

# Underreporting of Depression in Australian Commercial Pilots

Stuart D. T. Minnock; Matthew J. W. Thomas

- INTRODUCTION:** Undiagnosed depression in the aviation industry can have catastrophic consequences such as aircraft-assisted suicide. Depression is often underreported, especially when subjects are aware they are reporting on depression. The aim of the present study was to investigate whether scores on a depression screening tool would vary if it was disguised as a “life stress” questionnaire in a sample of Australian commercial pilots.
- METHODS:** A total of 109 subjects were assigned into either a “Life Stress” survey or a “Depression” survey, both containing the Depression, Anxiety, Stress Scales depression screening tool among other questions relating to either depression or stress to determine any variation in depression scores.
- RESULTS:** A statistically significant difference was found in which the covert group that completed a “life-stress” survey scored higher average depression scores than the control group completing an overt depression inventory. Prevalence of depression was consistent with the general population, with 25% of pilots meeting the threshold for depression within the control group, and this number increased to 41% when using a covert measure to assess depression.
- DISCUSSION:** This research adds further weight to the potential underreporting of depression in pilots as a function of stigma and fear associated with the label “depression”. Regulators and organizations must proactively minimize exposure to psychological harm, negating the reliance on self-reporting to control psychological risk and recruitment methods must aim to reduce bias against those with disabilities. Nonpunitive environments for pilots to self-assess and report psychological issues will allow better outcomes from expedited treatment.
- KEYWORDS:** psychosocial, pilots, aviation, underreporting.

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Depression is a common and serious mental health disorder that impacts all aspects of society. It has been estimated to cost billions of dollars annually and has a wide range of consequences affecting the individual throughout the course of the disorder ranging from mild to severe. It can lead to negative health outcomes manifesting in negative behaviors, problematic cognitions, and serious health issues. It is a major risk factor in suicide, especially when combined with other comorbidities such as substance use disorder.

In the workforce, suicide risk is elevated in occupations with high job demands, low autonomy, shift work, physical danger, and access to lethal means.<sup>1</sup> Aircraft have been used as a mechanism to end life, with the first recorded instance in the United States in 1964.<sup>2</sup> Although primarily in general aviation aircraft, larger aircraft have been used and the crash of Germanwings Flight 9525 in 2015<sup>3</sup> changed the way aviation stakeholders viewed pilot mental health and well-being. Unfortunately, this

was not an isolated incident, with other high-profile crashes, such as SilkAir flight MI 185 and Egypt Air flight 990 both being linked with intentional acts by the flight crew to end their own life while killing the traveling public in the process.<sup>4,5</sup>

The aviation sector has stringent medical requirements for pilots and examinations are carried out regularly to assess physical and psychological fitness through observations and self-report questionnaires.<sup>6</sup> Regulators require a pilot who has

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depressive symptoms to be stood down from flying duties while assessment, treatment, and, in some cases, suitability of medication is assessed.<sup>7</sup> Depressive episodes vary between individuals, with recovery times averaging between 2 to 4 mo once treatment is started.<sup>8</sup>

Pilots have a legal responsibility to ensure they are fit to fly. Australian legislation prohibits flight crew from acting as a crewmember when they are aware that they have a health issue that could impact their ability to operate safely.<sup>9</sup> Although data suggests that pilots may be willingly withholding their health status, often the reality is much more complex. Pilots often work long hours, crossing multiple time zones, carrying out shift work during both day and night through the window of circadian low, which are risk factors for depression.<sup>10</sup> These risk factors are also closely linked to fatigue, which shares many symptoms with depression such as difficulty concentrating, impairment in decision making, tiredness, and other disorders such as insomnia.<sup>11,12</sup> Being exposed to multiple factors that are consistent with both fatigue and depression may lead individuals to believe that symptoms being experienced are related to other factors inherent for the job rather than a mental health issue.

Depression is often underreported and underreporting has been shown to be prevalent in the general population, with men shown to underreport depression more frequently than women.<sup>13</sup> This has been suggested to be driven by a combination of factors, including perceived stigma, potential repercussions, and a belief that depression should be able to be controlled without assistance or intervention.<sup>14</sup> Further, fear of negative career implications and concern surrounding confidentiality explain the reasoning for not disclosing psychological issues within occupations that rely on medical standards for employment.<sup>15</sup> Being medically unfit for employment can create financial and employment uncertainty, with research into various organizational stakeholders finding that these fears may be warranted. Human resource professionals have been shown to discriminate against those with mental health issues as they attempt to reduce the employers' financial risk.<sup>16</sup> Disclosing can lead to issues within a team environment, impacting team dynamics and expectations, increasing the burden on the individual to justify their contributions under increased scrutiny.<sup>17</sup> Individual characteristics that are prevalent in the pilot population, such as an over-valuing of self-reliance, masculinity, and perceptions that psychological distress is a weakness, add to other deterrents in seeking help such as stigma and lack of mental health knowledge, which contribute to a lack of disclosure.<sup>16</sup>

Depressive symptoms are also underreported based on whether individuals are aware they are rating depression rather than other characteristics such as stress.<sup>18</sup> To assess whether subjects' depressive symptoms would differ based on reporting depression or stress, researchers disguised depression questions among questions relating to life stressors. Subjects reporting on the disguised depression survey scored significantly higher depressive symptoms than those who were aware of reporting on depression.

There has been limited research into the underreporting of depression within the Australian commercial pilot population. The present study aimed to determine whether Australian pilots will underreport depression if they are aware they are completing a depression inventory. We hypothesized that pilots who self-report using a covert version of the depression scales from the Depression Anxiety Stress Scales (DASS)<sup>19</sup> labeled "Life Stress Inventory" will report a higher mean depression score than pilots in the overt group that complete the DASS depression scale labeled "Depression Inventory".

## METHODS

### Subjects

The study protocol was approved in advance by the Central Queensland University Human Research Ethics Committee, approval number 2022-020. Each subject provided written informed consent before participating. A total of 109 subjects (101 men and 8 women) were randomly assigned into either the overt group ( $N = 56$ ) completing a depression survey or the covert group ( $N = 53$ ) completing a life stress survey. The mean age was 48.85 yr and subjects were required to hold at least an Australian commercial pilot license and current class one medical. Those who did not hold either of these were excluded from the research. Subjects were employed by a major Australian airline and were recruited into the survey by a communication contained in a weekly newsletter. Participation was anonymous, voluntary, and limited disclosure was used to disguise the aim of the research. After completing the survey, actual research aims were disclosed to subjects, who were then asked for consent a second time before submitting responses.

An experimental design was used in which one independent variable with two levels, control or experimental, was manipulated to provide a depression score as the dependent variable. The independent variable was manipulated by randomly assigning participants into either a control group where they answered questions related to depression or an experimental group where they answered questions on life stressors.

### Materials

The DASS was used to determine a depression score as the dependent variable. The DASS is a widely used screening tool in Australia, consisting of a 42-item inventory containing 3 self-report scales measuring negative emotion states of depression, anxiety, and stress among adults.<sup>19</sup> The depression scale assesses dysphoria, hopelessness, devaluation of life, self-deprecation, lack of interest/involvement, anhedonia, and inertia. The measure asks to rate the degree to which each item statement applies to subjects over the past 2 wk on a 4-point (0–3) scale answering either never, some of the time, most of the time, or always and scores were recorded only for questions relating to the depression scales. The covert "Life Stress Inventory" contained all DASS depression questions hidden among 12 filler questions from the DASS stress scale. Likewise, the

overt “Depression Inventory” contained the DASS depression questions hidden among filler questions from the Zung Self Rating of Depression Scale<sup>20</sup> which were adapted to conform to the format of the DASS.

### Procedure

Subjects were recruited via a communication contained in a weekly newsletter asking for participation in a study to understand the challenges experienced by pilots as they returned to work after the COVID-19 pandemic. They accessed the survey via a link where information, instructions, and a question asking for consent was given. Subjects were randomly assigned into two groups. Group one entered the overt group labeled “Depression Inventory” where they were presented with questions overtly related to depression and Group two entered the covert group labeled “Life Stressor Inventory” where they answered questions on stress and depression. As the DASS was being used as a survey and not as a screening instrument, standard instructions were not given to subjects. Both groups completed the DASS depression questions based on how they had been feeling over the past 2 wk. The dependent variable, depression, was the average of each group’s total depression scores based on the sum of individual participant depression scores. Individual depression scores were also evaluated using a threshold score of 10 as per the DASS scoring sheet to determine depressive symptoms of mild and greater.

### RESULTS

On average, pilots who completed a disguised, covert version of the DASS labeled Life Stress Inventory reported higher average depression scores ( $M = 8.74$ ,  $SE = 0.85$ ) than pilots who completed the DASS as an overt depression inventory ( $M = 6.32$ ,  $SE = 1.03$ ). An independent samples  $t$ -test determined this

difference was significant [ $t(107) = -1.81$ ,  $P = 0.037$ ]. These results suggest that pilots are more likely to report higher depression scores if they believe they are reporting on stress rather than depression.

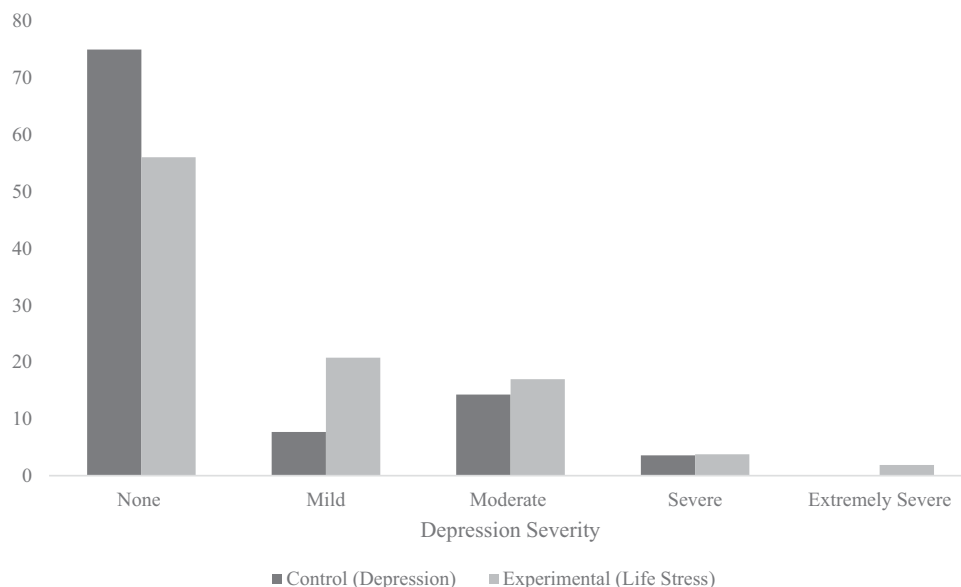
Overall, 25% of pilots in the control group where depression was overtly reported scored on or above the DASS threshold for depression (10). When the DASS was disguised, the number of pilots reporting above the threshold increased to 41%, capturing an additional 16% of pilots meeting the criteria for depression.

The experimental group had a higher percentage of pilots in the mild, moderate, moderate to severe, and severe categories, with the biggest difference noted in the mild depression range, as can be seen in **Fig. 1**.

### DISCUSSION

The results of this study confirmed that Australian pilots under-report depression severity based on whether they explicitly reported on depression. Results indicated that 25% of the sample met the threshold for depression, consistent with previous research within the pilot community, where between 12% and 18% of pilots surveyed achieved thresholds associated with depression when they were aware they were self-reporting on depression.<sup>21,22</sup>

When pilots believed they were reporting on stress, the percentage of pilots meeting the threshold for depression increased to 41%, indicating that self-reporting psychological distress can be unreliable. Pilots may be unaware they are experiencing depression, as other symptoms related to their job such as fatigue can often mask the severity of depressive symptoms.<sup>21</sup> Pilots often require a personality that exudes confidence and control, which may conflict with self-reporting due to a propensity to dismiss the symptoms, believing they can self-manage



**Fig. 1.** Pilot depression severity by group (%).

the disorder. Prior research indicates pilots often attend work when it is inappropriate to do so, with pilots flying despite experiencing a new physical or psychological symptom they felt needed further examination. Pilots also reported they had misrepresented or withheld information on healthcare questionnaires for fear of losing their flying privileges.<sup>23</sup> Fear of repercussions serves as a major barrier to disclosure. Aviation stakeholders have considerable resources aimed at pilot health and well-being; however, there remains a hesitancy to report health issues, especially mental health issues. Psychological risk mitigation and programs such as employee assistance programs rely heavily on self-disclosure and this has been shown to be unreliable, creating an inherent risk to safety that is not being captured adequately. Other mechanisms and methodologies need to be explored at the regulatory and organizational level which proactively minimize psychological risk and, therefore, minimize exposure to psychological harm, negating the reliance on self-assessment and reporting.

Pilots require a medical to work and any health issue that disqualifies them from a medical certificate may negatively impact their career progression and finances. Even after successful treatment and management of depression, a diagnosis that remains on health records has the possibility of being viewed negatively by those in recruitment, even though legislation prevents employers from discriminating on the basis of disability. This can further impact a pilot's career, where multiple organizational changes are often necessary to progress their career. Recruitment procedures may wish to separate medical history from applications until after the candidate is assessed as suitable for the role. Medical history can be scrutinized pre-employment by medical personnel to reduce bias based on the candidate's past health. Allowing flight crew freedom to investigate their psychological state in a nonpunitive environment to determine whether their experience is due to symptoms other than depression or depression itself can increase self-disclosure. Changing the way pilots perceive mental illness so that psychological fitness is treated in the same way as physical fitness, with clear treatment and return to work plans, could reduce stigma and fears associated with disclosing, which may allow pilots to seek treatment earlier in the course of the disorder, leading to quicker recovery times.

Limitations of the research include a low participation rate of female pilots and an inability to analyze gender differences. As no information was offered regarding when to complete the survey, associated factors such as fatigue may have impacted the results and further research may benefit from controlling for other factors that may be comorbid with depression in the pilot population. This research was carried out shortly after the COVID-19 pandemic when pilots were returning to their employment. Uncertainty surrounding employment, which is a risk factor for depression, and financial stress may have been a contributor to the results of the present research, and further research would need to focus on reasoning for nondisclosure. Limited disclosure was used to prevent awareness of research aims in order to measure the effect between groups. While limited disclosure was deemed acceptable within this research

context, using such a method in a clinical setting is not acceptable practice and clinicians should follow published instructions to achieve valid results.

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