

# The gendered impact of Covid-19 on health behaviours and mental health: Evidence from the UK

Karen Arulsamy (DUKE-NUS Medical School)

Paul McNamee (University of Aberdeen)

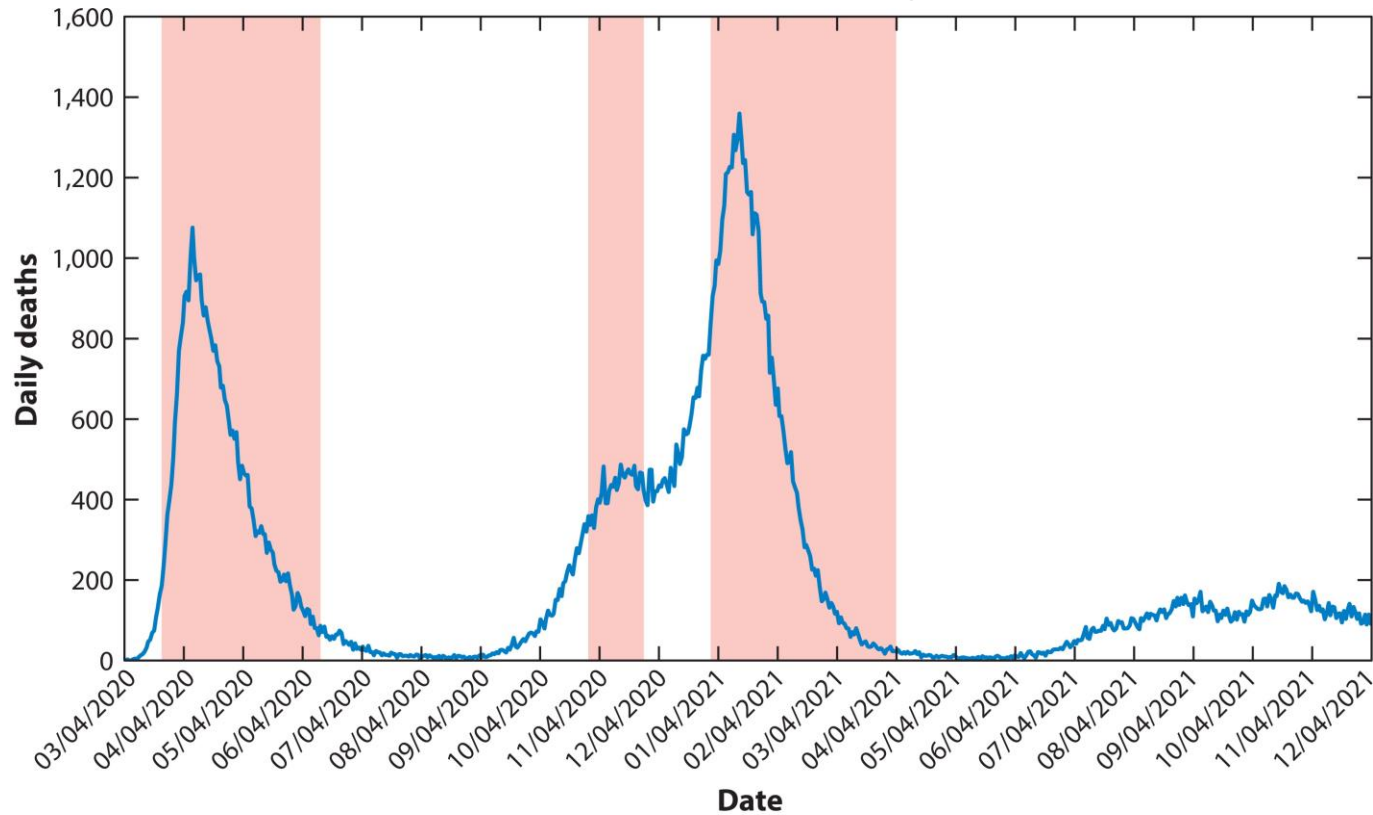
Silvia Mendolia (University of Turin)

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# Background

- Health behaviours play an important role in health and wellbeing.
- Diet, alcohol consumption, and physical activity influence mental health
  - The consumption of fruits and vegetables has been shown to improve mental health and buffer against clinical levels of distress (Conner et al. 2017; Mujcic and Oswald 2016; Mujcic and Oswald 2019; Ocean et al. 2019; Steptoe et al. 2004).
- Despite the benefits of health behaviours, a significant proportion of the population in the UK reports poor health behaviours (~30%)
  - Typically, women are more likely than men to report healthy behaviours (Health Survey for England 2018).
  - Less evidence on gender differences in the link between mental health and health behaviours.
- The Covid-19 pandemic may have impacted health behaviours and possibly the link between mental health and health behaviours.

**Figure 1 : Deaths per day from Covid-19 in the UK, March 2020, and December 2021. Lockdowns, corresponding to the shaded areas, are based on the dates of national restrictions in England. The first and third lockdowns were lifted gradually; the end date of these lockdowns is therefore the date of reopening of nonessential retail**



- The UK experienced a high rate of cases and deaths in Mar-May 2020, Nov 2020, and Jan-Feb 2021.
- Lockdowns were in place during these periods.
- In March 2021 onwards, restrictions are lifted in stages.

- Prior studies based on the initial periods (Spring 2020) of the pandemic find:
  - Significant heterogeneity (Braithwaite et al. 2022; Garnett et al. 2021; Jackson et al. 2021; Herle et al. 2021; McAtamney et al. 2021; Mitchell et al. 2022; Naughton et al. 2021; Robinson et al. 2021).
  
- Prior studies based on later periods of the pandemic (early 2021) find:
  - Lower consumption of fruits and vegetables and physical activity (O'Connell et al. 2022; Dicken et al. 2022).
  
- The likelihood of exhibiting poorer health behaviours during the pandemic is associated with:
  - Being female.
  - Having a lower socioeconomic status.
  - Poorer pre-pandemic behaviours.
  - Higher levels of stress, boredom, loneliness, and distress.

- The Covid-19 pandemic had a greater impact on women and may have adversely impacted their health behaviours to a greater extent than men.

### Why?

- Women with children shouldered more responsibilities.
  - Women spent more time on housework, childcare and other caring responsibilities, and home-schooling (Oreffice and Quintana-Domeque 2021; Sevilla and Smith 2020).
  - Relates to higher levels of cognitive labour i.e., anticipating, organizing, managing, and evaluating decision-making tasks of housework and childcare (Petts and Carlson 2023).
- Women experienced greater levels of psychological distress (Etheridge and Spantig 2022).
  - This gender gap in psychological distress was pronounced among younger women and largely driven by experiences of loneliness.
  - Some evidence that cognitive labour increased gender differences in distress (Petts and Carlson 2023).
  - Women also more likely to perceive COVID-19 as a serious health problem and were more compliant (Galasso et al. 2020).

- This study has two research objectives:
  1. What was the effect of the pandemic on gender differences in health behaviours?
  2. How did the pandemic change the relationship between mental health and health behaviours i.e., the protective effect of health behaviours on mental health?

- Our main contributions:
  - Rigorously document changes in health behaviours by gender during the pandemic.
  - Understand potential relationships with mental health.
  
- We utilize a longer time span to present a more comprehensive picture of how health behaviours changed throughout the pandemic covering all lockdown periods.
  
- We use a comprehensive set of information on health behaviours and assess the effects associated with overall health behaviours.
  
- We assess the link between mental health and health behaviours using a commonly used clinically validated measure.



# Methods

- UK Household Longitudinal Study (UKHLS): Panel dataset following 40,000 households in the UK.
- Consists of the Main Study (January 2009-May 2021) and the Covid-19 Study (April 2020-Sept 2021).
- While the Covid-19 Study was fielded monthly until July 2020 and then bimonthly with the last data collection in Sept 2021, health behaviours were not measured in every wave.
- We primarily use the Main Study to adequately capture changes in health behaviours and their associations with mental health throughout most of the pandemic
  - Data from Waves 7 (2015-2017), 9 (2017-2019) and 11 (Jan 2019-May 2021).
  - Data from other waves excluded as health behaviours variables not collected.



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| <b>Health behaviours</b>             | <b>Variables</b>  |
|--------------------------------------|---|
| Consumption of fruits and vegetables | Number of days a respondent consumes fruit in a week (at least 4 days a week vs. less than)<br>Number of days respondent consumes vegetables in a week (at least 4 days a week vs. less than)<br>Number of servings of fruit and veg (at least 5 servings of fruit and veg vs. less than) |
| Physical activity                    | MET minutes of moderate and/or vigorous activities and walking per week (at least 600 MET minutes vs. less than)  |
| Consumption of alcohol               | Frequency of consumption (drinking less than 2-3 times per week vs. more than)<br>Occasions of binge-drinking (binge-drinking less than weekly vs. more than weekly)  |
| Healthy Lifestyle Index              | Number of healthy behaviours (0-6)  |
| Healthy Lifestyle Indicator          | 4 or more healthy behaviours vs. less than  |

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- Mental health
  - Assessed using the **General Health Questionnaire (GHQ-12)** in every wave of UKHLS
    - Respondents are asked to rate on a 4-point Likert scale their general happiness, confidence and capacity to face problems, overcome difficulties, make decisions, and enjoy day to day activities.
    - We use the Likert score (0-36) with higher scores indicating worse mental health
    - We assess the sensitivity of results to using the Caseness score (0-12) and the cut-off score (at least 3 and above denoting risk of clinical levels of psychological distress on the Caseness score)

## Research Question 1: What was the effect of the pandemic on gender differences in health behaviours?

Difference-in-differences model comparing pre and post outcomes by gender

$$Y_{i(t)} = \delta_i + \delta_2 Female_i + \delta_3 (Female_i * COVID_t) + \delta_4 X_{it} + m_t + \varepsilon_{it}$$

- The coefficient on the interaction term shows the gender differences in the impact of the pandemic i.e., changes in health behaviours between men and women.
- Controls include ethnicity, region, age, educational attainment, and month fixed effects.
- Three other models also estimated with base model + gender-specific linear trends, gender-age interaction, and individual fixed effects.

## Research Question 2: How did the pandemic change the relationship between mental health and health behaviours?

Difference-in-differences model comparing pre and post outcomes estimated separately by gender

$$MH_{i(t)} = \beta_1 + \beta_2 HB_{it} + \beta_3 (HB_{it} * COVID_t) + \beta_4 X_{it} + m_t + \gamma_i + \mu_{it}$$

- Controls for ethnicity, region, age, educational attainment, month and individual fixed effects.
- $\beta_2$  captures the relationship between health behaviours & MH before the pandemic.
- $\beta_3$  captures the effect of the pandemic on this relationship.
- $\beta_2 + \beta_3$  captures the relationship between health behaviours & MH after the pandemic.

# Results

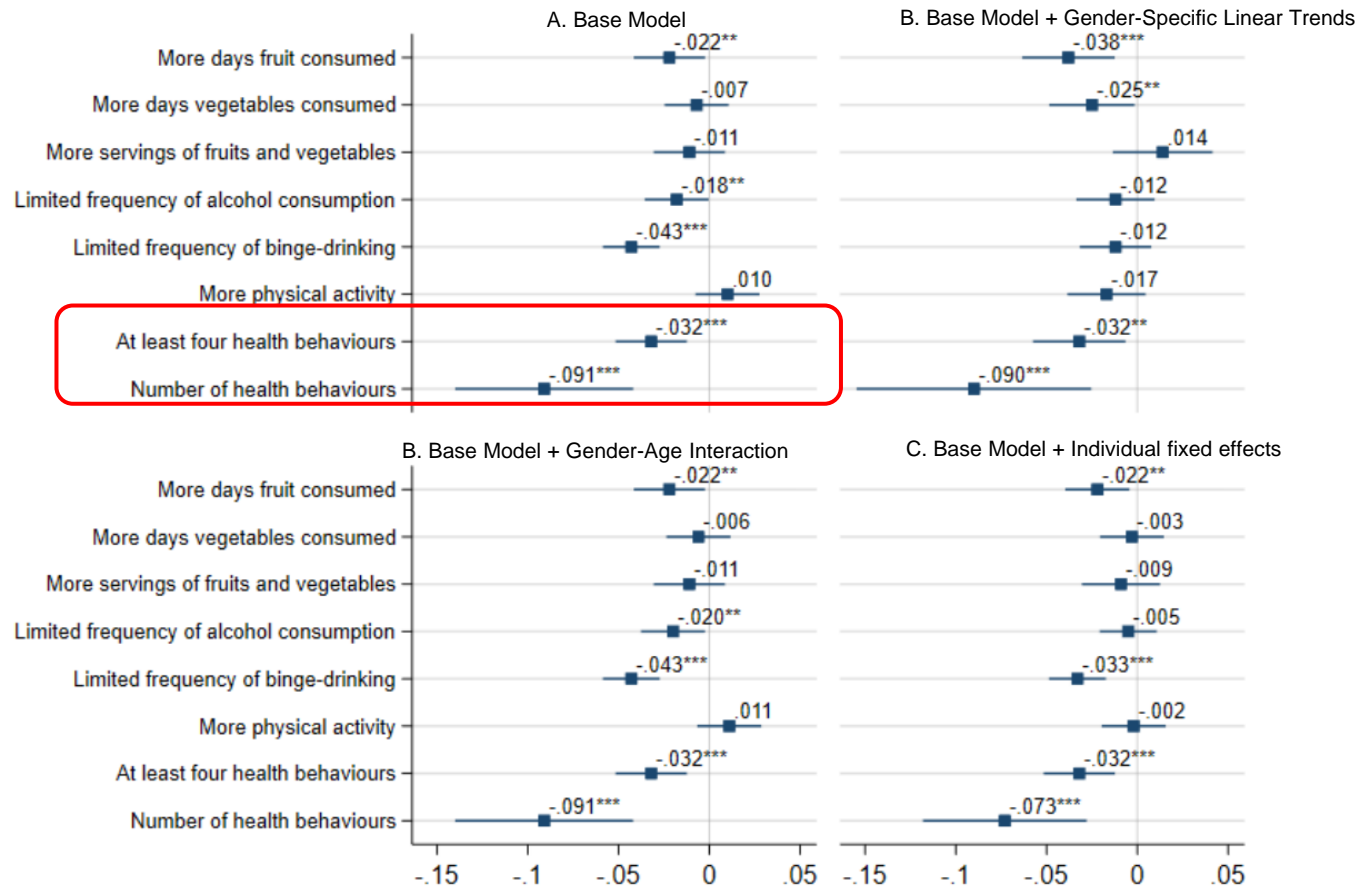
Table 2: A comparison of outcome variables before and during the pandemic by gender

|  | Women               |                     | Men                 |                     |
|--|---------------------|---------------------|---------------------|---------------------|
|  | Before the pandemic | During the pandemic | Before the pandemic | During the pandemic |
| More days fruit consumed                 | 68.6%               | 65.8%               | 59.3%               | 59.0%               |
| More days vegetables consumed            | 79.1%               | 76.3%               | 73.6%               | 71.7%               |
| More servings of fruits and vegetables   | 50.7%               | 56.2%               | 43.2%               | 49.9%               |
| Limited frequency of alcohol consumption | 49.5%               | 52.1%               | 34.7%               | 38.9%               |
| Limited frequency of binge-drinking      | 82.5%               | 86.8%               | 70.7%               | 79.3%               |
| More physical activity                   | 79.1%               | 74.6%               | 84.7%               | 79.2%               |
| Number of health behaviours              | 4.1<br>(1.3)        | 4.1<br>(1.3)        | 3.7<br>(1.3)        | 3.8<br>(1.3)        |
| At least four health behaviours          | 70.0%               | 70.5%               | 56.7%               | 60.5%               |
| GHQ-12 Likert Score                      | 11.6<br>(5.8)       | 12.6<br>(5.9)       | 10.5<br>(5.1)       | 11.2<br>(5.4)       |
| GHQ-12 Caseness Score                    | 2.0                 | 2.6                 | 1.4                 | 1.8                 |
| Presence of psychological distress       | 25.7%               | 34.6%               | 18.6%               | 22.8%               |
| N - Observations                         | 36,414              | 5,404               | 29,116              | 4,240               |

- Based on unadjusted data, we see that despite changes in health behaviours during the pandemic, women are still more likely than men to report better 'levels' of health behaviours.

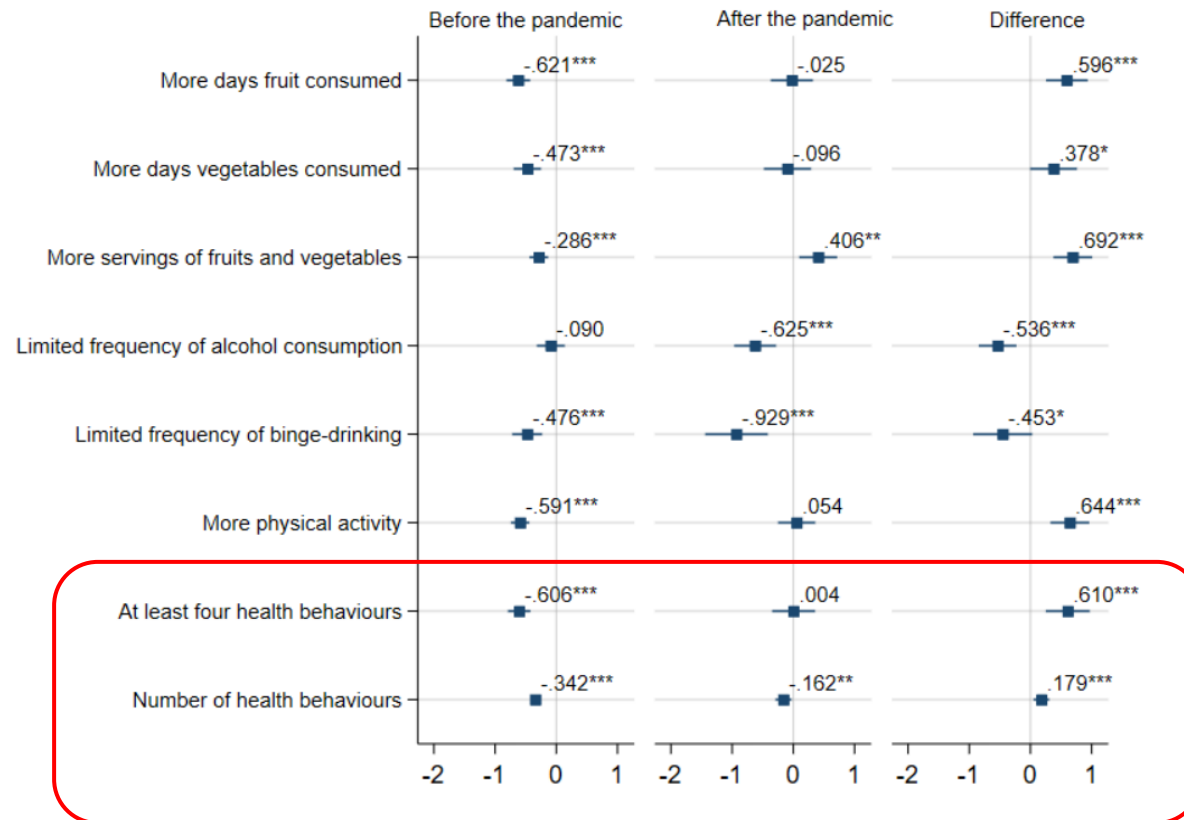


Figure 1: Gender differences in pandemic effects on health behaviours



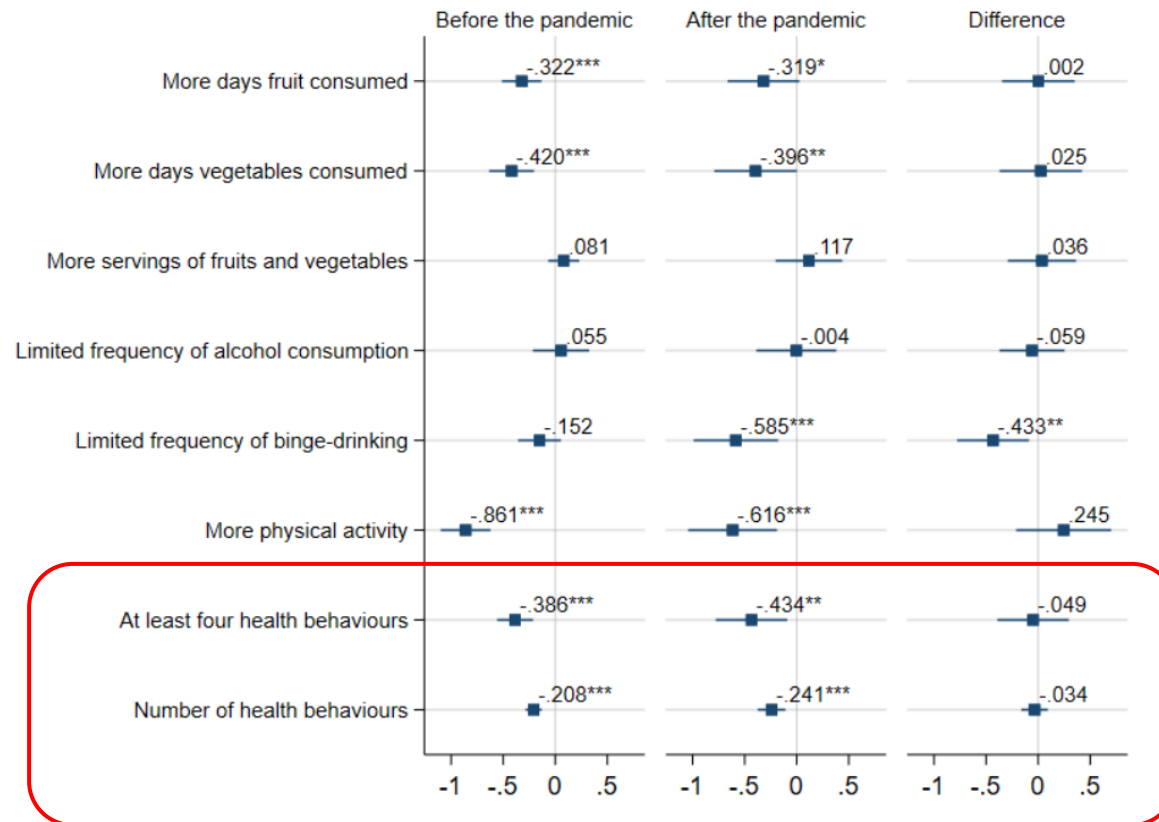
- Based on the main model, women were **3.2 percentage points less likely to report a healthy lifestyle** and reported **0.09 fewer health behaviours** compared to men during the pandemic.
- This finding is consistent across all four models although differences in the contribution of individual health behaviours emerge.

Figure 2: The protective effect of health behaviours for women



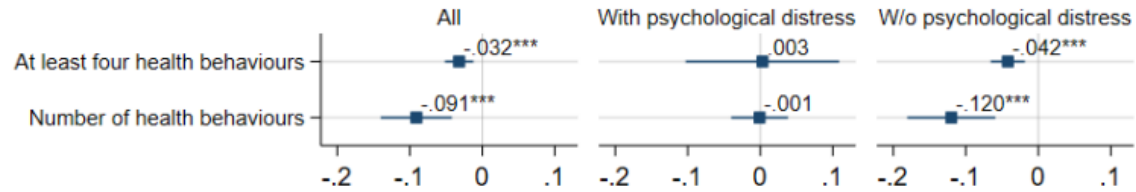
- Before the pandemic, there is a large statistically significant relationship between health behaviours and mental health, among women, before the pandemic.
- During the pandemic, the associations between most of these measures and mental health weaken or disappear.
- **The association between mental health and the healthy lifestyle indicator completely disappears during the pandemic** - corresponds to a loss of 10.5 per cent of a S.D in the GHQ-12 Likert score.

Figure 3: The protective effect of health behaviours on mental health among men



- Before the pandemic, there is a large statistically significant relationship between health behaviours and mental health to a lesser extent than for women.
- While the relationship between the healthy lifestyle indicator and number of health behaviours with mental health increase in magnitude, these differences are not significant.
- Thus, **while the pandemic is associated with a lower protective effect of health behaviours on mental health for women, this effect remains unchanged for men.**

Figure S9: Gender differences in pandemic effects on health behaviours by presence of psychological distress



- Adverse changes in health behaviours largely present in the sample of women and men who report no psychological distress
- Evidence that psychological distress is not the sole driver of poorer health behaviours among women but we cannot refute the bidirectional relationship between mental health and health behaviours

- Broadly, the pandemic worsened health behaviours among women compared to men
  - Women are 3.2 percentage points less likely to adopt a healthy lifestyle
  - Results are robust to gender-specific linear trends, gender-age interaction, and individual fixed effects.
  - Results also robust to using data from the COVID-19 Study, employing the GHQ-12 Caseness continuous and cut-off measures, and excluding walking under physical activity.
  
- We also observe that there was a reduction in the link between mental health and health behaviours for women but not so for men
  - Thus, the protective effect of health behaviours on mental health weakened for women but remain unchanged for men during the pandemic.