
Denbighshire	439	43.7	359	42.3	Decrease of 1.4
Flintshire	404	43.1	309	41.4	Decrease of 1.7*

Gwynedd	489	42.4	324	43.8	Increase of 1.4
Merthyr Tydfil	268	44.8	176	43.2	Decrease of 1.6
Monmouthshire	504	47.7	683	43.2	Decrease of 4.5**
Neath Port Talbot	498	42.8	324	41.8	Decrease of 1.0
Newport	489	44.5	770	40.8	Decrease of 3.7**
Pembrokeshire	972	44.5	356	44.7	Increase of 0.2
Powys	308	45.7	251	44.6	Decrease of 1.1
Rhondda Cynon Taf	637	45.2	605	42.3	Decrease of 2.9**
Swansea	1065	44.3	644	43.5	Decrease of 0.8
Torfaen	601	45.6	767	41.1	Decrease of 4.5**
Vale of Glamorgan	412	46.6	332	43.2	Decrease of 3.4**
Wrexham	326	42.1	180	41.4	Decrease of 0.7

** $p < .01$, * $p < .05$

Table S5. Percentage of participants experiencing moderate to severe psychological distress for each of the seven Health Boards across both the 2020 and 2021 survey.

Health Board	Number of Participants	Percentage experiencing moderate to severe psychological distress		Percent increase/decrease
		2020 Survey	2021 Survey	
Aneurin Bevan University Health Board	2020: 2470 2021: 3486	34.4%	44.7%	29.9% increase in prevalence*
Betsi Cadwaladr University Health Board	2020: 2464 2021: 1817	44.2%	39.1%	13.0% decrease in prevalence*
Cardiff & Vale University Health Board	2020: 1625 2021: 1187	32.6%	41.4%	27.0% increase in prevalence*

Cwm Taf Morgannwg Health Board	2020: 903 2021: 777	33.9%	39.1%	15.3% increase in prevalence*
Hywel Dda Health Board	2020: 2937 2021: 1523	35.4%	36.1%	2.0% increase in prevalence*
Powys Teaching Health Board	2020: 312 2021: 249	31.5%	32.1%	1.9% increase in prevalence*
Swansea Bay University Health Board	2020: 1881 2021: 1194	38.0%	36.3%	4.7% decrease in prevalence*

* $p < .01$

Table S6. Rates of psychological distress in each of the 22 Welsh Local Authorities in the 2020 and 2021 survey.

Local Authority	2020 Survey		2021 Survey		Change from 2020 to 2021
	N	% Psychological Distress	N	% Psychological Distress	
Anglesey	298	46.6	312	36.2	28.8% decrease in prevalence**
Blaenau Gwent	307	43.0	391	49.1	14.2% increase in prevalence
Bridgend	300	31.0	282	36.5	17.7% increase in prevalence
Caerphilly	539	37.8	901	48.4	28.0% increase in prevalence**

Cardiff	1174	34.6	856	42.8	23.7% increase in prevalence**
Carmarthenshire	1331	35.1	733	33.7	4.2% decrease in prevalence
Ceredigion	597	34.7	437	46.2	33.1% increase in prevalence**
Conwy	487	40.5	344	36.3	11.2% decrease in prevalence
Denbighshire	434	43.5	358	41.3	5.3% decrease in prevalence
Flintshire	402	38.3	307	44.0	14.9% increase in prevalence

Gwynedd	475	48.0	319	36.1	33.0% decrease in prevalence**
Merthyr Tydfil	262	33.2	176	39.8	19.9% increase in prevalence
Monmouthshire	495	23.4	674	34.9	49.1% increase in prevalence**
Neath Port Talbot	489	44.6	320	39.4	13.2% decrease in prevalence
Newport	477	38.6	763	44.8	16.1% increase in prevalence*
Pembrokeshire	959	36.4	353	28.6	27.3% decrease in prevalence**

Powys	308	31.8	249	32.1	0.9% increase in prevalence
Rhondda Cynon Taf	626	34.7	601	38.9	12.1% increase in prevalence
Swansea	1057	36.7	639	34.7	5.8% decrease in prevalence
Torfaen	597	32.0	757	46.8	46.3% increase in prevalence**
Vale of Glamorgan	414	26.8	331	37.8	41.0% increase in prevalence**
Wrexham	324	50.6	177	41.8	21.1% decrease in prevalence

** $p < .01$, * $p < .05$