University of Sunderland

Faculty of Health Sciences and Wellbeing
School of Psychology

PSY332 Empirical Project Report
2025/26

Cover Sheet

Word counts
- Abstract: 246
- Introduction: 4570
- Methods: 1565

Quantitative research projects
- Results: 683
- Discussion: 5200

Qualitative research projects
- Results and Discussion (or Findings): N/A
- Conclusions (if applicable): N/A

Checklist

The following are included in the report:
✓ Ethics application documents (in appendix)
✓ Ethics approval letter (in appendix)
✓ Requests for amendments of ethics application, if applicable (in appendix)
☐ Ethics approval of amendments, if applicable (in appendix)

The following have been submitted to my supervisor:
✓ All data collected for the project
☐ Signed consent forms (if applicable)

✓ I confirm that I deleted all *participant identifying* information gathered during data collection from my personal electronic devices.

If any of the items in the checklist are not confirmed, please explain why:

I did not receive a formal written ethics approval of amendments

My study was conducted using the Internet, therefore only the online consent form was used

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PSY332 Empirical Project Report

Academic Year 2025/2026

A Path to Healing: Exploring the Psychological Burden of Cancer Patients from a Student Perspective

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5th May 2026

Abstract

This empirical project examined how gender influence psychology students' knowledge, attitudes, and empathy, toward the psychological burden experienced by cancer patients, integrating biopsychosocial, cognitive and evolutionary frameworks. Data were collected using an online Qualtrics survey hosted on the University of Sunderland's SONA system and other social media platforms. The design was quantitative, cross-sectional, quasi-experimental and between-subjects, which employed 78 undergraduate psychology students (23 males, 55 females) who completed adapted items of cancer knowledge and attitudes and the Toronto Empathy Questionnaire (TEQ). Measures were assessed using 5-point Likert scales. A one-way MANOVA revealed a significant multivariate effect of gender on the combined dependent variables. Follow-up ANOVA analyses indicated no significant gender difference in knowledge, but females reported significantly more positive attitudes and higher empathy compared to males. Findings suggested that whilst theoretical understanding of cancer may be broadly similar across genders, affective and evaluative engagement with patient suffering differ meaningfully due to education, technology, biology, cognition, evolution and socialization. The study provided a multidimensional approach to a unified model that appraised both scientific and student perspectives about physical and psychological health and illness holistically, whilst also integrated crucial constructs for determining professional readiness for clinical practice. Implications emphasised the need for experiential and immersive training methods, such as serious games and virtual simulations, to enhance attitudes, empathy and work preparedness. Future directions in psycho-oncology, including artificial intelligence (AI), digital phenotyping, epigenetics, immunotherapy, and neuroplasticity, further underscored the importance of consolidating psychological existence with care, hope and meaning.

Cancer is not solely a biomedical disease, it is an extremely complex life event that disrupts the physical, psychological, social and existential dimensions of an individual's life (Engel, 1977; Grassi et al., 2017; Mehnert et al., 2018). It has been found to affect people on multiple levels simultaneously, often initiating a cascading interplay of biopsychosocial disruptions that extend far beyond the illness itself (Grassi et al., 2017; Pitman et al., 2018). Research suggests that patients frequently experience a spectrum of interrelated burdens that overlap and intensify (Caruso et al., 2017). For example, physical symptoms of fatigue and pain can limit a patient's motor ability, consequent to a risk for depression that in turn impacts and increases functional impairment in intertwined manner (Bultz & Carlson, 2006; Mehnert et al., 2018).

Subsequently, these burdens also include psychological distress such as anxiety, depression, trauma, suicidal ideation, self-harm, demoralization, and emotional pain (Anguiano et al., 2012; Grassi et al., 2017; Henson et al., 2019; Kissane, 2012; Mehnert et al., 2018; Mitchell et al., 2011; Pitman et al., 2018; Robinson et al., 2009; Robson et al., 2010), but also social isolation stemming from stigma (Else-Quest et al., 2009; Helgeson & Cohen, 1996; Lepore & Revenson, 2007), financial strain due to income loss and treatment costs (Carreira et al., 2018; Fenn et al., 2014; Zafar et al., 2013), spiritual or existential crisis involving meaning, purpose and identity (Breitbart et al., 2015; Park, 2010; Yalom, 1980), occupational disruption including job loss or reduced work capacity (de Boer et al., 2009; Feuerstein et al., 2010), relationship strain as partners and families adjust to shifting roles (Hagedoorn et al., 2008; Kim & Given, 2008; Northouse et al., 2012) and acceptance of mortality (Chochinov et al., 2005).

Globally, cancer remains one of the leading causes of death, with an estimate of 19.3 million new cases and 10 million fatalities in 2020 (Bray et al., 2018; Sung et al., 2021). Despite the biomedical advances in treatments like surgery, chemotherapy, immunotherapy, and radiotherapy, the survival rate for patients is 68% in the United States for 5 years and across all cancers combined (Siegel et al., 2022). Nevertheless, survival does not equate to recovery, and survivors go through psychophysiological struggles and anxieties around relapse (Crist & Grunfeld, 2013; Holland & Alici, 2010; Jacobsen & Jim, 2008; Lebel et al., 2016; Simard et al., 2013). For many individuals, remission is a complicated experience encapsulating loss (Park, 2010), fragility (Kangas et al., 2002), fear (Simard et al., 2013) and loneliness (Else-Quest et al., 2009)

rather than a relief, contributing to chronic stress (McEwen, 1998) impacting sleep (Bower, 2014), digestion (Mayer, 2011), inflammation (Bower et al., 2011), and immune functioning (Antoni et al., 2006).

Engel's biopsychosocial model explains the relationship between health and illness (Engel, 1977). It challenges the traditional biomedical approach that viewed disease as purely chemical, and argued that illness is a lived experience, and therefore cannot be separated from one's internal world and social environment. He showed that psychological conditions, biological processes and social factors are interconnected (Borrell-Carrio et al., 2004) and can shape the risk, progression and outcome of physical illness such as cancer (Antoni et al., 2006; McEwen, 1998), whilst also influence the quality of life (Holland et al., 2010), medication compliance and treatment adherence (DiMatteo, 2004) and overall well-being (Ryff & Singer, 2008). Taking into account that the experience of cancer often begins in the moment of diagnosis which is usually marked by denial (Holland et al., 2010), anger (Grassi et al., 2017), shock (Mehnert et al., 2018), fear (Simard et al., 2013), disbelief (Holland & Alici, 2010), a bodily threat (Kangas et al., 2002), a sense of interrupted continuity in life which collapses routine predictability (Bury, 1982), and provoke the realization that the body is indeed vulnerable and the future unknown (Park, 2010), this model will act as the core central framework for exploring the biopsychosocial factors in more detail (Engel, 1977), before shifting the focus to the student perspectives and the aims of this paper.

Depression represents one of the most prevalent psychological burdens in oncology, as it affects approximately 20-25% of cancer patients during their illness (Mitchell et al., 2011; Walker et al., 2014). From a clinical perspective, it manifests as persistent sadness, hopelessness, fatigue, loss of motivation and anhedonia, which is the inability to experience pleasure or happiness from old enjoyable activities (Caruso et al., 2017; Ribot, 1896). Studies have shown that depression often stems from complex biopsychosocial interactions such as systemic inflammation and cytokine dysregulation that can alter neurotransmitter pathways including serotonin and dopamine inhibitors (Miller & Raison, 2016), leading to catastrophic thinking, loss of control and threat hypervigilance that can heighten emotional vulnerability (Bower, 2014), but also social isolation, stigma and financial toxicity that can erode identity and perceived support (Carreira et al., 2018; Fenn et al., 2014; Lepore & Revenson, 2007).

Importantly, findings reveal that depression not only co-exists with cancer, but it can also affect health behavioural outcomes, because depressive symptoms have been associated with poorer treatment adherence, reduced engagement with rehabilitation, diminished quality of life and increased mortality, regardless of tumour stage pathology (Pinquart & Duberstein, 2010; Satin et al., 2009). From a cognitive point of view, the Common-Sense Model of illness and self-regulation may help explain this pattern, as it does link psychological distress, stress responses and disease progression, by emphasizing that the patients' meaning and beliefs around illness consequences, can shape their coping capacities (Leventhal et al., 2003). From a social standpoint, Bloom et al. (2001) suggested that social environment can disrupt emotional expression, as many cancer patients generally suppress their emotions to protect family members and avoid becoming stigmatized as weak, which can in turn lead to higher depressive symptoms, greater distress, poorer psychological adjustment and prevent help-seeking behaviours.

Anxiety is another crucial aspect of psychological burden among cancer patients, with typical estimates ranging between 30-40% of prevalence at some point during the illness (Mehnert et al., 2018; Mitchell et al., 2011). Unlike ephemeral worry, clinical anxiety usually reflects on fear of cancer recurrence, uncertainty about the prognosis and distress regarding treatment efficacy (Koch et al., 2014; Pitman et al., 2018), while symptoms are commonly expressed as tachycardia (Brosschot et al., 2006; Thayer & Lane, 2000) and gastrointestinal upset (Drossman, 2016; Mayer, 2011), including digestive discomfort like chest pain, bloating, cramping, nausea and diarrhoea (Van Oudenhove et al., 2016) caused by intrusive thoughts and hypervigilance (Ehlers & Clark, 2000). From a health viewpoint, the stress-coping theory helps explain why anxiety arises in the first place. Lazarus & Folkman (1984) proposed that when patients appraise cancer with avoidance and denial but also as unbearable, irreversible and overwhelming, then anxiety exacerbates (Hulbert-Wiliams et al., 2015). Besides that, anxiety has quite profound implications, mainly because it can impair decision-making (Eysenck et al, 2007; Starcke & Brand, 2012), disrupt sleep (Savard & Morin, 2001) and amplify physiological stress reactivity through heightened amygdala activation (McEwen, 1998; Phelps & LeDoux, 2005), thereby compromising immune recovery (Antoni et al., 2006; Segerstrom & Miller, 2004).

Trauma is a further understandable experience of cancer, with research suggesting that approximately 10-20% of patients develop symptoms of post-traumatic stress disorder (PTSD) following diagnosis or treatment (Kangas et al., 2002; Swartzman et al., 2017), including anger rumination (Cordova et al., 2017), intrusive recollections (Iyadurai et al., 2019), nightmares (Nadorff et al., 2011), hyperarousal (Abbey et al., 2015), avoidance (Foa et al., 2007) and emotional numbing (Litz et al., 1997). It has been theorized that cancer posits an ongoing trauma due to regular monitoring, hospital visits and follow-up scans that keep triggering distress (Kangas et al., 2005). On one hand, the dual representation theory suggests that traumatic memories are encoded in fragmented sensory forms that appear as recurring flashbacks (Brewin et al., 1996), whilst on the other hand, conservation of resources theory proposes that post traumatic stress disorder often emerges as a consequence to the loss of health, safety and autonomy that extend far beyond survival (Hobfoll, 1989).

Suicide risk is one of the most severe psychological burdens, with findings indicating that cancer patients are more likely to commit suicide, compared to the general population, with the highest risk observed during the first 6-12 months following diagnosis and progression (Fang et al., 2012; Henson et al., 2019; Zaorsky et al., 2019). De Clercq et al. (2025) also showed that ideation reflects an 4.3-17% of cancer patients, whilst attempts are less documented, but typically account for 0.44-3.3% of patients. Risk factors include advanced stages of disease, intense psychological pain, hopelessness, social isolation and psychiatric comorbidities (Oberaigner et al., 2014; Walker et al., 2014). The interpersonal psychological theory of suicide (IPTS) explains suicide behaviour as a combination of burdensomeness, which stems from the belief that one's existence imposes an excessive emotional, physical or financial liability on others, thwarted belongingness, which comes from feeling socially isolated and disconnected, and the capability of dying, which results from repeated painful or frightening experiences such as self-harm or witnessing trauma that eventually predispose the desire of death (Joiner, 2005).

Family dynamics play another central role, as they can provide emotional presence, financial support, practical assistance and a sense of being cared throughout the treatment process and thus contribute to lower distress, adaptive coping and medication compliance (DiMatteo, 2004; Holland & Alici, 2010; Helgeson &

Cohen, 1996; Kershaw et al., 2015; Lepore & Revenson, 2007; Uchino, 2009). Nonetheless, cancer can also create a caregiver burden in terms of how illness should be discussed or managed (Grassi & Riba, 2014; Kim & Schulz, 2008; Northouse et al., 2012). In this context, patients might hide distress and suppress their emotions to avoid worrying family members and protect them emotionally (Coyne & Smith, 1991; Hagedoorn et al., 2000; Manne et al., 2010). This role shift is very important, because family presence and support without emotional expression safety, may worsen recovery and increase stress responses (Gross & John, 2003; Miller et al., 2009; Slavich & Irwin, 2014).

Peer connections can also influence how positively or negatively the illness is experienced, as participation by cancer patients in support groups where storytelling can be shared and the presence of others who live and recognise the emotional complexity of cancer, may enhance coping and belonging, especially considering that many patients often do not openly talk about fear, shame, sexual concerns or emotional pain. Conversely, loneliness may predict psychological vulnerability and systemic inflammation, as perceived social isolation and emotional disconnection may elevate high cortisol dysregulation and chronic stress, leading to reduced activity of the natural cells associated with defending the body from viruses, cancer cells and metastasis (Cole et al., 2015; Hawkley & Cacioppo, 2010; Kiecolt-Glaser et al., 2002; Miller & Raison, 2016; Slavich & Irwin, 2014).

Stigma and cultural expectations can also shape personal identity and how patients respond to illness, as many patriarchal retrogressive communities, usually in Southern Europe and Mediterranean countries, where toxic masculinity norms tend to be highly valued, may discourage emotional expression and interpret help-seeking behaviour as a weakness (Gough & Novikova, 2020). Other cultures in Middle East might also impose silence around discussions of illness, loss or bodily vulnerability (Elshamy et al., 2023), as in Arab, masculine ideals like emotional toughness, endurance and honour are the reason of why emotional disclosure is discouraged, whilst seeking help is perceived as threat to the reputation of their family (El Halabi et al., 2021; Hall, 2021).

For instance, a large multi-country scoping review (Gough & Novikova, 2020) highlighted that American adults who strongly conform to traditional masculinity norms were less likely to engage in health-promoting

behaviors such as physical activity and healthy diet (Mahalik et al., 2007), whilst research has also suggested that Greek men display significantly more negative attitudes than women towards help-seeking behaviors due to stigma and the fear of social discrimination associated with visiting a therapist (Madianos et al., 2011). Moreover, findings from British males have shown that avoidance toward psychological support may stem from the emotional communication of help that may trigger their identity, rather than directly caused by masculinity norms (Robertson et al., 2015). On a broader European level across Belgium, France, Germany, Italy, the Netherlands and Spain, men were more likely than women to report attitudinal reasons for not seeking psychological help, with the main factors being stating no need for professional care, doubting treatment effectiveness and wanting to handle problems on their own, while practical barriers such as cost, availability and access were also present, but less frequently expressed as internalised masculinity norms discourage help-seeking at a cognitive level, meaning structural barriers only become relevant once the need for care has already been accepted (ten Have et al., 2010).

This means that toxic masculinity norms represent a cultural expectation and gender role, which is reinforced and expected by patriarchal societies, leading to internalized shame, self-blame and emotional suppression, patterns associated with physiological stress (Berke et al., 2017), mental health struggles, (Wagner & Reifegerste, 2024) and maladaptive coping during depression (Horton et al., 2026; Seidler et al., 2016) because across many studies examining men with prostate cancer, findings consistently confirmed that masculinity norms do magnify the extent to which men contend with both physical and psychological illness (Broom, 2004; Chambers et al., 2017; Ettridge et al., 2018; Goodwin et al., 2020; O'Neil, 2008; Spendelow et al., 2018; Vogel et al., 2014).

Socioeconomic inequalities can also relate to the psychological burdens of cancer patients. Studies have shown that countries who had faced significant adversities such as the COVID-19 pandemic, chemical explosions, terrorist attacks and economic recessions had caused major depressive episodes, anxiety, post-traumatic stress disorder (PTSD) and poverty to thousands of individuals (Karam et al., 2025; Lee et al., 2007; Madianos et al., 2011; Schlenger et al., 2002; Silver et al., 2002). This means that if a cancer patient had previously experienced environmental disasters which had contributed to their financial toxicity during

their illness, then psychological burdens may worsen, coping resources including employment and social interaction might deplete and vulnerability to treatment costs and survivorship outcomes becomes increased (Chi, 2022; Keya et al., 2023; Naser et al., 2020).

Epigenetics represents the major biological explanation of how environmental stressors interact with the human genes to understand the origins of cancer (Argentieri et al., 2017; Ashonibare & Akhigbe, 2024; Meaney & Szyf, 2005). In the past, it was believed that susceptibility to physical illness is merely derived by genetic inheritance and DNA mutations (Fearon & Vogelstein, 1990; Knudson, 1971). However, in modern research, psychoneuroimmunology and neuroplasticity provide a more complex and nuanced consideration by arguing that cancer is a developmental disease (Feinberg et al., 2006; Kim et al., 2022). As of now, we know that cancer is typically defined as an abnormal growth of cells that cannot be controlled (Brown, 2023; Hanahan & Weinberg, 2011). Epigenetic Reprogramming refers to the fundamental process of modifications in chemical tags that either alter gene expression or silence without changing the underlying genetic code (Cantone & Fisher, 2013), and involve mechanisms such as DNA methylation, histone modifications, non-coding RNA, transcription factors and chromatin remodelling that mainly operate in embryos and germ cells respectively (Feil & Fraga, 2012; Meaney & Szyf, 2005; Ng et al., 2025; Lai & Chan, 2024).

Research has shown that these mechanisms are driven by environmental factors such as pollution, toxins and diet (Hou et al., 2012; Feil & Fraga, 2012; Zakhari, 2013; Zhang et al., 2024), lifestyle choices such as smoking and alcohol (Joehanes et al., 2016; Zakhari, 2013), as well as psychosocial exposures to early life adversity including chronic stress, chronic pain, depression, trauma, abuse, neglect, domestic violence and social anxiety that can become pathologized over time (Apkarian et al., 2011; Banushi et al., 2025; Cecil et al., 2014; Heim et al., 2008; Serpeloni et al., 2020; Slavich & Irwin, 2014; Zhou & Ryan, 2023). In this context, the genomic memory of pain unifies the biological embedding of malignancy by arguing that chronic pain changes the anatomy and function of the human brain through decreased grey matter, reduced cortical thickness, abnormal function and altered connectivity in areas involving the amygdala, hippocampus and prefrontal cortex (Mathews et al., 2011; McEwen, 2017). These processes may consequently dysregulate the immune and endocrine systems, leading to elevated inflammation, oxidative stress, and

disruptions across metabolism, reproduction, mood, sleep, neuroplasticity, and emotional regulation, that ultimately contribute to the psychological burden experienced by cancer patients (Abraham et al., 2023; Golia et al., 2019; Peters et al., 2021; Zong et al., 2016). This means that epigenetics may be viewed as a way that the mind and body remember psychological pain.

Having covered the scientific perspectives regarding the psychological burdens of cancer patients, it is also crucial to examine the student perspectives. Psychology students represent an important population as they are the next generation of mental health professionals and practitioners, therefore assessing their knowledge, attitudes and empathy, three vital components for understanding how they perceive, interpret and emotionally engage with the psychological burden experienced by cancer patients and their preparedness to provide holistic and compassionate psychosocial care and support in the future, will be insightful. According to Kala et al. (2023), knowledge refers to how students understand and interpret symptoms, risk factors, likelihood of specific types of cancer in both genders and age susceptibility, while attitudes encompass students' evaluations of cancer symptom severity based on levels of agreement, but also the likelihood of visiting a doctor in case of having symptoms of cancer. Additionally, Spreng et al. (2009) conceptualised empathy as an affective emotional response to another's psychological suffering without having the need to cognitively process someone's distress. They emphasized that affective empathy is the ability to understand one's sadness without relying on explanation but by observing their facial expressions, body language or simply having a 'gut feeling' which triggers arousal and results in an automatic fast bodily reaction.

Interestingly, the research posits that knowledge attitudes and empathy have quite strong interactions with each other, as knowledge provides the cognitive basis for understanding the distress of a cancer diagnosis and the psychological burden of the whole experience of illness, and can strongly shape how students recognise that suffering as either serious, persistent or meaningful (Leventhal et al., 2016; Paasche-Orlow & Wolf, 2007; Sørensen et al., 2012). Subsequently, this awareness can directly influence attitudes, because students who possess greater and more accurate knowledge are more likely to validate and support psychological suffering and less likely to endorse dismissive or stigmatizing beliefs (Corrigan et al., 2014;

Weiner, 1985). As a result, this can positively affect empathic responding since empathy is facilitated when distress is appraised as legitimate and uncontrollable (Christov-Moore et al., 2014; Spreng et al., 2009).

This pattern can be explained by the attribution theory, which argues that people tend to respond with anger, blame, unwillingness to help and reduced empathy, if suffering is seen as controllable (Weiner, 1985). This framework builds upon Heider's (1958) belief that people tend to act as 'naïve psychologists', as they constantly try to give meaning to their experiences based on common sense derived by either internal or external locus, and that is why his idea centred around personal or situational cause. Thus, he proposed that since humans rely on everyday reasoning instead of scientific explanations, the assigned responsibilities and emotional evaluations to suffering can be influenced. However, later findings have criticised this perspective as biased. Firstly, Fiske & Taylor (1984) proposed the concept that people are not naïve scientists that systematically process information, but rather cognitive misers that rely on heuristics, which are quick intuitive solutions, in order to simplify complex thoughts and reduce the cognitive load, which eventually saves mental energy.

Similarly, Bartlett's (1932) schema model challenged Heider's theory as being unrealistic and asserted that individuals rely on pre-existing cognitive schemas, which are mental representations of the self, others, society and events that constitute knowledge, beliefs and patterns of behaviour. The core principle here is that schemas act as selective filters of attention and memory that evolve through the assimilation of new information but based on past experiences and facilitate fast decision-making. These cognitive schemas can truly shape how psychology students perceive, interpret and emotionally engage with the psychological burden of cancer patients, because selective attention is closely linked with the cocktail party effect, which posits that people are more likely to notice information that aligns with existing illness schemas, such as distress and fear, while overlooking less stereotypical experiences like emotional resilience or hope (Cherry, 1953).

Once these schemas are activated, confirmation bias may further reinforce them by leading students to interpret or remember stimuli that confirms possible negative beliefs about cancer as an overwhelming life event (Wason, 1960), resulting in a narrowed or incomplete knowledge, pessimistic attitudes, and distorted

empathy. Also, the illness representation theory, also called the common-sense model of self-regulation, suggests that the behaviour and emotional responses of an individual are shaped by their beliefs about illness consequences, timeline or controllability, which further underscores the importance of having a balanced humanistic approach to cancer patient care (Leventhal et al., 2016).

These findings can be integrated and applied by the folk theory of mind, which explains that if a mental state such as the psychological burden of cancer patients is attributed as an intentional desire or inevitable excuse by psychology students, then that may possibly reflect unpreparedness for future clinical care or psychosocial support and leaves the suffering both present and mistreated (Malle, 2004). All in all, knowledge, attitudes and empathy can be understood as an interpretative system of suffering that shapes how the psychological burden of cancer patients is acknowledged and respond to. If psychology students rely on cognitive schemas, selective attention, confirmation bias and folk explanations that attribute distress as high in agency, in terms of it being a choice or a matter of high personal control, then knowledge becomes oversimplified and inaccurate, attitudes shift the focus from patient-centred compassion towards judgment and paternalism, which is the restriction of self-autonomy and free will, and empathy becomes reduced and declined (Neumann et al., 2011).

Gender differences are also linked within this interpretative system of variables, as research consistently indicates that females tend to have higher affective empathy, characterized by emotional connection and automatic sensitivity toward the psychological burden of cancer patients, meaning that they might be able to recognise illness distress and compassionate more than male students (Christov-Moore et al., 2014; Eisenberg & Lennon, 1983; Rueckert et al., 2011). It has been also theorized that female students are more prone to hold positive attitudes marked by validation and support to individuals experiencing psychological distress whilst male students are more likely to emphasize on self-control, coping strategies and emotional regulation, especially in contexts that involve life-threatening disease (Corrigan et al., 2014; Eagly & Wood, 2012).

This pattern makes sense when viewed through the gender socialization process, which argues that females are encouraged by social norms and more specifically family, schools, media and peers to behave in a

particular manner through canalisation, which is the attribution of certain clothes, objects and colours to different genders and manipulation on physical appearance in terms of whether an appearance might seem feminine enough, ultimately forming an identity role of caregiving and emotional attunement, whilst males are also affected by these standards, to be more cognitively distant when faced with distress, leading to emotional invalidation of suffering (Burke & Stets, 2009, Oakley, 1972).

In terms of knowledge, findings remain mixed for both genders. For example, Kala et al. (2023) showed that in regards to the general risk factors of genetic, ageing, and smoking and common types of cancer, knowledge of males and females was relatively good, but in areas such as recognition of symptoms, age susceptibility, early detection, screening and practical understanding of illness appraisal, knowledge was either weak or quite limited. The presence of both strengths and weaknesses resulted in framing knowledge as partial and inconsistent, rather than comprehensive. Even though earlier findings suggested that gender differences do exist in knowledge, as women often devote greater engagement with health information, symptom recognition and help-seeking behaviours, it is still concerning the possibility of inadequate knowledge and the potential for limited nuanced understanding of the psychological burden of cancer patients from both males and females (Paasche-Orlow & Wolf, 2007; Sørensen et al., 2012).

Hence, the rationale for this research is grounded in previous findings suggesting that gender does play a significant role in understanding, evaluating and emotionally engaging with the psychological burden of cancer patients, whereby differences in limited knowledge, pessimistic attitudes and declined empathy between male and female psychology students may be explained through the cognitive schemas, confirmation biases, folk explanations, high agency attributions and selective attention (Bartlett, 1932; Christov-Moore et al., 2014; Corrigan et al., 2014; Eagly & Wood, 2012; Fiske & Taylor, 1984; Heider, 1958; Kala et al., 2023; Malle, 2004; Neumann et al., 2011; Paasche-Orlow & Wolf, 2007; Sørensen et al., 2012; Spreng et al., 2009; Wason, 1960; Weiner, 1985). Another essential component of this rationale that justifies why this empirical project is necessary and innovative is the research gap. Currently, there is no single study that directly and comprehensively investigates the influencing role of gender, and more

specifically the differences between male and female psychology students on their perspectives in terms of their knowledge, attitudes and empathy toward the psychological burden of cancer patients.

Instead, most of the research has predominantly prioritized populations in healthcare training such as medical, nursing and pharmacy students and treat knowledge and attitudes mainly as an awareness of risk factors, screening and early detection, but it remains unclear how and to what extent the psychological burden of cancer patients is fully understood and interpreted (Mremi et al., 2025; Wang et al., 2025). Accordingly, psychology students remain underrepresented, and even when gender differences are examined in literature, it is usually as a single domain, for instance, gender differences in empathy among nursing students, rather than a unified pattern that tests multiple variables together (Deng et al., 2023; Strakelova et al., 2019).

Therefore, the core aim of this study is to address an identified gap in the literature, by integrating the biopsychosocial model and environmental influences on the psychological burden of cancer patients, with the cognitive mechanisms and gender differences on psychology students' perspectives, in order to provide a unified multidisciplinary approach of how the emotional suffering of illness is perceived, interpreted and emotionally engaged with by future mental health care professionals.

Research objectives

- Measure knowledge, attitudes, and empathy using validated questionnaires
- Compare male and female students
- Interpret findings within biopsychosocial and psycho-oncological frameworks
- Evaluate psychology students' preparedness for compassionate psychosocial care
- Explain possible gender differences using any cognitive mechanism of the five
- Suggest alternative perspectives if findings are non-significant

By connecting all these missing elements, this thesis will directly explore: How does gender influence psychology students' knowledge, attitudes and empathy toward the psychological burden experienced by cancer patients?

Hypotheses

- H1 (Omnibus): There will be a significant multivariate effect of gender on the combined dependent variables of knowledge, attitudes, and empathy (Eagly & Wood, 2012).
- H1a: There will be no significant gender difference in psychology students' knowledge toward the psychological burden experienced by cancer patients (Kala et al., 2023).
- H1b: Female students will report significantly more positive attitudes toward the psychological burden experienced by cancer patients than male students (Corrigan et al., 2014).
- H1c: Female students will report significantly higher empathy scores toward the psychological burden experienced by cancer patients than male students (Christov-Moore et al., 2014).

Method

Participants

90 undergraduate psychology students initially took part in the study. 12 of them were excluded from the total sample and final analysis because their responses were incomplete. More specifically, five did not provide full consent, three stopped after reading the participant information sheet, two left the survey after writing their participant code and two left after writing their year of study, leaving us with 78 participants. Demographically, 23 were males (29.5%) and 55 were females (70.5%). Their age was distributed between 18-62 (M = 34.04, SD = 13.55). Regarding year of study, participants were primarily in the earlier stages of their degree, with 50 first-year students (64.1%), 26 second-year students (33.3%) and 2 third-year students (2.6). Participants were recruited through the University of Sunderland's SONA system and other online social media platforms such as Instagram, Snapchat and Microsoft Teams. Inclusion criteria required enrolment in a Psychology degree and English fluency. Exclusion criteria have also been applied to everyone who currently or previously had cancer.

Design

This project adopted a cross-sectional, quasi-experimental, between-subjects quantitative design. That is firstly because the data were collected at one single time point through an online survey, secondly the study compared groups based on gender, which cannot be manipulated or randomly assigned, thirdly each participant belonged to only one group such as male or female and comparison was made between different participants and fourthly the study used numerical data. The analysis of this study was conducted via a Multivariate Analysis of Variance (MANOVA) to identify the overall effect of gender on psychology students' perspectives toward the psychological burden of cancer patients. The independent variable (IV) was gender, with two levels (males, females), and the dependent variables (DVs) were knowledge, attitudes and empathy. A statistical power analysis indicated that a minimum sample size of 64 participants would be required to detect a medium effect size with a statistical power of .80. As the final sample analyzed consisted of 78 participants, the study had adequate statistical power to detect a meaningful effect.

Materials

This study was conducted using Qualtrics, an online research platform (Qualtrics, 2026) and hosted on the University of Sunderland's SONA system, a participant recruitment platform (SONA Systems, 2026) used by the School of Psychology. All questionnaires were administered online within a single survey. Demographic questions assessed participants' age, gender, and year of study.

Cancer Knowledge and Attitudes Questionnaire (Kala et al., 2023)

Six items were adapted from a researcher-developed structured self-report questionnaire (Kala et al., 2023), originally designed to assess cancer knowledge, attitudes, and awareness among university students. The original instrument was developed through a pilot study followed by a cross-sectional baseline survey and a subsequent intervention assessment, demonstrating adequate face and content validity, with questionnaire items evaluated by both students and experts including cancer specialists, researchers, healthcare workers, and English language teachers.

In the present study, the adapted items assessed knowledge of cancer risk factors, attitudes toward cancer symptoms, likelihood of seeking medical help, knowledge of gender-related cancer prevalence, and perceived age susceptibility to cancer. Six items from Questionnaire 1 were used, as item seven originally assessed media sources of cancer awareness, which was not relevant to the aims of this project. Questionnaire Set 2, which originally evaluated awareness following an intervention program, was excluded because it did not align with the objectives of the present study.

Responses were measured using a 5-point Likert scale. Items assessing knowledge and likelihood used response anchors ranging from very unlikely (1) to very likely (5), whereas items assessing attitudes used anchors ranging from strongly disagree (1) to strongly agree (5). The item assessing perceived age susceptibility used a four-category response format. The original study used response anchors ranging from least likely to most likely for Questionnaire Set 1. Minor wording adjustments were made in the present study to improve clarity and contextual relevance, whilst maintaining the original response format, scale structure, and underlying construct meaning. The adapted questionnaire was appropriate because it aligns with the population (university students), topic (cancer), and variables examined in this study (knowledge, attitudes, and gender).

Toronto Empathy Questionnaire (Spreng et al., 2009)

Empathy was assessed using the Toronto Empathy Questionnaire (TEQ), a widely used psychometric measure of affective empathy. The TEQ consists of 16 items measuring emotional responsiveness to others' experiences and distress. Participants responded using a 5-point Likert-type frequency scale ranging from never (0) to always (4). Scores were summed to calculate the total empathy score, with higher scores indicating greater empathic tendency. The TEQ has demonstrated good reliability and validity in previous research (Spreng et al., 2009). The full questionnaire items are provided in Appendix B.

Procedure

First, ethical approval was granted by the University of Sunderland Psychology Ethics Committee (see Appendix A). Upon clicking the study link, participants were directed to the online survey hosted on Qualtrics.

In the first block, participants were presented with a text box and were asked to create a unique participant code, which was made by six letters consisting of the first three letters of their favorite fruit and the first three letters of their favorite color, such as (BLUAPP), and were also asked to remember that code in case they wished their data to be withdrawn later. After providing their code, they were presented with the Participant Information Sheet (PIS) on a separate block, which outlined why the research was being done, what it involved, and participants were asked to read it carefully because it mentioned important details including the study title, the purpose of the project, the reason they were approached, whether or not they had to take part, as well as information about benefits, disadvantages, data anonymity, confidentiality, organization, funding, reviewal, presentation of results and contact details about the conduct of the study or for any possible questions or concerns they might have had.

After reading the full information sheet, the consent questions were illustrated on a separate block and required participants to agree to all eight questions so that they can take part in the study. Essentially, the questions required confirmation about age above 18, confirmation about reading and understanding the information sheet, confirmation about not having any personal experience with cancer, but also confirmation about their understanding in terms of data anonymity, voluntary participation, free withdrawal at any point, the possibility of data share with other researchers for teaching purposes and finally a question about their consent to participate. After agreeing to take part, participants were presented with a separate block about their demographic information. Specifically, they were required to provide their age in years in a text box, then their gender so either male or female, and their year of study so either first, second or third.

Following that, a separate block with the first dependent variable of knowledge was presented along with a neutral instruction text, which asked them to indicate how likely specific cancer risk factors might increase the risk of cancer, including items such as genetic, ageing, smoking etc. Participants had to select one circle for each item between a 5-point Likert scale ranging from very unlikely to very likely for all nine items of the matrix table. After that, and whilst remaining on the same block of knowledge, they were asked by the next instruction to indicate which cancers were more likely common in males, across five items, the same 5-point Likert scale and in a matrix table. Right after that, the next question asked them to indicate which cancers were

more likely common in females across five items and the same 5-point Likert scale and matrix table. Finally, participants answered the last question of knowledge in a multiple-choice format which asked about the age group they believed was most susceptible to cancer and they only had to choose one based on four available categorical options.

On the next block, their attitudes were assessed in a matrix table with the first question requiring their levels of agreement or disagreement based on statements like unexplained bleeding, and they had to select one from the 5-point Likert scale ranging from strongly disagree to strongly agree for all nine items in total. After answering that, participants scrolled down to the next question which asked them about their personal likelihood of visiting a doctor in case of having symptoms such as a sore that does not heal and they answered all nine items in the matrix table based on a 5-point Likert scale ranging from very unlikely to very likely.

Participants then moved to a separate block which included the last variable of empathy. They saw the instruction text which asked them to rate how frequently they feel or act in the manner described. They were also asked to circle their answers on the response form matrix table below as honestly as they could, then they read the 16 items of the Toronto Empathy Questionnaire (TEQ) which had a 5-point Likert scale ranging from never to always and selected the one option for each item that best reflected their perspective. Lastly, they were directed to the debrief on a separate block, which thanked them for their participation and informed them that their answers had been recorded and contributed to the present research project, including contact details and support resources provided in case they had any questions or if the content of the study caused them distress. After reading the debrief, participants reached the end of the survey and closed their browser.

Results

Data Cleaning

90 data were originally collected. Of these, 10 cases were removed prior to data export due to incomplete responses and failure to provide full consent. A total of 80 responses were then downloaded from Qualtrics. Following initial screening, irrelevant metadata and a further two cases were excluded due to missing data resulting from skipped questionnaire items. This resulted in a final sample of 78 participants included in the

analysis, and only relevant study variables were retained, with age, gender, year of study, and all questionnaire subscale items being kept. Text based- Likert responses were then recoded into numerical values, and year of study was also numerically coded. In JASP (JASP, 2026), variables were firstly assigned the appropriate measurement level, with gender treated as nominal and every other variable as scale, and then negatively worded Toronto Empathy Questionnaire (TEQ) items (2, 4, 7, 10, 11, 12, 14, 15) were reverse scored using computed columns on a formula of (4 – Original Score). Total scores were subsequently calculated for knowledge, attitudes, and empathy, which led to the creation of a final cleaned dataset containing only the six variables required for analyses, which were age, gender, year of study, knowledge total, attitudes total, and empathy total. Each row in the final dataset represented one participant whilst each column constituted of one variable.

Descriptive statistics were calculated for the study variables. As shown in Table 1, participants had a mean age of 34.04 years (*SD* = 13.55) and a mean year of study of 1.39 (*SD* = 0.54). Table 2 presents descriptive statistics for the dependent variables. Participants had a mean knowledge score of 70.83 (*SD* = 9.47), a mean attitudes score of 69.37 (*SD* = 9.47), and a mean empathy score of 48.27 (*SD* = 8.16).

Table 1

Descriptive Statistics for Age and Year of Study

Variable	Mean (SD)
Age (years)	34.04 (13.55)
Year of study	1.39 (0.54)

Table 2

Descriptive Statistics for Knowledge, Attitudes, and Empathy Totals

Variable	Mean (SD)
Knowledge total	70.83 (9.47)
Attitudes total	69.37 (9.47)
Empathy total	48.27 (8.16)

Table 3

Reliability Check for Research Instruments

Scale	Items	Cronbach's a
Knowledge	20	0.83
Attitudes	18	0.87
Empathy	16	0.86

Assumption Checks

Prior to the main analysis, the assumptions for MANOVA were also assessed. The Shapiro-Wilk test indicated a deviation from multivariate normality as ($W = .896$, $p < .001$), suggesting that the dependent variables were not perfectly normally distributed. Additionally, Box's M test for homogeneity of covariance matrices was non-significant at the $\alpha = .001$ level, which is widely used on a lower threshold due to its high sensitivity to large samples (Tabachnick & Fidell, 2001), as χ^2 (6) = 13.00, $p = .043$, indicating that the assumption was met. Despite that, Pillai's Trace was interpreted as the primary multivariate statistic because it is considered the most robust MANOVA test when assumption of normality and unequal group sizes are

not fully satisfied. Also, the adequate statistical power and sample size ($N = 78$) and good reliability further supported the robustness of the parametric analysis, according to the central limit theorem (Jacod & Protter, 2004).

Main Inferential Analysis

A one-way MANOVA was conducted to examine whether gender influenced the combined dependent variables of knowledge, attitudes, and empathy of psychology students toward the psychological burden experienced by cancer patients. The multivariate analysis revealed a statistically significant effect of gender on psychology students' perspectives, as Pillai's Trace = .108, F (3, 74) = 2.98, p = .037, f^2 = .12, indicating a moderate multivariate effect size.

Follow up Analyses and Descriptives

Follow-up univariate ANOVAs were conducted to determine which dependent variables contributed to the multivariate effect. The results indicated that gender did not significantly affect knowledge scores, F (1, 76) = 1.89, p = .17, η^2_p = .024, indicating a small effect size. However, gender had a statistically significant effect on attitudes, F (1, 76) = 4.80, p = .032, η^2_p = .059, indicating a moderate effect size and empathy, F (1, 76) = 5.71, p = .019, η^2_p = .070, also indicating a moderate effect size.

Descriptive statistics clarified that female psychology students reported greater knowledge scores (M = 71.78, SD = 10.33) than male psychology students (M = 68.57, SD = 6.68), and more positive attitudes scores (M = 70.86, SD = 9.34) than male students (M = 65.83, SD = 9.00), and higher empathy scores (M = 49.66, SD = 8.31) than male students (M = 44.96, SD = 6.86) toward the psychological burden experienced by cancer patients.

Discussion

This study found a clear answer to the research question, because gender did influence psychology students' knowledge, attitudes, and empathy toward the psychological burden experienced by cancer patients, through differences in symptoms recognition, help-seeking, and emotional responsiveness, but with similar levels of understanding in terms of risk factors, gender susceptibility, and age susceptibility. Therefore, most of the

alternative hypotheses of the study were supported. The omnibus hypothesis H1 was supported, indicating that gender had a significant effect on the combined psychology students' knowledge, attitudes, and empathy toward the psychological burden experienced by cancer patients. Hypothesis H1a was not supported, as no significant gender difference was found in knowledge scores between male and female psychology students toward the psychological burden experienced by cancer patients, indicating a failure to find evidence of a difference. Hypotheses H1b and H1c were supported, as female psychology students reported significantly more positive attitudes and higher empathy scores than male psychology students, toward the psychological burden of cancer patients. Thus, we reject the null hypothesis (H0) for H1, H1b, and H1c, since there was a significant effect of gender toward the knowledge, attitudes and empathy collectively, and a significant effect of females toward attitudes and empathy separately, but we fail to reject the null hypothesis (H0) for H1a, since no significant effect was found for knowledge between genders.

To begin with, the fact that there was no difference found between male and female psychology students' knowledge, may be explained mainly through education (Halpern, 2014**)**. It is true that universities and specifically psychology programs often emphasize providing academic training through exposure to psychological theories, models, concepts, principles and frameworks around health and illness behaviors, to help students acquire theoretical knowledge and independent research capabilities (Cranney et al., 2011; Dunn et al., 2007; Murtonen et al., 2008). This experience can therefore develop a quite similar understanding in genders because online and in person social environments including lectures, seminars and workshops can foster a cognitive representation of potential factors that may increase the risk of cancer, as well as the age groups and genders that might be more vulnerable to specific types of malignancy (Waller et al., 2009). The findings here are closely linked with (Kala et al., 2023), because although females had slightly higher knowledge scores than males, the fact that they were not enough to reach statistical significance, reflects a pattern of shared cognitive awareness that may be seen as a potential lack of depth in understanding, which is consistent with research suggesting that sometimes factual health knowledge is generalized or mixed and not always deeply internalized (Nutbeam, 2000).

The absence of gender difference in male and female psychology students' knowledge toward the psychological burden experienced by cancer patients may also be explained through the widespread public health information and technological advances. In an era where rapid digitalization provides myriads of electronic sources towards young people (Jacobs et al., 2017), it can be understood that knowledge about cancer risk factors, susceptibility, vulnerable populations and even prevention strategies and early symptoms can be acquired with just a few clicks on the internet, leading to a similar understanding of what cancer involves (Nutbeam, 2000; Sørensen et al., 2012; Stellefson et al., 2011). Besides that, global epidemiological guidelines and awareness campaigns may further increase health and illness literacy through explanations of what cancer is, why it matters and how people can protect themselves, which ultimately creates a standard basic knowledge regardless of gender (Wakefield et al., 2010).

Interestingly, the fact that female psychology students had more positive attitudes and greater empathy than male psychology students strongly align with the biopsychosocial model (Engel, 1977) and other theoretical underpinnings. Biologically, women often have higher reactivity in mirror neural systems such as the Inferior Frontal Gyrus (IFG), Anterior Cingulate Cortex (ACC), Superior Temporal Sulcus (STS), and the Inferior Parietal Lobule (IPL) (Molenberghs et al., 2012; Rizzolatti & Sinigaglia, 2016). In psycho-oncology, this means that female psychology students tend to resonate more naturally with a cancer patients physical pain and fear, which can increase their empathy (Christov-Moore et al., 2014; Decety & Jackson, 2004; Fan et al., 2011), but also read and evaluate more easily their body language such as facial expressions and eye contact as well us understand their actions, such as refusing a specific treatment, or intentions like masking their psychological burden to protect their family members (Frith & Frith, 2006; Hall & Matsumoto, 2004; Kret & De Gelder, 2012), which can in turn amplify their positive attitudes toward the ones affected by the illness. Furthermore, women also utilize a tend-and-befriend response to stress rather than a fight-or-flight one (Taylor et al., 2000). This biological predisposition of protecting their young (tending) and seeking social connection (befriending) has arisen from an evolutionary basis to reduce vulnerability to threat and promote survival, explains why they may hold more positive attitudes toward caregiving and emotional support for patients than males (Campbell, 2013).

Psychologically, females have been found to perform better in cognitive affective empathy (Christov-Moore et al., 2014; Thompson & Voyer, 2014), which means that they may understand and feel emotional distress more automatically (Decety & Jackson, 2004; Fan et al., 2011), as neurological findings have suggested that women show higher amygdala activation when processing feelings, whilst men often utilize more their prefrontal cortex for rational logical analysis of emotions (Schulte-Rüther et al., 2008; Stevens & Hamann, 2012). Additionally, women are more likely to define themselves through their relationship with others (Cross & Madson, 1997; Gabriel & Gardner, 1999). In clinical terms, this means that they might view the patient's psychological burden as a shared human experience rather than just a problem to solve, which can result in a more positive attitude and higher empathy toward the emotional needs of an individual diagnosed with cancer (Davis, 1983; Decety & Jackson, 2004**;** Gleichgerrcht & Decety, 2013).

Socially, the social role theory explains that behavioral differences between men and women stem from the traditional division of labor and the different social roles, as males are often seen as the breadwinner ones and females the homemakers (Eagly, 1987; Eagly & Wood, 2012). This means that across many societies, women are socialized into roles that emphasize on caregiving, emotional responsiveness, and interpersonal sensitivity (Bussey & Bandura, 1999; Wood & Eagly, 2012). As a result, these expectations may encourage females to develop more positive attitudes toward individuals experiencing vulnerability or distress, by prioritizing compassion and understanding (Christov-Moore et al., 2014), which justifies why they better evaluated cancer symptoms and help-seeking behaviors. Arguably, the fact that female psychology students had also greater empathy than male psychology students may be explained through the gender socialization process, which argues that women learn and adopt their social roles, behaviors, attitudes and skills expected based on their gender, such as recognizing and respond to emotional cues and bodily changes which are reinforced by family, media and school (Bem, 1981; Bussey & Bandura, 1999; Chaplin & Aldao, 2013; Eagly & Wood, 2012; Endendijk et al., 2013).

Conversely, the main reason of why male psychology students had fewer positive attitudes and empathy than females can be attributed due to cultural expectations and masculinity norms (Addis & Mahalik, 2003). Patriarchal environments can negatively form masculine ideals that focus on independence, self-reliance,

help-seeking avoidance, emotional control and cognitive distance when faced with severe situations (Courtenay, 2000; Wong et al., 2017). These norms can internalize stigma and fear of perceived weakness if emotional vulnerability is expressed (Vogel et al., 2011), but also influence how men interpret illness, as findings have shown that they tend to attribute outcomes to personal responsibility or individual resilience, which can affect the severity and emotional engagement with the psychological suffering of cancer patients (Corrigan et al., 2014).

Nonetheless, cognitive mechanisms may also explain the gender differences among male and female psychology students. For example, schemas may have predisposed females to perceive, interpret and respond to illness experiences including cancer through a more relational and emotional way, thereby facilitating more positive attitudes and higher empathy (Fiske & Taylor, 1984). Similarly, attribution styles might had been adopted by males and led them to assign causes of malignancy and suffering toward patients' responsibility, leading to reduced empathy and less positive attitudes (Rudolph et al., 2004; Weiner, 1985).

From an evolutionary perspective, it can be understood that the idea of nature versus nurture may be another explanation of the gender differences in psychology students' attitudes and empathy (Archer, 2019; Del Giudice et al., 2012). That is because evolution gave men the physical foundations of greater body size and muscle strength, whilst in women the reproductive capacities of gestation and nursing (Geary, 2021). Because of these physical differences, certain tasks were historically believed to be more efficiently handled by one sex, and even though in modern era this view has been criticized as stereotypical, many cultures in the past had accelerated these biological differences through socialization from different roles assigned back from childhood (Eagly & Wood, 2013; Wood & Eagly, 2015). This means that innate psychological adaptations formed over millions of years ago to solve ancestral problems like mate choice and resource acquisition (Buss & Schmitt, 2019; Conroy-Beam et al., 2015). Critically, this suggests that what something was seen as a solution in the past, can still affect how psychology students respond to the psychological burden experienced by cancer patients now, on an interpretational and emotional dimension.

Integrating all these findings together, it can be argued that the core meaning of the results is that even though both male and female psychology students generally knew what the psychological burden of cancer patients was, females seemed to be prepared to apply that theoretical knowledge into real-world clinical practice settings, through their positive attitudes and greater empathy found, which suggests that women may be more able to provide sufficient compassion and psychosocial support, as future mental health professionals.

Subsequently, this contributes to an important yet challenging implication for the wider field of psychology. That is the need for psychological science education to move beyond the transmission of theoretical knowledge and give greater emphasis on experiential, interactive and feedback-based learning approaches that foster practical skills through training programs. A recent systematic review by Facchino et al. (2025) showed that serious games designed to provide learning, interaction and practice can support education and training of psychologists, psychotherapists and psychology students across three main aspects: theoretical knowledge, specific traits and attitudes, and practical/professional skills that may foster empathy. Importantly, they highlighted that psychology students lack the training opportunities to apply their knowledge into real world contexts, which means that by integrating technological software tools to move from theory to practice can help bridge this major gap in psychology education. Across many studies, it has been found that quality training among psychology students only accounts for supervision and feedback, but the limited availability of experiencing practical training with real patients in university curricula remains quite evident and constrains learning crucial skills of clinical assessment and forensic interviewing (Lamb, 2016; Lamb et al., 2002; Pompedda et al., 2022; Viglione et al., 2017).

To address these challenges, plenty of research has shown that serious games have been identified as attractive educational tools that could benefit psychology, because they provide a realistic but safe environment in which students can make mistakes without experiencing real-life consequences (Mikropoulos & Natsis, 2011), participate actively rather than passively (Bellotti et al., 2013; Greitzer et al., 2007), receive flexible learning opportunities (Heyselaar et al., 2017), and benefit from more efficient feedback without any bias (Pompedda et al., 2022). For example, Cangas et al. (2017) used a serious game

called Stigma-Stop, where psychology students interacted with characters experiencing different mental disorders and had to persuade them to contribute to a shared task, which was designing a video game for a contest. This game was not mainly about memorizing facts, but about helping students understand symptoms, challenge stereotypes, and reflect on stigma, and students reported that it was enjoyable, informative, and useful for increasing awareness, empathy, helping behavior, and more accepting attitudes toward people with mental illness.

Olivier et al. (2019) examined another attitude-focused game, The World of Empa, in which psychology students interacted with characters who received no intervention, and while the serious game didn't significantly increase attitudes or empathy, the students in the game condition did not decline in empathy over time, which also means that serious games can help preserve emotional sensitivity. Redond-Rodriguez et al. (2022) used a more narrative and cooperative approach based on Game of Thrones, where students worked in teams, took on roles, completed challenges, and engaged in collaborative activities, and this was designed to improve learning strategies and vital goals such as assertiveness. Their findings showed improvement in self-regulation, motivation, and some aspects of emotional intelligence. Dancey et al. (2011) used the virtual world Second Life as an avatar-based learning environment where psychology students attended lectures and presented their empirical projects at a virtual conference, which allowed them to participate through avatars rather than face-to-face, and students who used it performed better on final exams than those who did not, especially if they attended more tutorials, while they also reported that they liked the anonymity, flexibility, interactivity, peer support, and conform it gave to them.

Iwamoto et al. (2017) used Kahoot, a simple quiz-based online game, to support psychological revision, and students who used it alongside traditional resources achieved significantly better test scores and were more satisfied with the learning materials, showing that even a relatively basic, non-immersive game can still improve exam preparation and enjoyment of learning. Sugden et al. (2021) developed a broader serious game package including web conferencing tutorials, interactive games, virtual demonstrations, case-based scenarios, and mind maps to encourage deep learning in biopsychology and social psychology, and students said these activities were memorable, engaging, and useful for conceptually understanding the material in a

deeper way than just surface memorization. Krach and Hanline (2018) used TeachLive, an avatar simulation platform, to help psychology students practice early consultation and school counselling skills in a safe space after first discussing case information and intervention plans, and students found it positive without worrying about pressure or mistakes that could occur in real world.

Rogers et al. (2022) also focused on consultation skills using avatars of distressed young women facing relationship or study problems, and psychology students interacted with them either through virtual reality or desktop version, with reports indicating that the game was interesting and useful to practice emotional understanding and responding to client distress positively and in a believable scenario. Other studies gave emphasis on the Empowerment Interviewer Training (EIT), where both psychology students and clinical psychologists interviewed a child avatar who might or might not had experience abuse or maltreatment, and findings revealed significant improvements on questioning quality, greater accuracy in eliciting relevant details, and better performance when observing effective and ineffective interview examples, which can further provide knowledge acquisition, professional attitudes and perhaps better engagement in emotional responses (Pompedda et al., 2021; Haginoya et al., 2021). Segal et al. (2023) went even further by exploring the emotional and physiological side of this process, showing that participants emotions such as anger, disgust, sadness, surprise and bodily responses like heat rate and galvanic skin response were related to how they formulated questions, which also aligns with the biopsychological aspect of (Engels, 1977) model, by arguing that stress can shape professional outcomes.

In simple terms, the core meaning of all these studies is that serious games are not a replacement for normal teaching, but they can be a very powerful complement in psychology education, to help students move from just knowing psychology to doing psychology through practice, reflection and guided feedback. This matters for the present study because if the development of knowledge, attitudes, and empathy depends partly on exposure, practice, and emotionally meaningful engagement, then traditional lecture-based teaching alone may be insufficient to provide the equivalent psychological growth for professional readiness. It also means that the gender differences found in this paper could potentially be reduced if psychology education implements serious games across programs in the future, because since attitudes and empathy differed by

gender, then we need to utilize educational tools to improve them, and serious games might be what is needed for building more holistic approaches to patient-catered care and more prepared students for professional work.

Despite suggesting implications for psychology education, it is also crucial to consider the strengths and weaknesses of this study. One of the strengths identified in this study is its multidimensional design, as it simultaneously assessed the influencing role of gender on psychology students' knowledge, attitudes, and empathy toward the psychological burden experienced by cancer patients. This is particularly important, as prior research has examined these variables in isolation rather than a unified pattern, which limited the ability to comprehensively understand how individual differences as well as cognitive and evolutionary components interact with biopsychosocial factors to explain health, illness, and human behaviors. In addition, the study addresses a highly relevant contemporary and real-world issue within psycho-oncology, enhancing its applied value and demonstrating its potential contribution to improve future psychological care and training. Another major strength is that whilst (Kala et al., 2023) established face and content validity for the original instruments, the present study adopted a more rigorous approach by formally testing internal consistency. By reporting Cronbach's alpha for the adapted knowledge and attitudes items, this empirical project provides the first evidence of the scales' reliability, addressing a methodological gap in the original development. This psychometric check not only elevated the coherence of the items, but it also enhanced methodological transparency across the sample.

Setting aside the strengths, it is also important to present the weaknesses of this study. The first one is the sample of psychology students that limits ecological validity, because it doesn't represent cancer patients or trained clinical psychologists. This means that the findings may not fully reflect how knowledge, attitudes, and empathy apply to real world clinical settings, where emotional capacities and professional responsibilities might differ substantially. Another crucial limitation is the reliance on self-report measures, which may have introduced the possibility of response bias, particularly social desirability effects, whereby participants might have reported more positive attitudes to align with what is socially accepted based on cultural norms. Apart from that, the cross-sectional design of the study represents another weakness, because

it restricts the ability to test if causal links across the variables may develop over time. As such, it remains unclear whether gender differences are truly stable or influenced by external factors like education or experience.

Another limitation concerns the somewhat indirect measurement of scales, as participants responded to hypothetical scenarios around attitudes, more broad questions in terms of knowledge, and general empathy statements, rather than direct psychological burdens or interactions with real cancer patients' experiences. Consequently, this may reduce the extent to which findings can be generalized in real world contexts. Additionally, the measurement of attitudes was relatively narrow, as it primarily focused on symptoms recognition and help-seeking behaviors, which may not fully capture the complexity of evaluative responses toward cancer patients. Finally, the conceptualization of gender as a binary variable represents a critical limitation, because it excludes non-binary and social identities diversity, thereby oversimplifying a complex construct and limiting both inclusivity and generalizability of the findings for future research.

Future directions in psych-oncology are increasingly defined by a combination of neurotechnology, artificial intelligence (AI), immersive environments, and psychobiological monitoring systems that shift the traditional reactive psychosocial support towards a more proactive, predictive and preventative intervention plan (Insel, 2017; Onnela & Rauch, 2016; Riva et al., 2019; Torous et al., 2021). This means that cancer is no longer treated as a medical pathology, but as a multi-level organic disruption that requires treatments that target neural, immunological, cognitive, emotional and existential processes together (Engel, 1977; Grassi et al., 2017).

The first future direction concerns the epigenetic biofeedback loops and liquid biopsies through blood or fluid samples of gene expression profiles that provide a real-time visualization of stress-related molecular activity (Ignatiadis et al., 2021; Slavich & Cole, 2013), including inflammatory pathways and transcriptional markers impacting the body and mind at a physio-psychological level (Irwin & Cole, 2011). This approach is important because it enables the doctors to immediately adjust a patient's treatment plan according to their needs (Topol, 2019). Another ground-breaking direction is to influence the central nervous system (CNS) through programming nano bio-robots that re-engineer the gut's chemical output (Cryan et al., 2019). For

example, scientists could modify viruses such as bacteriophages with specific synthetic genes that fight cancer and artificial enzymes that produce serotonin and increase mood, which could perhaps positively alter the genetic code of other neuroactive molecules (Cesaro et al., 2025; Strandwitz, 2018; Xu et al., 2026).

In addition, innovative approaches have also been identified for early detection of latent psychological burdens. For instance, trans-somatic emotional mapping (TSEM), using high-density electromyography (EMG), may enable the visualization of trauma-related muscular activation patterns, and therefore effectively ground subjective distress within the body that could reveal how psychological states are somatically encoded (Payne et al., 2015; van der Kolk, 2014). By externalizing the relationship between emotional experiences and neuroanatomical systems into measurable traces, TSEM might allow targeted bodily interventions such as somatic experiencing and thus alleviate both physical and psychological pain (Mehling et al., 2011). Complementing this direction, AI-driven linguistic analysis apps could potentially examine text and speech patterns and identify subtle semantic and syntactic markers of distress, including first-person singular pronoun use, reduced lexical diversity, and shifts in temporal framing that are associated with depression and anxiety (Miner et al., 2016; Pennebaker et al., 2003; Rahman et al., 2025). These tools may act as digital biomarkers of distress that enable continuous psychological support through everyday communication (Onnela & Rauch, 2016; Torous et al., 2020).

Similarly, digital phenotyping represents one of the most empirically advanced developments in the field (Insel, 2017; Onnela & Rauch, 2016), as it involves an ongoing passive collection of behavioral and physiological data through smartphones and wearable devices (Torous et al., 2017) that collect sleep patterns, physical activity, typing speed, voice tone, and social interaction that can be analyzed using machine learning algorithms to infer psychological states in real time (Bzdok & Meyer-Lindenberg, 2018; Wang et al., 2018). This matters because if integrated with just-in-time adaptive interventions (JITAIs) (Nahum-Shani et al., 2018) then that means these mobile systems can deliver tailored psychological support at moments of heightened vulnerability and provide coping strategies during predicted anxiety spikes or notifying clinicians when distress reaches critical thresholds (Mohr et al., 2017). Theoretically, this direction

aligns with the ecological momentary assessment of mental health, which conceptualizes psychological states as fluctuating processes influenced by context and time (Shiffman et al., 2008; Stone, 1994).

However, from a critical point of view, the tension between automated psychological interventions and human experience highlights a fundamental threat to oneself, often called perverse instantiation. This AI safety concept occurs when the literal goal of symptoms reduction is achieved at the expense of the spirit of the patients free will and deep therapeutic engagement (Bostrom, 2014; Koshiyama et al., 2024). This means that whilst digital phenotyping aims to track emotional states, an over-reliance on these systems in the future risks disrupting the relation R, which is defined as the psychological continuity of memories, intentions and personality traits that (Parfit, 1984) identified as the core elements of personal identity. Likewise, if a JITAI manages a patient's distress through automated prompts, the patient may lose the ability to preserve their internal reasoning and meaning behind their own coping mechanisms and values (Burge, 2007; Maio & Olson, 1998).

Emerging research has shown that psychedelic-assisted psychotherapy and immunotherapy could really change the psychology of cancer and the illness itself. On one hand, psilocybin and LSDs have been proposed to address depression and anxiety in patients, with clinical trials demonstrating sustained reduction of psychological suffering (Gasser et al., 2014; Griffiths et al., 2016; Ross et al., 2016). The effects are believed to be mediated through mechanisms such as decreased activity in the default mode network, increased neural connectivity and the facilitation of self-transcendent or mystical experiences that allow cancer patients to find meaning in their pain (Griffiths et al., 2006), and reframe their relationship with mortality (Carhart-Harris et al., 2012). On the other hand, immunotherapy has been suggested as a breakthrough in modern oncology by shifting treatment from directly targeting tumors to activating the body's own immune system through specific inhibitors that recognize and destroy cancer cells (Pardoll, 2012; Ribas & Wolchok, 2018; Topalian et al., 2015). The integration of these therapies in the future could potentially influence treatment adherence and improve quality of life (Greer et al., 2008), but the approach should also include controlled clinical environments and careful patient selection according to their medical history needs, as psychedelics could raise safety concerns (Johnson et al., 2008), whilst immunotherapy

could introduce unpredictability and significant side-effect risks (Postow et al., 2018). This direction matters because it shows that biological treatment and psychological experience are intertwined, so effective cancer care must address both simultaneously.

The penultimate future direction aims at the existential dimension of human suffering. Building on foundational models such as logotherapy (Frankl, 1963) and dignity therapy (Chochinov et al., 2005) that focused primarily on dialogue-based approaches, contemporary interventions are incorporating hybrid, technology-augmented tools including AI-assisted narrative reconstruction (Miner et al., 2017; Torous et al., 2020), virtual reality (VR) life-review environments (Chirico & Gaggioli, 2019; Riva et al., 2019), and digital legacy-building platforms (DeSanto-Madeya et al. 2021) that include photographs, videos, messages, or even letters to loved ones, that promote meaning and restore purpose (Park, 2010). At their core, these advancements reveal the principle that pain becomes psychologically unbearable not only because of its intensity, but because it disrupts narrative identity (McAdams, 2001). So, by enabling patients to revisit, reorganize, and symbolically extend their life stories, for example through guided autobiographical recall (Westerhof & Bohlmeijer, 2014), these interventions seek to reintegrate fragmented self-conceptions and restore a sense of authorship over one's life, even in the context of disease progression. This approach strongly aligns with the idea that death is inevitable (Yalom, 1980) and the reconciliation of global beliefs that a human life should have a purpose with situational appraisal of having cancer, to reduce distress that arises from the existence of both narratives. In practical terms, the terror management theory (TMT) could be applied in a real-life clinical scenario because AI narrative systems can prompt patients with tailored questions that elicit values, life lessons, and relational meaning, while VR life-review tools can recreate meaningful milestones, thereby enhance emotional salience for those who may struggle with verbal processing, to experience what matters most and reduce their fear (Pyszczynski et al., 2015).

The final future direction points toward an important necessity. That is because the proposed next steps have suggested that the psychological burden of cancer is becoming increasingly complex, multidimensional, and technologically mediated, requiring transformation in how future psychologists are trained and prepared. Specifically, innovations such as digital phenotyping, AI-driven distress detection,

psychoneuroimmunological treatments, and existential interventions collectively indicate that illness-related suffering can no longer be understood purely as emotional or cognitive, but rather as a dynamic interaction between biological processes, digital systems, and subjective meaning-making. This has direct implications for psychology students' knowledge, attitudes, and empathy, because the findings of this study showed that whist knowledge did not differ between male and female students, future directions suggest that basic factual knowledge will be insufficient. Instead, students will require integrative, system-level understanding, including familiarity with AI tools, biological mechanisms, and existential frameworks that evolve toward applied interdisciplinary practice.

Importantly, as technological advancements grow rapidly and psychosocial care becomes much more digital, the risk of emotional detachment and reduced human connection increases, making empathy and attitudes not just desirable traits but essential clinical competencies, that also intensify the importance of gender differences found. This means that males who showed comparatively lower empathy and less positive attitudes may be at a greater risk of under-engaging with the emotional and existential dimensions of patient care, particularly in environments where technology could further distance clinicians from patients. Thus, education should also intervene to reduce these disparities, not only through lectures, but via immersive and experiential methods such as serious games and virtual realities that provide equal opportunities for both genders to develop positive attitudes and greater empathy with ongoing learning, practice, exposure and meaningful engagement, qualities that represent the most critical competencies for their professional development as future psychologists.

All these directions matter for the future of psycho-oncology, because not only they will transform how the psychological burden of cancer is treated, but also redefine the required psychological skills that could address the gender differences in attitudes and empathy, by enhancing male students emotional responsiveness, reducing stigma-related biases, and strengthening their capacity to recognize, validate, and engage with cancer patients psychological and existential distress, as well as understand how such distress is biologically and physically embedded within the body, and to move beyond theoretical knowledge toward integrated, experiential, and human-centered training, through the implementation of immersive methods

such as serious games, virtual simulations, and AI-assisted learning environments that translate knowledge into real-world clinical skills, emotional attunement, and patient-centered care.

Finally, this empirical project has shown that the psychological burden of cancer is not just the outcome of an illness diagnosis, but a chronic mental weight that emerges from the continuous interaction between biological embedding, cognitive interpretation, social context, and existential meaning (Engel, 1977; Grassi et al., 2017; Phillipp et al., 2019). Although psychology students demonstrated comparable levels of knowledge, the presence of gender differences in attitudes and empathy reveals that awarenesses and understanding are not always enough for holistic care, without a positive mindset and emotional engagement (Christov-Moore et al., 2014; Corrigan et al., 2014). Looking forward, the integration of developments in psychoneuroimmunology, epigenetic monitoring, artificial intelligence, and immersive technologies will reinforce the need for navigating complexity about effective treatment plans (Insel, 2017; Slavich & Cole, 2013; Topol, 2019; Torous et al., 2020). Consequently, the role of psychologist must evolve beyond the passive application of theory toward active practice that interprets, translates, and responds to human suffering across biopsychosocial and experiential levels simultaneously (Borrell-Carrio et al., 2004).

In this sense, the challenge is no longer only to explain or treat cancer and psychological burdens but listen and undergo the same human experience of the patient (Rogers, 1957; Yalom, 1980). Because when we are feeling and understanding a person's life narrative, we can connect our knowledge, attitudes and empathy together and offer a therapeutic direction that treats both mind and body at the same time (Decety & Jackson, 2004; McAdams, 2001). This process is not a means of eliminating distress, but a realization that pain, suffering, adversity and darkness are inherited parts of humanity (Frankl, 1963), so the point should not be on reducing them, but rather face them and embrace survival and mortality, to flourish and thrive as human beings (Park, 2010; Tedeschi & Calhoun, 2004). Accepting that it is okay to experience loss, grief and trauma could maybe provoke an insightful perspective that sometimes emotional hurt is what eventually creates the psychological antidote of hope (Breitbart et al., 2015; Snyder, 2002), that ultimately leads both patients and practitioners toward a path to healing.

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Appendix A – Ethics Application Documents

Research Proposal and Ethics Application Form

Please carefully complete this form and send it to your supervisor for checking over. Keep in mind the following:

1. Once your supervisor has checked over the form, they will either send it back to you with comments on items that require fixing or they will send your application for moderation.
2. You should keep your sections concise but ensure you include enough detail so that the reader understands the core points of each section.
3. You **MUST** submit your proposal and ethics form before you collect data
4. You **MUST** await approval before you can begin collecting data

This form contains three main sections. The first section is your ethics and research proposal. The second section includes the additional documents needed to support your application. Both these sections need to be completed by you. Section three is reserved for the supervisor and moderator to approve your application.

SECTION 1: PROJECT AND ETHICAL APPROVAL FORM

Student Name: Konstantinos Vlogiaris
Supervisor Name: Dr Sidra Afzal

About Your Project

Preliminary Title: A Path To Healing: Exploring the psychological burden of cancer patients from a student perspective

Background

Engels (1977) biopsychosocial model transformed the way illness is understood by challenging the traditional biomedical approach that treated disease as purely physical and biochemical. Engel argued that biological processes, psychological conditions, and social factors are interlinked to health and both risk and progression of physical illness (Engel, 1977). This holistic perspective laid the foundation of psycho-oncology, integrating psychology, psychiatry, and medicine to recognize that cancer is not only a biological condition but also an emotional and existential experience that requires integrated care (Grassi & Riba, 2014).

Cancer remains a leading cause of death and distress worldwide (Bray et al., 2021). Beyond its physiological impact, patients face a substantial psychological burden including anxiety, depression, emotional distress, social withdrawal, existential fears, adjustment disorders, post-traumatic stress as well as suicidal ideations, self-harm and loneliness (Cordova et al., 2017; Grassi & Riba, 2014; Mitchell et al., 2011; Naughton et al., 2021; Pitman et al., 2018; Rustad et al., 2012). These difficulties persist across diagnosis, treatment, and remission, reducing quality of life and adherence to medication (Fann et al., 2008; Fernando et al., 2023; Henson et al., 2019). While advances in medicine have improved survival, many individuals continue to face intense psychological pain, illustrating that healing requires not only medical treatment but also empathy, understanding, and social connection (Bultz & Carlson, 2006). According to Engel's model, chronic stress, anxiety, and isolation can disrupt immune functioning, elevate inflammation, and hinder recovery (Chida et al., 2008; Antoni, 2013). Addressing the whole person, rather than the illness alone, is therefore essential. As Tedeschi and Calhoun (2004) observed, suffering can also foster post-traumatic growth.

The gap in psycho-oncology research is that it has mainly focused on the patient's perspective, with limited understanding of how psychology students, the next generation of mental health professionals, perceive, interpret, and emotionally engage with the psychological suffering of cancer patients (Kala et al., 2023; Neumann et al., 2011). Prior evidence suggests gender differences exist, with females typically showing higher empathy and more positive attitudes than males, while findings for knowledge remain mixed (Christov-Moore et al., 2014; Kala et al., 2023).

Aim: To examine how gender influences psychology students' knowledge, attitudes and empathy toward the psychological burden experienced by cancer patients and to understand their preparedness for compassionate, psychosocial support.

Objectives:

1. Measure knowledge, attitudes, and empathy using validated questionnaires.
2. Compare male and female students.
3. Interpret findings within biopsychosocial and psycho-oncological frameworks.
4. Evaluate psychology students' preparedness for compassionate psychosocial care.

Research Question:
How does gender influence psychology students' knowledge, attitudes, and empathy toward the psychological burden experienced by cancer patients?

Hypotheses:
H1 (Omnibus): There will be a significant multivariate effect of gender on the combined dependent variables (knowledge, attitudes, and empathy).
H1a: There will be no significant gender difference in students' knowledge toward the psychological burden experienced by cancer patients.
H1b: Female students will report significantly more positive attitudes toward the psychological burden experienced by cancer patients than male students.
H1c: Female students will report significantly higher empathy scores than male students.

Methodology:

Design: This study adopts a cross-sectional, quasi-experimental, between subject's quantitative design. The independent variable (IV) is gender (male, female), and the dependent variables (DVs) are knowledge, attitudes, and empathy.

Materials: Data will be collected through an online Qualtrics survey. Knowledge and Attitudes will be measured using validated items from Kala et al. (2023), which assess awareness of psychological distress, coping, and beliefs toward psychosocial care. Empathy will be assessed using the Toronto Empathy Questionnaire (Spreng et al., 2009). All measures will be used in their validated original form to preserve psychometric reliability and construct validity. Demographic questions will include gender, age, and year of study.

Procedure: Following ethical approval from the University of Sunderland Psychology Ethics Committee, the Qualtrics link will be posted on social media for data collection. Participants will read the information sheet, provide consent, and complete the 10-minute survey. Anonymous data will be stored on encrypted university servers for 5 years, for research purposes (such as a PhD) and will then be permanently deleted.

Data Analysis:

A Multivariate Analysis of Variance (MANOVA) will be conducted to examine the effect of gender (male, female) on the combined dependent variables, knowledge, attitudes, and empathy. MANOVA is selected because it allows the simultaneous evaluation of related dependent variables while controlling the familywise Type I error rate. Prior to analysis, all statistical assumptions will be checked: multivariate normality (Shapiro-Wilk test, Q-Q plots, and skewness/kurtosis values), linearity (scatterplots), homogeneity of variances (Levene's test), equality of covariance matrices (Box's M test), and multicollinearity (Pearsons's correlations).

All analyses will be conducted using JASP. Descriptive statistics (means, standard deviations, frequencies, and histograms) will summarize participant demographics and scale scores. A Multivariate Analysis of Variance (MANOVA) will test the overall gender effect across the three dependent variables. Wilks' Lambda will be reported as the primary statistic, with Pillai's Trace included for robustness, using the standard significance threshold of $\alpha = .05$.

If the overall MANOVA is statistically significant, follow-up univariate ANOVAs will be performed for each dependent variable (knowledge, attitudes, and empathy) to determine the specific sources of variance. Post hoc tests will then be interpreted carefully to identify where the significant group differences occur for each dependent variable. Effect sizes (partial η^2), exact p-values, F-statistics, degrees of freedom, and 95% confidence intervals will be reported to reflect both the magnitude and precision of effects.

If the overall MANOVA is not statistically significant, univariate results will be presented descriptively rather than inferentially, for exploratory purposes, with clear acknowledgment that no multivariate gender effect was observed.

The use of validated scales and an adequate sample size will further enhance measurement reliability, validity and statistical power.

Potential Participants

A target sample of approximately 80 undergraduate psychology students will be recruited via the University of Sunderland's SONA system and other digital platforms to ensure adequate statistical power for meaningful analysis. Participants will be aged 18 years or older and currently enrolled in a psychology degree program. Inclusion criteria require enrolment in psychology and English fluency. Exclusion criteria apply to anyone who is currently experiencing cancer or had this condition in the past.

Ethical Considerations

Risk Assessment

Confirm you will abide by the BPS research on humans (2021) code: **YES**/NO

Confirm you will abide by the data protection act (2018): **YES**/NO

Does your project contain any of the risk factors stated in the "risky research" document attached here or found on the canvas page below the ethics application form

NO

Potential Harm

Possible mild emotional discomfort when reading questions related to psychological distress and cancer can be expected. Participants may skip any question they feel uncomfortable to answer or withdraw at any time. Support links for their well-being will also be provided in the debrief.

Deception

No deception will be used in the study.

Data storage and confidentiality

All data will be anonymous and stored on encrypted University servers for 5 years and will then be permanently deleted. Only researcher (Konstantinos Vlogiaris) and the supervisor (Sidra Afzal) will have access.

SECTION 2: SUPPORTING INFORMATION

Please attach in the below section any of the following information to support your application:

1. Consent forms
2. Information and debrief sheets
3. Advertisements you will use to collect data (e.g. social media post text or posters)
4. Published or self-created questionnaires (including scales and what scores mean)
5. Links or examples of any materials you will give to participants (e.g. screenshots of experiments or images)

1. Participant Information Sheet

You are being invited to take part in a research study. Before you decide whether or not to take part, it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully.

Study Title: A Path to Healing: Exploring the psychological burden of cancer patients from a student perspective

What is the purpose of the study?

The purpose of this study is to explore the influencing role of gender on psychology students' knowledge, attitudes and empathy toward the psychological burden experienced by cancer patients. The aim is to gain a better understanding of how future mental health professionals perceive, interpret and emotionally engage with the psychological needs of cancer patients, and whether males or females differ in each of these constructs. The findings from this empirical project may contribute to the development of more compassionate and holistic psychosocial care in the future. This research is being conducted as part of my BSc (Hons) Psychology degree at the University of Sunderland.

Why have I been approached?

You have been invited to take part in this study because you are enrolled in an undergraduate psychology degree program, aged 18 or above and fluent in English. Psychology students are being recruited through the University of Sunderland SONA system and other social media platforms such as Instagram, Snapchat & Teams. Approximately 80 participants will take part in total.

Do I have to take part?

No, you do not have to take part. Participation is entirely voluntary.

What will happen if I don't want to carry on with the study?

If you decide not to continue, you can withdraw at any time before submitting your responses, simply by closing the browser. All data collected up to the point of withdrawal will be immediately destroyed. If you complete the study in full and you then wish your data to be removed, you must email the researcher (Konstantinos Vlogiaris) up to one week following your participation and provide your unique participant code that will be made by 6 letters (the first 3 will be your favorite color and the other 3 will be your favorite fruit). Requests about data removal that exceed the seven-days period may not be considered.

What will happen to me if I take part?

If you wish to take part in this study, you will be invited to complete a short anonymous online survey hosted on Qualtrics. You will first create a unique participant code and then be asked to read the Participant Information Sheet and provide Informed Consent before continuing. After providing consent, you will be asked to complete several questionnaires that explore psychology students' knowledge, attitudes and empathy toward the psychological burden experienced by cancer patients. The questionnaires are based on established psychological research and involve reading statements and selecting the response that best reflects your perspectives. Please remember that there are no right or wrong answers. The full survey will take approximately 5-10 minutes to complete. You may skip any question you do not wish to answer, and you are free to withdraw from the study at any time by closing your web browser before submitting your responses.

What are the possible disadvantages and risks of taking part?

There is no known physical, psychological or social risks and disadvantages associated with taking part in the study. The questionnaires used are brief, non-invasive and like those typically used in psychological research. However, because some of the questions refer to cancer risk factors and symptoms, some participants may experience mild emotional discomfort if they have had a personal or family experience of cancer. Participants will be reminded that they are free to skip any questions they do not wish to answer and may withdraw from the study at any time without providing a reason. If completing the survey raises any concerns or distress, participants will be directed at the end of the survey to a list of support resources including:

- Samaritans: 113 223
- Mind: 0300 123 3393
- NHS Mental Health Helpline: 111
- University of Sunderland Wellbeing Service: wellbeing@sunderland.ac.uk

What are the possible benefits of taking part?

There are no direct benefits for taking part in this study. However, your participation will contribute to research aiming to improve understanding of how psychology students engage with the emotional and psychosocial aspects of cancer care. This may help inform future training of mental health professionals and promote more empathic and holistic approaches to patients' wellbeing.

What if something goes wrong?

If you are unhappy with the conduct of this study, please contact my supervisor Sidra Afzal or the Chair of the University Research Governance, Integrity, and Ethics (URGIE) group. Dr Jon Rees. Contact details are included below.

- sidra.afzal@sunderland.ac.uk
- ethics.review@sunderland.ac.uk

How will my information be kept confidential?

All data will be collected anonymously through Qualtrics. No names, contact details, or identifying information will be recorded. The survey is configured to anonymize responses with IP address and geolocation tracking turned off, to ensure complete confidentiality. Data will be stored securely on encrypted password-protected University of Sunderland servers, accessible only to the researcher (Konstantinos Vlogiaris) and project supervisor (Sidra Afzal). However, to allow participants to withdraw their data after completing the survey, each participant is automatically assigned a unique participant code. If a participant later wishes to withdraw, they can provide their code, and their responses will be removed. During this withdrawal period, the dataset is anonymized coded. Anonymized data will be retained for 5 years after online collection and will then be permanently deleted. Completely anonymized data from the project may be shared with other researchers and/or used for teaching purposes. The data may be looked at by staff authorized by the University of Sunderland for audit and quality assurance purposes.

What will happen to the results of this study?

Results will be written up in my empirical project report. If suitable, results may also be published in academic journals and/or presented at academic conferences.

Who is organizing and funding the research?

The research is organized by Konstantinos Vlogiaris, who is a BSc (Hons) Psychology student at the University of Sunderland, Faculty of Health Sciences and Wellbeing, School of Psychology.
This project is not externally funded.

Who has reviewed the study?
The study has been reviewed and approved by the University of Sunderland Research Ethics Group's review system.

Further information and contact details

- Name: Konstantinos Vlogiaris (Researcher)
- Email:Bi52oq@student.sunderland.ac.uk

- Name: Dr Sidra Afzal (Project Supervisor)
- Email: Sidra.Afzal@sunderland.ac.uk

- Name: Dr Jon Rees (Chair of the University Research Governance, Integrity, and Ethics (URGIE) group)
- Email: ethics.review@sunderland.ac.uk

Thank you for taking time to read the information sheet

2. Consent Statements

A "No" response will be denied access to the study with the statement: "Thank you for considering taking part in the study! Unfortunately, we have not received your full consent and therefore, we are not able to grant you access to the study."

If participants consent to take part, they will be directed to the study. At the end of the questionnaire, participants will be directed to a final page with a debrief and "Submit" button and be made aware that by clicking "Submit" they are granting permission for their data to be used in the study. Participants will then be directed to appropriate support resources if required.

	Yes	No
I confirm that I am over the age of 18.		
I confirm that I have read and understood the Participant Information document.		
I confirm that I do not have any personal experience with cancer.		
I understand that the anonymized data from this study may be shared with other researchers and/or used for teaching purposes.		
I understand that my participation is voluntary and that I am free to withdraw at any time during the study by closing my web browser.		
I understand that the data collected in this study are completely anonymous.		
I understand that I must be fluent in English to take part in this study.		
I agree to take part in this study.		

3. Debrief

Study title: A Path to Healing: Exploring the psychological burden of cancer patients from a student perspective

Thank you for taking the time to participate in this study. The study is now complete, and your responses recorded. Your responses have contributed to understand how gender influence psychology students' knowledge, attitudes and empathy toward the psychological burden experienced by cancer patients. The data collected from this study are for research purposes only as part of my BSc (Hons) Psychology degree. If you have any questions about the study, please email the researcher or project supervisor using the contact details below.

If the content of this study has caused any distress to you, you should contact your GP's surgery who will signpost you to relevant support.

If you have been affected by the topic of the study or if you wish to find out more about the topic, please contact charities such as

- Samaritans: 113 223
- Mind: 0300 123 3393
- NHS Mental Health Helpline: 111
- University of Sunderland Wellbeing Service: wellbeing@sunderland.ac.uk

Further contact details

Researcher – Konstantinos Vlogiaris – bi52oq@student.sunderland.ac.uk

Supervisor – Sidra Afzal – Sidra.Afzal@sunderland.ac.uk

Chair of the University Research Governance, Integrity, and Ethics (URGIE) group Dr Jon Rees
Email: ethics.review@sunderland.ac.uk

4. Social Media Advert

Hey everyone! As part of my BSc (Hons) Psychology degree at the University of Sunderland, I am conducting a research study exploring how psychology students perceive, interpret and emotionally engage with the psychological burden experienced by cancer patients. The study looks at knowledge, attitudes, and empathy, and how these may differ between males and females. If you're an undergraduate psychology student aged 18 or above, I'd really appreciate your participation. The study is completely anonymous, takes about 5–10 minutes, and can be completed online via Qualtrics using the link below ... This study has received ethical approval from the University of Sunderland Psychology Ethics Committee. Participation is entirely voluntary, and you can withdraw at any time by closing the browser. If you have any questions, please feel free to contact me at bi52oq@student.sunderland.ac.uk Thank you so much for your time and support, it really means a lot! Please feel free to share this post with other psychology students who might be interested.

https://sunduni.eu.qualtrics.com/jfe/form/SV_6VAwRDCJ6bcPGlg

5. Risky Research Indicators

Do any of the following apply to your research:

Takes place outside UK? **NO**
Involve the NHS? **NO**
Is healthcare research? **NO**
Uses ESRC funding? **NO**
Involves adults who lack the capacity to consent? **NO**
Is led by another UK institution? **NO**
Involves human tissue? **NO**
Is a clinical trial? **NO**
Is social care research? **NO**

Read the following statements and record if any of them apply to your research:

Does the research involve participants who are potentially or in any way vulnerable or who may have any difficulty giving meaningful consent to their participation or the use of their information? **NO**
Are participants involved in the study without their knowledge and consent (e.g. through internet-mediated research, or via covert observation of people in public places)? **NO**
Will the study require the co-operation of a gatekeeper for initial access to the groups or individuals to be recruited? **NO**
Does the research methodology involve the use of deception or activities which are conducted without participants' full and informed consent at the time the study is carried out? **NO**
Are there any significant concerns regarding the design of the research project? **NO**
Does the research involve any of the following groups? **NO**
a. children under 18 years of age? **NO**
b. vulnerable adults (eg people with learning or communication difficulties) **NO**
c. individuals who have a dependent or subordinate relationships to researchers **NO**
d. people in custody (eg young offenders or people in prisons) **NO**
e. individuals unable to give consent **NO**
f. individuals involved in illegal activities **NO**
g. therapeutic interventions **NO**

If the proposed research relates to the provision of social or human services is it feasible and/or appropriate that service users or service user representatives should be in some way involved in or consulted? **NO**
Are there payments to researchers/participants that may have an impact on the objectivity of the research? **NO**
Will financial inducements (other than reasonable expenses and compensation for time) be offered to participants? **NO**
Could the study induce unacceptable psychological stress or anxiety or cause harm or negative consequences beyond the risks encountered in normal life? **NO**
Will the study involve prolonged or repetitive testing? **NO**
Will the study involve discussion of sensitive topics? For example (but not limited to): sexual activity, illegal behavior, experience of violence or abuse, drug use, etc.) **NO**
Are drugs, placebos or other substances to be administered to the study participants or will the study involve invasive, intrusive or potentially harmful procedures of any kind? **NO**

Will research involve the sharing of data or confidential information beyond the initial consent given? **NO**
Is there ambiguity about whether the information/data you are collecting is considered to be public? **NO**
Will the research involve administrative or secure data that requires permission from the appropriate authorities before use? **NO**
Will the research involve the use of visual/vocal methods that potentially pose an issue regarding confidentiality and anonymity? **NO**
The Data Protection Act 2018 will apply to any data-processing activities entailed by this research. Is there any cause for uncertainty as to whether the research will fully comply with the requirements of the Act? **NO**
Are there any particular groups who are likely to be harmed by dissemination of the results of this project? **NO**
Do you have any doubts or concerns regarding your (or your colleagues) physical or psychological wellbeing during the research period? **NO**
Will the research involve accessing security-sensitive material, such as material related to terrorism or to violent extremism of any kind, including, but not limited to, Islamist extremism and far-right extremism? **NO**

Ethics Approval

Sidra Afzal (Staff)

4/12/2025

Hi,

I hope you are well. You are getting this email because your ethics application is approved. You can go ahead with data collection. I will send you your ethics form with comments from reviewers. You may find suggestions on minor changes which you *must* incorporate, and this form will be attached in appendices of your research project final submission.

Thanks
Sidra

SECTION 3: SUPERVISOR AND MODERATOR SIGNOFF

Supervisor

I confirm that I have checked the proposal and ethics application and that I am happy for the research to go ahead

Name: Sidra Afzal Signed: Sidraafzal Date:13th Nov 2025

Moderator

I confirm that (delete as appropriate):

The research may proceed, only if compulsory changes are made.

Name: Mark Ord
Signed: Mark Ord
Date: 25-11-25

General feedback:
Please use this space to provide feedback on the application

There are a few things missing from the application that need to be confirmed as present by the supervisor before you can proceed.

1. The social media advert needs to include an ethics approval statement.

2. The questionnaire you have uploaded for Q1-Q6 is not actually a questionnaire. It looks like the results for the questionnaire. Please can you update the form with the actual questionnaire and scale and ensure you supervisor signs this off before you proceed. You have the scales in the information sheet, it should be fairly quick to fix. But, it is required for any audit that this be amended. Once amended, Sidra, can you upload the corrected form.

3. The "what will happen to me if I take part" section on the information sheet is too long and contains information that is not needed for the participant. E.g. they do not need to know what the scale response options are in the information sheet. With it being so long, it impacts willingness to read and thus the ability to obtain informed consent. Make this more simple to parse.

These changes have been implemented on 17/12/2025.

Appendix B – Questionnaires

6. Published Questionnaires

The following questionnaires present the items, instructions, and response options as they appeared to participants in the Qualtrics survey. Items are based on validated instruments developed by Kala et al. (2023) and Spreng et al. (2009). Minor adjustments to wording and item selection were made in accordance with the study design, as described in the Materials section.

Questionnaire 1: Cancer Risk Factors

Instruction shown to participants:

Please indicate how likely you think each of the following factors increases the risk of cancer.

Items:	**Response options (5-point Likert scale):**
Genetic	1 = Very Unlikely
Ageing	2 = Unlikely
Smoking	3 = Neutral
Alcohol consumption	4 = Likely
Occupational hazards	5 = Very likely
Stress	
Being overweight	
Environmental factors	
God's will	

Questionnaire 2: Attitude Toward Cancer Symptoms

Instruction shown to participants:

Please indicate how much you agree or disagree with the following statements.

Items:	**Response options (5-point Likert scale):**
An unexplained lump or swelling	1 = Strongly disagree
Persistent unexplained pain	2 = Disagree
Unexplained bleeding	3 = Neither agree/nor disagree
A persistent cough or hoarseness	4 = Agree
A persistent change in bowel or bladder habits	5 = Strongly agree
Persistent difficulty in swallowing	
A change in the appearance of a mole	
A sore that does not heal	
Unexplained weight loss	

Questionnaire 3: Likelihood of visiting a doctor when experiencing symptoms

Instruction shown to participants:

If you personally experienced any of the following symptoms, how likely would you be to visit a doctor?

Items:	Response options (5-point Likert scale):
An unexplained lump or swelling	1 = Very unlikely
Persistent unexplained pain	2 = Unlikely
Unexplained bleeding	3 = Neutral
A persistent cough or hoarseness	4 = Likely
A persistent change in bowel or bladder habits	5 = Very likely
Persistent difficulty in swallowing	
A change in the appearance of a mole	
A sore that does not heal	
Unexplained weight loss	

Questionnaire 4: Types of cancer predominant in males

Instruction shown to participants:

Please indicate how likely you think each of the following cancers are more common in males.

Items:	Response options (5-point Likert scale):
Lungs	1 = Very unlikely
Oral, Esophageal and Stomach	2 = Unlikely
Colorectal	3 = Neutral
Blood	4 = Likely
Breast	5 = Very likely

Questionnaire 5: Types of cancer predominant in females

Instruction shown to participants:

Please indicate how likely you think each of the following cancers are more common in females.

Items:	Response options (5-point Likert scale):
Cervical	1 = Very unlikely
Oral, Esophageal and Stomach	2 = Unlikely
Ovarian	3 = Neutral
Blood	4 = Likely
Breast	5 = Very likely

Questionnaire 6: Age susceptibility to cancer

Instruction shown to participants:

Please select the age group you believe is most susceptible to cancer.

Response options: 0-20, 20-40, 40-60, 60-80

Toronto Empathy Questionnaire

Instructions: Below is a list of statements. Please read each statement carefully and rate how frequently you feel or act in the manner described. Circle your answer on the response form. There are no right or wrong answers or trick questions. Please answer each question as honestly as you can.

1. When someone else is feeling excited, I tend to get excited too

2. Other people's misfortunes do not disturb me a great deal

3. It upsets me to see someone being treated disrespectfully

4. I remain unaffected when someone close to me is happy

5. I enjoy making other people feel better

6. I have tender, concerned feelings for people less fortunate than me

7. When a friend starts to talk about his\her problems, I try to steer the conversation towards something else

8. I can tell when others are sad even when they do not say anything

9. I find that I am "in tune" with other people's moods

10. I do not feel sympathy for people who cause their own serious illnesses

11. I become irritated when someone cries

12. I am not really interested in how other people feel

13. I get a strong urge to help when I see someone who is upset

14. When I see someone being treated unfairly, I do not feel very much pity for them

15. I find it silly for people to cry out of happiness

16. When I see someone being taken advantage of, I feel kind of protective towards him/her

Scoring Item responses are scored according to the following scale for positively worded items 1, 3, 5, 6, 8, 9, 13, 16. Never = 0; Rarely = 1; Sometimes = 2; Often = 3; Always = 4. The following negatively worded items are reverse scored: 2, 4, 7, 10, 11, 12, 14, 15. Scores are summed to derive total for the Toronto Empathy Questionnaire