

# The Impact of COVID-19 Restrictions on Perceived Health and Well-Being of Active Australian Older Adults

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The aim of this study was to determine the impact of COVID-19 restrictions on older adults' perceived health and well-being according to different types of participation in sport and physical activity by gender and region. A survey was implemented during the first COVID-19 lockdown in Australia (June 2020) and information collected on demographics, sport and physical activity patterns pre-COVID-19, and health and well-being outcomes during lockdown and compared to 1 year earlier. During COVID-19 lockdown, older adults who participated in both club sport and informal activities had significantly better general health, physical health, and resilience than those who participated solely in a single setting. Those participating in both team and individual activities reported better general well-being. Older adults who were active in a range of settings and modes had improved health and well-being. Social support is especially important for older adults to become and remain active.

**Keywords:** sport participation, settings, physical activity, social support

Australia had its first reported COVID-19 case in January 2020, and on March 11, 2020, the World Health Organization declared COVID-19 a pandemic. Following this, all Australian borders were closed on March 25, 2020 (Karg et al., 2021). Throughout March 2020, there was widespread cancellation of elite and community sport in Australia; then in May, there was a return to sport, according to guidelines developed by national and state governments. By mid-October, restrictions were significantly eased in the Australian State of Victoria, which was the most impacted state until then (Karg et al., 2021). From early August to the October 21, 2021, the city of Melbourne was in lockdown again with another cancellation of community sport competitions and restrictions on general exercise (Chief Health Officer, 2021).

The lockdowns and restrictions on movement and social connectedness throughout 2020 and 2021 greatly impacted vulnerable groups like older adults, particularly in relation to their health (De Pue et al., 2021; Manca et al., 2020). Older adults are a susceptible population group to critical and fatal COVID-19 (Piniella-Ruiz et al., 2021; Shahid et al., 2020) and often have underlying health conditions and sometimes few economic resources (Henning-Smith, 2020; Li & Mutchler, 2020; Shahid et al., 2020). A Belgian study demonstrated that 93% of COVID-19-related deaths were people aged 65 years or older (De Pue et al., 2021). Studies have demonstrated that the virus can cause worse physical health outcomes and a higher mortality rate in older adults and those with comorbidities, such as hypertension, cardiovascular disease, diabetes, chronic respiratory disease, and chronic kidney disease (Shahid et al., 2020).

Furthermore, COVID-19 presents unique risks to the emotional and social well-being of older adults (Henning-Smith, 2020). Older adults are disconnected from society through COVID-19

restrictions, and many without online virtual connectedness are at greater risk of loneliness and isolation (Henning-Smith, 2020). Furthermore, they are challenged to meet their basic daily needs, go grocery shopping, access health care, and have assistance in their homes—all resulting in additional health risks (Henning-Smith, 2020). While social distancing is supposed to protect at-risk population groups, like older adults, it in fact introduces further complications to their health and well-being (Tyrrell & Williams, 2020). Loneliness and social isolation have substantial effects on mental and physical health, specifically for older adults (Tyrrell & Williams, 2020). Globally, many older adults were and continue to be separated from family members and other close friends, which restricts caregiving and access to other resources and connections (Tyrrell & Williams, 2020).

The social isolation and loneliness negatively impact mental health in older adults and may predispose them to cognitive decline (Manca et al., 2020) and contribute to depression and anxiety (García-Portilla et al., 2020). There is also evidence that older women may be more negatively impacted than older men (García-Portilla et al., 2020). In a Spanish study of adults aged 60 years or older, women scored significantly worse in the five psychological domains. Furthermore, 53% of women and 34% of men were emotionally distressed, and 29% of women and 14% of men were depressed (García-Portilla et al., 2020). In a cross-sectional Belgian study of older adults aged 65+ years, depression was strongly related to reported declines in activity level, sleep quality, well-being, and cognitive functioning (De Pue et al., 2021). With regard to well-being, a study of older adults reported that the most prominent decreases were for general life satisfaction, safety, community connectedness, and future security (De Pue et al., 2021).

The social distancing restrictions for older adults also place them at risk of a decline in their physical health (Tyrrell & Williams, 2020). Many studies of physical activity among older adults also report other psychological, mental health, and general well-being outcomes (Carriedo et al., 2020; De Pue et al., 2021;

Suzuki et al., 2020; Visser et al., 2020). In a Belgian study, half of all older adults reported a significant decrease in physical activity in the past week compared to before COVID-19, as well as deteriorating sleep quality and well-being (De Pue et al., 2021). Similarly, in a Dutch study of older adults, approximately half reported a decrease in physical activity, and those in self-quarantine had significantly lower levels of physical activity (Visser et al., 2020). Similarly, a Japanese study of older adults reported that 48% were less active and there was a significant decrease in subjective well-being in the less active group of older adults (Suzuki et al., 2020). The COVID-19 restrictions impacted the physical activity of older adults, especially those who had higher levels of physical activity and lower health-related quality of life before COVID-19 (Suzuki et al., 2020). A Spanish study of older adults (60+ years) reported that those older adults who met the physical activity recommendations during lockdown had higher resilience, positive affect, and lower depressive symptoms (Carriedo et al., 2020).

As summarized above, much of the literature on the impact of COVID-19 on older adults' health and well-being has focused on social and mental health, and well-being. Some also focus on levels of physical activity in surveys of the general population. However, there is no detail of the different modes and settings of participation in physical activity. This may be an important factor above and beyond the health benefits of general physical activity because we know that being active in different ways can impact health differently (Eime et al., 2013). For example, participation in team sport can have greater psychological and social health benefits than being active alone (Eime et al., 2013). There is consistent evidence that older adults are motivated to be active for social reasons, that is, to be active with others which sport can provide (Jenkin et al., 2018; Lindsay-Smith et al., 2019). This relates to both physical activity in general (Lindsay Smith et al., 2017, 2019) and to sport specifically (Jenkin et al., 2018). The social aspects of participation in physical activity contribute to enjoyment and positive mental health benefits (Lindsay-Smith et al., 2019) and help to prevent loneliness (Lindsay Smith et al., 2017). In relation to sport, older adults report benefits of participation to include social, physical, and mental health (Jenkin et al., 2018). The most prominent reported outcome is social health and well-being (Jenkin et al., 2018).

There is limited research on older adults' participation in community sport. Most research has targeted the young and elite sport participants or has focused on physical activity in general, but not specifically on participation in community sport. In this paper, we seek to determine the association between various demographic and sport participation characteristics of older adults and their perceived health and perceived changes in health under the impact of COVID-19-related restrictions. Specifically, we investigated the levels of perceived health and perceived changes in health across genders, age groups, regions, different modes of activities (e.g., team vs. individual activities), and settings (e.g., club-based vs. informal activities).

## Methods

This study is part of a broader program of research in Australia which involves the longitudinal measurement of sport and physical activity participation and the physical, mental and social health, and well-being outcomes of this participation. This study was conducted via two waves of online surveying during the COVID-19 period (2020 and 2021), the first of which also included

participation and health data related to the pre-COVID-19 baseline in 2019. Ethics approval was granted by the Human Research Ethics Committee of Victoria University (HRE20-049) and Flinders University (8654), and conducted in accordance with the Declaration of Helsinki.

In the online survey, potential respondents were first presented with an information sheet about the study, which detailed all the research procedures, including participants' rights to anonymity and confidentiality. Following this information, survey respondents had to indicate their consent to participate in this study before commencing the survey.

The present study is based on data collected in the first wave using an online survey conducted during May and June 2020. Recruitment for the survey was primarily facilitated by sports including Australian football, bowls, cricket, golf, tennis, and football (soccer). The present study is one of three age-based studies, each focusing on a different stage of the lifespan. Two studies are focused on adolescents (13–17 years) and adults (18–59 years) and the third, current study is focused on older adults. The target population was adults aged 60+ years at the time of the survey who were registered in the 2019 and/or 2020 playing seasons to participate in one or more sports. The sports organizations that sent out the invitation to the survey to their registered participants represent major sports in Victoria and Australia (Eime et al., 2020). The research team has previous experience with working with all these sports at national, state, and local levels.

In order to broaden the scope of the survey sample to include people who only participate in recreational physical activity in settings other than sports clubs, and potentially, to include people who do not participate in any recreational physical activity, the primary recruitment strategy was supplemented by snowball sampling through social media pages of sports organizations and research teams.

The first wave, or baseline, of the longitudinal survey included, among many other, questions about:

- demographic characteristics—gender, date of birth, and residential postcode
- types of sports and other recreational physical activities participated in
- settings in which the participation occurred—sports clubs and other less structured informal settings
- modes of participation—team and individual modes of activity
- self-assessed general, physical, and mental health
- measures of well-being—general well-being, resilience, and life satisfaction.

Date of birth was used to determine age in years at the time the survey was completed. Residential postcode concordances (Australian Bureau of Statistics, 2016) were used to assign each postcode to one of two broad geographical zones or regions: metropolitan, comprised of the capital cities of Australian states; and nonmetropolitan, comprised of regional cities, towns, and rural areas.

Regarding sport and physical activity, two separate sections of the survey dealt with two “settings”: organized club sport involving membership and registration (designated “club”) and more informal sport and recreational physical activity (designated “informal”). In each section, a list of the most common activities was presented—16 for club sports and 26 for informal physical activities (including 12 of the 16 club sports). Respondents indicated which activities they participated in, with permission to add other

activities that were not listed. On the basis of these responses, a combined list of 88 activities was established and classified as either “team” or “individual.” Each respondent was then assigned a category for each of “settings” (club only, club and informal, informal only, and inactive) and “modes” (team only, team and individual, individual only, and inactive).

Six survey items were devoted to self-assessed health—three pertaining to the time of the survey (during COVID-19 lockdown) and three comparing current health to health 12 months prior to the survey (before COVID-19). The general health item was a 5-point Likert scale item (*poor, fair, good, very good, and excellent*) derived from the Short-Form Health Survey (SF-36) instrument (Ware et al., 1993). The same format was used for the assessment of physical health and mental health. The three comparative items used a 5-point Likert scale (*much worse, somewhat worse, about the same, somewhat better, and much better*).

General well-being was assessed using a scale derived by averaging the responses to a battery of 14 items regarding frequency of positive and negative feelings in the 2 weeks prior to the survey. Most of the content was informed by the existing literature (Australian Institute of Health & Welfare, 2012; Ware et al., 1993), supplemented by three items developed by the research team to address negative feelings likely to be exacerbated by COVID-19. Each item was scored on a 5-point scale (*all of the time, most, some, a little, and none*) with reverse coding of the negative items so that higher average scores represented greater well-being. The wording of the items can be found in the [Supplementary Table S1](#) (available online).

Resilience was similarly assessed using a scale derived by averaging the responses to a battery of four items of which three were derived from the brief resilience scale (Smith et al., 2008) and the fourth (regarding challenges) defined by the research team as appropriate wording for sport-focused respondents. Each item consisted of a statement about the respondent with responses on a 5-point scale (*strongly agree, agree, neutral or unsure, disagree, and strongly disagree*). The wording of the items can be found in the [Supplementary Table S1](#) (available online).

Life satisfaction was assessed using a direct question (Women's Health Australia, 2008) with the response on a 10-point scale from 1 (*least satisfied*) to 10 (*most satisfied*).>

For the purpose of tabulation and statistical analysis, the six health items, comprised of five categories, were recoded into three categories. Regarding sport and physical activity settings and modes, there were insufficient “inactive” responses in the older adult cohort for valid and meaningful statistical analysis; therefore, these were excluded from the analysis. Consequently, the variable “settings of sport and physical activity” was reduced to three categories (club only, club and informal, and informal only), and the variable “modes of sport and physical activity” was similarly reduced to three categories (team only, team and individual, and individual only).

The six recoded health items were each cross-tabulated against four respondent characteristics: gender, region, settings of sport and physical activity, and modes of sport and physical activity. Chi-square tests of independence were conducted to identify differences in the health profiles of the groups defined by each of the characteristics.

For the measures of general well-being, resilience, and life satisfaction, mean values for the groups defined by each of the five characteristics were tabulated, and group differences were analyzed using independent-samples *t* tests (for two groups) and *F* tests (for three groups).

## Results

The survey was completed by 1,836 active older adults (60+ years)—1,188 men (65%) and 648 women (35%) (Table 1). Their age ranged from 60 to 92 years, with mean 69.8 years and *SD* 6.4 years. Most respondents resided in metropolitan cities (60%) compared to nonmetropolitan regions (40%) (Table 1). The majority participated in both club and informal sport and physical activity (71%) followed by club only (26%) and informal only (3%). Nearly half participated in team and individual sport and physical activities (46%), followed by individual-only activities (38%) and then team-only sports (16%) (Table 1).

### Health Outcomes During COVID-19 Lockdown and Restriction

There was a significant difference between reports of general health during COVID-19 lockdown for men and women ( $p = .006$ ; Table 1). Men were more likely to report poor/fair general health (11%) than women (9%), and women were more likely to report very good or excellent general health (91%) than men (89%). There was no significant difference between men and women for physical health or mental health. Of all respondents, over 40% reported very good or excellent physical health (men: 44% and women: 48%) and over half reported very good or excellent mental health (men: 60% and women: 56%) (Table 1).

When comparing nonmetropolitan and metropolitan residents, there were some significant health differences. Older adults living in nonmetropolitan regions were significantly more likely to report poor or fair physical health; in contrast, those living in metropolitan cities were significantly more likely to report higher rates of very good or excellent physical health ( $p = .022$ ). Older adults living in metropolitan cities were more likely to report very good or excellent general health compared to those living in nonmetropolitan areas; however, this difference was not significant ( $p = .07$ ).

With regard to the settings of participation in sport and physical activity, older adults participating in both club sport and informal sport and physical activity were significantly more likely than those who only participated in one type of setting (club or informal) to report better general health and physical health (both  $p < .001$ ). They were also more likely to report better mental health; however, this was not quite significant ( $p = .054$ ).

In terms of the mode of participation, those participating in individual-only activities had significantly higher reported general health and physical health (both  $p < .001$ ) than those who participated in team-only or in both team and individual activities. There was no significant difference in reported mental health, and over 50% of people within each sport and physical activity mode reported very good or excellent mental health.

### Perceived Changes in Health Outcomes Before and During the COVID-19 Lockdown

Table 2 summarizes the results of self-assessed health during COVID-19 lockdown compared to a year ago (pre-COVID-19). Overall, most (over 60%) of all older adults reported their general, physical, and mental health during COVID-19 lockdown restrictions were about the same as a year ago, pre-COVID-19. However, women were significantly more likely than men to report poorer physical health ( $p = .035$ ) and mental health ( $p = .008$ ) during COVID-19, compared to a year ago. There was no significant

**Table 1 Self-Assessment of Current Health: By Respondent Characteristics**

Health assessments	Characteristics				<i>p</i> <sup>a</sup>			
	Gender							
	Male		Female					
	<i>n</i>	%	<i>n</i>	%				
General health					.006			
Poor or fair	130	11.0	57	8.8				
Good	438	36.9	203	31.3				
Very good or excellent	619	52.1	388	59.9				
Total	1,187	100.0	648	100.0				
Physical health					.329			
Poor or fair	197	16.6	123	19.0				
Good	804	67.8	433	67.0				
Very good or excellent	185	15.6	90	13.9				
Total	1,186	100.0	646	100.0				
Mental health					.213			
Poor or fair	181	15.4	90	14.0				
Good	481	40.9	245	38.0				
Very good or excellent	514	43.7	309	48.0				
Total	1,176	100.0	644	100.0				
			Region					
			Metropolitan		Nonmetropolitan			
			<i>n</i>	%	<i>n</i>	%		
General health						.070		
Poor or fair	97	8.8	89	12.1				
Good	387	35.1	256	34.7				
Very good or excellent	618	56.1	393	53.3				
Total	1,102	100.0	738	100.0				
Physical health						.929		
Poor or fair	191	17.4	129	17.5				
Good	745	67.8	495	67.1				
Very good or excellent	163	14.8	114	15.4				
Total	1,099	100.0	738	100.0				
Mental health						.022		
Poor or fair	144	13.2	127	17.3				
Good	430	39.4	297	40.5				
Very good or excellent	517	47.4	310	42.2				
Total	1,091	100.0	734	100.0				
			Sport and physical activity settings					
			Club only		Informal only		Club and informal	
			<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
General health								<.001
Poor or fair	75	15.9	6	9.7	106	8.1		
Good	207	43.9	22	35.5	415	31.7		
Very good or excellent	190	40.3	34	54.8	788	60.2		
Total	472	100.0	62	100.0	1,309	100.0		
Physical health								.024
Poor or fair	102	21.7	9	14.8	210	16.1		
Good	311	66.0	39	63.9	892	68.2		

(continued)

Very good or excellent	58	12.3	13	21.3	206	15.7
Total	471	100.0	61	100.0	1,308	100.0
Mental health						<.001
Poor or fair	108	23.1	12	19.4	152	11.7
Good	204	43.7	20	32.3	504	38.8
Very good or excellent	155	33.2	30	48.4	643	49.5
Total	467	100.0	62	100.0	1,299	100.0

**Sport and physical activity modes**

	Team only		Individual only		Team and individual		
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	
General health							<.001
Poor or fair	43	14.6	72	10.3	72	8.4	
Good	134	45.6	215	30.9	295	34.6	
Very good or excellent	117	39.8	409	58.8	486	57.0	
Total	294	100.0	696	100.0	853	100.0	
Physical health							.128
Poor or fair	58	19.7	136	19.6	127	14.9	
Good	194	66.0	456	65.7	592	69.5	
Very good or excellent	42	14.3	102	14.7	133	15.6	
Total	294	100.0	694	100.0	852	100.0	
Mental health							<.001
Poor or fair	64	22.0	100	14.5	108	12.8	
Good	132	45.4	249	36.0	347	41.1	
Very good or excellent	95	32.6	343	49.6	390	46.2	
Total	291	100.0	692	100.0	845	100.0	

<sup>a</sup>Chi-square test of independence.

difference in the reporting of changes in general health for men and women, nor in the change of any health status (general, mental, and physical) for those living in metropolitan cities compared to nonmetropolitan regions (Table 2).

However, there were significant differences in change of health status by participation settings for general and mental health, but not physical health. For general health, older adults participating only in clubs were more likely to report lower general health than those participating only in informal activities or those participating in both club and informal activities. Informal-only respondents were more likely to report improvement in general health scores ( $p = .011$ ). Changes in physical health did not significantly differ according to participation setting, and over 60% of all older adults reported that their physical health was about the same as last year. However, more respondents reported that their physical health was worse (in comparison to those who reported it was better) during COVID-19 compared to pre-COVID-19. Regarding mental health, those participating only in informal activities were more likely than the other two groups to report either better or worse mental health during COVID-19 lockdowns. Those participating in only club activities or in both club and informal activities were more likely to report having about the same level of mental health during COVID-19 lockdown ( $p = .014$ ).

Regarding modes of participation, the only significant difference between older adults participating only individually, or only in teams, or both, was in mental health changes. Those participating only in individual activities were more likely to report having worse mental health during COVID-19 lockdown, compared to

those participating only in team activities or in both team and individual activities; team-only respondents had the highest rates of improved mental health ( $p = .002$ ).

The results of general well-being, resilience, and life satisfaction are presented in Table 3. Older men reported higher general well-being and resilience than older women, although the difference was not significant. However, men reported significantly greater life satisfaction (mean = 7.62;  $p = .002$ ) than women (mean = 7.35). While there were no significant differences between those living in metropolitan and nonmetropolitan areas, measures of well-being varied substantially across sport and physical activity settings and modes, with four of the six comparisons being statistically significant, and the remaining two falling just short of significance (Table 3). Regarding sport and physical activity settings, participants in both club and informal settings had the highest levels of general well-being (mean = 3.88;  $p < .001$ ) and resilience (mean = 3.88;  $p = .025$ ). Regarding modes of participation, participants in both team and individual activities had the highest level of general well-being (mean = 3.88;  $p = .009$ ). This group also scored high on life satisfaction (mean = 7.67), but not quite as high as the team-only group (mean = 7.69), with the individual-only group scoring significantly lower (mean = 7.30;  $p < .001$ ).

## Discussion

This study investigated the impact of COVID-19 restrictions on perceived health and well-being of active Australian older adults.

**Table 2 Self-Assessment of Current Health Compared to 1 Year Ago: By Respondent Characteristics**

Health assessments	Characteristics				<i>p</i> <sup>a</sup>		
	Gender						
	Male		Female				
	<i>n</i>	%	<i>n</i>	%			
General health					.032		
Worse or much worse	229	19.4	158	24.6			
About the same	758	64.1	389	60.5			
Better or much better	196	16.6	96	14.9			
Total	1,183	100.0	643	100.0			
Physical health					.157		
Worse or much worse	135	11.4	79	12.3			
About the same	334	28.2	205	31.9			
Better or much better	716	60.4	359	55.8			
Total	1,185	100.0	643	100.0			
Mental health					.009		
Worse or much worse	218	18.4	156	24.1			
About the same	863	72.8	446	68.9			
Better or much better	105	8.9	45	7.0			
Total	1,186	100.0	647	100.0			
Health assessments	Region				<i>p</i> <sup>a</sup>		
	Metropolitan		Nonmetropolitan				
	<i>n</i>	%	<i>n</i>	%			
	<i>n</i>	%	<i>n</i>	%			
General health					.990		
Worse or much worse	231	21.1	156	21.2			
About the same	688	62.8	462	62.9			
Better or much better	177	16.1	117	15.9			
Total	1,096	100.0	735	100.0			
Physical health					.293		
Worse or much worse	118	10.8	97	13.2			
About the same	328	30.0	212	28.8			
Better or much better	649	59.3	428	58.1			
Total	1,095	100.0	737	100.0			
Mental health					.834		
Worse or much worse	222	20.2	153	20.7			
About the same	784	71.3	529	71.6			
Better or much better	93	8.5	57	7.7			
Total	1,099	100.0	739	100.0			
Health assessments	Sport and physical activity settings						<i>p</i> <sup>a</sup>
	Club only		Informal only		Club and informal		
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	
General health						.046	
Worse or much worse	114	24.3	9	14.8	265	20.3	
About the same	295	62.8	37	60.7	820	62.9	
Better or much better	61	13.0	15	24.6	218	16.7	
Total	470	100.0	61	100.0	1,303	100.0	
Physical health						.051	
Worse or much worse	69	14.7	8	12.9	138	10.6	
About the same	150	31.9	17	27.4	374	28.7	

(continued)

Better or much better	251	53.4	37	59.7	791	60.7	
Total	470	100.0	62	100.0	1,303	100.0	
Mental health							.012
Worse or much worse	87	18.4	14	22.6	274	21.0	
About the same	349	73.8	36	58.1	930	71.2	
Better or much better	37	7.8	12	19.4	102	7.8	
Total	473	100.0	62	100.0	1,306	100.0	

**Sport and physical activity modes**

	Team only		Individual only		Team and individual		
	n	%	n	%	n	%	
General health							.253
Worse or much worse	67	22.9	160	23.1	161	19.0	
About the same	185	63.1	421	60.8	546	64.3	
Better or much better	41	14.0	111	16.0	142	16.7	
Total	293	100.0	692	100.0	849	100.0	
Physical health							.200
Worse or much worse	38	12.9	94	13.6	83	9.8	
About the same	87	29.6	200	28.9	254	29.9	
Better or much better	169	57.5	397	57.5	513	60.4	
Total	294	100.0	691	100.0	850	100.0	
Mental health							.002
Worse or much worse	45	15.3	174	25.0	156	18.4	
About the same	220	74.6	470	67.5	625	73.5	
Better or much better	30	10.2	52	7.5	69	8.1	
Total	295	100.0	696	100.0	850	100.0	

<sup>a</sup>Chi-square test of independence.

Specifically, we compared perceived levels of general health, physical health, and mental health during COVID-19, and changes in each from 1 year earlier before COVID-19, on the basis of gender, residential location, and activity modes and settings.

Many other studies on physical activity and COVID-19 are focused on youth and adults, and studies including older adults generally focus on changes in activity levels and mental health (Carriedo et al., 2020; Esain et al., 2021; Suzuki et al., 2020). Furthermore, many other studies focus on total activity levels and change in activity but do not differentiate between different modes and settings of participation (García-Esquinas et al., 2021; Suzuki et al., 2020; Visser et al., 2020). This study focused on a range of health and well-being indicators and how these differ according to a variety of sport and physical activity participation modes and settings. We found significant differences in perceived health, well-being, and life satisfaction according to the type of activity and gender and residential location.

Overall, over 60% of all older adults reported their general, physical, and mental health during COVID-19 lockdown restrictions were about the same as a year ago, pre-COVID-19. This is somewhat surprising; however, it could be related to the underlying health conditions and social isolation which are associated with older adults (Manca et al., 2020, Tyrrell & Williams, 2020). During COVID-19 lockdown in 2020, the older men reported significantly poorer general health, but significantly better life satisfaction, than older women. With regard to changes in health compared to pre-COVID-19, women were more likely than men to report a decline in physical and mental health. This may be related to the fact that

women often seek out social groups more than men (Drummond et al., 2017). There is evidence that social isolation impacts mental health more for older women than men (García-Portilla et al., 2020). However, these gender differences in health for older adults are not consistent. A study of older adults in Spain did not report gender differences (García-Esquinas et al., 2021). Noteworthy, while men's and women's health have largely been reduced to a discussion around men not accessing health services as much as women, there are underpinning reasons why some groups of men do not access health services. Indeed, Mahalik and Backus Dagirmanjian (2018) argued that this needs to be understood within a gendered and social context, and traditional masculine norms (Mahalik & Backus Dagirmanjian, 2018). Traditional masculinities heavily underpinned by physical strength, and toughness is the cornerstone of the ideology that influences men's decision making. Mahalik and Backus Dagirmanjian (2018) claimed that men value the notion of annual checkups and visiting health practitioners. However, getting them to these check-ups is the difficult part (Mahalik & Backus Dagirmanjian, 2018).

Participants living in nonmetropolitan areas reported poorer physical health than those in metropolitan areas. This is not surprising given the previously reported underlying health differences between these regions, with those living in nonmetropolitan areas generally having poorer health than those living in metropolitan cities (Wakerman & Humphreys, 2019). These health inequalities by region are further exacerbated by the lack of health care services and issues with access to care, including telehealth, due to poor internet in regional and rural areas (Peters,

**Table 3** Measures of Well-Being<sup>a</sup>: By Four Respondent Characteristics

Measure	Characteristics									<i>p</i> <sup>b</sup>
	<i>n</i>	Mean	<i>SD</i>	<i>n</i>	Mean	<i>SD</i>	<i>n</i>	Mean	<i>SD</i>	
	Gender			Gender						
	Male			Female						
General well-being	1,105	3.85	0.555	596	3.80	0.60				.068
Resilience	1,135	3.85	0.579	625	3.81	0.59				.291
Life satisfaction	1,162	7.62	1.580	632	7.35	1.88				.001
Measure	Region									<i>p</i> <sup>b</sup>
	Metropolitan			Nonmetropolitan						
	<i>n</i>	Mean	<i>SD</i>	<i>n</i>	Mean	<i>SD</i>	<i>n</i>	Mean	<i>SD</i>	
General well-being	1,023	3.85	0.571	682	3.82	0.57				.285
Resilience	1,060	3.84	0.584	703	3.83	0.58				.590
Life satisfaction	1,077	7.52	1.667	720	7.54	1.73				.861
Measure	Sport and physical activity settings									<i>p</i> <sup>b</sup>
	Club only			Informal only			Club and informal			
	<i>n</i>	Mean	<i>SD</i>	<i>n</i>	Mean	<i>SD</i>	<i>n</i>	Mean	<i>SD</i>	
General well-being	432	3.73	0.614	59	3.72	0.61	1,217	3.87	0.55	<.001
Resilience	451	3.78	0.612	59	3.77	0.53	1,256	3.86	0.57	.031
Life satisfaction	459	7.41	1.902	60	7.32	1.67	1,281	7.58	1.61	.109
Measure	Sport and physical activity modes									<i>p</i> <sup>b</sup>
	Team only			Individual only			Team and individual			
	<i>n</i>	Mean	<i>SD</i>	<i>n</i>	Mean	<i>SD</i>	<i>n</i>	Mean	<i>SD</i>	
General well-being	269	3.78	0.582	656	3.80	0.61	783	3.88	0.53	.009
Resilience	281	3.77	0.586	672	3.83	0.60	813	3.86	0.57	.087
Life satisfaction	287	7.69	1.689	684	7.30	1.88	829	7.67	1.50	<.001

<sup>a</sup>General well-being: 14 items, Scale 1–5. Resilience: four items, Scale 1–5. Life satisfaction: one item, Scale 1–10. <sup>b</sup>Independent-samples *t* test (two groups) and *F* test (three groups).

2020). No other regional differences were observed. There may be cultural differences in attitudes compounded by literal social isolation which is further amplified during the pandemic, and/or fewer opportunities to play sport and be active. Furthermore, in regional and rural communities, sport plays such an important social role for the whole community. In general, non-metropolitan areas have limited choice for organized leisure-time physical activity compared to metropolitan areas (Eime et al., 2017). Therefore, older adults lost opportunities to spectate and volunteer in community sport, and to engage socially within their communities in nonmetropolitan regions, negatively impacting their health and well-being.

In terms of sport and physical activity status during COVID-19 lockdown, older adults who participated in diverse settings (both club sport and informal sport, and physical activity) had significantly better general health and physical health than those who participated solely in one of these settings. Club-only participants reported the poorest general health and physical health. The same pattern was observed for measures of general well-being and resilience. Also, regarding modes of participation, those participating in both team and individual activities reported better general well-being than those who participated solely in either team or individual activities. From a self-determination theory perspective, this could reflect how a combination of team and individual sport involvement optimally satisfies human psychological needs of control, competence, and relatedness (Deci & Ryan, 2008). For example, an individual may possess several opportunities to remain

socially connected if they are involved in a team sport environment. They may also benefit from demonstrating autonomy through having a wider range of sport and physical activity choices that can be sought out during a pandemic. By additionally engaging in individual-only sport and physical activity, the same individual may be able to satisfy their needs to feel competent through task choice and design (e.g., electing to go for a hard, fast run or a slow, leisurely walk). In this way, involvement in team and individual sport may have led to better general well-being compared to those who participated solely in either team or individual sports because they were more readily able to satisfy their basic psychological needs.

The pattern was slightly different for general and physical health, with the worst health reported by those who participated solely in team activities. There were better response profiles for those who participated solely in individual activities or in both individual and team activities. Individual sports can be more readily adapted, modified, and maintained in nontraditional settings compared to team-based sports. This has implications for how team sports can develop resources and support for members during the next unexpected event. It seems that more diversity in activity status is associated with improved health and well-being and that may also be related to social support or social nature of participation. Particularly important for older adults' activity status is their social support (Lindsay Smith et al., 2017). Social support to be physically active helps older adults become physically active, especially when that support comes from family members



(Lindsay Smith et al., 2017). Therefore, sports organizations need to consider how to support participation for older adults, especially those without immediate support from their families.

Regarding changes compared to pre-COVID-19, those who participated only in informal settings generally had the most positive profiles of health changes, while club-only participants had the most negative profiles of health change. It may be that sports club-only participants rely on sport more than others for their mental health and well-being (Elliott et al., 2021). The comparison was clearest and strongest for general health, weaker for physical health, and more complex for mental health where the informal-only group exhibited the greatest variability with the highest reported proportions of both better and worse health. These results may be a consequence of inability to engage in club-based sports during COVID-19 restrictions, while participation in informal activities such as walking or cycling was still possible.

On the other hand, team-only respondents reported the most positive profile of health changes and the highest life satisfaction during COVID-19 which may be related to better social connectedness and sense of community through teammates and other club personnel, providing a buffer effect on their well-being (Eime et al., 2013; Lindsay Smith et al., 2017). There are perceptions that team-based sports with large membership of players and volunteers have the access, infrastructure, and literacy to remain connected during the pandemic, using social media and online events to sustain connectedness (Elliott et al., 2021). It is plausible that sports with smaller membership, often characterized by individual and informal sports, experienced more barriers to remain connected with its membership by virtue of capacity. Such a perspective might encourage team only and individual only organizers and volunteers to share resources, ideas, and platforms in order to keep older Australian adults in sport and physical activity as a strategy to support general, physical, and mental health.

This study has limitations. It is based on data from a convenience sample of Australian sports participants who were predominantly recruited with the assistance of National Sporting Organisations (NSOs) and State Sporting Organisations (SSOs), in May and June 2020. The primary sample was supplemented by recruitment through social media which resulted in an additional smaller sample of participants in only informal sport or other physical activity settings, and an even smaller sample of physically inactive people. Consequently, the sample is subject to both known and unknown sources of bias and caution must be exercised in generalizing the results. Even within the primary club sport sample, the geographical coverage was uneven, depending on the strength of the relationships between the research team and the SSOs in the various states, and the capacities and priorities of different SSOs in the context of the unfolding COVID-19 situation. Nevertheless, on the other side of the ledger, the sample obtained was extremely large. Since respondents provided information about the multiple sports and other physical activities that they engaged in, there was comprehensive representation of the sporting codes and other types of recreational physical activity that are participated in by older adults in Australia.

## Conclusions

In conclusion, those older adults active in a range of settings and modes had improved health and well-being. Perhaps those who were more active pre-COVID-19 had greater motivation and/or support to continue being active during COVID-19 restrictions. Social support is very important for people to become and remain

physically active, especially for older adults. Furthermore, social support impacts the health and well-being of active adults. It is recommended that sport and community groups encourage diversity of activities for older adults and ensure social support mechanisms to maximize participation and health outcomes. The nature of diversifying activities and sporting opportunities must be engineered in a way that meets the needs of older Australian adults who seek informal, formal, individual, and team sports, and can be maintained in diverse settings (e.g., at home and at the local club) if long-term engagement in sport and physical activity is to be sustained. It is recommended that future research continue to measure participation and the range of health outcomes associated with participation and see how the return to sport post-COVID-19 can impact health and well-being.

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