



TRACKERR STUDY

Twins Research Australia COVID-19 Knowledge,
Experience, Reaction and Resilience study

Brief Report 1: Wave 1 Adult Twin Survey

15 April – 12 May 2020

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Acknowledgements

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Executive summary

The COVID-19 pandemic has changed societies globally. However, its potential short-, medium- and long-term consequences are still to be investigated and understood. Family, social and work relationships have all been severely impacted by the social distancing restrictions imposed as a response to the pandemic. Each of us has our own way of understanding, experiencing, reacting and coping with the challenges imposed by this new reality.

Twins Research Australia (TRA), a nationwide registry of twins and triplets and their families, has developed the Twins Research Australia COVID-19 Knowledge, Experience, Reaction & Resilience (TRACKERR) study. It aims to capture a holistic view of how Australians are dealing with the COVID-19 pandemic by collecting data on physical, mental, and social health. This information will shed light on differences between individuals and families, such as those influenced by age, gender, and the quality of close relationships, through the experiences of twins and triplets. The research will thus provide evidence directly applicable to the population as a whole.

We found that, at 3 to 6 weeks after social distancing restrictions were introduced:

- the quality of close relationships, as exemplified by those between twins and triplets, appears to be linked to mental resilience and having a more optimistic outlook for one's own future
- reactions to the pandemic differ by age; older participants were less anxious and depressed
- women's mental health in particular was more severely impacted by the pandemic
- reports about feeling threatened and experiencing abuse or assault indicate that there are additional challenges related to abusive partners and/or family members
- younger females appeared to be especially concerned about their future.

This report is the first in a series that will feature the most relevant results from TRACKERR.

In this first issue, we report results from the analysis of **3,526** twins and triplets who participated in our survey from **15 April to 12 May**, starting three weeks after the social distancing restrictions were introduced, and finishing one day before the first guidelines for the relaxation of the social distancing restrictions were released by the Australian Government.

We used a mix of descriptive statistics with some more sophisticated modelling of twin and family data to present evidence that will help shape the understanding of the shorter-term impacts of COVID-19. Studying twin pairs, triplets and their families allows researchers to go a step further in understanding the predictors of improved physical and mental health outcomes because they can shed light on the familial causes of those predictors, as well as control for familial factors.

We also made extensive use of participants' open-text responses to illustrate our findings and provide a personal outlook on their experiences.

While this report presents only a broad view of the issues, it helps guide future research and decision-making related to public health and prevention. We will continue to collect longitudinal data from twins, triplets and their families to capture the medium- and long-term impacts of COVID-19. The next report will deal with specific challenges for parents of twins and triplets and issues related to remote learning and home environment during the pandemic.

We are extremely grateful to all the twins and triplets who contributed their time and insights to our research.

Some specific key findings

- One in four participants reported a change in income, the same for women and men, while one in six reported a change in mental health.
- Women reported that their mental health had been more severely impacted by the COVID-19 pandemic than did men.
- There were some reports of participants having been threatened and experiencing abuse or assault.
- Older participants were less worried about contracting COVID-19 than younger participants but were more worried about dying from it.
- Older participants were also less anxious and depressed while younger female participants appeared to be especially concerned about their future.
- The quality of relationships with co-twins and triplets might be linked to mental resilience and a more optimistic outlook for the future.
- For female identical twin pairs, those who reported a risk-prone behaviour profile had higher mental resilience scores and were more confident about their future mental health than their co-twins who were neutral or risk-averse.
- While some participants reported substantial disruptions to, and increased stresses in their lives, some reported positive consequences of the restrictions in terms of their close relationships and in their physical and mental health, related to not having to deal with some of the usual stresses of their daily lives.

Introduction

With the early consequences of the COVID-19 pandemic upon us, there is substantial uncertainty about its short-, medium- and long-term impacts on Australian society. The ways we understand, experience, react and cope with this pandemic can and will vary greatly, but the reasons we differ so much are less clear. Understanding the differences in age, gender and the families we are brought up in is crucial to assess social, physical, and mental health outcomes. Twin studies can help untangle these risk factors, offering a comprehensive approach to generate scientific evidence for clinicians, policy makers and other major stakeholders.

Twins Research Australia (TRA), formerly known as the Australian Twin Registry, is custodian of a national twin registry. It was established in the late 1970s and currently has a membership of more than 40,000 twin pairs and triplets. TRA has used this resource to facilitate more than 240 scientific studies with its twin members.¹

The Twins Research Australia COVID-19 Knowledge, Experience, Reaction and Resilience (TRACKERR) study investigates the impacts of the COVID-19 pandemic, including the social distancing restrictions, on Australian families.

The aim is to obtain insights into how family and individual-specific factors combine to affect the health and experiences of people and families over the course of the pandemic and beyond.

The first confirmed case of COVID-19 in Australia was reported on 25 January 2020. While travel restrictions on overseas visitors began on 14 February 2020, a comprehensive range of domestic social distancing restrictions did not begin until 14 March 2020. Data collection for the TRACKERR study commenced on 15 April 2020. This report refers to data collected from 3,526 adult twins and triplets of both sexes who participated in the online study survey from 15 April until 12 May 2020, when the social distancing restrictions imposed by the Australian Government were about to be relaxed. Therefore, the responses outlined in this report cover a period of approximately one to two months after Phase 1 restrictions were introduced and enforced (timeframe dependent on State or Territory).

We continue to invite participants and collect baseline data and will conduct future follow-up surveys. Recently, the survey was adapted and sent to parents of twins aged up to 17 years to determine the impact of the pandemic on them as parents and individuals, and whether having twin children in the household might differentially affect these experiences. Other reports will follow to assess mid- and long-term impacts of COVID-19.

¹ See more about Twins Research Australia at www.twins.org.au.

Method

Study participants were adult twins and triplets registered with TRA. Members with an active email, mobile number or postal address on the TRA database were contacted to participate in the study, totalling 20,462 invitations sent.

The TRACKERR survey was designed to capture a wide range of variables across four constructs:

- » COVID-19 Knowledge
- » Experience
- » Reaction
- » Resilience

The survey also included the opportunity for participants to provide open text responses to:

- Tell us why they did not seek medical attention, if they experienced symptoms related to COVID-19
- Provide additional insights into their experiences that we did not ask about

Data analyses

This first report is predominantly based on descriptive statistics, with frequency data stratified by sex, age and location (State or Territory). We also conducted analyses using data from 'complete' twin pairs who both participated in the survey. Not all participants answered all questions.

We applied a co-twin control design to paired data. We used paired t-tests to estimate differences within pairs for continuous variables. We used a mixed-effects maximum likelihood (ML) regression model to investigate associations between exposures and outcomes, while controlling for familial (both genetic and nongenetic) factors. Statistical analysis was conducted using Stata version 16.0 MP.

Responses to the open text questions were coded into common categories, and a preliminary analysis of major themes was conducted. Selected quotes made by the twins and triplets are included throughout this brief report for illustrative purposes.

Results

A total of 3,526 survey responses were received online from 15 April to 12 May 2020, with more than two-thirds received in the first two weeks out of 20,462 invitations sent via email (a response proportion of 17%). On average, responses were made 33 days after the Stage 1 restrictions were introduced to take effect on March 23² (range 23 to 41 days; i.e. between 3 to 6 weeks afterwards). Most responses came from women (77%) and over one-third of responses from men and women aged 60 years or older (35%). There were 1,001 complete twin pairs, of which 76% were monozygotic (MZ) or genetically identical pairs, with the remainder from dizygotic (DZ) or fraternal (non-identical) pairs. There were also two twin pairs of unknown zygosity and two complete sets of MZ female triplets.

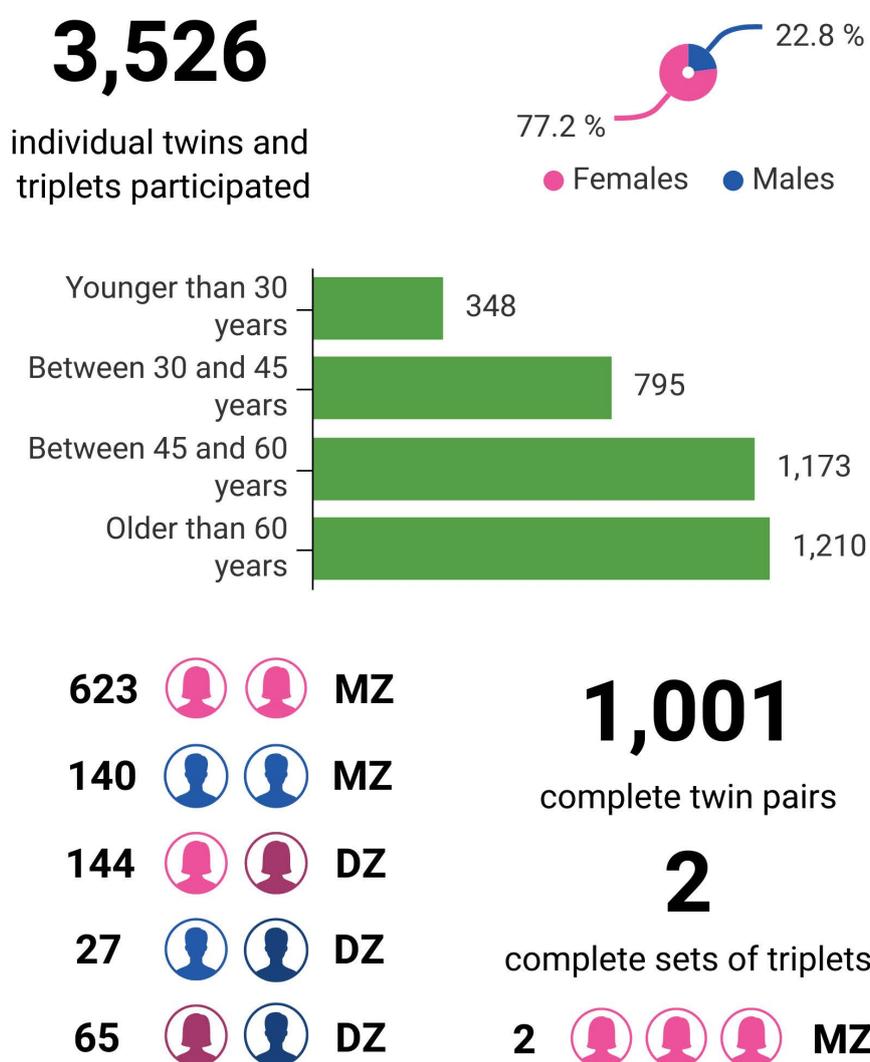


Figure 1: Sample characteristics

² See more at <https://www.pm.gov.au/media/update-coronavirus-measures-220320>.

Responses were received from all Australian States and Territories. Most participants lived in Victoria (32%) followed by New South Wales (25%) and Queensland (16%) (see Figure 2). While we also received 79 responses from participants living overseas, these have not been included in our analyses.

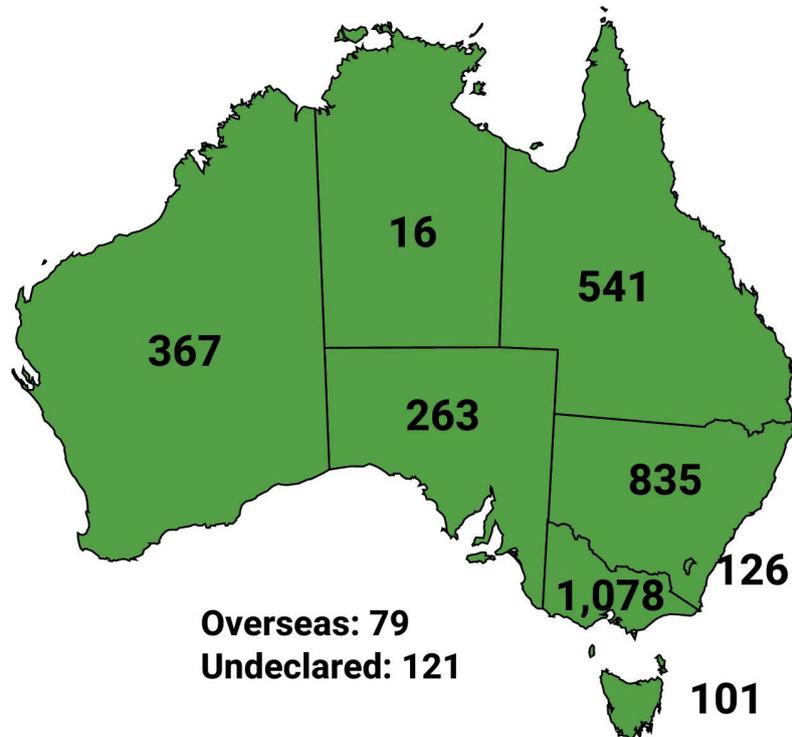


Figure 2: Number of participants by each Australian State and Territory

COVID-19 Knowledge

This section contains basic information about symptomology and testing, how much participants knew about the pandemic and the sources they used to find information, and differences in how participants viewed the importance of social distancing.

The proportion of twins who had been tested for COVID-19 was 5%, with three individual females receiving a positive result (2% of those who were tested). Proportions of those who undertook testing differed across Australian States and Territories, ranging from 6% in NSW and 5% in TAS to 2% in WA.

Of the 228 participants who reported 'not feeling quite right', only 18 (7%) said they would seek medical attention as a result. Of those not planning to seek medical attention, 207 provided open-text responses explaining their reasons for not doing so. Some thought their symptoms were simply a result of the common cold, others had recently had pneumonia or were being treated for other underlying medical conditions such as cancer or lupus (see Box 1). The most common reported symptoms amongst these 228 participants were fatigue (50%), sore throat (22%), cough (22%), wheeze and asthma-related symptoms (15%), shortness of breath (14%) and loss of taste and smell (7%).

Box 1. Some views on not seeking medical treatment during the COVID-19 pandemic

- [I] feel that no medical attention is required at this stage, already self-isolating and taking precautions as per COVID guidelines and don't want to expose myself/family to going to a test centre
- Suspect fatigue due to depression. Don't want to use up medical time and facilities needed by people with more urgent needs
- Have only recently become eligible for testing and symptoms are receding
- Tiredness likely linked to social/emotional factors (recently retired from stressful fulltime work)
- I don't believe I have the right symptoms to be tested

We asked the twins to indicate the information sources they used to find out about COVID-19. The vast majority referred to as many as three different information sources which they checked each week, with television and official websites rated as the most used sources overall (76% and 73% of twins, respectively). Social media was the most frequently accessed information source, with twins reporting they checked it up to 16 times per week, on average. More than 86% of participants considered their knowledge about COVID-19 was good or excellent. On a 5-point Likert scale, almost 90% of twins considered that social distancing as a response to COVID-19 was extremely important.

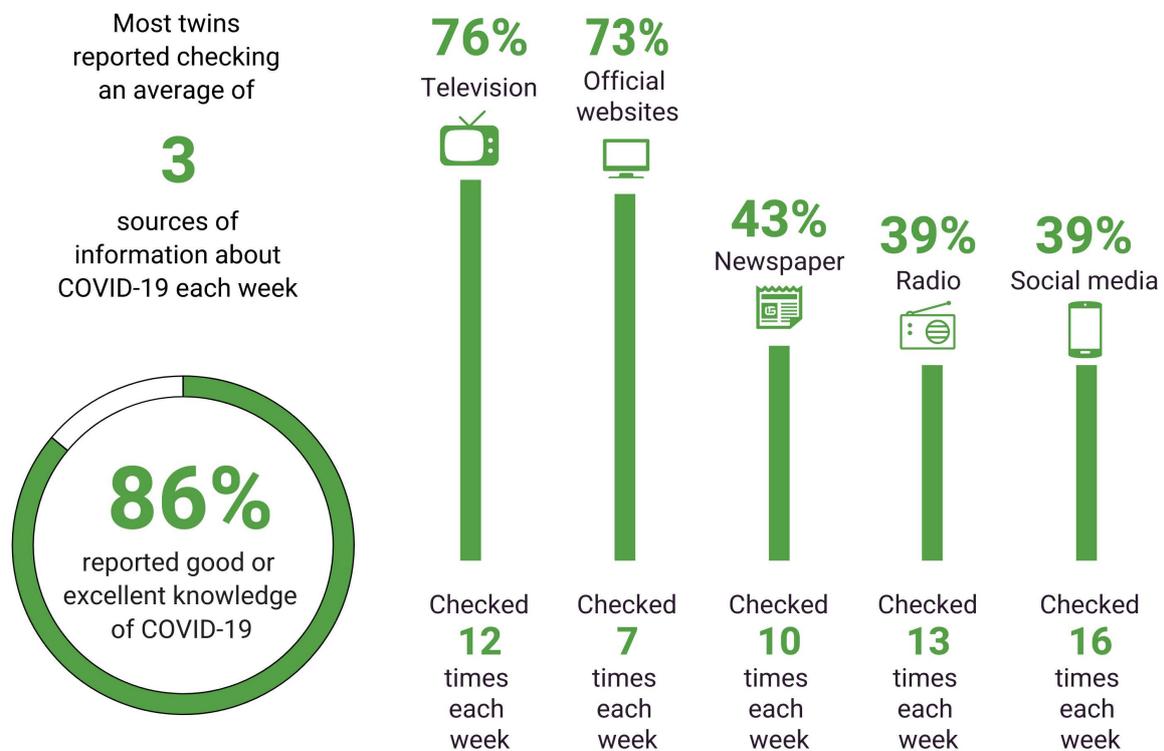


Figure 3: Sources used to obtain information about COVID-19

Experience

This section reports on twins' experiences of social isolation, changes in their living arrangements, employment (including unemployment) and income status due to COVID-19 restrictions.

Approximately 2% of males and 1% of females reported they had not been self-isolating at home during the restrictions. During the week prior to completing the survey, twins reported the average number of times they left the house was approximately twice for grocery shopping, and less than once to see families, friends or their twin.

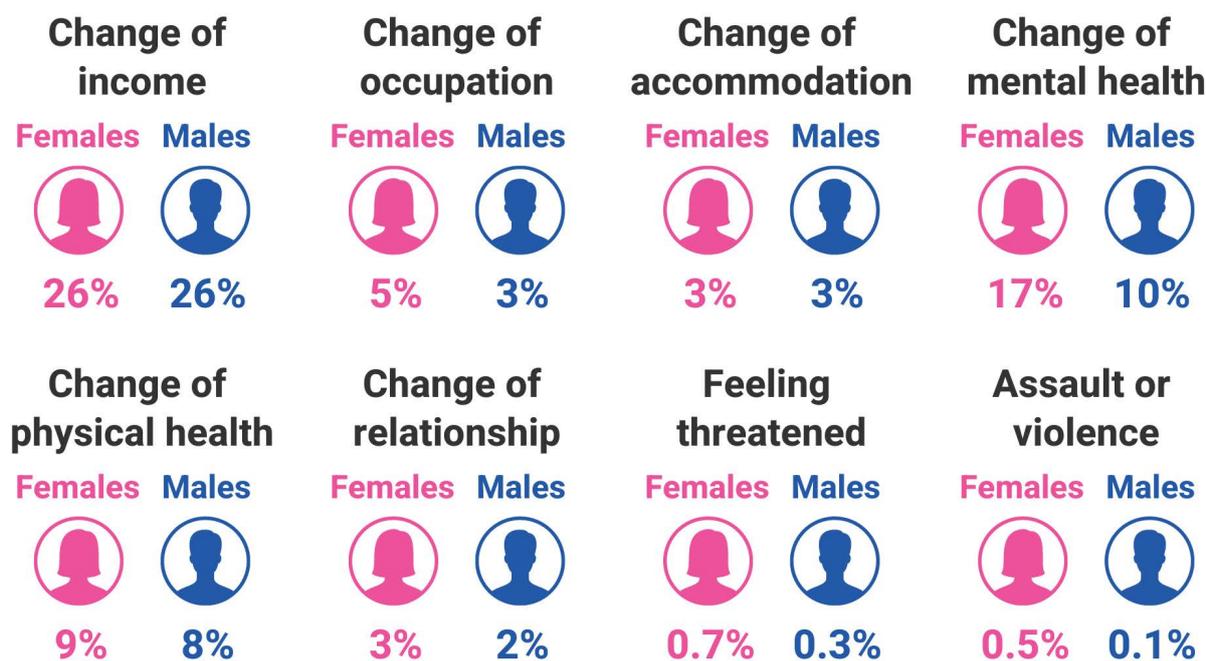


Figure 4: Sex differences in life changes after COVID-19

Of the 3,526 survey participants, 3% experienced changes in their accommodation arrangements as a result of the COVID-19 social distancing measures (see Figure 4 for the full range of changes reported by participants). For some, this took the form of additional household members and, for others, it meant the numbers in their household decreased. In the open-text responses, one respondent reported that their household doubled in size, as their daughter and family moved in for the duration of the social distancing restrictions, as did a workmate. Some other reasons for accommodation changes described in open-text responses were:

- moving in with friends/siblings due to job losses/reductions in finances or to provide mental health support to family or friends, or to help with remote learning needs
- children relocating home to live with their parents from University or from living/travelling elsewhere/overseas

- parents relocating to live with children because of travel restrictions, or so they wouldn't be alone, or to be cared for due to illness
- spouses/partners/children living in different houses due to work requirements or to protect family members
- renting short-term accommodation close to medical clinics to continue treatment

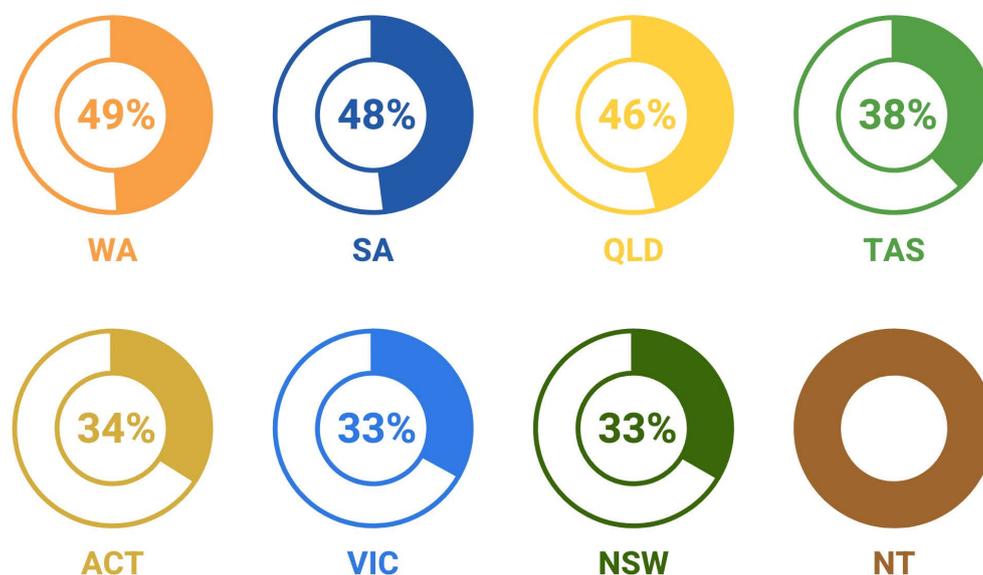


Figure 5. Percentage of those still leaving their house to go to work during COVID-19 restrictions, by state. * NT not reported due to very small sample size.

In open-text responses, four participants reported they (or their tenants) were 'displaced'; that is, two relocated to crisis accommodation due to forced homelessness, and one as a result of a domestic violence disclosure. Of note, we found that 0.7% of women had felt threatened and 0.5% reported experiencing incidences of abuse or violence since the beginning of the pandemic. However, we could not assess whether such outcomes were a result of the COVID-19 social distancing restrictions or whether such experiences were usual in these households.

Other results indicate the level of impact of the restrictions on employment and income:

- There were fewer participants in VIC and NSW (33%) who continued to leave home to go to work during this time period than in TAS (38%), QLD (46%) and WA (49%) (see Figure 5).
- The number of twins who became unemployed as a result of work shut-down due to the impact of COVID-19 was similar across all States (ranging from 4-6%) and did not differ between men and women.
- Twenty-six percent of twins experienced a change in income and there were no differences in the magnitude (income brackets) of the change between men and women.
- However, those who were aged 30 years or less were the most affected, with 41% reporting a change in their income compared with 19% for those aged 60 years or older.

Reaction

This section outlines twins' perceived risk profiles, and the overall social and mental health impacts on themselves and their social relationships of COVID-19 and the resultant restrictions.

Whilst the majority of participants reported their self-esteem and close relationships had mostly 'stayed the same' overall, nearly 50% of participants reported their social health had become worse/much worse compared with before the COVID-19 restrictions (see Figure 6). About 18% of participants, however, reported their physical health had become better/much better during 'lockdown', which may be due to increased opportunity to participate in exercise (see Box 5).

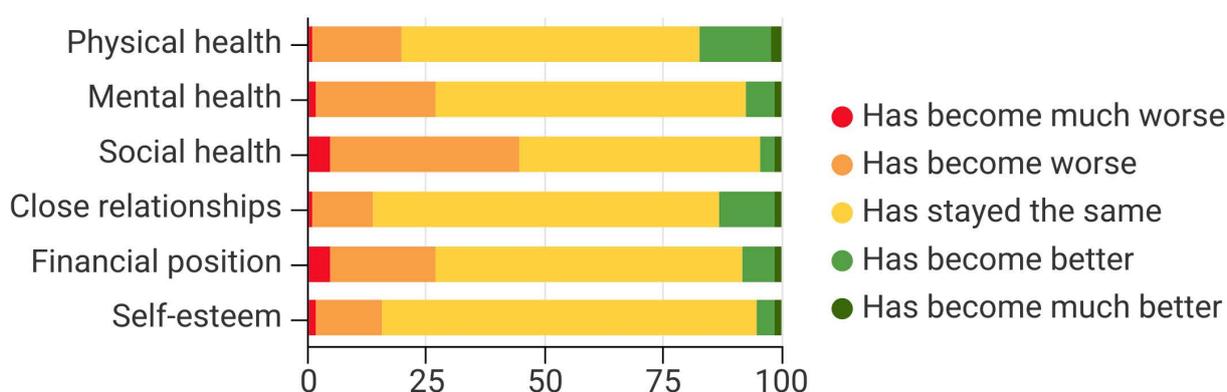


Figure 6: Mental and social changes after COVID-19

Participants also rated their chance of contracting COVID-19 and their self-perceived probability of dying if they were infected, on a scale ranging from 0 to 100. The middle 50% of responses ranged from 5 to 30% for worry or concern, and 1 to 25% for probability of dying.

Twin pairs analysis (1)

In terms of the total number of days the twin pairs spent in self-isolation at home (leaving home only for essential purposes), there was a correlation of 0.24 (95% confidence interval 0.17-0.33) for identical pairs and 0.32 (95% confidence interval 0.21-0.46) for fraternal pairs; indicating there was no significant difference between them. Thus, while factors shared by twins influenced how long pairs spent in self-isolation, there was no evidence that these factors were genetic.

Participants also reported how worried or concerned they were about contracting COVID-19 (ranging from 1 = not worried/concerned at all to 5 = extremely worried/concerned), with most of them (25%) scoring 4 (worried) on this scale. The older the participants the higher the percentage of those who reported being extremely concerned about contracting COVID-19, ranging from 3% in the younger group up to 9% in the older group.

Concerns about employment, and losing jobs and losing homes decreased with age. However, concerns about their own and their co-twin's overall health were greatest amongst older participants. The biggest source of concern, regardless of age, was the health of elderly relatives (Figure 7).

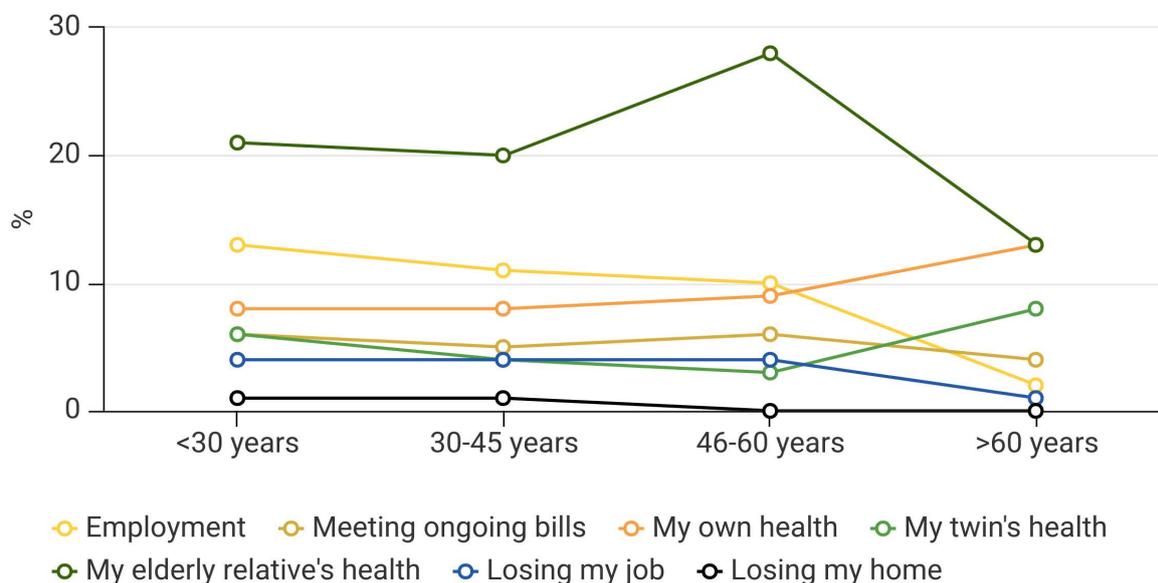


Figure 7. Causes of most concern during the COVID-19 pandemic

There were 470 twins (16%) who were healthcare workers in our study. Their open text responses indicated they had particular concerns about COVID-19 (see Box 2).

Box 2. Some views from healthcare workers

- *I am concerned working as a health professional about being face to face with patients that potentially will increase my risk of getting Covid19 and passing it onto my husband. Normally I would be seeking out work at the moment, but for now I feel it is safer not to be working.*
- *[I worry about the] effect of Covid, working in the health industry and schooling. My children are at school several days a week and I am concerned about what risk the teachers perceive themselves to be in due to my occupation.*
- *I am worried as a healthcare worker of contracting COVID but there are several precautions and supports in place, so this hopefully won't happen. I worry for my family if I was to bring it home.*
- *I felt anxious/deeply worried before the government brought in restrictions. Once restrictions took effect, I felt a lot more relaxed as I was not going to work and could limit risk by staying at home. As restrictions have lifted (elective surgery/dental) I'm now more worried as I need to interact with people at work in a high-risk environment.*
- *The stress of it [the pandemic] and my ex-partners study/work in healthcare resulted in us parting ways, unfortunately.*

We observed age differences in depression and anxiety, based on scores using a widely utilised and valid scale.³ A score of less than 8 on this scale represents the normal range, a score between 8 and 11 is indicative of anxiety or depression and a score of more than 11 is suggestive of anxiety or depression. Our data shows that the prevalence of those in the 'suggestive' category for anxiety was as high as 10% for the group under 30 years, down to 1% for those aged 60 years or older. The same trend was seen for depression, with prevalence of 'suggestive' depression ranging from 5% for those in the 30-45 years category and 2% for the older group (Table 1).

Age group (years)	Anxiety score			Depression		
	Normal range (0-7)	Indicative of anxiety (8-11)	Suggestive of anxiety (>11)	Normal range (0-7)	Indicative of depression (8-11)	Suggestive of depression (>11)
<30	53%	37%	10%	70%	25%	4%
30-45	65%	29%	6%	74%	21%	5%
46-60	75%	23%	2%	80%	17%	3%
>60	88%	11%	1%	86%	12%	2%

Table 1. Average anxiety and depression level by age group

Twin pairs analysis (2)

We studied male-female twin pairs to assess differences between genders in terms of anxiety and depression. Females scored 15% higher for anxiety and 17% higher for depression than their male co-twins (Figure 8). Those gender differences existed for participants who had the same age and grew up in the same families, given we compared twins within pairs. Male-female twin pairs also share 50% of their genes, as any other pair of siblings. By studying male-female twin pairs, our analysis ensured that the differences we observed are actual gender differences and not due to differences in age or familial factors.

There was no evidence that the proportion of twins who reported being anxious or depressed increased with the number of days of social isolation. For some, however, the consequences of COVID-19 caused a wide range of concerns (see Box 3). For others, the impact of COVID-19 was felt in other ways – restrictions which impacted people’s ability to exercise due to gyms being closed or competitive sports being cancelled, or because they were casual workers who became unemployed and were ineligible for the National *Job Keeper* social security scheme.

³Snaitch. The Hospital Anxiety & Depression Scale. *Health and Quality of Life Outcomes* 2003, 1:29.

Box 3. Impact of COVID-19

- *Ask if I'm scared or afraid - I am.*
- *I was very concerned about contracting COVID19 earlier on and passing it on to my parents. I went on leave early-on to reduce the risk. Generally, I'm not particularly anxious but during the first couple weeks it [anxiety] increased considerably, due to [fear of] contracting it, safety of my elderly parents and fear of the unknown.*
- *...my stress levels are high due to my [agricultural] job. I feel a social responsibility to feed the world and am always stressed now as we are working long hours ...add to that now my wife is schooling our children at home while trying to keep up with her paid work. Life is Flat Out!!!*
- *I feel anxious about information overload about the situation and often restrict how much I listen too (and ask husband to refrain from discussing it too much). Usually I am not an anxious person, and this is unusual for me...*
- *Many parents are far more worried about their adult children than themselves. This is a huge source of anxiety & helplessness. It's hard watching your children lose jobs and what they've studied and worked for and not know the future for them - and the affect [sic] on their health and futures.*
- *My workload has increased somewhat due to COVID-19 and a lot organically, so I feel like a lot of my stress and anxiety comes from that. Not having the same stress outlets means all I can focus on is work so I don't get a reprieve*

In terms of gender differences, the qualitative responses to our Wave 1 survey indicate that the combination of working from home and supporting children who were learning from home caused both stress and anxiety for women (see Box 4).

Box 4. Impacts of learning from home

- *How am I coping as a full-time working parent with home schooling 2 young primary school children? Response - Terrible. At times I feel like I'm losing my mind*
- *...my escalated stress levels are a direct result of having to work full time and care for children at the same time. An impossible task yet one that is being asked of us*
- *My biggest concern at the moment is that I am trying to work from home and home school 3 children. Over the past 2 days I have been sitting up late catching-up on the work I should do during the day. My husband is still working at his job full time but not from home.*
- *Has the impact of distance learning for your school children increased your workload/ stress at home? Yes, as I have to continue doing my fulltime work at home and then provide additional assistance and greater management of my children with their schoolwork.*

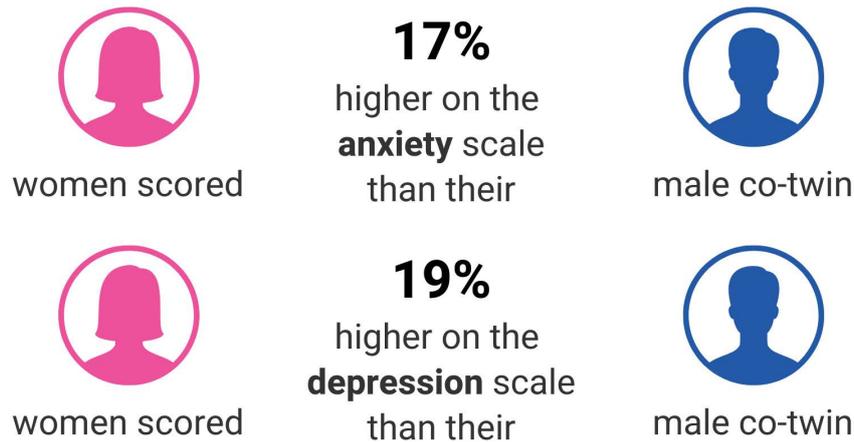


Figure 8: Differences in anxiety and depression scores between female and male co-twins.

Resilience

This section relates to how participants coped with the challenges imposed by the COVID-19 pandemic. We report on the state of relationships between twins and triplets and how it may affect their outlook of the future. We also report on some risk factors for mental resilience.

The impact of the pandemic on our survey participants varied. For some, the social restrictions gave them time to step away from their busy lives and to concentrate on maintaining their health and wellbeing. Some of their qualitative comments are reflected in Box 5.

The quality of relationships between twin pairs and triplet sets can add further insight into participant coping and mental resilience factors. Our results indicate that 89% of participants enjoy their co-twin or triplets' company. In addition, more than 84% reported they could rely on their twin or triplet member(s) for practical assistance or emotional support during the pandemic if needed. This proportion increased to 92% when participants reported being relied upon for the same reasons (Figure 9).

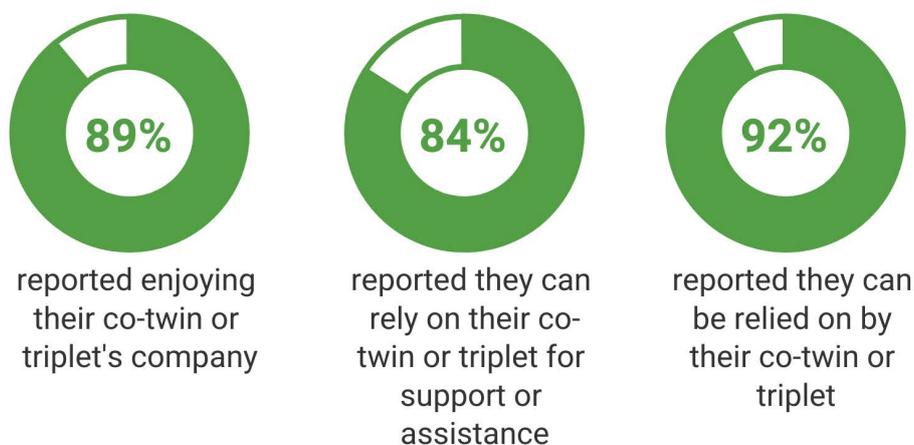


Figure 9: Quality of relationships with co-twin or triplet.

Box 5. Positive aspects of social restrictions

- *Not going into the workplace and working at home is of benefit to my mental health and well-being and the flexibility has me exercising more and planning meals better*
- *I am coping really well; no financial issues and I love my work. I am also studying which is helping to fill in time to cover less social interactions*
- *My physical health has improved [during the physical distancing period]; some weight loss from more exercise, more physical activity around the house (cleaning, tidying, sorting), more heavy physical work in the garden*
- *Q: What were the positives of the COVID-19 restrictions? A: More time to exercise, devote to mental health and well-being. Am I enjoying the slowness and quietness of this new world? Yes*
- *What improvements in life the restrictions have brought? I get to spend a lot more time working in the garden. GOOD. My daughter's spending more time at home and not at school brought us closer together. GOOD. My wife's spending less time shopping. GOOD. We are lucky in South Australia that the restrictions are quite manageable, even though I can't get to [sports] training. No problem, more time in the garden when it's not raining. We are also lucky that we live on a [large] block of land and not in a 30-storey block of flats. We have plenty of room to move and enjoy life*
- *I'm an ENTJ but am actually enjoying the isolation and reduced pressure to 'perform' as an extrovert for my work and socially*

Participants who reported they could rely on their co-twin or triplet were 21% less likely to report that their mental health was negatively affected during the pandemic, and 17% more likely to report optimism for their own future. Twins who felt they were able to rely on their co-twin were more confident of their mental health over the next year, irrespective of whether or not they were married. For some twins, support consisted of exercising regularly together throughout the social distancing period (see Box 6). For others, ongoing support consisted of maintaining as regular a contact as was possible although they were unable to see each other in person because they lived in different states, for instance. For some, however, their close relationships with co-twins or triplet(s) were disrupted due to external factors and this had caused anxiety and stress. For others, the twin relationship itself was a cause of tension (see Box 6).

Twin pairs analysis (3)

Our study sample was predominantly female and MZ, therefore we studied MZ female pairs to look at what predicted higher mental resilience scores during the pandemic in these pairs. We found that higher mental resilience scores were linked to having more risk-prone behaviour. We also observed that the risk-prone twin was 80% more likely to report confidence about their mental health over the next year compared to their neutral or risk-adverse twin.

Box 6: Support in twin relationships

- *I have seen my twin on a regular basis during the shutdown. We have managed this through exercise. Whilst the weather was warm, we would drive to each other's house and then go for a 45-minute walk. We did this several times a week. We got to catch up in person and do exercise at the same time. Win-Win.*
- *The impact of being told only to leave the house for essential purposes is really difficult because I need to see my twin regularly. The psychological impact of not seeing family members is actually very damaging.*
- *I don't live in the same state/city as my twin but we still talk a lot and are available to each other for emotional support when needed.*
- *Perhaps you could have asked what effect not seeing my twin in person has had on me. It has affected me greatly as we have never had an argument etc ever in our 64 years.*
- *We don't actually like being twins, so turning to each other is not something we would naturally do.*
- *How I feel about my twin not wanting to engage with me? - very sad indeed.*
- *My twin and I don't get on that well, but I would still do things for her & she has done things for me*
- *My twin and I were always extremely close but in the last 4 years we have struggled as he has become mentally unstable-abusive-alcoholic-and even I cannot help him. This is devastating.*

We did not observe significant sex or age differences in mental resilience scales. Examples of coping mechanisms reported by participants in their open-text responses included exercise, gardening, and the presence of pets (see Box 7).

Box 7. Coping mechanisms

- *I continue to exercise because the angst at work can very much affect your whole life. Exercise is how I cope with keeping me mentally healthy*
- *With holidays cancelled, I have started my vegie garden again. Good for relaxation and exercise plus the benefits of my Winter vegetables*
- *...not going into the workplace and working at home is of benefit to my mental health and well-being and the flexibility has me exercising more and planning meals better*
- *I believe having an animal helps regulate stress in the house & helps kids focus on other's needs.*
- *My twin and I have dogs and we walk them every day at the beach with my husband. They are the best medicine for keeping me mentally well through difficult times.*

Final remarks and future work

This report provides the first iteration of the evidence from Wave 1 of our TRACKERR study. It provides a brief snapshot of our findings to date but is no means definitive, and the value of these data will grow as time evolves and more surveys are conducted with the cohort. Further reports and academic articles will be published at a later date.

Additional surveys will look at the experiences of parents and their twins and other children during the pandemic, as well as follow-up participants in the first wave of the current survey. These additional surveys will track the experiences and responses of twins and their families over time as the impacts of the pandemic change and evolve.