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NEAR-PEER MENTORING PROGRAM IN MEDICAL SCHOOL: ANOTHER WAY OF STUDENT SUPPORT

PhD thesis

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TABLE OF CONTENTS

LIST OF ABBREVATIONS

ANOVA	Analysis of Variance
APA	American Psychological Association
CD-RISC	Connor-Davidson Resilience Scale
COREQ	Consolidated criteria for reporting qualitative research
COVID-19	Coronavirus disease 2019, a viral respiratory disease
CY	Cynicism subscale of the MBI-SS
DASS-21	Depression Anxiety and Stress Scale
DASS-D	Depression subscale of the DASS 21
ECTS	European Credit Transfer and Accumulation System
EE	Emotional Exhaustion subscale of the MBI-SS
FGD	Focus Group Discussion
MBI-SS	Maslach Burnout Inventory
PCR	Polymerase Chain Reaction (a test used for COVID-19 diagnosis)
RAE	Reduced Academic Efficacy subscale of the MBI-SS
T1	Time-1 (Baseline)
T2	Time-2 (Follow-up)
WBI-5	WHO Well-Being Index
WHO	World Health Organization

1. INTRODUCTION

1.1. The Focus of the Research

This doctoral research explores the impact and role of a structured peer mentoring program in Hungarian medical education, with particular emphasis on its contribution to student resilience, mental health, and professional socialisation (Pölczman et al., 2025). The study centers around the Student Mentoring Program at the Institute of Behavioural Sciences, Semmelweis University, which is the first of its kind in Hungary. I chose this topic based on my personal experiences as a lecturer and a psychologist working closely with medical students in the context of a mentoring program. I regularly encountered the psychological challenges they faced during training. I witnessed that students frequently lack adequate guidance, psychological support, and resources, despite the increasing demands and stressors. It became evident that structured interventions, like mentoring, serve as a meaningful support system, not only helping students manage stress but also fostering resilience and supporting students' professional socialisation. There is extensive research on medical students' mental health, and study after study confirms what we already know: medical students are a highly vulnerable population. What is urgently needed now are real solutions, interventions that don't just describe the problem but actively address it. This research aims to contribute to such a solution.

While mentoring initiatives are widely promoted in medical education, there is still limited empirical evidence - from longitudinal designs - regarding their psychological impact on students. This study therefore investigates the mentoring program from multiple perspectives. It examines participants' psychological outcomes over time, and explores mentors' experiences through qualitative research. By combining these approaches, the research seeks a deeper insights into how mentoring contributes to students' growth, professional socialisation, and mental health within medical training. Ultimately, I hope the findings will highlight the mentoring programs' potential and offer practical guidance for integrating such initiatives more widely into medical curricula.

1.2. The Concept of Burnout

Freudenberger (1974) first described burnout in self-help networks for healthcare professionals. It refers to an emotional response to demanding situations and chronic

stress, and it is characterised by emotional exhaustion, which is a state of physical and emotional fatigue (Ádám et al., 2015). Negative attitudes towards oneself, work, and others are common traits (Freudenberger, 1974). Later studies expanded the term beyond human service professions (Maslach & Leiter, 1997). Burnout may be a risk factor for the emergense of a variety mental health problems.

Maslach and colleagues conducted the most thorough research on burnout, conceptualising it as a distinct health risk syndrome (Maslach & Leiter, 1997; Maslach & Jackson, 1981; Maslach et al., 2001). According to their framework, burnout is characterised not only by the presence of emotional exhaustion, but also by psychological detachment from problems, dissatisfaction with one's own performance, and a perceived decline in effectiveness. Three major components of burnout was identified: (1) emotional exhaustion, (2) depersonalisation, and (3) decreased personal accomplishment (Maslach & Jackson, 1981). Emotional exhaustion may manifest as fatigue, insomnia, vulnerability to illness, and diffuse physical complaints. Depersonalization involves a cynical, detached attitude toward patients or colleagues and is often accompanied by guilt, loss of purpose, withdrawal, and reduced work engagement. These symptoms frequently co-occur with hopelessness, reduced self-efficacy and dissatisfaction with performance, and a sense of incompetence despite significant effort (Hazag & Major, 2008; Maslach & Jackson, 1981). Burnout and depression share some symptoms. However, burnout is initially situation-specific, while depression affects all aspects of life (Glass et al., 1993). Importantly, while it is not classified as a clinical diagnosis, it has the potential to evolve into a mental disorder if left unaddressed (Hazag & Major, 2008).

1.2.1. The Student Burnout

The growing body of empirical research has confirmed that burnout also exists among university students (Balogun et al., 1995; Meier & Schmeck, 1985). Schaufeli and colleagues defined the concept of student burnout (Schaufeli et al., 2002). Building on Maslach's framework, they identified three dimensions: (1) emotional exhaustion caused by academic workload, (2) cynicism or psychological distancing from one's studies, and (3) a reduced sense of efficacy as a student, experiencing a declining effectiveness and academic performance. Although students are not employed and do not have workplaces, their primary activity might be regarded as "work." They participate in regulated and

obligatory activities, such as attending classes or completing assignments, that aim at achieving concrete goals like passing exams (Ádám & Hazag, 2013; Schaufeli et al., 2002). Balogun et al.(1995) reported that students experienced higher levels of emotional exhaustion and cynicism compared to the general population (Balogun et al., 1995). Jacobs and Dodd (2003) found that active engagement in leisure activities and spending time with friends may act as a protective factor against burnout, by providing individuals a sense of personal efficacy (Jacobs & Dodd, 2003).

Research highlights the significant vulnerability of medical students and young doctors to burnout (Hsu & Marshall, 1987; Maslach et al., 2001; Shanafelt et al., 2003). Furthermore, among medical students the prevalence of burnout syndrome can reach 50% (Ádám & Hazag, 2013; Ádám et al., 2014; Dyrbye & Shanafelt, 2016; Dyrbye et al., 2006; IsHak et al., 2013; Pölczman et al., 2025; Tlili et al., 2021). Burnout rises via phase of study, in the clinical phase the severity is greater than in the preclinical phase (Galán et al., 2011; Győrffy et al., 2016; Santen et al., 2010). Among internal medicine residents, burnout rates have been higher, exceeding 70%, often attributed to high responsibility combined with limited autonomy and inadequate communication skills (Shanafelt et al., 2003).

1.2.2. The Link Between the Medical Training and Burnout

Medical training poses risks, including premature career commitment and idealized expectations, which can lead to maladaptive coping and harmful health behaviors, especially in the absence of social support. A large proportion of students report feelings of disappointment and a sense of unsuitability for the profession (Hazag & Major, 2008; Molnár et al., 2003). In contrast, protective factors include social support, altruism, positive thinking, a sense of meaning in life, realistic self-knowledge, self-awareness, and openness to self-exploration (Győrffy et al., 2016; Hazag & Major, 2008). One university counseling center reported that campuses fostering supportive peer communities reported fewer mental health issues among students (McCarthy et al., 1990). Futhermore, recognizing early symptoms of burnout allows for mobilization of adaptive coping strategies and timely help-seeking, preventing mental illness. Training programs about stress management and communication are extremely important during the medical education supporting self-awareness, career planning, and coping skills which may help

prevent the development of later symptoms associated with mental health problems (Evans et al., 1991; Hazag & Major, 2008; Molnár et al., 2003). Thus, it is essential to begin preparing physicians early in their training how to manage stress, recognize their own emotions, and seek support from available systems, as only those who care for themselves can effectively care for others (Hazag & Major, 2008).

1.3. The Concept of Depression

Depression is a mood disorder marked by persistent emotional disturbance, including feelings of sorrow and guilt, fatigue, loss of interest, low self-esteem, impaired concentration, and loss of appetite. Both genetic predispositions, vulnerability and external variables play a role in the development of the disorder (Hidaka, 2012). The Conservation of Resources Theory defines both burnout and depression are understood as emotional responses to prolonged stress and demanding situations (Ádám et al., 2015; Hobfoll, 2011). In cases of depression, individuals often experience a diminishment of some of their most fundamental psychological and existential resources, such as the sense of safety or the perceived ability to meet basic needs like obtaining food (Ádám et al., 2015; Bakker et al., 2000).

A Hungarian study revealed findings align with national trends indicating that 24–45% of healthcare professionals report clinically relevant levels of depression, as measured by self-report questionnaires. In this study 35% of the participants had at least mild depressive symptoms measured by Beck Depression Inventory (BDI) (Ádám et al., 2015). The most recent study included 10,285 Hungarian healthcare personnel; 42.3% suffered from various degrees of depression, but only 19.9% of the participants had at least mild depressive symptoms measured also with the BDI. This mental state of the population has been substantially influenced by the COVID-19 pandemic, and it is suspected that among health care professionals it has also caused significant psychological damage (burnout, depression and anxiety) (Németh & Papp, 2024; WHO, 2022). A large-scale systematic review that included 167 cross-sectional studies with over 116,000 participants from 43 countries, found that approximately 27.2% of medical students reported some level of depression symptoms (using various validated self-report questionnaires, like BDI, Hospital Anxiety and Depression Scale, and DASS-21). It should be noted that variations in reported prevalence rates may reflect differences in

population characteristics, measurement instruments, and definitions of depression severity (mild, moderate, severe) across studies. Furthermore, the prevalence of suicidal ideation was reported to be 11.1% (Rotenstein et al., 2016). Suicide is the fourth greatest cause of mortality among individuals aged 15-29, emphasising the importance of early detection and mental health intervention in emerging adulthood (WHO, 2025). Tjia and colleagues (2005) discovered that medical students frequently underestimate the level of severity of their signs of depression and suicidal ideation, and are hesitant to seek professional care. One of the main reasons appear to be a fear of stigmatisation, which is a great barrier to recieve mental health care. These findings underscore the need of assisting students in recognising their symptoms and seeking mental health care (Schwenk et al., 2010; Tjia et al., 2005).

1.3.1. The Link Between the Medical Training and Depression

According to the international and national literature, medical professionals and students show poorer mental health with increased rates of distress, depression, anxiety and suicidal ideation than the general population (Aziz et al., 2020; Cho & Lee, 2021; Dyrbye et al., 2009; Grant et al., 2015; Győrffy et al., 2012; Heinen et al., 2017; Jordan et al., 2020; Kaewpila et al., 2020; Langness et al., 2022; Moutinho et al., 2017; Pölczman et al., 2025; Rajapuram et al., 2020; Rotenstein et al., 2016; Tlili et al., 2021; Torales et al., 2019; Whistle, 2021; Wilkes et al., 2019). Medical students begin their education with a mental health profile comparable to that of other students; nonetheless, they are more prone to develop depressive symptoms and other psychological problems (Bíró et al., 2008; Dyrbye et al., 2008; Shanafelt, 2011).

Emerging adulthood is a susceptible period, during which many young adults may experience a normative crisis, leading to serious mental health issues, as anxiety and depression (Arnett et al., 2014; Heinen et al., 2017; Pölczman et al., 2025). This is especially relevant for medical students, as they have to cope with additional challenges from a myriad of societal and individual sources. These students face with numerous challenging and demanding situations during their university studies (Dyrbye et al., 2008; Dyrbye et al., 2006; Pölczman et al., 2025). The aspects of the learning environment and it’s climate greatly impact academic performance, students’ emotional well-being and overall mental health (Dyrbye et al., 2009; Rehman et al., 2014.), by participating in

dissections, difficulties in time management and stress regulation, high academic workload, and examination burden (Oláh et al., 2022; Pölczman et al., 2025; Sándor et al., 2015), during which students face strong expectations. The mental health of future physicians are expected to be detrimental to their performance and commitment to medical care (Moutinho et al., 2017; Pölczman et al., 2025; Rotenstein et al., 2016), further emphasizing the importance for accessible professional support (Dahlin & Runeson, 2007).

1.4. Stressors and Challenges in Medical Education

Several studies have investigated the sources of stress in medical students (Dahlin et al., 2005; Dahlin & Runeson, 2007). One unique stressor they face is the exposure to cadavers and corpses during anatomy, pathology, and forensic medicine courses (Sándor & Győrffy, 2012). According to Sándor & Győrffy (2012) Students visit the autopsy room at a critical point in their personality development, the beginning of young adulthood. This stage of life can be viewed as a transitional period on the path to the formation of a mature personality, including the consolidation of a professional identity. It is commonly understood that this time is marked by uncertainty and fragility. It goes without saying, therefore, that in order to restore emotional stability, handholds are needed, which is why role models and model experiences will be essential (Sándor & Győrffy, 2012).

According to research, coping with transitions is a significant challenge, and successful adaptation to new roles presents considerable difficulties for medical students (Győrffy et al., 2012; Hazag & Major, 2008). It should be noted that while this period of emerging adulthood has its own set of risks, it also has the potential for successful coping. As a result, medical education must take responsibility for shaping professional personality (Molnár, Csabai, & Csörsz, 2003) and must teach future physicians how to cope adaptively with stressors and identify risk factors (Sándor & Győrffy, 2012).

Additionally to the well-documented difficulties of medical education, the COVID-19 pandemic introduced unprecedented challenges resulting in a global crisis, often described as a "permacrisis" (Lausberg et al., 2024). During the peak of the pandemic, all education institutions were closed between March 2020 and April 2021, with classes conducted online. To understand the experiences of our sample, it's essential to recognize that these medical students were in their formative years, facing disruptions in education

and social development. First-year students were in the final years of high school, while other students, already in medical school, were required to serve in the healthcare system, in hospital wards or assisting in PCR testing. These experiences with the online education, placed considerable psychological and academic burdens on them. These challenges may have heightened their vulnerability to mental health issues and may have limited their opportunities to develop essential coping skills in traditional learning environments.

1.5. The Role of Resilience in Medical Education

1.5.1. The Concept of Resilience

Resilience a core concept in positive psychology and it is described as an emotional and mental flexibility to adjust to difficult experiences, that enables a person to thrive and develop when faced with obstacles and challenges, and can be observed in individuals and groups (APA, 2018; Howe et al., 2012; Pölczman et al., 2025; Thompson et al., 2016). According to the Conservation of Resources Theory, resilience arises from a persoon's ability to protect, restore, and foster both external and internal resources in reaction to stress and adversity — including self-efficacy or self-esteem (Hobfoll, 2011). Several aspects influence how effectively individuals adapt to adversity, such as (1) how they perceive and engage with the outside world, (2) specific coping mechanisms, and (3) the quality and availability of social support (APA, 2018). Thus, resilience is not an inborn or fixed trait; rather, dynamic process in which individuals engage specific coping strategies to navigate challenging situations. The abilities and resources associated with greater adaptation (improved resilience) could be learnt, nurtured and practiced through training, coaching, therapy, or even mentoring (Julien-Chinn et al., 2024; Stoffel & Cain, 2018; Thompson et al., 2016).

Sanderson and Brewer (2017) conducted a scoping review of 36 studies to identify resilience factors relevant to health professional education. The authors organized 22 identified factors into three domains: Personal resilience strategies include such as motivation, self-awareness, spirituality, and a growth mindset. Lifestyle strategies including physical activity, reflection, self-care practices. The third domain, external resources captures such as social support and mentoring (Sanderson & Brewer, 2017). These protective factors reflect the multifaceted nature of resilience. Together, they form

a psychological foundation that supports well-being and helps individuals adapt to adversity (Dai & Smith, 2023).

1.5.2. Importance of Resilience

Recent research found that resilient individuals are less prone to depression, burnout and have lower rates of suicidal ideation (Dyrbye et al., 2010; Goldstein et al., 2013; Min et al., 2012; Pölczman et al., 2025; Whistle, 2021). In their comprehensive review, Dai and Smith (2023) underlined the key role of resilience in protecting against depression (Dai & Smith, 2023). Developing resilience can also reduce the risk of burnout and can prevent poor concentration, cynicism, hindered professional progress, and compromised patient care (Kiesewetter et al., 2021). Moreover, there is evidence for a positive association between resilience and subjective well-being (Whistle, 2021). Recent research has increasingly examined resilience among healthcare professionals, including physicians, nurses, medical residents, and medical students. Compared to the general population, resilience was also found to be poorer among medical students (Lin et al., 2019; McAllister & McKinnon, 2009; Pölczman et al., 2025; Saeed et al., 2016). Enhancing resilience might serve as a protective factor, helping to prevent the onset or worsening of psychological symptoms.

Stoffel and Cain suggested techniques for teaching resilience in the health professions, which were found to have a significant impact: Problem-based learning, teaching adaptive coping, self-care activities, social support, role modelling, and mentorship (Julien-Chinn et al., 2024; Stoffel & Cain, 2018). So, social support and a sense of belonging has a vital part in promoting resilience for both medical students and to healthcare professionals (Brown et al., 2021; Dyrbye et al., 2010; Sulimani-Aidan & Tayri-Schwartz, 2021). A recent resilience training program for medical students emphasized these factors through experiential learning, which led to significant improvements in students' understanding and confidence regarding resilience—both in caring for themselves and for vulnerable patients—highlighting the critical role of such training in medical education (Julien-Chinn et al., 2024). Addressing the psychological well-being of medical students has also become a growing priority. The establishment of the *Personal Development and Professional Socialisation in Healthcare* course at the Semmelweis University is an outstanding instance of preventive measures. The course aims to help students develop

strategies for managing emotional challenges associated with healthcare work. The *Humánia Professional Socialisation Workshop* aims to equip future physicians with skills and coping strategies, serving as a protective factor against later burnout (Balog & Pintér, 2019; Hazag & Major, 2008). Among the elective courses offered is *The Theory and Practice of Mindfulness-Based Stress Reduction*, which introduces students to evidence-based techniques for managing stress. Additionally, university student counselling services seek to provide psychological support to those facing difficulties (Győrffy et al., 2012). These student well-being services are likewise part of the programs offered by the Institute of Behavioural Sciences. Furthermore, in response to the COVID-19 pandemic, the Institute of Behavioural Sciences provided various forms of support for medical students, including an individual help hotline, group interventions, and the development of a dedicated support website.

A better, more humane healthcare system for both employees and patients will ultimately result from psychoeducating the next generation of healthcare professionals on the importance of mental health and well-being as well as equipping them with the knowledge and techniques to maintain and enhance it (Pölczman et al., 2025; Pölczman et al., 2024).

1.6. The Link between Professional Socialisation and Near-Peer Mentoring in the Medical Education

1.6.1. The Concept of Professional Socialisation

Professional socialisation is the process of learning the roles, tools, behavioural norms, and attitudes necessary to perform a specific career or profession (Hegyi-Halmos, 2018; Holland, 1985). Merton et al. (1957) defined medical professional socialisation as students preparing for their professional duties by acquiring values, attitudes, theoretical and practical knowledge, and behavioural patterns (Merton et al., 1957). Occupational roles, behavioural norms and habits related to a specific occupation, are an important concept in this professional socialisation. They are acquired by both imitation and experiential learning (Hegyi-Halmos, 2018).

The literature distinguishes between two types of professional socialisation during medical education, which can be contradictory: direct and indirect. *Direct* socialisation involves students receiving explicit guidance on how to act and behave in various professional scenarios. In contrast, *indirect* socialization is mostly accomplished through

the hidden curriculum, in which observed and experienced practical examples shape students' professional identities and personalities (Susánszky et al., 2006). A key conclusion of the studies is that professional socialization includes preparing students for the successful practice of their future professional medical roles. Throughout both undergraduate and postgraduate training, it is essential to provide students with replicable and learnable "*models*", as well as the necessary skills (Hamberg & Johansson, 2006; Molnár et al., 2012).

1.6.2. The Hidden Curriculum in Medical Education

Hafferty (1998), an American sociologist, discussed first the role of the hidden curriculum in medical education (Hafferty, 1998). In this context, the hidden curriculum refers to an informal or implicit set of learning that operates in the background, almost in the shadow, of the formally taught and explicitly promoted curriculum. While official values emphasise empathy, trust, compassion, alleviation of suffering, patient-centered care, and self-reflection, the hidden curriculum instead promotes objectivity, cautious detachment, and distrust of emotions and patients (Bandini et al., 2015; Molnár et al., 2003). The hidden curriculum outperforms the formal curriculum because it is considerably more directly related to students' daily actions and experiences than the values explicitly expressed and emphasized in lectures. In other words: "*The hidden curriculum comprises the unintended lessons that are learned but not taught and can support or contradict the formal curriculum*." (Nimmons et al., 2019). While the formal curriculum in the preclinical years closely adheres to the profession's beliefs, the values embedded in the informal curriculum encountered during the clinical years are far more diverse (Molnár et al., 2003). Rather than passively receiving the hidden curriculum, students internalise everything they experience, which contributes to their identity as future health care professionals (Bandini et al., 2015).

The hidden curriculum is an inherent aspect of any educational system, making its complete elimination impossible. The primary challenge regarding the hidden curriculum is that the learning process and its consequences are less predictable but powerful. However, by acknowledging its significance and continuously reassessing its impact, both the quality of education and student well-being could be improved. In medical training, evidence suggests a strong interconnection between the professional

socialisation, hidden curriculum, and the development of medical identity (Hafferty, 1998; Joynt et al., 2018; Sándor, 2022).

1.6.3. Professional Identity Formation Through Role Modeling

Professional socialisation and associated fundamental concepts—such as role, identity, role model, and vocation—are frequently studied in psychology and sociology, notably in domains such as social psychology and medical sociology (Zsinkó-Szabó, 2015). During the professional socialisation, students form their medical (professional) self-concept and professional identities (Merton et al., 1957). The identity emerges as a result of personality development and socialization, shaped through human interactions (Goffman et al., 1981; Hegyi-Halmos, 2018). Holland (1997) defines professional identity as a clear and stable image of a person's goals, aspirations, abilities, interests, and encompasses the internalization of roles, behavioral patterns, and value systems associated with a particular profession (Hegyi-Halmos, 2023; Holland, 1985).

This implies that, in addition to personality factors, role models, who transmit professional values, attitudes and behaviours, are of particular importance in the formation of identity during training. Paice, Heard and Moss (2002) described the concept as follows: Role models are people with whom we can identify, they have attributes we want to hold, and they are in the positions we want to achieve (Paice et al., 2002). Role models are a crucial aspect of indirect professional socialization - students observe and internalize their behaviors, values, and professional standards of practicing medizine, incorporating them into their own value systems and attitudes (Merton et al., 1957; Molnár & Molnár, 2002; Sági, 2006). Throughout medical training peers, instructors, and healthcare professionals serve as key reference points for shaping students' professional identity (Merton et al., 1957). Medical students thus learn about the unique values, specific beliefs, behavioral norms, and role expectations of the medical community, while simultaneously internalizing and identifying with them (Molnár et al., 2003). Physicians and lecturers play a vital part in the process of professional socialisation, as they interact with students on a daily basis and serve as a reference group by modeling and conveying prevalent norms and patterns of behavior (Sági, 2006).

One of the most remarkable aspects of becoming a physician is how medical students attempt to integrate their emerging professional identity with their "original" self—the

identity they had before beginning their studies (Molnár et al., 2003) to align with the expectations of their peers, colleagues, and superiors most medical students gradually lose their lay identity, as the medical school redefine their former self-concept. This period, during emerging adulthood, is a highly sensitive and formative phase, characterized by significant personality and identity development. As Shapiro (1987) states: "*The medical student needs something to hold on to, and this can only be the new medical identity*." (Shapiro, 1987). Altough, some medical student may have a strong professional identity if they are confident that they want to become a doctor, however their identity develops as they go through medical school, interact with physicians and integrate into the professional culture. This is closely influenced by an individual's self-knowledge and self-perception play a fundamental role in shaping their career path, creating the professional self. Over time, this becomes more stable and well-defined (Holland, 1985; Koltói & Kiss, 2021).

1.6.4. Near-Peer Mentoring as a Tool for Professional Socialisation

Near-peer mentoring refers to a mentoring relationship in which a mentor (senior student) provides support to a mentee (fresher student) (Pölczman et al., 2025). Mentors provide guidance on a path of professional and personal development and in settling into university life (Akinla et al., 2018). The mentors serve as peers, guides, gatekeepers, and role models at the same time for the mentees. By this proximity in age, academic, and social background, mentors are credible to their mentees (Pölczman et al., 2025; Pölczman et al., 2024). Mentoring programs could be informal or formal, short-term or long-term, and adaptable to heterogeneous or heterogeneous groups of students (Berk et al., 2005). Especially during transitional phases, such as the first year of university, mentoring programs offer essential guidance to help newcomers adjust to new academic and social settings and cope with the many challenges ahead (Abdolalizadeh et al., 2017). Nonetheless, mentoring is also challenging, resource-intensive and faces challenges such as communication and time management issues. For example, mentors may struggle to find the balance between their academic and mentoring responsibilities, moreover, misaligned expectations between mentees and mentors can also lead to dissatisfaction (Cho & Lee, 2021; Pölczman et al., 2025; Pölczman et al., 2024). In order to ensure mentors' well-being and growth, mentoring requires ongoing assessment of the mentoring

process and suitable psychological assistance. Mentors' ability to effectively support their mentees can be enhanced by regular supervision, training, and psychoeducational interventions, which will ultimately result in an impactful mentoring experience and a more meaningful and long-lasting mentoring relationship (Pölczman et al., 2025). Moreover, mentor responsibilities also necessitate self-reflection (Kukreja, 2018).

There seems to be a clear consensus emerging from the research on the relevance of mentoring because of its role in professional socialization (Hernandez et al., 2022; Nimmons et al., 2019). Mentors have a crucial role in this process, serving as reference points for professional identity development. Socialization into the medical profession involves adopting its values, norms, and behavioral expectations, a process in which mentors, particularly near-peer mentors, can serve as significant reference groups (Merton et al., 1957). Through longitudinal mentoring relationships, ongoing interactions, and exposure to institutional values, mentors help mentees navigate the ethical and socio-cultural dimensions of the profession. This continuous engagement shapes not only the mentees' understanding of medicine but also reinforces the mentors' own professional growth and identity, as they begin to think, act, and feel like physicians (Krishna et al., 2023). Therefore, mentorship experiences are crucial milestones because they impart valuable knowledge that will enable students to develop into the best healthcare professionals possible (Pölczman et al., 2024).

1.7. The Impact of Near-Peer Mentoring in Medical School

A number of studies have shown that peer mentorship is an effective and cost-efficient approach to support students (Pölczman et al., 2025). The mentoring approach benefits mentees and mentors by providing academic and social support, and fostering both personal and professional growth (Al-Dubai et al., 2013; Altonji et al., 2019; Atlas et al., 2021; Aziz et al., 2020; Kalén et al., 2012; Kovács & Kovács, 2012; Laurence et al., 2020; Nimmons et al., 2019; Pölczman et al., 2025; Rehman et al., 2014; Singh et al., 2014; Yusoff et al., 2010; Zhang et al., 2017). Mentoring can put mentors’ previous theoretical knowledge into practice and significantly enhance their empathy, self-awareness, and sense of responsibility (Kukreja, 2018; Mohd Shafiaai et al., 2020; Pölczman et al., 2025; Pölczman et al., 2024; Prunuske et al., 2019; Singh et al., 2014).

Previous research has found that students benefit from mentoring programs in a variety of ways. The most generally stated benefits were enhanced social skills and reduced symptoms of anxiety (Al-Dubai et al., 2013; Altonji et al., 2019; Atlas et al., 2021; Chatterton et al., 2018; Jordan et al., 2020; Kalén et al., 2012; Kovács & Kovács, 2012; Laurence et al., 2020; Mohd Shafiaai et al., 2020; Pölczman et al., 2025; Prunuske et al., 2019; Rehman et al., 2014; Sonawane et al., 2021). Whether serving as mentors or mentees, students who engage in mentoring frequently report a variety of benefits, such as decreased worry, boosted self-esteem, better social and communication skills, improved problem-solving ability, and more effective learning (Al-Dubai et al., 2013; Altonji et al., 2019; Kalén et al., 2012; Kovács & Kovács, 2012; Pölczman et al., 2025; Rehman et al., 2014).

While most studies report positive outcomes, some cross-sectional study showed significant changes in students' quality of life, highlighting that program outcomes can vary depending on implementation details (Bechara Secchin et al., 2020). Nonetheless, in a longitudinal study, students after participating in a mentoring program experienced decreased levels of burnout and stress, and increased quality of life (Pölczman et al., 2025; Zhang et al., 2017). Qualitative findings of a 7-month-long mentoring program indicated that over time mentors experienced improvements in their resilience and mental health (Kukreja, 2018; Pölczman et al., 2025). Further research has also confirmed, that mentoring programs can alleviate the medical school strains by building students' resilience to cope effectively with challenges, and improving medical students' overall mental health and well-being. In conclusion, mentors are vital cornerstones in student burnout and depression prevention (Abdolalizadeh et al., 2017; Akinla et al., 2018; Altonji et al., 2019; Lapp et al., 2018; Pölczman et al., 2025; Prunuske et al., 2019; Sonawane et al., 2021; Yusoff et al., 2010).

1.8. The Semmelweis Student Mentoring Program

The Semmelweis University places an emphasis on student mental health support, mandatory electives in humanities, and other services aiming to raise students' well-being (e.g., free health care, free sports classes, courses about stress management, downloadable relaxation audio materials). The Semmelweis Mentoring Program is a part of the well-being curriculum for the students. The program was launched in September 2019 at the

Institute of Behavioural Sciences. A total of 120 mentees (first-year students) and 112 mentors participated in the program during the 2022/2023 academic year. Since then, the program has grown and the need for mentoring has tripled (Pölczman et al., 2025). After admission mentees are randomly matched to a near-peer mentor. The mentoring program aims to help first-year students adjust to university life and to give them practical information about medical school. The program's objective is psychosocial intervention, which aims to decrease the level of stress, avoid burnout, preserve and improve students' mental health and resilience (Pölczman et al., 2025; Pölczman et al., 2024).

Mentors are at least third-year students who receive training at the beginning of each semester on these topics: competencies and goals in mentoring, stress and time management, assertive communication techniques, and mental health support. They have been educated in psychiatric emergencies and how to initiate the right responses until the mentee gets professional help, if necessary (Pölczman et al., 2025). They learn about the university's resources and services (such as the psychological student counseling program or the Department of Psychiatry and Psychotherapy) and are urged to suggest them to others in need. When mentors are unsure of what to do next, they are encouraged to immediately get in touch with the Mentoring Program leaders or supervisors. Mentors learn and teach the mentees how to adaptively cope with stress. They also acquire soft and adaptive problem-solving skills, which are taught and encouraged and refined through workshops and supervision. Mentors must attend at least 4 required training sessions and 2 supervision sessions per semester, each lasting at least 90 minutes (minimum 9 training hours/term) (Pölczman et al., 2025; Pölczman et al., 2024). Supplementary workshops are also offered at frequent intervals over the academic term. Mentors can voluntarily participate in resilience and an internationally standardized behavioral stress management program (Kirby et al., 2006), which is also a culturally adapted and standardized intervention in Hungary (Pölczman et al., 2025; Stauder et al., 2016). There is a combination of voluntary and mandatory participation in the different parts. For their efforts, the mentors received ECTS credits (Pölczman et al., 2025).

According to the program’s guidelines, there must be at least one in-person meeting each month and weekly online communication. The vast majority of students adhere to the rules. It is up to the mentor and mentee to set the ground rules together (Pölczman et al., 2025; Pölczman et al., 2024). Although clearer instructions would be beneficial, having

stricter rules regarding the meetings (frequency, going through predefined topics) may discourage the students to participate given the lack of spare time and pressure they have. The mentee's needs determine how often the mentor and mentee communicate or interact. Notwithstanding the recommendations, schedule conflicts, personal obligations, or the varying needs and preferences of mentees and mentors may cause the actual frequency of meetings to fluctuate (Pölczman et al., 2025; Pölczman et al., 2024).

The strength of our program rests in the practice-based training and workshops provided to mentors (Pölczman et al., 2025). This preparatory phase is essential, as mentoring itself involves emotional and interpersonal challenges that require specific skills. This is particularly important, as previous studies have highlighted that students interested in mentoring need training in areas related to providing helpful feedback and establishing realistic goals and expectations (Nimmons et al., 2019). The other key strength of our program rests in the approach to monitoring mentors' work and commitment through supervision sessions and mentor diaries, which is a unique feature among mentoring programs worldwide. Despite being a suitable tool for giving mentors direction and feedback, supervision is also not common in the majority of mentoring programs (Altonji et al., 2019). Throughout the program, in supervision and in the Mentor Diary, mentors reflect on their experiences and thoughts. The Mentor Diary is a well-structured tool that guides mentors in reflection on their mentees' needs and their mentorship work. It comprises a set of questions for guidance and sections for mentors to record the frequency of the meetings with their mentees and the main topics covered during these interactions (Pölczman et al., 2025). Supervision occasions always take place in a group setting, in person on the campus, with 8-15 students and a facilitator. These sessions offer mentors a safe space to ask questions, an provide them with opportunity to reflect on their personal experiences and interactions, and to give and receive peer support. Self-awareness and self-reflection, as well as the peer support that students provide to each other, are also powerful impact factors of this program (Pölczman et al., 2025).

The Semmelweis University Mentoring Program holds a unique position among the mental health initiatives aimed at medical students due to its distinctive personal approach. The program provides students with meaningful one-on-one interactions, offering personalized guidance tailored specifically to individual needs, in an educational environment often characterized by mass education and anonymity. This personal

connection helps students feel recognized and reduces the feeling of anonymity, creating mutual benefits for both mentors and mentees. The program further stands out with the thorough preparation provided to mentors, which includes comprehensive training sessions, Mentor Diary, and regular supervision meetings. Such structured preparation not only enhances the mentors' effectiveness but also makes this initiative worldwide unlike any other. Additionally, it must be noted that this was the first structured mentoring program in Hungary developed specifically by medical students for their peers, reflecting an authentic understanding of the challenges faced during medical training. While they are other commendable programs at Semmelweis University, the Semmelweis Mentoring Program uniquely integrates rigorous mentor training with deeply personal student support, directly addressing both emotional well-being and professional development.

1.9. Challenges and Innovations in Medical Education

Medical training in Hungary follows a structured format, separated into two phases, (1) preclinical: first and second years and (2) clinical: third to sixth years, with each focussing to cultivate distinct skills, attitudes, and behavioural competencies necessary for professional development (Moutinho et al., 2019; Susánszky & Szántó, 2002). Historically, the clinical years of medical training were considered the primary period for shaping doctor-patient relationships. However, recent research underscores the preclinical experiences in fostering communication skills and early professional socialization (Molnár et al., 2003; Sándor & Győrffy, 2012). An emerging trend in literature highlights a generational shift in attitudes toward professional hierarchies. Younger physicians are increasingly resistant to rigid hierarchical structures, instead favoring mutual trust, respect, and collaborative teamwork (Győrffy et al., 2012). Medical education in Hungary is deeply anchored in tradition from a pedagogical perspective. Teaching innovation is primarily manifested in the transfer of modern scientific knowledge using traditional methods, as well as the partial incorporation of innovative technological approaches (Varga, 2021). This calls into question whether traditional medical education approaches that worked successfully in the 20th centuries, continue to fulfil the evolving needs of 21st-century students and, by extension, patients and modern healthcare demands. Furthermore, can these approaches adequately equip future physicians to deal with rapid change (Varga, 2021)? As medical practice becomes

increasingly demanding, is essential for future physicians to build resilience, enabling them to adapt to change, manage setbacks, and sustain long-term professional well-being.

2. OBJECTIVES

The objectives of this doctoral research are to investigate the role and effects of a structured near-peer mentoring program within medical education. The present study represents the first comprehensive evaluation of the Semmelweis University Student Mentoring Program, an innovative initiative and the first structured near-peer mentoring program of its kind in Hungary. Utilizing both qualitative and quantitative research methods, the goal of the research is to gain deeper insight into the potential benefits and limitations of mentoring interventions and their implications for medical education and student well-being. To our knowledge, no previous study in Hungary or internationally has longitudinally investigated the psychological effects of structured mentoring programs, specifically focusing on changes in resilience and mental health outcomes among medical students. In this dissertation, the following research questions and objectives are addressed:

Qualitative Research Questions:

1) What are mentors' personal and professional perceptions, experiences, and reflections associated with their participation in the near-peer mentoring program?
2) What specific benefits do mentors report as outcomes of their involvement in mentoring activities?
3) What challenges and difficulties do mentors face during the mentoring process?
4) How satisfied are mentors with the mentoring program, including mentor training, supervision, and program organisation?

Quantitative Research Questions:

5) What is the overall mental health profile of the participating medical students at baseline, with a focus on burnout, depression, anxiety, and perceived stress levels? Are there significant differences in these indicators based on gender and phase of medical training (preclinical vs. clinical)?
6) Does participation in a near-peer mentoring program (either as mentor or mentee) significantly influence medical students' psychological resilience over time?
7) Are there significant differences in psychological resilience over time between students who took part in the mentoring program (case group) and those who did not (control group)?

8) Are there significant differences in depression symptoms over time between students who participated in the mentoring program (case group) and those who did not (control group)?
9) Are there significant differences in burnout levels at the end of the intervention period between students who took part in the mentoring program and those who did not?

Ultimately, this research aims to provide insights into how structured mentoring programs can effectively enhance medical students' resilience and support their mental health, with potential implications for facilitating their professional identity formation and professional socialisation within the uniquely challenging context of medical training.

3. METHODS

3.1 The Study Design

This dissertation is based on a mixed-methods study conducted within the framework of the Semmelweis Student Mentoring Program. The research included both quantitative and qualitative components to gain deeper insight and focused on the psychological and professional effects of participation in a structured near-peer mentoring program.

Given the complexity and relatively unexplored nature of the topic, it was important to include mentors' personal perspectives in the study in order to understand the underlying processes and individual experiences related to mentoring. The qualitative research was exploratory in nature, aiming specifically to understand students' perspectives on their experiences within the mentoring program, particularly focusing on the resources they utilized and the positive outcomes they perceived. Additionally, we sought to identify the strengths of the mentoring program as well as the mentors' motivations for participating. To achieve this, focus group interviews were conducted with mentors, exploring their personal experiences, perceived benefits, challenges, and opinions regarding the organization and implementation of the mentoring program. The qualitative study was conducted first to uncover initial insights into the mentors' experiences and was intended to complement the quantitative results and to provide a richer context and a greater comprehension of how mentoring can effectively support student development, resilience, and overall well-being.

The quantitative research was primarily designed to assess the impact of the mentoring program on psychological resilience, depression symptoms, and burnout levels among medical students, with a particular focus on comparing intervention and control groups longitudinally. This longitudinal approach was chosen due to its unique ability to reveal program-specific effects and changes over time, contributing new insights to the existing literature. Additionally, I aimed to obtain a baseline overview of students' overall mental health status, including indicators such as anxiety and well-being, to explore potential differences according to gender and phase of medical training (preclinical vs. clinical). The choice to concentrate particularly on psychological resilience, depression symptoms, and burnout in the analysis was driven by the recognition of resilience as a critical protective factor in medical training contexts. Resilience not only influences students'

ability to manage stress effectively but also impacts their long-term mental health and foster professional growth. Depression symptoms and burnout were selected because of their well-documented prevalence and detrimental impact on medical education.
The research was carried out with the approval of Semmelweis University's Regional, Institutional Scientific, and Research Ethics Committee (protocol number: 37/2022) (Pölczman et al., 2025). Further details about the sample, instruments, and procedures are presented in the following sections.

3.1.1. The Qualitative Study

A qualitative study was conducted to explore the mentors' experiences and satisfaction with the mentoring program, and their perceptions of the potential benefits as a result of participation. The data was collected through semi-structured Focus Group Discussions (FGDs), held on the campus of Semmelweis University between March and April 2022 (Pölczman et al., 2024). The FGDs were held in Hungarian. The participants were informed about the objectives of the study, confidentiality, and their right to withdraw at any time from the study prior to the discussions. Each participant signed an informed consent form, gave verbal consent for the audio recordings, and completed a demographic questionnaire (gender, age, year of study). The FGDs lasted between 60-90 minutes and were audio-recorded. Only the study participants and the moderator were present during the FGDs. The moderator also took notes. Following the first few FGDs, a debriefing session was held with the research team to debrief on the data collection. Data collection was carried out until data saturation was reached and no new significant data or theme emerged (Pölczman et al., 2024). The study was reported according to Tong et al.'s (2007) Consolidated Criteria for Reporting Qualitative Research Guidelines (COREQ), and the checklist can be found in the Appendix (Pölczman et al., 2024; Tong et al., 2007).

3.1.2. The Quantitative Study

The aim of the non-randomised controlled trial was to investigate whether the mentoring program can affect the resilience and mental health outcomes of students in a medical school setting (Pölczman et al., 2025). The sample composed a case and control group. The case group consisted students who were enrolled in a mentoring program as mentees or mentors at the time. The students in the control group were not enrolled in the program.

Group allocation was independent of this study. A voluntary sample of students participated in the mentoring program and the research (Pölczman et al., 2025).
Both groups were assessed at two time points 5 months apart: at the beginning of the academic year in August 2022 (Time-1, T1) and at the end of the term in February 2023 (Time-2, T2). Data collection for the case group took place before and after the participation in the mentoring program (Pölczman et al., 2025). Convenience sampling was applied, and responses were gathered using a secure online survey (Evasys software) sent via email through the Neptun system to all medical students in the Hungarian Program (n = 300) via email. It took approximately 20 minutes to fill out the survey. The participants were informed about the aim of the study, confidentiality, and their right to withdraw from the study. Participants provided written informed consent to participate in the study (Pölczman et al., 2025).

3.2. Participants and Procedures

3.2.1. The Focus Group Study

For the focus group study purposive sampling was utilized, based on the following inclusion criteria: students who were enrolled in the mentoring program at that time and were mentors. Participants were recruited through the Semmelweis Student Mentoring Program's social media account and via email during March 2022. At this point, mentors had been providing mentorships for around 8 months (Pölczman et al., 2024). Exclusion criteria were as such: students who did contribute to the audio recording. Since there was no student, who satisfied these criteria, no one was excluded from the study. Participation in the study was voluntary, and the grouping into focus groups was randomized. The five focus groups involved a total of 26 participants (5–9 per group) from the age group of 20–24 years (M=22.04; *SD*=2.163). Ten (38.5%) of the participants were male and sixteen (61.5%) were female. Most of them were third-year medical students (21; 81%), and only 5 of them were in their 4th year (19%) (Pölczman et al., 2024).

3.2.1. The Quantitative Study

In this trial and its final sample, 133 medical students participated. However, during the data collection, in the first survey, 243 valid responses, while in the second survey, 158

valid responses were received. To follow up with the study participants while ensuring their anonymity, a five-digit code was created by each participant, among others, containing the first letter of their mother's name, the capital letter of their place of birth, and the number of siblings they have (Pölczman et al., 2025). The responses of the participants were then paired for the data analysis, based on the codes that had been provided. Numerous students had to be excluded from the final sample because their responses could not be matched (e.g., they mistyped their code or multiple students using the same code) or because they completed a single survey twice, resulting a smaller sample size. Those students who did not complete both questionnaires were excluded from the study. The paired data analysis only included participants who completed both surveys. The participants were enrolled in the study voluntarily, and the confidentiality of their data and anonymity were assured. No financial benefit was received by them for their participation (Pölczman et al., 2025).

Previous research exploring the impact of mentoring programs has predominantly relied on cross-sectional study designs, capturing only a single point in time, thus providing limited insights into how mentoring relationships and their psychological effects persist over time. To address this gap, a longitudinal approach was chosen, enabling students' resilience to be tracked over an extended period. This design allows for a deeper and richer comprehension of subtle developmental changes and long-term trajectories that typically cannot be detected by shorter studies. Although the sample size is relatively small, to the author's knowledge, no other longitudinal investigations of mentoring programs in a medical education setting have been conducted with significantly larger samples. Indeed, no longitudinal research of this nature has previously been carried out within this specific context. Therefore, despite the limitations, this research aims to provide unique and valuable insights into the long-term effects of mentoring.

3.2.1.1. The Sample

A total of 133 medical students participated in this trial. Thirty of the participants were male (23%), and one hundred and three were female (77%). Responses were from the 18–26 age group with a mean age of 20.55 years (*SD* = 1.948) (Pölczman et al., 2025). Seventy-one participants (53.4%) were in the pre-clinical phase (Years 1 and 2 of medical school), while 62 (46.6%) were in the clinical phase (Years 3 to 6 of medical school). The case group included 94 students enrolled in the mentoring program, which represented

71% of the total sample. This group included fifty mentees (35%) and forty-four mentors (33%). Forty-six participants were first year students, and the rest were second year or above. In other words, fifty students were in their pre-clinical phase, and 44 were in their clinical phase of study (Pölczman et al., 2025). The control group included thirty-nine students (29%) who did not participate in the mentoring program. This group consisted of 12 first year students. In this group twenty-one students were in their pre-clinical phase and 18 were in their clinical phase of study. The characteristics of the research participants are presented in Table 1 (Pölczman et al., 2025).

Table 1. Distribution of the sample of non-randomised controlled trials by gender and year in medical school. Own published table (Pölczman et al., 2025).

Characteristic		**Case group (n = 94)**	**Control group (n = 39)**	**Total Sample (N = 133)**
Gender	Male	17 *(18.1%)*	13 *(33.3%)*	30 *(22.6%)*
	Female	77 *(81.9%)*	26 *(66.7%)*	103 *(77.4%)*
Year in Medical School	Year 1	46 *(48.9%)*	12 *(30.8%)*	58 *(43.6%)*
	Year 2	4 *(4.3%)*	9 *(23.1%)*	13 *(9.8%)*
	Year 3	16 *(17.0%)*	7 *(17.9%)*	23 *(17.3%)*
	Year 4	20 *(21.3%)*	3 *(7.7%)*	23 *(17.3%)*
	Year 5	5 *(5.3%)*	4 *(10.3%)*	9 *(6.8%)*
	Year 6	3 *(3.2%)*	4 *(10.3%)*	7 *(5.3%)*
Clinical Phase	Pre-Clinical	50 *(53.2%)*	21 *(53.8%)*	71 *(53.4%)*
	Clinical	44 *(46.8%)*	18 *(46.2%)*	62 *(46.6%)*

Values represent frequencies (n) with percentages (%).

3.3. Measurements

3.3.1. Measuring Instrument for the Focus Group Study

Throughout the focus group study a semi-structured interview guide was utilized to give the interview a flexible structure. The guiding questions were developed after careful consideration of various sources, including the guide we developed for the supervision sessions and topics discussed during these sessions in previous years, content mentioned by students, and student feedback on the program and the mentoring role gathered during supervision sessions (Pölczman et al., 2024). The FGD interview guide also consisted of open-ended questions that explored mentors' experiences with mentoring, and their perceptions of the benefits they received as a result of participating. The questions aimed

to cover relevant areas of the main topics, but left ample room for additional information the interviewees provided (Pölczman et al., 2024). The interview guide was structured around the following thematic blocks: key tasks and challenges, the mentor-mentee relationship, impact of the mentoring program, skills gained through mentoring, and evaluation of the program. The interview guide can be found in the Appendix (Pölczman et al., 2024).

3.3.2. Measuring Instrument for the Quantitative Study

The self-completed questionnaire assessed socio-demographic variables, and psychological factors (burnout symptoms, resilience, well-being, depression, anxiety and stress). Standardised tools validated on Hungarian samples were used as described below. The language of the survey was Hungarian. The socio-demographic characteristics included gender, age, year of study in medical school, and participation in the mentoring program (Pölczman et al., 2025). The above psychological factors were assessed:

To assess the burnout level of the sample, the student version of the Maslach Burnout Inventory (MBI-SS) was utilized. This 15-item questionnaire evaluates burnout in educational settings through three subscales: emotional exhaustion (EE), cynicism (CY), and reduced academic efficacy (RAE). Each item is rated on a 7-point Likert scale from 0 (never) to 6 (every day), capturing the extent of emotional fatigue related to academic demands, a cynical attitude toward studies, and a perceived decline in academic performance and effectiveness. The scores on the EE subscale range from 0 to 30, and are classified into three categories: low (0-7), moderate (8-14), and high (15-30). For the CY subscale, scores range from 0 to 24, and are categorized as follows: low (0-4), moderate (5-10), and high (11-24). The RAE subscale ranges from 0 to 36, with moderate levels of reduced academic efficacy defined as scores between 1 and 17, and high levels between 18 and 36. A higher score on any of the subscales indicates the presence of difficulties related to that specific component of burnout. These dimensions collectively provide an overall measure of student burnout. The range of scores that can be obtained on this scale is from 0 to 90, wherein higher overall scores indicate a higher degree of burnout. Scores are categorized as follows: low (0–25), moderate (26–36), and high (37–90) (Hazag et al., 2010).

The Hungarian version of the Connor-Davidson Resilience Scale (CD-RISC) was utilized to assess the level of resilience (Járai et al., 2015), an individual's perceived ability to cope with stress and adapt to adversity in university setting. Respondents indicate how true each statement has been for them over the past 3 month. An example item is: "*I feel that studying is emotionally exhausting*". This shortened scale contains 10 items, scored on a 5-point Likert scale from 0 (not true at all) to 4 (almost always true). The range of scores that can be obtained on this scale is from 0 to 40, wherein a higher overall scores indicating a higher degree of resilience (Pölczman et al., 2025).

The WHO Well-Being Index (WBI-5) validated for use in Hungarian (Susánszky et al., 2006). Comprising 5 items with answers measuring the general well-being based on the last two weeks. Items are scored on a 4-point Likert-type scale extending from 0 (not true at all) to 3 (almost always true). The range of scores that can be obtained on this scale is from 0 to 15. After adding the values, a higher score reflects a higher level of well-being.

To assess the presence of symptoms of depression, anxiety and stress, the Hungarian version of the Depression Anxiety and Stress Scale (DASS-21) was used (Rózsa et al., 2020; Szabó, 2009). The scale contains 3 subscales. Every subscale comprise 7 items, which participants had to rate on a 4-point Likert scale (0-Did not apply to me at all, 3-Applied to me very much or most of the time). The score for each subscale is calculated by adding the items together. The range of scores that can be obtained on this scale is from 0 to 100. A higher score on the subscales reflects greater levels of depression, anxiety, and perceived stress. The depression symptoms are categorized as follows: normal (0-9), mild (10-13), moderate (14-20), severe (21-27), and extremely severe (28-42). The anxiety symptoms are categorized as follows: normal (0-7), mild (8-9), moderate (10-14), severe (15-19), and extremely severe (20-42). The stress symptoms are categorized as follows: normal (0-14), mild (15-18), moderate (19-25), severe (26-33), and extremely severe (34-42) (Pölczman et al., 2025; Rózsa et al., 2020).

3.4. Statistical analysis

3.4.1. Analysis of the Focus Group Study

After the completion of each FGD, the recordings were transcribed verbatim and anonymised. A deductive approach was adopted and the data from the FGDs were analysed following the six-step method developed by Braun and Clarke (Braun & Clarke,

2006). A semantic approach was used in the data analysis, which was carried out by two researchers with different disciplinary backgrounds (medical and psychological) (Pölczman et al., 2024). First, the transcripts were read several times independently by both researchers to familiarise themselves with the data. In the second step, a few of transcripts were coded independently line by line. The codes were then compared, the codebook created and consensus reached on the coding. Following the recoding of the first transcripts, the remaining transcripts were independently coded. Their independent analyses were then discussed and compared to resolve the discrepancies. Therefore, no further re-coding was necessary. Once consensual agreement was reached on the coding, the relationships between codes were considered and then patterns, differences and similarities were searched for and explored (Pölczman et al., 2024). In the third step we categorised sub-themes and emerging themes. The potential themes were regularly discussed several times. In the fourth step, the themes were reviewed in relation to the coded material and the entire data set, and a thematic map was assembled. In the fifth step the themes were further refined and defined. The findings were reviewed and a consensus on the thematic analysis was achieved (Pölczman et al., 2024). Finally, in step six, the report was produced and the findings were reported in the form of a narrative summarising the experiences, thoughts and attitudes of the participants. Quotes that best illustrated the themes were selected using codes such as FGD5-P08. The data analysis was reviewed by a third researcher to ensure that the interpretation reflected the original data. All researchers agreed on the final interpretation of the data (Pölczman et al., 2024).

3.4.2. Analysis of the Quantitative Study

Statistical analysis was performed using SPSS 29 and 30 (SPSS Inc., Chicago, Illinois, USA). Descriptive statistics were used for demographic characteristics and for all other variables to calculate frequencies, means, and standard deviations. Levene's tests were conducted, but the results did not reach statistical significance ($p > 0.05$), so parametric tests were used. The significance level was fixed at 0.05 (Pölczman et al., 2025).

To assess medical students' overall mental health at baseline (T1) and to obtain a comprehensive profile of their psychological characteristics, independent samples t-tests were performed to explore differences based on gender and phase of study. The dependent variables included mean scores on the Maslach Burnout Inventory–Student Survey, the

Connor-Davidson Resilience Scale, the WHO Well-Being Index, and the Depression, Anxiety and Stress Scale (Pölczman et al., 2025).

A mixed-effects linear model approach to repeated measures ANOVA was performed to investigate the difference in resilience and depression between the case and control groups across all time points (main effect). It was also used to assess potential interaction effects between the within-subject factor (Berk et al.) and the between-subject factor (intervention) (Pölczman et al., 2025). In the first analysis, the within-subject variable was the mean score on the Connor Davidson Resilience Scale, measured before (T1) and after (T2) the intervention. In the second analysis, the within-subject variable was the mean score on the depression subscale of the Depression Anxiety Stress Scale, measured before (T1) and after (T2) the intervention. A mixed linear model was chosen to handle repeated measures data, which is suitable for non-randomised controlled trials. The models were adjusted for two covariates due to their possible influence on mental health and resilience outcomes: age and gender (Pölczman et al., 2025). Sphericity was assessed with Mauchly's test, and since the assumption was violated ($p < 0.05$), the Greenhouse-Geisser correction was conducted to adjust the degrees of freedom. If a significant interaction effect between intervention and time was observed in the analysis, Bonferroni-corrected post-hoc tests were conducted. Additionally, independent samples t-test was performed to compare student burnout scores between the case and control groups after the intervention (T2). In this analysis, the dependent variable was the mean score on the Maslach Burnout Inventory–Student Survey (Pölczman et al., 2025).

4. RESULTS

4.1.Results of the Focus Group Study

Three broad themes emerged from the thematic analysis. Two of these relate to the outcomes and perceived benefits of participating in the program, while the third is related to the mentors' reflections on the experience and on the program. The thematic map illustrating the themes and sub-themes is shown in Figure 1 (Pölczman et al., 2024).

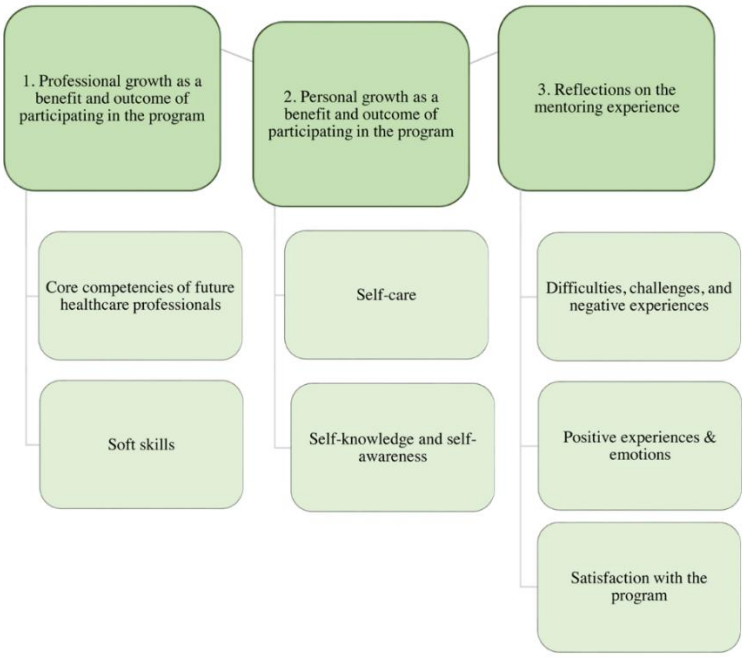

Figure 1. Thematic map. Own published figure (Pölczman et al., 2024).

4.1.1. Professional Growth as a Benefit of Participating in the Program

Two sub-themes of professional development emerged. Participants perceived that as a result of participating in the program they had improved in the following areas: (1) soft skills and (2) core competencies. Acquiring and developing these skills are vital stepping stones in becoming a good healthcare professional (Pölczman et al., 2024).

4.1.1.1. Soft skills

One of the most frequently stated benefits of the program was the development of soft skills, specifically: time management, punctuality and a sense of responsibility. Mentors often shifted responsibility from their mentees to someone else or took full responsibility on their mentees' behalf. Problem-solving and communication skills were also acquired

by mentors through mentoring. Participants reported that coordinating and organizing meetings, meeting deadlines, managing schedules, and paying careful attention to detail were major tasks that each mentor had to excel at (Pölczman et al., 2024):

"[...] *my problem-solving skills have improved significantly. I encountered numerous administrative challenges while assisting my mentee, some of which were unfamiliar to me, leaving me unsure of where to begin. However, with perseverance, I successfully found solutions to address her issues and resolved them effectively*." (Pölczman et al., 2024, p.4, FGD4-P01).

"*I found that the 2-3 days before an exam quite critical, as I received a couple of calls from mentees who were feeling unstable. It wasn't difficult to reassure them, but I think it helped to plan ahead for those critical days. I planned my own time around that 2-day period, I could set aside an evening to either call or calm them down*." (FGD1-P06)

4.1.1.2. Core Competencies of Future Healthcare Professionals

The participants reported improvements in their empathy. Most of the mentors expressed the importance of boundaries and competencies in mentoring. Some mentors also improved their own ability to keep boundaries and become more self-aware of their competencies. These skills gained through mentoring are pivotal to successful mentoring, which is also essential to becoming a successful physician (Pölczman et al., 2024).

"*I discovered that some situations, which were easy for me, may not be the same for others. Through my mentoring experience, I gained empathy and realized that everyone's experiences are unique. This understanding will be valuable in my future healthcare work, where patients have diverse experiences and process them differently."* (Pölczman et al., 2024, p.4, FGD5-P03)

Some reported that they could easily keep the previously set boundaries, while others had to adjust them to their mentees' needs, and some found it difficult to maintain them. A few mentors found it difficult to accept that they were unable to protect the mentee from failure completely. And still, others were aware of the limits of their competence.

"*In our first meeting, I conveyed to my mentee the purpose of the program and clarified my role. I endeavored to maintain those boundaries throughout our mentoring relationship, aiming to provide assistance and support to the best of my ability within my competencies*." (Pölczman et al., 2024, p.4, FGD1-P09)

"*I referred my mentee to student counseling not because I felt overwhelmed, but because such situations occurred, where I wasn't competent enough to help*." (FGD5-P03)

Some mentors compared their mentor-mentee relationship to the doctor-patient relationship. They described their mentoring work as a form of simulation, emphasizing that it provided valuable practice for future interactions with patients:

"[…] *it was good practice for the future, like getting ready for when I become a physician. We can try hard to help, but if the mentee- or later the patient- doesn't want to change, there's not much we can do*." (Pölczman et al., 2024, p.4, FGD2-P02)

Most of the participants engaged in a discussion on 'The doctor as a drug.' They conceptualized that the success of treatment depends not only on the medical intervention itself but also on the healthcare professional's attentiveness and personality. Accordingly, the majority of mentors emphasized the importance of connection and attentiveness in the mentoring relationship, believing that every form of support matters and that, at times, mentees simply need someone to listen.

"[...] *It is a great experience, as we will have countless colleagues and work with numerous people, including patients. Therefore, we must be able to interact with all kinds of people and support everyone. Of course, the other person also plays a crucial role in making this work; however, it is our responsibility to try to collaborate with everyone and remain open to all*." (FGD1-P03)

Mentors reported various additional benefits of mentoring, particularly altruism and a sense of reward. Many mentors found altruism to be a defining aspect of their experience, as helping others and witnessing the impact of their support was deeply fulfilling.

"*The greatest positive aspect of the program was that I could help him and see the tangible impact of my efforts. It was a truly rewarding experience*." (FGD5-P02)

Another mentor highlighted how the program reinforced their intrinsic motivation to help others: "*For me, this program is highly positive, as I enjoy helping others. It is evident why I chose this profession—whether it involves mental, spiritual, or physical support*." (FGD4-P01)

4.1.2. Personal Growth as a Benefit of Participating in the Program

Mentors desribed several distinct aspects of personal development and growth in relation to the program. Two sub-themes were emerged: (1) self-knowledge and self-awareness, and (2) self-care (Pölczman et al., 2024).

4.1.2.1. Self-knowledge and Self-awareness

The discussion revealed enhanced self-knowledge and self-awareness. Some mentors acknowledged their tendency to be perfectionists and highly self-critical (Pölczman et al., 2024).

"*My mentee also served as a reflection for self-awareness. During specific instances when my mentee exhibited inappropriate behavior, it became apparent that I was mirroring those actions, recognizing the undesirability of such conduct. This awareness motivated me to initiate changes in these aspects of myself. In this reciprocal dynamic, the mentorship has proven to be a valuable catalyst for personal growth."* (Pölczman et al., 2024, p.4, FGD5–P03)

"*During the mentoring process I realized that I hold high expectations for myself, particularly regarding my academic achievements. In the beginning, it was quite difficult not project my perfectionism on them. However, over time, I learned to manage it well and stopped projecting my expectations onto my mentees. It was really valuable to work on this and see my own growth*." (Pölczman et al., 2024, p.4, FGD1-P03)

4.1.2.2. Self-care

Mentors expressed recognition of the importance and necessity of self-soothing, at times emphasising the importance of prioritising personal interests. A mentor underlined the practice of prioritising personal interests (Pölczman et al., 2024):

"*I gained insight that there are moments when prioritizing myself and my needs is necessary for my mental health in order to be able to help others*." (Pölczman et al., 2024, p.4, FGD1-P01)

4.1.3. Reflections on the Mentoring Experience

During mentoring mentors experienced a broad range of emotions and gained a diverse set of experiences. This theme includes mentors' perceptions and reflections on their own experiences and the mentorship program. This theme contains three sub-themes (Pölczman et al., 2024).

4.1.3.1. Positive Experiences And Emotions

The majority of the experiences and feelings about the mentoring program and the mentoring relationship were positive. These experiences had a pivotal role in the program, with a significant number of mentors expressing positive feelings, joy, and satisfaction with the mentor role (Pölczman et al., 2024). Feeling helpful and efficient was a regular benefit highlighted by mentors. They further elaborated on the benefits they gained from the program, including increased confidence, a sense of community, a close relationship or friendship with their mentee, and abundant positive feedback and support. Mentors often stated that positive feedback, such as the mentee's success in adapting to university life, accepting their advice, and becoming more independent and capable, motivated them to continue. Additionally, a few students also experienced reciprocity from their mentees, who provided support and motivation, showed attentiveness to their needs, and celebrated their successes (Pölczman et al., 2024).

"*I provided assistance to my mentee beyond practical matters. She faced numerous personal challenges that hindered her from focusing on her exams. During a particularly difficult moment when she had a panic attack and couldn't stop crying, I reached out to her. We engaged in a two-hour conversation, discussing the potential solutions and reassuring her that her life was not without hope. At that moment, I felt a profound sense of being able to offer significant support. Cultivating such a close relationship with her and earning her trust brought me immense joy."* (Pölczman et al., 2024, p.5, FGD5–P03)

"*I had an exceptionally positive experience. We've cultivated a strong bond to the extent that my mentee turns to me first with all her inquiries. The trust she places in me is truly gratifying. Additionally, it's quite encouraging that she values and heeds my advice. I sense that she greatly relies on my guidance."* (Pölczman et al., 2024, p.5, FGD2-P01)

4.1.3.2. Difficulties, Challenges, and Negative Experiences

Mentors reflected on the difficulties they had and the challenges they faced. Some mentors shared that sometimes they experienced a sense of disappointment to some extent. Mentors reflected on instances in the mentee-mentor relationship where their expectations were not met. One participant stated (Pölczman et al., 2024):

"*My mentee proved to be an exceptionally bright and clever student, which, in a way, presented a challenge as I noticed him handling nearly every task independently. I aimed*

to offer my assistance to share the wisdom I had gained, but unfortunately, he seldom sought my guidance. This lack of need for my support left me disappointed, and I interpreted it as a personal setback." (Pölczman et al., 2024, p.5, FGD2–P04)

Working with people will not only bring positive and reassuring moments, challenges, and feelings, but negative ones, too. This is not different when it comes to mentoring. Some students reported passivity of the mentee and ambivalency, tension, and a lack of attachment in the mentoring relationship. Hence, some participants reported feelings of ineffectiveness. Mentors also encountered difficult situations. One mentor shared his challenging and difficult experience (Pölczman et al., 2024):

"*It's disheartening to witness the challenges the mentee is facing and understand the reasons behind them. You make an effort to offer assistance, equipped with the knowledge of how to help, yet they remain resistant to your advice. Feeling ineffective is profoundly discouraging. Nevertheless, it's crucial to learn how to cope with these situations, as similar challenges may arise in the future."* (Pölczman et al., 2024, p.5-6, FGD2-P06)

4.1.3.3. Satisfaction with the Program

Based on the FGDs, the participants expressed their satisfaction with the program, its offers, and its organization. The mentors emphasized the significance of the program, and highlighted that the supervision sessions were extremely useful. Mentors frequently appreciated the pre-program training, noting its optimal nature and the colllection of valuable and up-to-date knowledge. The transfer of information was perceived to be effective and appropriate (Pölczman et al., 2024).

"*For me, these supervisions turned out to be a pleasant surprise. Initially, I lacked motivation to attend, but it proved beneficial to learn about others' experiences and realize that they encountered similar or even identical challenges as me. Furthermore, I found the opportunity to assist my fellow mentors rewarding […]. The training and supervision adequately equipped us to address the diverse issues and problems that might arise."* (Pölczman et al., 2024, p.6, FGD1-289 P04)

"*I wouldn't alter or include anything additional in the mentor training, as it exceeded my expectations by covering a wide range of topics. It proved exceptionally valuable, and I appreciated the self-awareness component of the mentor training, which I found truly engaging and enjoyable."* (Pölczman et al., 2024, p.6, FGD1-P01)

4.2. Results of the Quantitative Study

4.2.1. Indicators of Mental Health by Gender and Phase of Study

To examine the sample's mental health at baseline (T1), independent samples t-tests were used to investigate differences across gender and stage of study. On the Maslach Burnout Inventory (MBI-SS), the average score was 47.69 (*SD*=10.30), indicating a high level of burnout. There was no significant difference between the high burnout scores of men and women (48.30 vs 47.51, $t(131) = 0{,}366$, $p = 0{,}715$). However, clinical students showed a significantly higher burnout score compared to pre-clinical students (44.69 vs 51.12, $t(131) = -3.768$, $p = <0.001$).

The sample's average scores on the subscales showed that emotional exhaustion (EE) was above moderate (M = 17.05; *SD* = 6.43), cynicism (CY) reflected a moderate level (M = 7.54; *SD* = 7.96), and reduced academic efficacy (RAE) indicated a high level (M = 18.99; *SD* = 3.91). There were no significant differences in the EE scores based on gender (15,36 vs 17,54, $t(131) = -1{,}640$, $p = 0.103$) or phase of study (16.14 vs 18.09, $t(131) = -1{,}762$, $p = 0.080$). No difference was found between gender on the CY scores (8.16 vs 7.36, ($t(131) = 0{,}481$, $p = 0.631$). The results indicate that, in the CY dimension, the higher average score in clinical students showed significant differences compared to pre-clinical students (4.90 vs 10.58, ($t(104{,}984) = -4.265$, $p = <0.001$) There were no significant differences in the RAE scores based on gender (19.86 vs 18.73, $t(131) = 1{,}395$, $p = 0{,}165$) or phase of study (18.85 vs 19.14, $t(131) = -0.419$, $p = 0{,}676$).

The average score on the Connor-Davidson Resilience Scale (CD-RISC) reflected a moderate level (M = 27.06; *SD* = 6.44). There were no significant differences in the scores based on gender (27.93 vs 26.81, $t(131) = 0.842$, $p = 0{,}401$) or phase of study (26.61 vs 27.58, $t(131) = -0.869$, $p = 0.386$)

On the WHO Well-Being Index (WBI-5), the score achieved average (8.72; *SD* = 3.62). The difference between men and women was not significant (9.20 vs 8.59, $t(63{,}885) = 0{,}957$, $p = 0.342$). When analyzed by the phase of study, only a trend towards significance was found in favor of pre-clinical students (9.21 vs 8.17, ($t(131) = 1{,}654$, $p = 0.050$).

On the Depression, Anxiety and Stress Scale (DASS-21) the average score was 19.23 (*SD* = 12.62), which is within the normal range. Significant differences between the genders on the DASS-21 scale was found. Women had significantly higher scores than men (14.34

vs 20.65, (t(131) = -2,444, p = 0.016). However, there were no significant differences between the student groups on the scale (18,92 vs 19.58, (t(131) = -0.296, p = 0.768).

The sample fell within the normal range of the subscales. The sample's average scores on the subscales of anxiety were 4.78 (*SD* = 4.36), stress were 8.76 (*SD* = 5.02), and depression were 5.68 (*SD* = 5.31). Women had significantly higher anxiety scores than men (3.36 vs 5.20, (t(131) = -2,053, p = 0.042) and no difference was found between the students on the anxiety subscale (5.00 vs 4.54, t(131) = 0.594, p = 0.554). Futhermore, women achieved significantly greater scores on the stress subscale compared to men (6.80 vs 9.33, (t(62,765) = -2,053, p = 0.005). No difference was shown between the pre-clinical and clinical students on the stress subscale (8.26 vs 9.33, t(62,765) = -1,229, p = 0.221). There were no significant differences in the depression scores based on gender (4.20 vs 6.11, t(131) = -1,744, p = 0,084) or phase of study (5.66 vs 5.69, (t(131) = 0.034, p = 0.973) (Table 2).

Table 2. Mental Health Indicators by Gender and Phase of Study at baseline (unpublished table).

	Male (n=30)	**Female (n=103)**	**Pre-clinical phase (n= 71)**	**Clinical phase (n=62)**	**Total Sample (N=133)**
Maslach Burnout Inventory (MBI-SS) *(Score range: 0–90; Moderate: 26–36)*	48.30 (*10.07*)	47.51 (*10.41*)	44.69 (*9.34*)	51.12 (*10.35*)	47.69 (*10.30*)
t-test significance	p=0.715		**p<0.001**		
MBI-SS components: *Emotional Exhaustion (EE)* *(Moderate: 8-14)*	15,36 (*6.07*)	17,54 (*6.48*)	16.14 (*6.27*)	18.09 (*6.50*)	17.05 (*6.43*)
t-test significance	p=0.103		p=0.080		
Cynicism (CY) *(Moderate: 5-10)*	8.16 (*7.52*)	7.36 (*8.11*)	4.90 (*6.00*)	10.58 (*8.85*)	7.54 (*7.96*)
t-test significance	p=0.631		**p<0.001**		
Reduced Academic Efficacy (RAE) *(Moderate:1-17)*	19.86 (*3.90*)	18.73 (*3.90*)	18.85 (*3.83*)	19.14 (*4.03*)	18.99 (*3.91*)
t-test significance	p=0.165		p=0.676		
Connor-Davidson Resilience Scale (CD-RISC) *(Score range: 0–40)*	27.93 (*7.12*)	26.81 (*6.24*)	26.61 (*6.44*)	27.58 (*6.45*)	27.06 (*6.44*)
t-test significance	p=0.401		p=0.386		
WHO Well-being Index (WBI-5) *(Score range: 0-15)*	9.20 (*2.79*)	8.59 (*3.82*)	9.21 (*3.77*)	8.17 (*3.37*)	8.72 (*3.62*)
t-test significance	p=0.342		p=0.050		

Depression, Anxiety and Stress Scale (DASS-21) *(Score range: 0–100; Normal: 0-78)*	14.34 (*10.18*)	20.65 (*12.94*)	18,92 (*12.76*)	19.58 (*12.54*)	19.23 (*12.62*)
t-test significance	***p*=0.016**		*p*=0.768		
DASS-21 components *(Score range: 0–42)***:** *Anxiety* *(Normal: 0-7)*	3.36 (*3.70*)	5.20 (*4.47*)	5.00 (*4.49*)	4.54 (*4.23*)	4.78 (*4.36*)
t-test significance	***p*=0.042**		*p*=0.554		
Stress *(Normal: 0-14)*	6.80 (*3.85*)	9.33 (*5.19*)	8.26 (*5.06*)	9.33 (*4.94*)	8.76 (*5.02*)
t-test significance	***p*=0.005**		*p*=0.221		
Depression *(Normal: 0-9)*	4.20 (*4.99*)	6.11 (*5.34*)	5.66 (*5.00*)	5.69 (*5.68*)	5.68 (*5.31*)
t-test significance	*p*=0.084		*p*=0.973		

Values represent Means (M) and Standard Deviation (Glass et al.).

4.2.2. Effects of the Mentoring Intervention on Resilience

The mean CD-RISC scores at T1 were 27,19 points (*SD*=5,91) for the case group and 26,00 (*SD*=6,36) points for the control group, while at T2, the case group showed a mean score of 28,02 (*SD*=6,15), compared to 24,74 (*SD*=6,62) in the control group. The analysis of the CD-RISC scores of the group main effect found that there was a significant increase in the resilience score in the case group ($F(1, 129) = 5.578$, $p = 0.020$) as compared to the control group. The main effects of age ($F(1, 129) = 0.303$, $p = 0.583$) and gender ($F(1, 129) = 2.748$, $p = 0.100$) showed no significant increases in the resilience scores. The main effect of time for the CD-RISC scores was not significant ($F(1.000, 129.000) = 0.038$, $p = 0.846$). The interaction effect between the intervention and time was significant for resilience ($F(1.000, 129.000) = 4.915$, $p = 0.028$) (Pölczman et al., 2025). The case group showed a statistically significant increase in resilience scores following the intervention, with participants achieving higher scores than the control group, whose scores declined significantly over time (Figure 2). The interaction effect between time and gender ($F(1.000, 129.000) = 0.281$, $p = 0.597$); and time and age ($F(1.000, 129.000) = 0.010$, $p = 0.921$) was not significant. A Bonferroni post-hoc test was conducted to explore the significant interaction between intervention and time. No significant difference was found between the groups at T1 ($p = 0.167$). The between-group comparisons at T2 showed a significant difference in resilience scores, with participants in the case group reporting higher levels of resilience than those in the control

group (p = 0.004). Changes in the CD-RISC scores over time in both groups are shown in Table 3 (Pölczman et al., 2025).

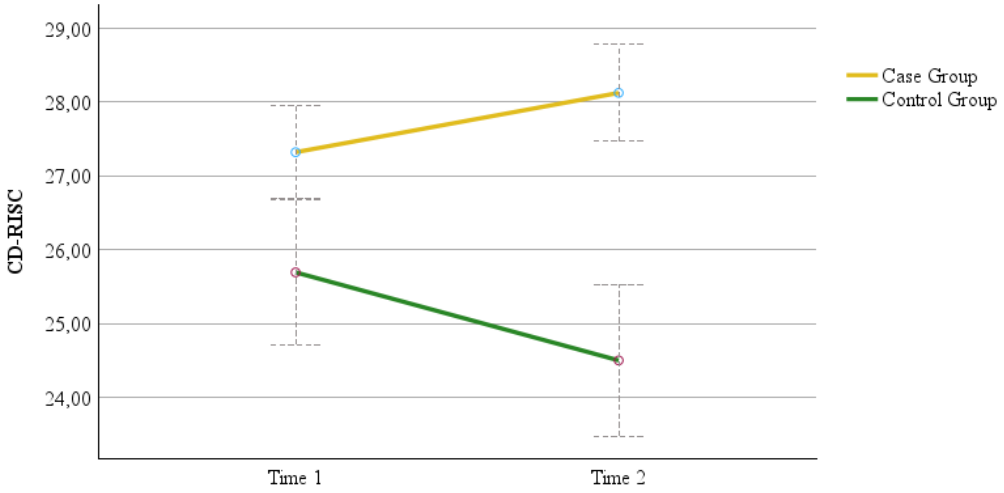

Figure 2. The changes in resilience score over time in both groups. Own published figure (Pölczman et al., 2025).

Table 3. Comparison of case and control group scores on the CD-RISC and DASS-depression subscale across time points. Own published table (Pölczman et al., 2025).

	Case group (n = 94)		**Control group (n = 39)**		**Group main effect, *P***	**Time main effect, *P***	**Interaction effect, *P***
Dependent variables[a]	Time 1 M (Glass et al.)	Time 2 M (Glass et al.)	Time 1 M (Glass et al.)	Time 2 M (Glass et al.)			
CD-RISK	27,19 (*5,91*)	28,02 (*6,15*)	26,00 (*6,36*)	24,74 (*6,62*)	0.020*	0.846	0.028*
DASS-D	5,08 (*5,06*)	5,25 (*5,11*)	4,87 (*4,51*)	6,69 (*5,70*)	0.318	0.032*	0.047*

[a]CD-RISC = Connor Davidson Resilience Scale; DASS = Depression Anxiety Stress Scales; D = depression subscale.
*p-value is < 0.05.

4.2.3. Effects of the Mentoring Intervention on Depression

The mean DASS-Depression scores at Time 1 were 5,08 points (*SD*=5.06) for the case group and 4,87 points (*SD*=4.51) for the control group, while at Time 2, the case group showed a mean score of 5,25 (*SD*=5.11), compared to 6,69 points (*SD*=5.70) in the control group (Pölczman et al., 2025). Analysis of the DASS-Depression scores for the group main effect found that there were no significant differences in depression scores in the case group as compared to the control group *(F*(1, 129) = 1.004, *p* = 0.318). The main effect of age (*F*(1, 129) = 0.039, *p* = 0.843) and gender (*F*(1, 129) = 2.663, *p* = 0.105) showed no significant increases in the depression scores. The main effect of time for the DASS-D scores was significant (*F*(1.000, 129.000) = 4.725, *p* = 0.032). The interaction effect between intervention and time was significant for depression (*F*(1.000, 129.000) = 4.018, *p* = 0.047). There was a statistically significant increase in DASS-D scores in the control group, who scored higher than the case group after the intervention, whose depression scores remained steady over time (Figure 3). The interaction effect between time and gender (*F*(1.000, 129.000) = 0.915, *p* = 0.341); and time and age (*F*(1.000, 129.000) = 1.646, *p* = 0.202) was not significant. The Bonferroni post-hoc test was conducted to follow up the intervention and time interaction in depression scores. Between-group comparisons showed no significant difference at Time 1 (*p* = 0.912), and a non-significant difference, at Time 2 (*p* = 0.066), with higher depression scores in the control group. Changes in the DASS-D scores over time in both groups are shown in Table 3 (Pölczman et al., 2025).

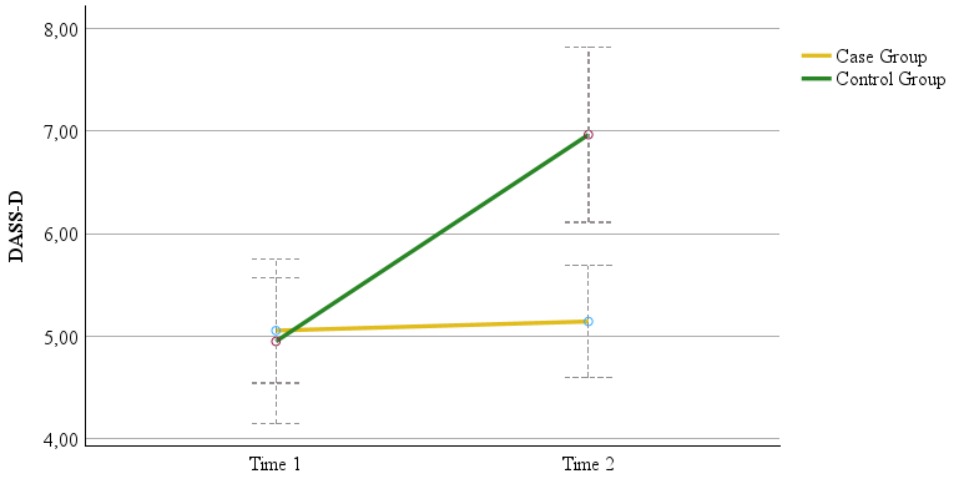

Figure 3. The changes in depression score over time in both groups. Own published figure (Pölczman et al., 2025).

4.2.4. Differences in Burnout Scores Between Case and Control Groups

To test whether the case group had a significantly lower burnout level on average at Time 2, an independent samples t-test was applied to compare the MBI-SS mean scores between the two groups. The mean burnout score for the case group was *M* = 46.38 (*SD* = 10.06), while the control group had a mean score of *M* = 50.84 (*SD* = 10.33). The results indicated a statistically significant difference between the two groups ($t(131) = 2.310$, $p = 0.022$). The control group's mean scores were significantly higher than those of the case group (46.38 vs. 50.84). The effect size was calculated applying Cohen's d, which was 0.44, indicating a moderate effect size. Differences of case and control group mean scores on the MBI-SS are shown in Figure 4.

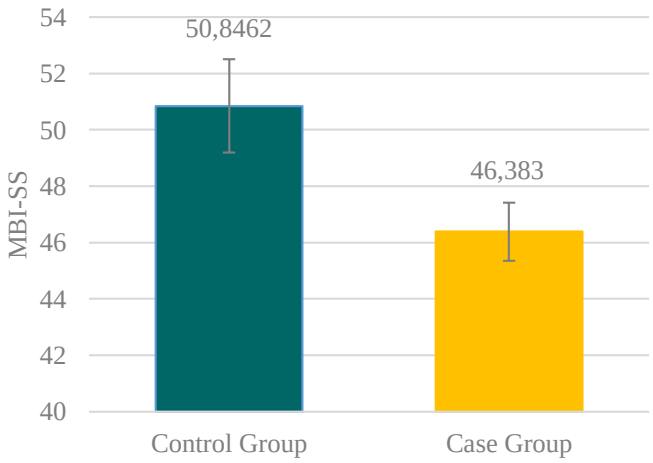

Figure 4. Comparison of case and control group mean scores on the MBI-SS (Pölczman et al., 2025).

5. DISCUSSION

This doctoral research explored the effects of a structured near-peer mentoring program on medical students' resilience, mental health, and professional development. The research was conducted in the context of a Hungarian medical university. The central research questions were whether participation in the mentoring program has a measurable positive effect on student's mental health and whether it contributes to their personal and professional growth.

A mixed-methods approach was employed, combining a longitudinal non-randomized controlled trial with focus group interviews. The qualitative study explored the perspectives, benefits, and experiences of mentors involved in the Semmelweis University Mentoring Program. Through the analysis, three themes emerged: reflections on the mentoring process, insights into professional development, and regarding personal growth. Mentors highlighted the various benefits and positive outcomes derived from participating in the initiative, emphasizing its impact on both their mentees and themselves (Pölczman et al., 2024). Additionally, the study provided a comprehensive examination of both the favourable and challenging aspects of of mentoring, offering insights into the complexities of peer support within an academic setting.

The quantitative component compared the development of resilience, depression, and burnout between students who participated in the mentoring program and in the control group. The findings demonstrated that the case group maintained more stable mental health indicators over the semester, while control group participants showed an increase in depressive symptoms and higher levels of burnout. Notably, the resilience of the case group improved compared to controls, with no significant influence of gender or age (Pölczman et al., 2025). Due to the longitudinal approach, we were able to capture not only immediate effects but also improvements in resilience over the course of a semester. Qualitative findings reinforced these results, revealing that mentors experienced notable personal and professional development, including enhanced self-awareness, communication skills, and a clearer professional identity.

In summary, the findings reinforce the protective nature of mentoring, demonstrating its potential in alleviating the emotional strain associated with academic demands within medical education. It may buffer against psychological distress while simultaneously fostering skills and attitudes that are essential for future medical professionals.

5.1. Insights from the Focus Group Study

5.1.1 Professional Growth and Core Competencies

The mentors reported that the program enhanced their time management skills and sense of responsibility while fostering professional development by bolstering their problem-solving, communication, and soft skills. These findings are supported by earlier research, which concluded that students benefit considerably from near-peer mentoring programs in terms of both their professional and personal development (Aziz et al., 2020; Mat Nor et al., 2017; Nimmons et al., 2019; Pölczman et al., 2024; Prunuske et al., 2019; Singh et al., 2014). The development of professional attributes like improved stress management, more effective time management, improved problem-solving abilities, communication skills, responsibility and flexibility are among the advantages of mentoring programs that mentors have reported in prior international studies (Kukreja, 2018; Mohd Shafiaai et al., 2020; Pölczman et al., 2024; Prunuske et al., 2019; Singh et al., 2014; Yusoff et al., 2010). The success of the program was also attributed by mentors in previous studies to a greater sense of responsibility (Cho & Lee, 2021). These abilities and traits are crucial for medical training (Mat Nor et al., 2017).

In the present study, mentors improved their empathy and the ability to maintain their own boundaries. The mentors frequently reported that they were aware of their boundaries and that the program had helped them build a sense of competence (Pölczman et al., 2024). An interesting aspect emerging from the focus group discussions was that mentors perceived their mentoring work as a simulation of practice for future patient care and as valuable practice for developing doctor-patient communication skills. Research has shown that professional socialisation and identity formation are closely linked to early patient interactions and role modeling (Goffman et al., 1981; Hernandez et al., 2022; Paice et al., 2002). By engaging in mentoring, students took on obligations similar to those necessary in clinical practice, such as active listening, empathy, and guiding. This shows that mentoring programs may offer a unique chance to establish key doctor-patient relationship skills even before direct patient care begins. A prior study found that mentorship helped to build qualities and essential skills that are regarded fundamental for becoming a „*good enough*" and successful healthcare practitioner (Mohd Shafiaai et al., 2020; Pölczman et al., 2024). In other words, these abilities are congruent with a good

physician's core competencies, including competent interpersonal and communication skills, as well as the practice of professional qualities like humility, compassion, empathy, attentiveness, adaptability, and confidence. Without these, patient care would suffer greatly (Lauer & Lauer, 2017; Mat Nor et al., 2017; Pölczman et al., 2024).

Mentors' soft skills, such as time management, are indirectly developed. Mentors must balance their mentor role with their own obligations and responsibilities, in addition to supporting their mentees (Pölczman et al., 2024). Mentor training has been recognized to help mentors find work-life balance and enhance students' communication and mentoring skills (Abdolalizadeh et al., 2017; Kukreja, 2018; Usmani & Omaeer, 2016). Chatterton et al. showed that mentors reported higher resilience after participating in their mentoring program and training. Mentors found that participating in the training and near-peer mentoring program improved their understanding of the university's processes and procedures, as well as their resilience and professionalism, which supported them in their journey through medical school (Chatterton et al., 2018; Pölczman et al., 2025; Pölczman et al., 2024).

5.1.2. Personal Growth

The program encouraged personal growth by improving the mentor's self-knowledge, self-awareness, and self-care. The mentors also identified patterns in their behaviour that they believed needed to be improved. Throughout the conversations, the mentors highlighted the need to maintain good mental health in order to help others (Pölczman et al., 2024). This applies to anyone working in a helping profession, not only to mentors. These results align with previous research suggesting that the mentor role assists mentors in gaining self-awareness and practicing self-compassion and empathy (Pölczman et al., 2024; Prunuske et al., 2019).

The study's findings revealed a variety of experiences and feelings, although the majority of them were favourable about the mentoring and program. It was rewarding for the mentors when they were able to assist the mentee, when they followed their advice, or when the they excelled in their endeavors (Pölczman et al., 2024). Prior studies found consistent results, with the mentee and mentor providing emotional support to each other and developing a close personal bond (Cho & Lee, 2021; Pölczman et al., 2024).

Belonging to a supportive social network, such as a mentoring relationship or group, increases mentors' psychological well-being and mental health (Kukreja, 2018).

Throughout the program, the mentors discovered that their guidance was greatly valued, giving them a sense effectiveness. Futhermore, mentors experienced enhanced self-efficacy, self-awareness, and self-confidence as a result of mentoring (Pölczman et al., 2024). Additionally, active engagement in leisure activities, like mentoring, can promote a sense of self-efficacy, which serves as a powerful protective factor against medical student burnout and contributes to mental health (Abdolalizadeh et al., 2017; Altonji et al., 2019; Jacobs & Dodd, 2003; Kukreja, 2018; Pölczman et al., 2024; Yusoff et al., 2010).

The results showed that mentors benefited not only professionally but also personally, socially, and emotionally from their participation in the mentoring program. The most frequently stated benefits were increased self-awareness and social support from both peers and mentees. Mentors' development in these critical areas likely improved the level of support they offered to mentees, establishing positive mentoring relationships. These skills and abilities are pivotal for their future role as professionals (Pölczman et al., 2024).

5.1.3. Reflections on the Mentoring Experience

Initially, the mentors had obstacles, e.g., dealing with something that did not fulfill their expectations. A earlier study discovered comparable unfavorable experiences, such as mentees who did not actively participate, did not follow the advice, or did not respond on time (Cho & Lee, 2021; Pölczman et al., 2024). Kukreja (2018) discovered that mentors had low self-efficacy and high stress due to their unrealistic expectations and aspirations, but this diminished after the initial month of the program as they adjusted to their roles and learned crucial skills (Kukreja, 2018; Pölczman et al., 2024). In the future the mentor training will focus on teaching mentors how to create reasonable expectations and goals for themselves. This is one of the most crucial skills for becoming a successful healthcare professional (Pölczman et al., 2024).

In the current research, students expressed their satisfaction regarding the program. The focus group discussions revealed that this program is important to the students and that they are pleased with its organisation. Perhaps the program's success is also reflected in the fact that most of the mentors were involved for the second or third time, with over

half having previously participated as mentees in the program. Mentors also acknowledged a need for mentor training, supervision sessions, and the Mentor Diary, all of which were necessary for self-reflection, beneficial to mentoring success and contributed to their personal growth (Pölczman et al., 2024).

The qualitative analysis effectively addressed our research questions about mentors' experiences, motivations perceived benefits, challenges, and satisfaction. Focus groups found that mentors experienced significant personal and professional development, notably in soft skills, empathy, and communication skills. These qualitative findings greatly complement and contextualize the quantitative results, offering an in-depth understanding of mentoring's multidimensional impact.

5.2. Findings from the Quantitative Study

5.2.1. Mental Health Indicators by Gender and Phase of Study

The findings of the present study regarding students' mental health align closely with both international and Hungarian findings. On the Maslach Burnout Inventory Student Survey medical students received high points, indicating high level of burnout, that was particularly evident among female and clinical students. Our sample showed high levels of emotional exhaustion and reduced academic efficacy and a moderate levels of cynicism with average points. Clinical students also displayed significantly higher burnout, especially in cynicism, compared to pre-clinical peers, aligning with earlier research findings on a Hungarian sample of medical student (Sándor, 2022). The findings emphasise the exponentially increasing incidence of burnout during academic years, which has previously been noted in foreign and Hungarian studies (Ádám & Hazag, 2013; Dyrbye et al., 2009; Dyrbye et al., 2006; Galán et al., 2011; Győrffy et al., 2016; Hazag et al., 2010; Pölczman et al., 2025; Sándor, 2022).

Higher scores of the cynicism of the clinical students suggest a decrease in students' enthusiasm, a sense of coherence with their studies, and a lack of confidence in their future careers. This is especially significant because, while it is during the clinical phase that students first face the "real" nature of medicine, it is also during this stage that enthusiasm or passion (as a crucial component of professionalism) declines. The cause for this can also be found in the course of the student's professional socialization, such as how the initial idealized image of the profession breaks down when confronted with

reality (actual patients, hospital, suffering, death, etc.), which can be crucial for students. In a good example, the next step could be to create a more realistic career image, but this may necessitate external assistance. Teachers have an important role as role models in the lengthy and complex process of professional socialization, which is mostly carried out through the hidden curriculum (Goldie, 2012; Sándor, 2022).

The average student well-being (WBI-5) scores were similar to the average for a Hungarian sample of similar age and education (8.72 vs. 8.8) (Susánszky et al., 2006) and higher compared to a representative sample of medical students (8.72 vs 7.4) (Sándor, 2022). The students' average resilience scores (CD-RISC) were slightly lower than the average for a Hungarian sample of medical students (28.03 vs. 27.06) (Sándor, 2022). In terms of resilience and overall well-being, no significant differences based on gender or study phase were found, underscoring a stable yet moderately challenged state of psychological adaptability among medical students.

According to their scores on the Depression, Anxiety and Stress Scale, the sample fell within the normal range of the scale and subscales. Regarding anxiety and stress, female students demostrated significantly higher level os symptoms than male students, although these levels still remained within the normal range. These results are consistent with the findings of Sándor (2021). Both studies consistently identified female medical students as experiencing higher psychological distress. Sándor's work also emphasized the role of emotionally demanding experiences (such as dissection practicals) as additional stressors unique to medical training (Sándor, 2022). While our study did not explore specific sources of stress, the similarly high anxiety and stress levels underline the critical importance of addressing emotional and psychological needs within medical education.

The present study identified high baseline levels of burnout among medical students, specifically female students, and those in their clinical years reported higher levels of burnout. The average resilience scores at the beginning of the semester were slightly lower than those reported in other studies. Additionally, female students experienced higher levels of anxiety and stress than their male counterparts, although these remained within the normal range of the scale. Considering our findings in the context of national and international literature, it can be highlighted that medical students represent a vulnerable group that may particularly benefit from targeted mental health interventions.

5.2.2. Effects of the Mentoring Intervention on Resilience

Quantitative analysis revealed that the case group demonstrated significantly higher resilience levels than the control group. One possible explanation is that students who chose to participate in the mentoring program may have already possessed stronger coping mechanisms or a greater ability to manage academic pressures. This suggests a potential self-selection effect, where individuals who are more adept at handling the demands of their academic workload may be more inclined to seek out and engage in mentorship opportunities (Pölczman et al., 2025). However, beyond this initial difference, the findings indicated that by the end of the semester, the resilience of the case group had improved at a significantly greater rate than that of the control group. Notably, those students who participated in the mentoring program percieved a sustained increase in resilience, whereas those who did not engage in mentoring showed a decline over time (Pölczman et al., 2025). This pattern was observed in resilience scores, with no significant effects of gender or age on the trend. While one might assume that the higher resilience scores observed in the sample were driven by the overrepresentation of older and female students in the sample, this was not the case. These variables, gender and age were controlled for in the analysis and had no significant effect on the findings, further emphasizing the potential of mentoring as a supportive mechanism for student well-being. Prior research has highlighted that near-peer mentoring programs can enhance resilience not only in mentees but also in mentors (Chatterton et al., 2018; Kukreja, 2018; Pölczman et al., 2025; Yusoff et al., 2010), further reinforcing the results of this study and underscoring the broader benefits of structured mentoring initiatives in academic settings. Mentoring relationships enable mentees to develop their problem-solving and social abilities through the process of socialisation. This, along with social support, allows mentees to adjust more successfully to university life and its challenges, as well as connect better with their peers; all of these foster resilience, which is required for navigating complex professional contexts in the future (Pölczman et al., 2025). Previous research suggests that a sense of belonging has a substantial impact on young people's resilience and can explain how mentoring relationships contribute to resilience. A sense of belonging may mediate the link between mentorship and psychological resilience (Sulimani-Aidan & Tayri-Schwartz, 2021). Mentoring relationships and programs enable individuals to develop a sense of belonging and self-awareness (Pölczman et al., 2025). Social support, positive role modelling, and mentorship were identified to contribute to

resilience (Stoffel & Cain, 2018). Furthermore, the program fosters the students' identity formation and sense of self-efficacy. Throughout the supervision occasions, our program provides students the ability to reflect and learn from each other, which have all been acknowledged as critical components of building resilience (McAllister & McKinnon, 2009; Sanderson & Brewer, 2017). Additionaly, research highlighted, that mentoring programs support students develop empathy, which has been linked to improved mental health (Kukreja, 2018; Pölczman et al., 2025).

This study found that participation in the near-peer mentoring program significantly enhanced psychological resilience among medical students. Longitudinal comparisons revealed that resilience scores improved in the case group, contrasting with declines observed in the control group, underscoring the program's protective role. Research has shown that resilience acts as a protective factor against depression and burnout, helping individuals adapt to stress (Goldstein et al., 2013; Thompson et al., 2016). Our findings provide further evidence that mentoring plays a key role in fostering resilience among medical students. The significant improvement in resilience scores among mentors suggests that mentoring interventions may serve as an effective strategy to enhance students' psychological adaptability. Considering the broader context of ongoing uncertainty in the world and the ongoing challenges faced globally in recent years, the mentoring program's role becomes clearer. It is necessary to clarify that mentoring programs do not directly facilitate adaptation to change itself. Rather, it fosters specific skills and essential internal resources that enhance resilience, and it is this strengthened resilience that subsequently supports more effective adaptation. Thus, the impact of the program on resilience can be understood as indirect, yet crucially significant. These results emphasize the relevance of integrating structured mentoring programs into medical education to provide students with tools for coping with academic stress and professional challenges (Pölczman et al., 2025).

5.2.3. Effects of the Mentoring Intervention on Depression

Previous study on mentorship's effect on depression found varied results. Kukreja (2018) revealed no significant changes in mentors' depression levels or mental health over the study period (Kukreja, 2018; Pölczman et al., 2025). A one-year mentorship program did not significantly improve students' mental health or quality of life compared to students,

who did not participate in the program, according to a cross-sectional study (Bechara Secchin et al., 2020; Pölczman et al., 2025). In contrast, studies have indicated that involvement in a mentorship program can lead to a reduction in stress and anxiety levels, and depression, amongst mentees (Harra & Vargas, 2023; Pölczman et al., 2025; Sonawane et al., 2021). These findings suggest that mentoring may serve as a protective factor for students' mental well-being, potentially offering emotional support, guidance, and coping strategies that alleviate psychological distress. The discrepancy between these results and those of Bechara Secchin et al. (2020) highlights the complexity of mentoring outcomes, which may depend on factors such as the structure of the program, mentor-mentee relationships, and the duration or intensity of support provided.

Statistical analyses showed a significant increase in depressive symptoms in the control group compared to the case group by the end of the semester. These findings indicate that students who did not participate in the mentoring program experienced a worsening of depressive symptoms, whereas those who engaged in mentoring maintained stable levels over time (Pölczman et al., 2025). This suggests that while the program may not have directly reduced depressive symptoms, it played a protective role in preventing their escalation. Notably, gender and age were controlled for in the analysis and these variables had no significant effects, indicating that these factors do not account for the observed differences, further highlighting the potential of mentoring as a supporting method for student well-being (Pölczman et al., 2025).

The results also suggest that changes in depressive symptoms over time might be influenced by the timing of the data collection, which was conducted at the end of the term, after the exam period. The stress, fatigue and pressure associated with academic exams could have contributed to fluctuations in participants' depressive symptoms, highlighting the impact of external academic stressors on mental health (Pölczman et al., 2025). Despite these challenges, the mentoring program appeared to have an impact, as students who participated exhibited more stable depressive symptom levels compared to students in the control group. This finding underscores the potential of mentoring programs to support students' psychological well-being even during high-stress periods. Moreover, the observed association between program participation and a more balanced mental state suggests that structured mentorship may have a role in fostering resilience

and mitigating the negative impacts of academic stress. Thereby offering a balanced view of the program's impact on its participants within an academic setting.

This study has found that participants showed stable depression scores, while control students showed worsening depressive symptoms. The mentoring program did not lead to a reduction in depression symptoms, which aligns with realistic expectations, given that it was not specifically designed as an intervention for depression. However, findings suggest that participation in the program served as a protective factor against the worsening of depressive symptoms over the study period, potentially as a result of increased resilience. This underlines the crucial role of mentoring in fostering psychological adaptability and coping mechanisms, reinforcing the importance of integrating resilience-building components into similar programs. By enhancing students' ability to manage both academic and personal challenges, mentoring may contribute to long-term mental well-being, even if it does not directly alleviate existing depressive symptoms (Pölczman et al., 2025).

5.2.4. Effects of the Mentoring Intervention on Burnout

To examine whether the mentoring program had an influence on burnout levels, the burnout scores between the case group and the control group was compared. The results indicated a significant difference, with the case group showing lower burnout levels compared to the control group. This suggests that mentoring may serve as a protective factor against burnout (Pölczman et al., 2025). The effect size was calculated, revealing a moderate effect, which suggests that the mentoring program played a meaningful role in the burnout levels. These findings are consistent with previous research that emphasized the positive impact of mentoring in reducing stress and burnout, providing emotional support and coping mechanisms for students facing academic challenges (Abdolalizadeh et al., 2017; Altonji et al., 2019; Pölczman et al., 2025; Singh et al., 2014; Sonawane et al., 2021; Yusoff et al., 2010).

These results also support earlier research that highlighted the beneficial effects of mentoring on students' mental health and resilience (Chatterton et al., 2018; Kukreja, 2018; Pölczman et al., 2025). Burnout is an issue for medical schools since strong satisfaction with the learning environment is linked to student achievement and well-being (Dyrbye et al., 2010). By supporting students in managing their stress and academic

pressures, mentoring programs can contribute to improving students' overall well-being and reducing the risk of burnout and depression, emphasizing their value in educational settings (Sonawane et al., 2021).

This study identified at the end of the term that students involved in mentoring displayed significantly lower burnout levels compared to their counterparts, affirming mentoring's role as a buffer against emotional exhaustion and student burnout. This reduction in burnout further underscores the importance of integrating mentoring programs into medical schools. By offering students both emotional and practical support, mentoring may help reduce the mental and emotional strain associated with academic demands. Moreover, these findings suggest that mentoring not only fosters resilience but is also a protective factor against depressive symptoms and burnout, which could have significant implications for students' general well-being and academic success (Pölczman et al., 2025). In our work in higher education, we often observe that students face a variety of crises while attending university—crises that touch far too many people to be considered unique or exceptional cases (Hazag & Major, 2008). Universities clearly benefit from well-implemented support systems. Mentoring programs not only serve the best interests of the students but also align closely with the broader goals of the university, the healthcare system as a future employer, and ultimately, the patients these future professionals will care for.

5.3. Broader Implications and Future Directions

5.3.1 The Role of Mentoring in Medical Education

The primary objective of education for healthcare professionals is to provide them with the essentials skills and knowledge to fulfill their future obligations. Although direct patient care was not a component of this mentoring program, the mentorship experience catalyzed fostering professional development and strengthening the healthcare profession (Prunuske et al., 2019). The hidden curriculum plays a crucial role in the professional socialization process, because medical students learn, internalize professional norms through observation and experience rather than formal instruction (Bandini et al., 2015; Hafferty, 1998; Hernandez et al., 2022; Nimmons et al., 2019). The mentoring program may have contributed to this process by offering role models for mentees and reinforcing principles like empathy, professionalism, and ethical decision-making.

This experience can also be viewed as an essential element of professional socialization, as it allows mentees to engage with the values, expectations, and behavioral norms of their future profession in a supportive environment. Moreover, mentors themselves must embody these professional attributes, reinforcing their own professional identity as future healthcare professionals through a "learning by doing" approach. By taking on the responsibility of guiding and supporting firts-year students, mentors acted as role models, reinforcing their own commitment to the profession. Furthermore, by taking on the role of a mentor, they practice key competencies such as leadership, communication, and ethical responsibility, further solidifying their professional role and identity. Our findings align with the broader research on professional socialisation, which emphasises the role of reference groups in shaping professional identity (Merton et al., 1957). Although the current study did not directly evaluate professional identity formation, some qualitative outcomes indicate that mentoring may help with this process. Mentors noted gains in core professional competencies such as empathy, communication, and boundary-setting, all of which are necessary attributes of a strong professional identity. Furthermore, some mentors perceived their experience as preparation for doctor-patient interactions, indicating that mentoring fosters role internalisation. These observations align with previous literature indicating that near-peer mentoring promotes the development of professional values, behaviors, and essential physician competencies through experiential learning (Krishna et al., 2023; Pölczman et al., 2024; Prunuske et al., 2019).

Serving as a pivotal milestone in the participants' educational journey, mentoring demonstrated its effectiveness in providing both professional and psychosocial benefits to students. These findings reinforce the increasing body of evidence that supports the worth of mentoring, highlighting its multifaceted advantages. These results also *suggest* that near-peer mentoring is not just an academic support tool, but also a *key factor in fostering professional identity formation.* Given its potential impact, medical schools should carefully evaluate and optimize the implementation of mentoring programs to maximize their benefits (Dyrbye et al., 2009; Mat Nor et al., 2017; Pölczman et al., 2024). Furthermore, the key elements of our unique program (training, supervision, mentor diary) can be considered structured methods that promote reflection—a process increasingly recommended for integration into medical training by institutions worldwide as they foster the development of professional identity, professionalism and self-

awareness in future physicians (Abrams et al., 2021; Sándor, 2022). Reflection, a metacognitive activity, is a strategy for developing an understanding of oneself, others, and situations. This process entails describing and attempting to broaden a person's understanding of events by identifying different experiences and perspectives, exploring and being aware of feelings and emotions, and engaging in analysis of the circumstances. These lessons learned will guide future behaviour (Karnieli-Miller et al., 2021). In the framework of reflective education, recommended strategies include journaling, reflective writing, and guided small-group discussions. These approaches have been shown to facilitate emotional processing of experiences and enhance empathy and communication skills (Abrams et al., 2021; Sándor, 2022; Shiozawa et al., 2020). Developing these capacities may later support students in tailoring information to patients' individual needs and responding to emotions with empathy, competencies that are especially critical when communicating difficult or distressing news (Karnieli-Miller et al., 2021).

As it was earlier written the medical students in our sample experienced critical stages of their education during the COVID-19 pandemic, which was characterized by remote learning, limited clinical exposure, and reduced peer interactions. These factors may have had lasting effects on their professional and personal development. These obstacles may have made them more vulnerable to mental health issues and hindered their ability to build coping mechanisms in traditional learning settings. As future healthcare professionals, they will encounter high-pressure situations, emotional demands, and complex decision-making in clinical settings. Our findings suggest that mentoring programs could play a protective factor in fostering resilience, equipping students with the psychological resources needed to navigate the academic and professional challenges of medical training and patient care.

The relevance of near-peer mentoring programs in academic development is a valid question. Medical students require help and advice during their professional socialisation (Cho & Lee, 2021). According to Mohd Shafiaai et al. (2020), mentors believe mentoring is instrumental in building the necessary characteristics and skills for success in medicine (Mohd Shafiaai et al., 2020; Pölczman et al., 2025). Cherniss (1980) emphasizes the importance of supporting the development of a realistic and healthy professional identity already during university education. Fostering self-awareness and psychological skills during this formative period contributes significantly to maintaining and enhancing

mental health throughout one's professional career (Cherniss & Sarason, 1980). Professional socialization is crucial in preparing individuals for helping professions due to the elevated risk of burnout and mental disorders (Tomcsányi et al., 1990). Therefore, Prunuske et al. (2019) proposed that peer mentoring should be more widely expanded in the medical school curriculum (Pölczman et al., 2025; Prunuske et al., 2019).

5.3.2. Mentoring as a Protective Factor for Mental Health

Research indicates that 75% of mental health issues develop by the age of 24 (Heinen et al., 2017; Kessler et al., 2005), emphasising the pivotal role of early prevention, diagnosis, and treatment in emerging adulthood (Pölczman et al., 2025). The COVID-19 pandemic has led to a considerable increase in the rates of depression and anxiety (WHO, 2022). Untreated mental health issues might negatively impact young adults' ability to lead fulfilling lives in the future. Preventing significant mental health issues is imperative (Kaligis et al., 2023; Pölczman et al., 2025).

Emerging adults' levels of depression, stress, and anxiety decrease as their access to psychosocial resources increases (Brito & Soares, 2023; Pölczman et al., 2025; Sulimani-Aidan & Tayri-Schwartz, 2021). Brito and Soares (2023), in a sample of emerging adults, discovered a negative link between depression and meaning in life. The researchers argue that a sense of purpos in life associated with satisfaction can diminish negative emotional states and improve resilience to depression (Brito & Soares, 2023; Dai & Smith, 2023; Pölczman et al., 2025). Based on Pereira et al. (2018), social support and the ability to engage in social activities contribute to well-being. Relationships with family, peers and friends, often known as social support, provide significant emotional benefits throughout emerging adulthood (Pereira et al., 2018; Pölczman et al., 2025). Previous research has indicated that social support can effectively mitigate student burnout, protect students against the adverse impacts of stress, and enhance their resilience by promoting more effective stress management (Al-Dubai et al., 2013). A significant body of data shows that social support contributes to increased well-being and helps prevent depression, both directly and indirectly by enhancing resilience (Dai & Smith, 2023; Dyrbye et al., 2009; Howe et al., 2012; Kukreja, 2018; Pölczman et al., 2025; Thompson et al., 2016).

5.3.3. Future Directions: Integrating Mental Health Strategies into Mentoring

As this study found, the mentoring acted as a buffer in maintaining mental health during a demanding period. Future mentorship programs should consider incorporating methods of experiential and reflective education (*practice-based training, workshops, journaling or reflective writing, guided small-group or peer discussions, and supervision*). This approach supports realistic goal setting and the growth of communication skills, professional identity, professionalism, self-awareness and empathy in future physicians (Abrams et al., 2021; Karnieli-Miller et al., 2021; Krishna et al., 2023; Nimmons et al., 2019; Prunuske et al., 2019; Sándor, 2022; Shiozawa et al., 2020).

A Norwegian study found that participation in case discussion groups helped healthcare professionals reduce stress and improve communication and patient understanding (Kjeldmand et al., 2004). Thus, it is critical to teach physicians medical students how to recognise their own emotions, and seek help from accessible resources, because only those who care for themselves are able to care for others (Hazag & Major, 2008). Integrating targeted mental health strategies within mentoring programs, for example equipping students with effective and practical coping skills and cultivating an empathetic and supportive atmosphere, can substantially improve students' capacity to handle stress and emotional difficulties (Pölczman et al., 2025). By embedding these elements into the mentoring framework, the program can provide mentees with tools to navigate academic pressures, interpersonal difficulties, and personal struggles more effectively. In addition to promoting academic and personal development, such initiatives ensure that mentoring serves as a buffer for students' mental well-being. Cultivating a warm climate in which students feel heard, supported, respected, and encouraged to seek help when needed can mitigate the impact of stressors that may contribute to depressive symptoms and university dropout.

The development of a more humane healthcare system - for both employees and patients - could depend on educating future healthcare professionals about mental health and equipping them with practical tools to maintain it. Mentorship experiences—by fostering resilience, empathy, and self-awareness—serve as key milestones in this transformation. These findings also support a growing recognition that conventional models of medical education may no longer be adequate to meet the evolving demands of modern healthcare. As the medical practice grows increasingly complex, mentoring can help future

physicians develop adaptive skills crucial for navigating change, overcoming setbacks, and maintaining professional well-being over time.

5.3.4. Limitations

One of the research's limitations is that the sample only included participants from one university. Although a single-institution approach allows for controlled analysis of the Semmelweis Student Mentoring Program outcomes, it might restrict the generalizability of findings. Therefore, future studies should include multiple institutions with diverse learning environments and cultural contexts to ensure that findings are applicable.

Another limitation relates to the sample size. Smaller subgroup sizes (dividing the control group into specific student cohorts such as first-year and senior students) would further reduce sample sizes, potentially compromising the reliability of subgroup analyses. Future research could benefit from larger and more balanced subgroups, to allow for more thorough and divided analyses of mentors and mentees, enabling greater insights into the specific experiences of each group.

Additionally, the presence of self-selection bias must be acknowledged. Students who voluntarily enrolled in the mentoring program might inherently differ from non-participants, possibly influencing observed outcomes (Pölczman et al., 2025). Future research might consider qualitative methods, such as interviews, to more thoroughly explore motivations and characteristics distinguishing participants from non-participants, thus providing a deeper understanding of how self-selection bias could impact study results. Moreover, the voluntary nature of participation may also introduce bias, potentially underrepresenting less motivated or less engaged students in the sample. Consequently, non-respondents' attitudes or satisfaction levels remain unknown. Therefore, the results must be interpreted within this context.

Furthermore, the survey utilized in this study did not examine whether participants were simultaneously involved in other university programs. Future studies should explicitly investigate students' participation in other comparable interventions, as this factor could influence the outcomes and provide a clearer picture of program-specific effectiveness.

Investigating the long-term psychological influence of structured mentoring programs within the context of medical education requires more focused attention in future research

(Nimmons et al., 2019). We plan to conduct follow-up studies to further explore these long-term effects.

Despite these limitations, a significant strength of this research is undoubtedly its longitudinal design, offering unique insights on the the impacts of structured near-peer mentoring programs, which remain unique in existing literature. Overall, the findings highlights the promising role of mentoring interventions in medical education, highlighting the need for continued longitudinal and comprehensive evaluations.

6. CONCLUSIONS

The present research focused on the following qualitative and quantitative questions:

1) What are mentors' personal and professional perceptions, experiences, and reflections associated with their participation in the mentoring program?

Mentors reported substantial personal and professional growth through their engagement in the near-peer mentoring program. Their reflections emphasized increased empathy and time management, better communication skills, and a heightened sense of responsibility. Mentoring was perceived as valuable preparation for future clinical interactions, reinforcing their professional identity and carrier socialisation (Pölczman et al., 2024).

2) What specific benefits do mentors report as outcomes of their involvement in mentoring activities?

Mentors identified significant benefits, including enhanced self-awareness, improved boundary-setting, increased resilience, and a stronger sense of belonging. Mentors as well stated increased motivation in their studies. These gains were attributed directly to their active participation in the mentoring process (Pölczman et al., 2024).

3) What challenges and difficulties do mentors face during the mentoring process?

Mentors encountered challenges primarily related to managing unmet expectations, setting realistic goals, and maintaining a balance between mentor duties and their own academic obligations. Mentors also described emotional strain, time management difficulties, and uncertainty in handling complex mentee issues. Overcoming these challenges facilitated important skill development, including flexibility and stress management. However, they also developed adaptive strategies to manage these challenges effectively (Pölczman et al., 2024).

4) How satisfied are mentors with the mentoring program, including training, supervision, and organisation?

Mentors expressed general satisfaction with the structure and support offered by the program. They highlighted the importance of mentor training, peer support, and regular supervision as key to their effectiveness. Continued participation across multiple years highlighted the program's effectiveness and positive reception (Pölczman et al., 2024).

5) What is the overall mental health profile of the participating medical students at baseline, with a focus on burnout, depression, anxiety, and perceived stress levels? Are there significant differences based on gender and phase of training?

Medical students demonstrated high levels of overall burnout, especially in emotional exhaustion and reduced academic efficacy, with clinical-phase students showing notably higher cynicism. Female students and those in the clinical phase reported reported significantly higher anxiety and stress, although scores remained within normal ranges. These findings confirm that certain subgroups are especially vulnerable who may benefit from targeted mental health interventions (Pölczman et al., 2025).

6) Does participation in a near-peer mentoring program significantly influence medical students' psychological resilience over time?

Students enrolled in the mentoring program displayed significant improvements in psychological resilience over the semester, whereas non-participating students experienced a decrease. This suggests that mentoring has a stabilizing and protective effect on psychological resilience during the academic year (Pölczman et al., 2025).

7) Are there significant differences in psychological resilience over time between students who took part in the mentoring program and those who did not?

Students participating in the mentoring program displayed significantly higher resilience over the semester, whereas non-participating students experienced a decrease. Notably, improvements in resilience were sustained throughout the semester and were independent of gender or age. These longitudinal results highlight the importance of continuous, long-term mentoring experience. Thus, future mentoring programs should prioritize ongoing support and engagement to maximize psychological resilience (Pölczman et al., 2025).

8) Are there significant differences in depression symptoms over time between students who participated in the mentoring program and those who did not?

Depression symptoms increased among the control group during the semester, while students, who were enrolled in the program maintained stable levels. This highlights mentoring as a potential buffer against worsening mental health (Pölczman et al., 2025).

9) Are there significant differences in burnout levels at the end of the intervention period between students who took part in the mentoring program and those who did not?

At post-intervention, Mentoring program participants reported significantly lower levels of burnout than non-mentored peers. This suggests that mentoring has a stress-reducing effect and a protective role against emotional exhaustion and strain in the academic environment (Pölczman et al., 2025).

7. SUMMARY

This doctoral research explored the impact of a structured near-peer mentoring program on resilience, mental health, and professional socialization among medical students at Semmelweis University, Hungary. Given the elevated levels of depression, and burnout documented within medical training, innovative interventions, such as mentoring programs, have become increasingly critical. This thesis represents the first longitudinal evaluation of a mentoring intervention within the Hungarian medical education context, integrating both qualitative and quantitative methods to capture the comprehensive effects of mentoring. The mixed-method study employed focus group discussions (N=26) and a non-randomized controlled quantitative assessment (N=133) conducted longitudinally. Participants were medical students enrolled either as mentors or mentees in the mentoring program, with controls not taking part in the intervention. Quantitative analyses measured resilience, depressive symptoms, and burnout, while qualitative focus groups explored mentors' experiences, perceived benefits, and challenges. Results demonstrated significant positive outcomes. Quantitative findings confirmed that structured near-peer mentoring enhanced resilience and effectively maintained stable levels of depressive symptoms among participating students compared to controls, who experienced a notable decline over time. Importantly, the control group showed elevated burnout scores by the end of the term, indicating a potential protective role of the intervention. Qualitative findings further highlight that mentoring fostered considerable professional and personal growth. Mentors reported acquiring essential skills that extended beyond mentoring, improving their readiness for future doctor-patient interactions and reinforcing their professional identities. These experiences are critical milestones in the professional socialization process. Conclusively, this research confirmed that structured near-peer mentoring significantly foster the psychological resilience, mental health, and professional development of medical students. The research advocates adopting a combined framework of structured mentorship with targeted mental health interventions into medical curricula, thus equipping future healthcare professionals with the resilience and competencies needed to navigate complex clinical and academic environments. Ultimately, fostering resilience, and self-awareness through mentoring may be pivotal in evolving a more humane healthcare system for both professionals and patients alike (Pölczman et al., 2025).

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9. BIBLIOGRAPHY OF PUBLICATIONS

Publications related to the thesis:

1. **Pölczman L**, Árva D, Győrffy Z, Jámbor M, Végh A, Kristóf G, Purebl G and Girasek E 10.3389/feduc.2024.1372697 Enhancing resilience: the impact of a near-peer mentoring program on medical students. *Frontiers in Education*. 9:1523310. doi: 10.3389/feduc.2024.1523310

IF: 1,9

2. **Pölczman, L.,** Jámbor, M., Győrffy, Zs., Purebl, Gy., Végh, A., Girasek, E., (2024). A qualitative study of mentors' perceptions and experiences of a near-peer mentoring program for medical students. *Frontiers in Education*. 9:1372697. doi: 10.3389/feduc.2024.1372697

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Publications not related to the thesis:

1. Boros, J., Radó, N., **Pölczman, L.,** Sükösd, A., & Győrffy, Z. (2024). Taking a closer look at physicians in the context of digital health: Experiences from a qualitative study. In Z. Győrffy & N. Radó (Eds.), *E-patients and E-physicians in Hungary* (pp. 43–49). Semmelweis Kiadó.

2. Győrffy, Z., **Pölczman, L.,** Radó, N., Sükösd, A., & Boros, J. (2023). Digitalizáció, kiégés és a munka–magánélet egyensúlyának kérdései a hazai gyógyítók körében. Eljött-e a digitális kiégés korszaka? Újratervezés a változó világban. *Psychiatria Hungarica, 38*(103).

3. Győrffy, Z., Radó, N., **Pölczman, L.,** Sükösd, A., Boros, J., (2023). Creating work-life balance among physicians in the age of digitalization: the role of self-consciousness and communication – a qualitative study. *BMC Health Serv Res* 23, 1141. doi: 10.1186/s12913-023-10101

IF: 2,7

∑IF: 6,5

List of presentations related to the dissertation

1. **Pölczman L**, Árva D, Győrffy Zs, Jámbor M, Végh A, Kristóf G, Purebl Gy and Girasek E (2024): Resilience Boost: Longitudinal Pilot Study of a Medical Student Near-Peer Mentoring Program. EHPS, 38th Annual Conference of the European Health Psychology Society. September 3 - 6, 2024, Cascais, Portugal.
2. **Pölczman L**, Jámbor M, Győrffy Zs, Purebl Gy, Végh A, and Girasek E (2023): A focus group study on students' experiences of the Semmelweis Mentoring Program. PhD Scientific Days. June 22-23, 2023, Budapest, Hungary.
3. **Pölczman L**, Jámbor M, Győrffy Zs, Purebl Gy, Végh A, and Girasek E (2023): 'I will be able to put this experience to good use when I will be working in healthcare': A focus group study of students' experience of a mentoring program. The 15th International Conference on Humanities, Psychology and Social Sciences. March 17-19, 2023, Berlin, Germany.
4. **Pölczman L**, & Girasek E (2022*): Near-peer mentoring program in medical school*. PhD Tudományos Napok. July 6-7, 2022, Budapest, Hungary.

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11. APPENDIX

11.1. Focus group discussion interview guide (Pölczman et al., 2024)

Introductory question

- What do you associate with the Mentor Program? What are the first thoughts that come into your mind when hearing the word mentoring?

Section One

- Please, share your experiences of what it was like to be a mentor.
- Please, briefly share your past experience regarding mentorship! What were your most significant positive and negative experiences? Please, tell me specific instances!
- What were your main tasks as a mentor? What were the topics in which you could help your mentee?
- As a mentor, how could you contribute to facilitating the student's transition to university?
- How would you describe your mentoring relationship?
- How was the collaboration (with the mentee)? How were you able to cooperate with the mentee? How could you collaborate with your mentee? How was this collaboration?
- Overall, how satisfied are you with your performance as a mentor?
- What do you think you still need to improve in supporting your mentee?
- What are the fields where you need to improve to be able to help your mentee even more?
- Did you experience any hardships during the mentoring? How could you overcome them? What did you learn from it?
- What challenges did you face during mentoring?

Section Two

- What benefits did you experience while participating in the program? What did you gain personally and/or professionally?
- What new skills did you acquire during mentoring?
- In what areas did you improve as a result of the program?
- Have you experienced any changes in any area of your life due to the mentoring program?

Section Three

- What do you think about the mentor training?
- What do you think about the mentoring program? What do you think about the structure and organisation of the program?
- How satisfied are you with the program and the opportunities provided by the program?
- What suggestions would you have regarding the development of the program? What did you miss from the program?
- Would you like to be a mentor again in the future?
- What are the most important tips/advice you would give future mentors?

Outlook

- Is there anything else you would like to add?

11.2. Completed checklist of the consolidated criteria for reporting qualitative research (COREQ) (Tong, 2007; Pölczman et al., 2025).

No. Item	Desciption
Domain 1: Research team and reflexivity *Personal Characteristics*	
1. Facilitator	Lea Pölczman
2. Credentials	Lea Pölczman (MSc), Márk Jámbor (Saeed et al.), Zsuzsa Győrffy (PhD), György Purebl (MD, PhD), András Végh (Saeed et al.), Edmond Girasek (PhD)
3. Occupation	LP, MJ, AV: research associate; ZsGy: associate professor; GyP: professor; EG: assistant professor
4. Gender	LP, ZsGy: female; MJ, GyP, AV, EG: male
5. Experience and training	PL: educational background in psychology, practical experience in mental health research and teaching; MJ: medical education, practical experience as a physician and in teaching; ZsGy educational background in sociology and psychology, experience in mental health research, qualitative research and teaching; GyP: medical education, psychiatrist, and psychotherapist, experience in behavioural sciences and teaching; AV: medical education, practical experience as a physician and in teaching; EG educational background in sociology and health sciences, experience in occupational health research and teaching.
Relationship with participants	
6. Relationship established	No
7. Participant knowledge of the interviewer	Participants knew that LP was a psychologist and a PhD student researching on student health
8. Interviewer characteristics	No other characteristics were reported about the facilitator
Domain 2: study design *Theoretical framework*	
9. Methodological orientation and Theory	Thematic analysis by Braun and Clarke
Participant selection	
10. Sampling	Purposive sampling
11. Method of approach	Via advertisement on social media or email
12. Sample size	26 participants
13. Non-participation	Not applicable

Setting	
14. Setting of data collection	Seminar room at the university
15. Presence of non-participants	No
16. Description of sample	$Mean_{age}$= 22.04 (SD = 2.163; Range: 20-24 years); female = 61.5%, male = 38.5%
Data collection	
17. Interview guide	Provided in the Methods section
18. Repeat interviews	No
19. Audio/visual recording	Audio recording
20. Field notes	Yes
21. Duration	Circa 60-90 minutes
22. Data saturation	Yes
23. Transcripts returned	No
Domain 3: analysis and findings *Data analysis*	
24. Number of data coders	Two
25. Description of the coding tree	Yes
26. Derivation of themes	A deductive approach was adopted, the themes were derived from the data.
27. Software	None
28. Participant checking	No
Reporting	
29. Quotations presented	Yes
30. Data and findings consistent	Yes
31. Clarity of major themes	Yes
32. Clarity of minor themes	Yes