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Title

Exploring the wellbeing and resilience of postgraduate researchers.

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Abstract

Much research around student mental health focuses on undergraduate students. However, recent research suggests that depression and anxiety are just as prevalent among postgraduate researchers (PGRs). This study explores the experience of PGRs in the UK (*N*=50) and their wellbeing and resilience. The results of the survey indicated that the participants had significantly lower wellbeing and resilience levels in comparison to the general population. The analysis of qualitative survey responses highlighted five factors that affected the participants' perceived wellbeing: supervision, expectations, support, balance, and coping. A benefit of the current study is that it investigates a whole range of known stressors in contrast to previous research that tends to focus on one or a small number of factors. The study puts forward several key recommendations for supervisors and universities. The authors recommend that supervisors and doctoral schools encourage peer support networks and open dialogue with students around the reality of PGR study, to manage expectations and reduce self-doubt. Further research should look to investigate in more detail the challenges faced by PGRs across the whole journey to develop beneficial wellbeing interventions that are aligned to PGRs' specific needs.

Key words

Wellbeing, resilience, postgraduate research, doctoral researchers, higher education, student mental health.

Introduction

Concerns about the rates of poor mental health, suicide, and a demand for counselling in students in higher education (HE) have increased in recent years (Eisenberg, Gollust, Golberstein, & Hefner, 2007; Macaskill, 2013; M. Williams et al., 2015). Much research around student mental health focuses on undergraduate students. However, recent research suggests that depression and anxiety are just as prevalent among postgraduate researchers (PGRs) (Barton & Bulmer, 2017). Studies that focus on PGR mental health indicate a high occurrence of mental health problems, mental distress, and symptoms of anxiety or depression (Evans, Bira, Gastelum, Weiss, & Vanderford, 2018; Guthrie et al., 2018; Levecque, Anseel, De Beuckelaer, Van der Heyden, & Gisle, 2017; Lipson, Zhou, Wagner, Beck, & Eisenberg, 2016; Pranger, Tyron, & Smith, 2014; Rummell, 2015).

Review of factors affecting PGR mental health and wellbeing

Existing research has highlighted a range of factors that contribute to the high rates of mental health problems in PGRs. The landmark study by Levecque et al. (2017) highlights several differences between European and North American PGR programmes including fees, funding, publication requirements, time to degree, and training. However, the decision was made to include international research within this review due to the limited UK-specific research and the many similarities across contexts, such as programme structure and supervision. Levecque et al. (2017) conclude that the PGR experience is likely to be comparable across countries due to these similarities and the high mobility of academic researchers globally.

Existing literature reviews identify that supervision is the most-researched factor in relation to PGR wellbeing (Leonard, Metcalfe, Becker, & Evans, 2006; Mackie & Bates, 2019). The research supervisor is commonly identified as the central resource of support for PGRs (Devos et al., 2017; Hunter & Devine, 2016; Metcalfe, 2018; S. Schmidt, Roesler, Kusserow, & Rau, 2014), having a significant impact on their emotions and work engagement (Caesens, Stinglhamber, & Luypaert,

2014; De Clercq et al., 2019). Poor supervision has been linked to increased stress, exhaustion, burnout, attrition, and mental health problems (Cornér, Löfström, & Pyhältö, 2017; Hyun, Quinn, Madon, & Lustig, 2006; Levecque et al., 2017; Peluso, Carleton, & Asmundson, 2011; Travaglianti, Babic, & Hansez, 2018). Research suggests areas in which supervisors should support PGRs, such as encouraging them to take part in a wide range of academic activities (Emmioğlu, McAlpine, & Amundsen, 2017), supporting their psychosocial needs (Roach, Christensen, & Rieger, 2019), and encouraging reflective practice and problem-solving (Spacey, Harvey, & Casey, 2020). Satisfactory supervision has been linked to reduced emotional exhaustion and attrition, and better mental health (Begin & Gerard, 2013; Hunter & Devine, 2016; Levecque et al., 2017). Important positive traits of supervisors, as reported by PGRs, include accessibility, helpfulness, enthusiasm, and supportiveness (Barnes, Williams, & Archer, 2010; Begin & Gerard, 2013; Wright, 2003; Yarwood-Ross & Haigh, 2014), but there lacks a consistent framework in the sector of what makes a "good supervisor". Currently, there is not a standardised training or selection process for becoming a research supervisor in the UK (Taylor, 2018), with supervisors often learning through experience (Grant, Hackney, & Edgar, 2014). However, it is acknowledged that most universities run their own training and development programmes. Accordingly, in 2019 the UK Council for Graduate Education (UKCGE) set up a national Research Supervisor Recognition Programme, which invites supervisors to reflect on their practice and apply for the award of Recognised Research Supervisor (Taylor, 2019).

Aside from supervision, research explores the personal factors that can impact PGR wellbeing. For example, maintaining work-life balance is acknowledged as a central challenge of PGR study (Levecque et al., 2017; Martinez, Ordu, Della Sala, & McFarlane, 2013; Metcalfe, 2018; Offstein, Larson, McNeill, & Mwale, 2004), with students continually making trade-offs to balance conflicting responsibilities (Martinez et al., 2013; M. Schmidt & Umans, 2014; Sverdlik, Hall, McAlpine, & Hubbard, 2018). Moreover, financial concerns can negatively impact the mental health of PGRs (Barton & Bulmer, 2017; Hyun et al., 2006). A recent study by the HE Policy Institute, "PhD life: The student experience" (Cornell, 2020), highlighted that the basic stipend from the UK Research Council equates to earning less than minimum wage. In addition, only 40% of PGRs are likely to be in fixed-term employment after graduation (UKCGE, 2020); with just 30% working in an academic or research role in HE three and a half years after graduation (Hancock, 2020). Although this is a higher rate than undergraduates (Reino & Byrom, 2017), recent research links the uncertainty of career prospects to adverse mental health outcomes for PGRs (Levecque et al., 2017; Marais, Shankland, Haag, Fiault, & Juniper, 2018; Mattocks & Briscoe-Palmer, 2016; Metcalfe, 2018; Travaglianti et al., 2018).

With increased pressure to gain employment after graduation, post-doctoral job opportunities are extremely competitive to secure. An international survey recently revealed that 56% of those who had completed their doctorates had a negative view of their job prospects (Woolston, 2020). HE professionals argue that academic environments are becoming increasingly competitive due to the job market, leading to feelings of self-doubt in PGRs (Metcalfe, 2018). In relation to the PGR experience, this is commonly discussed via blogs, social media, and related research. Fear or failure and the expectations of others are said to shape feelings of self-doubt in PGRs (Craddock, Birnbaum, Rodriguez, Cobb, & Zeeh, 2011), others believe that this stems from feeling academically unprepared (Cisco, 2020). Byrom, Dinu, Kirkman, and Hughes (2020) measured perceived fraudulence and self-depreciation in PGRs, finding these concepts predicted higher levels of stress and wellbeing.

Byrom et al. (2020) recommend that enhancing social support from other academics may tackle self-depreciation. Research confirms that a sense of belonging to an academic community and networking with peers is an important factor in helping PGRs adjust and navigate the journey, providing a source of vicarious learning and inspiration (Christensen & Lund, 2014; Pyhältö, Peltonen, Castelló, & McAlpine, 2019; Stubb, Pyhältö, & Lonka, 2011; Trout, 2018; Vekkaila, Pyhältö, & Lonka, 2013), and negating stress and study disengagement (Cornwall et al., 2019; Pyhältö &

Keskinen, 2012; Sakurai, Pyhältö, & Lindblom-Ylänne, 2012). Much research argues that peer support is key to promoting wellbeing and academic success (Caesens et al., 2014; De Clercq et al., 2019; Susan Gardner, 2010; Naylor, Chakravarti, & Baik, 2018; Waight & Giordano, 2018). However, several studies from various countries suggest that PGRs report a lack of academic community at their universities (Cornwall et al., 2019; Susan Gardner & Gopaul, 2012; McAlpine, Jazvac-Martek, & Hopwood, 2009; Pyhältö & Keskinen, 2012; Pyhältö, Stubb, & Lonka, 2009; Sakurai et al., 2012; Trout, 2018). This may be because not all PGRs have equal access to social support (Lahenius, 2012; Waight & Giordano, 2018). For instance, part-time students and distance learners may miss out on the face-to-face interaction which is said to be most valuable to PGRs, in comparison to online methods of delivering support and supervision (Pilbeam, Lloyd-Jones, & Denyer, 2013). However, the shift to online methods of support during the COVID-19 pandemic may have been beneficial to some PGRs. There may be more importance placed on online delivery of these resources going forward, but research is yet to confirm this.

Measuring mental health and wellbeing

Measuring student wellbeing is complex due to the range of terminology and scales used to describe and measure the concepts. The imprecise and blurred terminology along the mental health and wellbeing spectrum, paired with the lack of consistency in data collection, limits the extent to which the existing research evidence can be combined or compared (Barkham et al., 2019; Hazell et al., 2020; M. Schmidt & Hansson, 2018; Scott & Takarangi, 2019). In the study of PGR wellbeing, there has been a multitude of survey-based studies using different scales and reporting varying estimates of wellbeing or mental illness. This has meant that researchers have been unable to link and combine the data systematically (Hazell et al., 2020). This may have led universities to implement interventions without robust evidence and prevalence data (Barkham et al., 2019).

Wellbeing

From this point onwards, this study will specifically refer to the wellbeing of PGRs as the topic of investigation. In the last decade, there has been a substantial shift from the research focus of mental illness to the study of wellbeing and good mental health (Huppert, 2009). Likewise, many charity, sector, or university-funded initiatives have focused on promoting wellbeing: population-based strategies to promote self-care and coping, not solely the referral and treatment of individuals with mental health problems.

There is a need for continuity of wellbeing measures in the study of student wellbeing (Dodd et al., 2021). The Warwick-Edinburgh Mental Wellbeing Scale (WEMWBS) (Tennant et al., 2007) is said to be the most frequently used scale to measure the wellbeing of student samples and is recommended for use within student populations (Barkham et al., 2019; Dodd et al., 2021). The concept of wellbeing defined by the WEMWBS goes beyond the absence of mental illness, encompassing psychological functioning and subjective wellbeing. The conceptual framework of the WEMWBS is consistent with the definition of wellbeing provided by The World Health Organization (WHO): a state in which an individual can cope with the stresses of life, realises their potential, and has a sense of belonging to their community (World Health Organization, 2005).

Resilience

A recent literature review highlighted the role that resilience can play in coping and success at university (Brewer et al., 2019). Therefore, interest in resilience in student groups is increasing, with many interventions focusing on promoting resilience (Worsley, Pennington, & Corcoran, 2020). To the researchers' knowledge, resilience has not been measured in PGR samples in relation to wellbeing (Hazell et al., 2020).

The Connor-Davidson Resilience Scale (CD-RISC) was utilised in this study. The scale was developed with the goal of creating a primary, well-validated measure to establish the resilience of the general population. The authors drew upon the work of previous researchers to develop their own theoretical framework of resilience. The scale assesses an individuals' bonds and attachments, previous experiences of success (Rutter, 1985), hardiness and control (Kobasa, 1979), and patience and endurance (Lyons, 1991), to embody all personal qualities that enable one to thrive in the face of adversity (Connor & Davidson, 2003).

Study Aims

The current study aimed to:

- assess the factors relating to the PGR experience that affect wellbeing; and
- compare the wellbeing and resilience levels of the PGR sample to population samples.

Methods

Ethical approval

Ethical approval was received on the 7th August 2019 from XX University *(add after peer-review*), under the reference 24627. All participants gave consent for their non-identifiable responses to be included in the analysis and reporting of this research.

Method

A survey was disseminated in 2019, seeking a convenience sample of PGRs through word of mouth and social media advertisements. The web-based survey was built via Online Surveys and was administered in English. The survey took approximately 20 minutes to complete.

Quantitative and qualitative data were collected concurrently. However, a quantitative, rather than a qualitative orientation, was given priority in this study (Creswell, 2004). The survey consisted of 3 validated quantitative scales, with one open-ended question at the end:

> *"If you have any additional thoughts you would like to share about your experience of being a PGR student and how this may have affected your wellbeing please enter your comments below"*.

This question was included to ensure that all participants had an opportunity to voice any thoughts or concerns in their own words (Oppenheim, 1966). The triangulation of the results occurred during the reporting and discussions of the results (Creswell, 2004) to gain complete understanding of the PGRs' experiences of wellbeing.

Quantitative measures

Factors affecting PGR Wellbeing

To address the study's first aim, the factors that most affected PGR wellbeing were conceptualised using the Juniper PhD Wellbeing Scale (JPWBS) (Juniper, Walsh, Richardson, & Morley, 2012). The scale was designed to measure the part of a PGR's overall wellbeing that is primarily affected by their research degree (Juniper et al., 2012). The scale operationalises PhD wellbeing through 7 domains: "Supervision", "Research", "University", "Social", "Health and Home", "Facilities" and "Development". Each item is rated from 1 to 5 from "not at all important" to "extremely important", with 5 indicating that the item has a greater impact on wellbeing. Each domain has a different number of items within it, for example the "Supervisor" domain has 13 questions in comparison to the "Facilities" domain that has 6. Therefore, results are based on mean scores.

Few researchers have since utilised the scale (Hargreaves, De Wilde, Juniper, & Walsh, 2017; Marais et al., 2018), however, the scale possesses high internal reliability (.79-.91), and several review papers have advocated its usefulness (M. Schmidt & Hansson, 2018; Scott & Takarangi, 2019). Based on this evidence, the decision was made to include the scale within this study, to pinpoint the factors of PGR study that most affect wellbeing.

Measuring Wellbeing and Resilience

To address the study's second aim, the wellbeing and resilience levels of the PGR sample were compared to population samples taken from widely used, validated scales: the WEMWBS and the CD-RISC.

The WEMWBS scale is comprised of positively worded items relating to different aspects of positive mental health (Tennant et al., 2007). The scale has high internal reliability (.91), measured by Cronbach's alpha. The scale is made up of a series of statements, such as: "I've been feeling optimistic about the future", to which participants respond on a 5-point Likert scale ranging from "none of the time" to "all of the time". Respondents are asked to select the answer that best describes their experience over the last two weeks. The 14-item scale is said to provide a fuller picture of wellbeing in comparison to the 7-item scale (Stewart-Brown et al., 2011); these 14 items were summed to provide a single score. The mean population average provided by the scale authors was used for comparison within this research (*N*=1749).

The CD-RISC scale was initially validated in a series of samples; therefore, can be utilised in research and clinical practice (Connor & Davidson, 2003), with high internal reliability (.89). The full 25-item CD-RISC (CD-RISC 25) was used in this research, comprising of 25 items, each rated on a 5-point scale from "not at all true" to "true nearly all the time", with higher scores reflecting greater resilience. All items are positively worded, for example "I am able to adapt when changes occur". In this study, the averages from the general population (*N*=577), provided by the scale authors, were used in comparison to the sample mean.

Participants

The decision was made to recruit only UK PGRs within this study to explore the context-specific factors that most affect PGRs in the UK. Students in the UK can undertake PGR degrees full-time or part-time, often whilst working in academia. Participants undertaking all kinds of research degrees were included. A sample of PGR students (*N*=104) were drawn from a survey disseminated in 2019. For the current study, respondents from the researchers' home institution were excluded (*N*=54) as their responses were reported within a separate publication. The remaining respondents (*N*=50) were from 23 institutions, the characteristics of the PGRs are displayed in Table 1.

Data Analysis

All quantitative data were analysed using SPSS 25. Firstly, demographic categories were reported using frequencies and percentages. The internal reliability of each scale was established by calculating the Cronbach's alpha. The normality of the WEMWBS and CD-RISC scores were assessed via visual inspection and the Shapiro Wilk test, both of which were normally distributed. Therefore, one-sample parametric tests were used to compare the mean scores for the sample to the population means that were provided by the scale authors.

For the JPWBS scale, the means were calculated to establish which domain, and the items within each domain, most impacted participants' perceived wellbeing.

Qualitative responses were analysed by following the 6-steps of Thematic Analysis outlined by Braun and Clarke (2006). This was an inductive process. The two lead authors reviewed the data separately, generating initial themes. The authors then discussed the themes together, went back to the data, and resolved any discrepancies before confirming the thematic map.

Results

Quantitative Results

Each of the included scales: WEMWBS, CD-RISC and JPWBS, had high internal reliability as calculated by Cronbach's alpha (.91, .80 and .83 respectively).

The wellbeing level of the sample was measured using the WEMWBS. The total mean WEMWBS score for the sample was 41.53 (± 8.80). This value was significantly lower than the average taken from the population sample (Tennant et al., 2007) ($t(48)=8.06$, $p<.01$). The resilience level of the sample was measured using the CD-RISC. Mean CD-RISC scores for the sample (57.46 ± 11.81) were significantly lower than the population average (Connor & Davidson, 2003) ($t(49)=-6.07$, $p<.01$).

The 3 domains rated highest on the JPWBS for their negative impact on wellbeing were "Health and Home" (3.39 ± .12), "Research" (3.24 ± .13) and "Social" (3.00 ± .15). The lowest scoring domain, indicating the lowest importance to wellbeing, was the "Facilities" domain (2.09 ± .13). The top-rated items impacting the participants' wellbeing are displayed in Table 2.

Qualitative Results

From the sample (*N*=50), 19 participants inputted a qualitative response. The qualitative results were used, in combination to the JPWBS, to address the first aim of the study. The participants reported five factors that impacted their perceived wellbeing: "Supervision", "Expectations", "Support", "Balance", and "Coping". Fig. 1 shows the themes and subthemes.

Supervision

Supervision was discussed, especially the role of the supervisor in providing emotional support and reassurance:

> *"My supervisors could do better in terms of encouragement and validation in that what I am doing is good... uncertainty is probably the most stressful thing."* P2, male, physical sciences.

> *"Other PGR students in the department get a lot more support which made things very difficult."* P6, female, psychology.

Commonly, participants commented on their supervisors' lack of academic expertise in their research area and the impact this had on their work and wellbeing:

> *"Personally, I don't think my lead supervisor was selected based on their expertise… This can have a negative effect on PGRs when unsuitable academics are leading a PGR's supervision, as PGRs end up as collateral."* P10, female, engineering and technology.

> *"Supervisors are vital and play a big part in affecting your wellbeing. The biggest issue for me was the fact that my supervisors were not specialists in my field, so I had very limited advice."* P6, female, psychology.

Expectations

Of the participants, five discussed the discrepancy between what they expected from their studies and what their experience was. When their reality did not meet their expectations, they were left

dissatisfied and disappointed. One participant suggested it was the supervisors' responsibility to be more open about the reality the PGR experience:

> *"Looking back on my experience I don't think I was well informed about what a PhD entails before starting. I think I had very unrealistic expectations, as do many PhD students when starting, and this makes the journey quite demoralising... this is the responsibility of the supervisory team to better set and guide these expectations from the start."* P10, female, engineering and technology.

However, one participant commented that the narrative focusing on poor mental health during PGR study concerned them:

> *"Everything you read about completing a PhD implies that you will feel bad and have a poor mental health. It would be nice if we heard some positives as there is a lot of negativity out there."* P16, female, social sciences.

Support

Of the respondents, five identified the need for more instrumental support from their institution:

> *"Part-time students are even more invisible and can disappear through administrative gaps."* P15, female, social sciences.

> *"PGR research is also the bottom of the pecking list when it comes to university resources and technician support... PGRs are simply viewed as less of a priority… and you are often expected to work it out yourself."* P10, female, engineering and technology.

Those that felt unsupported commented on the loneliness they experienced:

> *"It is a relatively lonely process… no one really understands what you are doing which can be frustrating."* P2, male, physical sciences.

Emotional support from peers seemed to negate feelings of isolation:

> *"Having the possibility to talk about friends/colleagues about issues and what advice they could give me helped me a lot".* P8, male, life sciences.

> *"I genuinely enjoy being immersed in the academic environment."* P15, female, social sciences.

Balance

The respondents often reported conflicting demands in their lives such as work, financial, and caring responsibilities:

> *"Since starting my PhD I have moved into, and renovated, a new house, changed jobs 4 times, got married, and had 2 children, so had my share of life challenges along the way."* P9, male, clinical, pre-clinical and health.

Balancing multiple responsibilities prevented some from setting acceptable boundaries or taking breaks from their work:

> *"Sometimes it's not worth taking time off for a holiday or break because the prep you have to do to be able to walk away for a little bit is harder than just getting on with it."* P1, female, psychology.

For others, their own perfectionist personality traits added extra pressure:

> *"My perfectionistic tendencies make things much slower. This makes it difficult for me to set boundaries on my work as a PhD student as it takes me much longer to complete tasks than others, and this is becoming unmanageable with depth of learning required for PhD."* P14, female, clinical, pre-clinical and health.

High workload also prevented respondents from engaging in other activities such as professional development opportunities or exercise:

> *"There seem to be plenty of opportunities at my current university… However, taking advantage of them feels overwhelming and ultimately increases my workload."* P15, female, social sciences.

> *"Work-life balance is really difficult. The work only gets done if you do it and there is no one who can actually help with that… I have no time or energy left for exercise."* P1, female, psychology.

Coping

Some respondents discussed helpful ways of coping with stress, often engaging in wellbeing activities provided by their universities:

> *"Exercise has helped me a lot, spending time outside surrounded by nature. During term they organise sessions where families bring their dogs with them and you get to stroke them and throw them the ball to destress."* P8, male, life sciences.

However, many discuss feeling unable to cope, with three respondents using the metaphor of reaching a "breaking point":

> "*Although I feel I am generally an upbeat, positive person, the thought of having a PhD hanging over you on top of full-time work and the demands of working in academia can be highly stressful… I wonder how those who do not have strong coping mechanisms actually cope with these situations!"* P3, female, clinical, pre-clinical and health.

> *"The biggest thing I have learnt during the PGR experience is where my breaking point is... I have had a love hate relationship with my work."* P10, female, engineering and technology.

> *"From my experience everyone that does a PhD has a 'break or make' point throughout their research. At a point, students either choose to stay and face the challenge or they choose to leave."* P19, female, life sciences.

Discussion

The wellbeing and resilience scores of this sample of PGRs were significantly lower than population averages, indicating poor wellbeing and the potential for the development of mental health problems in this group. Challenges relating to "Health and Home", "Research", and "Social" domains most affected PGRs' perceived wellbeing. Through their qualitative responses, PGRs highlighted issues relating to supervision, expectations, support, balance, and coping that affected their perceived wellbeing. A benefit of the current study is that it investigates a whole range of known stressors in contrast to previous research, which tends to focus on one or a small number of factors (Mackie & Bates, 2019). However, the pilot and exploratory nature of this research limit the applicability of the results. Also, the study findings are specific to the UK HE landscape. Further cross-national research is needed to establish whether the issues highlighted in this study are experienced by PGRs in other educational contexts.

The results of the JPWBS revealed that the items that most affected wellbeing related to the domain "Health and Home". Specifically, many of the top-rated items were associated to a lack of confidence, self-doubt, and self-depreciation (for *"example lacking confidence in your ability to conduct research to the necessary standard"*, *"feeling frustrated/demotivated by your results and apparent lack of progress"*, and *"feeling disappointed in your abilities as an academic researcher"*). This echoes previous research by Byrom et al. (2020), who highlighted the detrimental impact that perceived fraudulence can have on PGR wellbeing. Cisco (2020) explored how feeling academically unprepared can underpin self-doubt, suggesting that teaching a range of disciplinary and academic literacies strategies can support PGRs to overcome this. Gill (2020) suggests that recognising the feelings of fraudulence is the first step in mitigating self-doubt for researchers. Consequently, it is recommended that supervisors and doctoral schools encourage an open dialogue with PGRs about self-doubt and advocate the sharing of successes to help them overcome such feelings and develop a stronger sense of self-belief.

In this study, the remaining top-rated items from the JPWBS related to work-life balance (for example "*experiencing high levels of stress because of your research*", *"having a high workload that impacts on your private life"*, *"making unreasonably high demands of yourself in the name of research"*, and *"being unable to balance your research with home demands"*). Many of the qualitative comments were focused on high workload and balancing multiple responsibilities; limiting the ability to engage in enjoyable professional development opportunities or hobbies outside of their research. PGR study is considered to involve working a high number of weekly hours (Cornell, 2020), meaning maintaining work-life balance is challenging (Levecque et al., 2017; Martinez et al., 2013; Metcalfe, 2018; Offstein et al., 2004). The academic culture of high achievement and high workload needs to be challenged in order to alleviate the expectation of overwork for academics and PGRs (Metcalfe, 2018). Taylor (2019) argues that this responsibility falls on the supervisor to be a role model for PGRs in achieving a work-life balance. However, supervisors themselves often feel over-worked (Wisker & Robinson, 2016), and this could therefore perceived as the "norm" in academic life (Lashuel, 2020). This may create a vicious cycle that may be maintained by PGRs, who may become research supervisors in the future. Martinez et al. (2013) suggest that work-life balance could be achieved through offering increased flexibility: making training opportunities more accessible and allowing PGRs to work from home. A further recommendation is that tailored training could be provided to PGRs on how best to manage their projects whilst maintaining work-life balance. Along with increased institutional support for flexible working, this could reduce the burden of overwork and help PGRs to set realistic, achievable goals.

This study found that resilience in PGRs was low when compared to other populations. Of the 19 respondents who added qualitative comments, three discussed the concept of breaking point during PGR study:

> *"I believe the very strong-minded people stay."* P19, female, life sciences.

It could be useful for students to access courses through their universities that might help them to manage or regulate these pressures. An evaluation of review-level evidence found that mindfulness has been effective in reducing stress, anxiety and depression in higher education students (Worsley et al., 2020). Mindfulness has also been demonstrated to significantly increase resilience and self-efficacy in PGRs (Barry, Woods, Martin, Stirling, & Warnecke, 2019). Therefore, mindfulness can be recommended as an evidence-based method to reduce stress and increase resilience that can be integrated with minimal cost (Conley, Durlak, & Dickson, 2013).

This study also found that the third highest rated factor negatively impacting wellbeing was the "Social" domain of the JPWBS. As outlined in the introduction, numerous studies identify that a sense of belonging to an academic community and peer support are important factors in assisting the PGR throughout their studies, particularly in relation to promoting wellbeing (Caesens et al., 2014; De Clercq et al., 2019; Susan Gardner, 2010; Naylor et al., 2018; Waight & Giordano, 2018). Peer support, coaching, or mentoring interventions have been found to be beneficial in PGR groups (Fried & Atkins, 2019; Grant-Vallone & Ensher, 2000; Lewinski et al., 2017), even when delivered online (Galica et al., 2018). However, no large-scale interventions have been implemented and formally evaluated. Consequently, the authors recommend that universities support and promote the development of PGR peer support networks. Moreover, this study was carried out prior to the impact of COVID-19, where many PGRs, due to the imposition of social distancing and lockdowns across the UK, have been working from home. This further reduced the opportunities for face-to-face interactions and placed a greater reliance on technology as a medium for supporting networks (Byrom & Metcalfe, 2020). Face-to-face interaction is said to be most valuable to PGRs in comparison to online methods of support (Pilbeam et al., 2013), but this may shift as efforts have increased to improve online support since the COVID-19 outbreak. Therefore, universities need to continue making strides in how they can simulate face-to-face interactivity, pastoral care, and support through online methods.

One participant discussed the negativity surrounding the experience of PGR study via social media. Interestingly, research has highlighted that many PGRs perceive engaging with the academic community as a burden (Stubb et al., 2011). Exploratory studies have found that individuals experiencing mental health problems turn to social media to share their experiences, seek information, and give and receive support (Naslund, Aschbrenner, Marsch, & Bartels, 2016). This could mean that social media may be a source of pessimism. This suggests that universities must balance the need to honestly represent the reality of the PGR experience to manage expectations, with the desire to maintain a positive environment for the student. Highlighting positive experiences is important (Guthrie et al., 2018), and challenges the cultural narratives that successfully completing doctoral research inevitably involves sacrificing wellbeing. It is essential for institutions to disentangle the normal 'healthy stress' related to the intellectual challenge of completing a PGR degree (Metcalfe, 2018) from other stresses that could lead to the development of mental health problems. Interestingly, "Supervision" was not one of the highest rated domains of the JPWBS scores within this sample. This finding contrasts with the consensus of current literature reviews relating to the PGR experience, concluding that supervision is the main factor influencing the wellbeing of PGRs (Leonard et al., 2006; Mackie & Bates, 2019). Yet, supervision was a central theme of the qualitative comments. One explanation could be that the items of the JPWBS do not cover all aspects of the supervisory relationship. However, the most recent Postgraduate Research Experience Survey data from UK PGRs suggests that 86% were satisfied with the support they received from their supervisors, with 92% feeling that their supervisor had sufficient subject knowledge in their research area (S. Williams, 2019). Therefore, it is possible that poor or unsatisfactory supervision is less common in UK institutions in comparison to international samples (Cornér et al., 2017; Hyun et al., 2006; Levecque et al., 2017; Peluso et al., 2011; Travaglianti et al., 2018). Alternatively, due to the lack of respondents from science, technology, engineering, and mathematics, there could be a disparity between disciplines that could not be identified within this small sample.

Of the respondents in this study, six discussed the expectation that supervisors would provide more than just academic expertise by playing a role in supporting wellbeing, offering encouragement and validation, and building their confidence as researchers. The participants tended to lack self-belief and confidence in their academic ability, which impacted their sense of wellbeing. This suggests that

there is a need for supervisors, as well as being the subject expert, to be an advocate or a "cheerleader" for the student, helping to instil a level of confidence. This is reflected in The Good Supervisory Practice Framework, recently introduced by the UKCGE (Taylor, 2018). Of the recommended competencies, many address the supportive, emotional role that PGR supervisors should play alongside their role of an academic. These include supporting and motivating candidates to progress, being aware of issues in their candidate's personal lives and acting in a pastoral capacity (Taylor, 2019). It is important that supervisors understand their own supervisory style (Gatfield, 2005) and adapt this to the PGR, balancing structure and support. We recommend that both supervisors and PGRs receive training on their own working styles and how to help support an effective working relationship. If UK universities were to embed this within their supervisory training, supervision would likely be more aligned with the expectations and ways of working of PGR students.

Limitations

This study has several limitations. Self-selection bias is a common limitation in mental health and wellbeing research, this impacts the generalisability of this study's results. The survey title "UK PGR Mental Wellbeing" has clear mental health connotations. Research suggests that participants recruited through social media advertisements that include the words "mental health" tended to score higher on clinical measures of wellbeing, distress and stress (Choi et al., 2017). This is an important consideration in the application of this study's findings.

The sample in this study was female biased, with few males completing the survey. Males may not have opted to take part in the survey due to the mental health connotations (Oliffe et al., 2019; Trenoweth & Lynch, 2008). Males tend to be more likely to participate in mental health and wellbeing surveys if terms like "strength" and "happiness" are used in place of mental health-related terminology (Choi et al., 2017). Although there were no gender differences found in relation to wellbeing and resilience scores in this study, the lack of response from male students may suggest that they perceive their wellbeing as being less affected by PGR study. Research documents that female university students experience poorer mental health than those not in education (McManus & Gunnell, 2020). Also, female PGRs face unique challenges face in balancing their research and family responsibilities, as evidenced in previous research (Harman, 2003; Kurtz-Costes, Andrews Helmke, & Ülkü-Steiner, 2006; M. Schmidt & Umans, 2014). Notably, most respondents in this study were researching within the fields of psychology and social sciences that typically attract female students. Specifically, half (20) of the 40 female participants were from psychology or social science disciplines in comparison to just 1 of the 10 male participants. This could also be because individuals from these disciplines are likely to have a greater awareness and literacy in relation to mental wellbeing. It should also be recognised that when it comes to mental health issues, studies suggest that men have difficulty communicating, recognising and understanding depression (Seidler, Dawes, Rice, Oliffe, & Dhillon, 2016). Therefore, it is potentially incumbent on universities to consider strategies for engaging and supporting men who may also be facing poor mental health, this could also be an area for further research.

Conclusion

In conclusion, this study found that the participants' wellbeing and resilience scores were significantly lower than population averages. Wellbeing was most impacted by self-doubt, work-life balance, and social support. Qualitative responses also expressed that supervision, expectations, support, balance, and coping were important to wellbeing. The study puts forward several key recommendations for PGRs, supervisors and universities. The authors recommend that supervisors

and doctoral schools should encourage peer support networks and open dialogue with students around the reality of PGR study and the experience of self-doubt, to manage expectations and help to build PGR self-belief. It is therefore recommended that PGR supervisors should foster encouragement and confidence building, and that UK universities should embed the evidence-based UKCGE competencies (Taylor, 2018) within their supervisory development and training. Further research should look to investigate in more detail the challenges faced by PGRs at different timepoints and the impact the whole PGR journey can have on PGR wellbeing, in order to develop beneficial interventions that are more aligned to PGRs' specific needs. Moreover, it would also be useful to shine a light on how gender may impact the wellbeing of PGRs.

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Declaration of interest statement

The authors declare that there are no conflicts of interest.

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Data availability statement

Data sets associated with this research will be deposited in the Bournemouth Online Research Data Repository (BORDaR) upon completion of the research degree.

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