Digital assessment and intervention strategies for teachers' occupational health during the COVID-19 pandemic

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> Abstract. This study investigates teachers' occupational health challenges and intervention strategies during the COVID-19 pandemic in Ukraine. Using digital assessment methods via Google Forms, we surveyed 322 teachers from urban (62.7%) and rural (37.3%) schools to evaluate occupational health indicators before and during quarantine periods. Results reveal significant deterioration in teachers' psychological well-being, emotional regulation, and professional satisfaction during pandemic-related restrictions. Notably, teachers with over 10 years of experience showed more pronounced negative health impacts, as did those working in rural settings with limited digital infrastructure. The study identified critical needs for psychological support, revealing that 42% of female teachers and 25% of male teachers required professional health-related assistance during quarantine. Based on these findings, we developed a comprehensive framework for the Centre of Pedagogical Consulting that offers targeted digital intervention strategies, including webinars, online training, and remote psychological support services. This research demonstrates the essential role of digital technologies in both assessing and addressing teachers' occupational health challenges during educational disruptions, providing a model for integrating remote support services into educational systems facing similar crises.

> Keywords: teachers' occupational health, digital health assessment, COVID-19 educational impact, remote psychological support, professional stress resistance, educational consulting, digital intervention strategies, teacher well-being, pandemic adaptation, blended learning challenges

1. Introduction

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The occupational health of teachers represents a critical factor in educational quality, student wellbeing, and the sustainability of educational systems. Even before the

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COVID-19 pandemic, teaching was recognised as a profession with significant occupational stressors [15]. The pandemic has exponentially intensified these challenges, creating unprecedented pressures on educators worldwide.

In Ukraine, as in many countries, the education system faced rapid transformation due to quarantine restrictions, requiring significant adaptation to distance and blended learning models. The implementation of the New Ukrainian School concept, concurrent educational reforms, and accelerated digitalization created additional burdens for teachers who were already navigating pandemic-related stressors.

Research has established that teachers' occupational health – defined as an integrated functional state characterized by dynamic harmony of internal experiences, professional efficacy, and resistance to negative workplace factors – significantly impacts educational outcomes [15]. When teachers experience diminished occupational health, this can manifest in decreased teaching effectiveness, increased psychogenic impacts on students, and compromised student health outcomes. Significantly, teachers who lack proper occupational health culture themselves are poorly positioned to foster health culture in their students.

The principles of orthobiosis – promoting mental health through a positive, ecologically sound lifestyle [13, p. 93] – provide a theoretical foundation for understanding teachers' health needs. Mental health constitutes the foundational component upon which higher-level psychological health is built, enabling full development of personal potential and resilience. As observed in psychosomatic literature [14] and psychoenergetic studies [5], maintaining mental health directly influences physical wellbeing, with psychological wellbeing creating a reciprocal positive impact on physical health.

Critically, the individual's own approach to health significantly determines outcomes [3, p. 39]. The concept of an "internal picture of health" [17, p. 437] or "subjective concept of health" [22, p. 190] describes one's perception and management of personal health. These approaches manifest in various health strategies, from continuous monitoring to strengthening, rehabilitation, implementation, or sometimes pathological attitudes toward health [22, pp. 144-145].

For teachers, developing occupational stress resistance represents an essential protective factor, enabling them to withstand negative workplace factors without health deterioration [15, p. 60]. This capacity is enhanced through autopsychological competence – the ability to self-regulate and maintain emotional control [23, p. 117] – which becomes particularly crucial during periods of heightened stress, such as a global pandemic.

The COVID-19 pandemic has created what the United Nations describes as "an unprecedented global health crisis" [11], with profound impacts on mental health. Research suggests that approximately 80% of Ukrainian adults experienced pandemic-related depressive disorders [4], highlighting the urgent need for psychological support. This context necessitates systematic assessment of teachers' occupational health and the development of targeted interventions.

Digital technologies offer promising solutions for both assessment and intervention. The Digital Competence Framework for Educators (DigCompEdu) [6] provides methodological guidelines for implementing digital approaches, while Ukrainian educational policy supports digital solutions for professional development and psychological support [9, 28, 29]. International practice also demonstrates the effectiveness of digital team-building approaches for educational professionals [2].

Based on these considerations, this study aimed to examine teachers' occupational health status before and during quarantine periods using digital assessment methods, focusing on three primary indicators: emotional wellbeing, occupational stress resistance, and teaching satisfaction. The results were intended to inform the development of targeted digital intervention strategies through a Centre of Pedagogical Consulting.

2. Methodology

2.1. Conceptual framework

This study employs a multidimensional conceptual framework for understanding teachers' occupational health. We define occupational health as an integrated characteristic encompassing the functional state of physical and psychological systems, characterized by dynamic harmony of internal experiences and manifested through professional efficacy and resistance to occupational stressors.

Our approach draws upon three complementary theoretical perspectives:

- 1. The principles of orthobiosis promoting a healthy, intelligent lifestyle through ecological awareness, optimism, and positive activity [13, p. 93].
- 2. Psychosomatic and psychoenergetic connections between mental and physical health [5, 14].
- 3. The internal picture of health framework, focusing on subjective health perceptions, attitudes, and behavioral strategies [17, p. 437].

Within this framework, we prioritize mental health as the foundational component of overall occupational health, recognizing its role in enabling psychological health – characterized by subjectivity, stress resistance, harmony, and spiritual development.

2.2. Digital assessment instruments

Data collection employed a purpose-designed digital questionnaire administered via Google Forms [20]. The questionnaire contained 12 items addressing three domains of occupational health:

- 1. General health perception and attitudes (3 items).
- 2. Emotional wellbeing and self-regulation (4 items).
- 3. Professional satisfaction and support needs (5 items).

Each question required responses regarding two time periods: pre-quarantine and during quarantine, enabling comparative analysis of pandemic impacts. The questionnaire specifically addressed connections between digital technology use, distance learning, and teachers' psychological wellbeing.

The digital administration format aligned with the Digital Competence Framework for Educators (DigCompEdu) [6] and Ukrainian guidelines for digital technology implementation in educational contexts [9, 28, 29].

2.3. Participants and procedure

The study involved 322 teachers from Ternopil, Poltava, and Kharkiv regions of Ukraine, with the following demographic characteristics:

- School location: 202 (62.7%) urban school teachers and 120 (37.3%) rural school teachers
- Gender: 290 (90%) female and 32 (10%) male participants
- Teaching experience: 20 (6.2%) with <3 years, 52 (16.2%) with 3-10 years, 114 (35.4%) with 10-20 years, and 136 (42.2%) with >20 years

Participation was voluntary and anonymous, with informed consent obtained from all respondents. The questionnaire was distributed through institutional channels at participating schools. Data were collected between April and June 2020, capturing experiences during initial COVID-19 quarantine implementation.

2.4. Analytical approach

Data analysis involved quantitative comparison of pre-quarantine and quarantineperiod responses, with particular attention to:

- Changes in self-reported health indicators
- Shifts in emotional states and self-regulation capacities
- Alterations in professional satisfaction and support needs

Responses were analyzed according to demographic variables (gender, school type, teaching experience) to identify differential impacts and targeted intervention needs. Results were interpreted within the conceptual framework to determine appropriate digital intervention strategies.

3. Results

3.1. General health status and attitudes

Analysis of self-reported health status revealed significant shifts between prequarantine and quarantine periods. Prior to quarantine, 76.1% of teachers rated their health as "excellent" (25.4%) or "good" (50.7%), with only 5.6% reporting "unsatisfactory" health. During quarantine, those reporting "satisfactory" health increased dramatically from 18.3% to 45.6%, indicating widespread perception of health deterioration.

Comparative analysis revealed contextual differences in health self-assessment (figures 1-2). Rural school teachers initially reported better health status than urban counterparts (81.3% vs. 73.1% "excellent" or "good" ratings), but both groups experienced significant decline during quarantine (23% and 28.3% decreases, respectively).



Figure 1: Teachers' occupational health status before quarantine.

Gender analysis indicated that female teachers experienced more pronounced health perception changes, with "excellent" ratings decreasing by 17.5% and "good" ratings by 9.5%. Male teachers showed higher proportions of "unsatisfactory" ratings both before (18.8%) and during (16.7%) quarantine.

Experience-based analysis revealed cumulative negative health impacts correlated with teaching longevity, with significant deterioration observed after 10 years of service and pronounced decline after 20 years. Among teachers with >20 years' experience, 10.2% reported negative health states during quarantine.



Figure 2: Teachers' occupational health status during quarantine.

Teachers' health attitudes shifted substantially during quarantine, with tripled increases in those reporting case-by-case health concerns. Proactive health maintenance attitudes increased from 35.4% to 49.7%, suggesting heightened health awareness during the pandemic. Correspondingly, medical help-seeking behavior increased from 61.5% to 87.1% during quarantine.

3.2. Emotional wellbeing and self-regulation

Emotional wellbeing indicators showed marked deterioration during quarantine (figures 3-4). Before quarantine, 66.2% of teachers reported stable, positive emotional states, with no participants reporting depressive conditions. During quarantine, positive emotional states decreased to 21.8%, while 6.7% reported depressive states and 24% experienced predominantly negative emotional conditions.



Figure 3: Teachers' emotional states at school before quarantine.

School context analysis revealed that before quarantine, both urban and rural teachers reported similarly positive emotional states (95.2% and 95.5% reporting



Figure 4: Teachers' emotional states at school during quarantine.

"stable positive" or "often positive" states). During quarantine, comparable proportions reported negative emotional states (31.1% urban, 30.1% rural).

Experience-based analysis showed heightened vulnerability among early-career (\leq 3 years) and late-career (>20 years) teachers. Among early-career teachers, 30% reported negative emotional states during quarantine, while among those with >20 years' experience, 39.3% reported negative emotional conditions.

Self-regulation capacities diminished during quarantine, with significant increases in teachers reporting emotional control difficulties (34.2% increase in those experiencing "some difficulties" and 8% increase in those facing "significant difficulties").

Access to emotional regulation techniques declined substantially (figures 5-6), with teachers reporting active stress-relief strategies decreasing from a pre-quarantine 34.5% to 13.3% during quarantine. This decline was more pronounced among rural teachers (from 44.2% to 29.5%) and female teachers (from 37.5% to 13.7%).



Figure 5: Teachers' access to emotional stress relief techniques before quarantine.



Figure 6: Teachers' access to emotional stress relief techniques during quarantine.

3.3. Psychological support access and needs

Access to psychological support showed concerning limitations both before and during quarantine (figures 7-8). Pre-quarantine, 49.2% of teachers reported limited or no access to psychological assistance (9.4% "no" and 39.8% "more no than yes"), increasing during quarantine.





Both urban (52.5%) and rural (44%) teachers reported limited psychological support access. Gender analysis revealed that female teachers' inability to access support increased from 8.9% to 23.9% during quarantine. Experience-based analysis showed early-career teachers (\leq 3 years) experiencing the most substantial increase in access limitations (from 0% to 40%).

Digital technology impacts on psychological wellbeing showed negative trends during quarantine, with teachers reporting adverse effects increasing from 19.5% to 49.3%. Rural teachers reported more negative impacts from digital technology use both before



Figure 8: Teachers' access to timely psychological assistance during quarantine.

and during quarantine.

Professional satisfaction declined dramatically during quarantine (figures 9-10), with teachers reporting full satisfaction decreasing from 78% to 26.4%, while those reporting partial or complete dissatisfaction increased from 22% to 73.7%.



Figure 9: Teachers' professional satisfaction before quarantine.

Rural teachers showed higher initial professional dissatisfaction (21.1% vs. 0% urban), though both groups experienced substantial increases during quarantine. Gender analysis revealed higher pre-quarantine dissatisfaction among male teachers, with substantial increases during quarantine (from 0% to 15.4% fully dissatisfied). Experience-based analysis showed mid-career teachers (3-10 years) experiencing the greatest satisfaction decline.

Psychological support needs increased substantially during quarantine (figures 11-12), with teachers explicitly requesting occupational health assistance increasing from 15.3% to 39.9%. Gender analysis showed female teachers' support needs increasing



Figure 10: Teachers' professional satisfaction during quarantine.



Figure 11: Teachers' need for psychological assistance with occupational health before quarantine.

more dramatically (from 12.8% to 42%) than male teachers' (from 21.4% to 25%).

Experience-based analysis revealed high support needs across all career stages during quarantine: 50% (≤ 3 years), 38% (3-10 years), 26.6% (10-20 years), and 46% (>20 years).

4. Discussion

4.1. Pandemic impacts on teachers' occupational health

Our findings reveal substantial deterioration in teachers' occupational health during COVID-19 quarantine periods, indicating that pandemic conditions created a perfect storm of stressors for educational professionals. The results align with international research suggesting that teaching professionals faced heightened occupational risks during pandemic conditions [26, 27].

The observed shift toward "satisfactory" health self-ratings (increasing from 18.3%



Figure 12: Teachers' need for psychological assistance with occupational health during quarantine.

to 45.6%) suggests widespread perception of health erosion during quarantine. This corresponds with findings from Bondar [4] indicating that approximately 80% of Ukrainian adults experienced depressive disorders during the pandemic.

Several interrelated factors likely contributed to these health impacts:

- 1. **Abrupt transition to distance learning**: Teachers faced rapid implementation of unfamiliar digital teaching methods with limited preparation [1]
- 2. **Digital competence gaps**: Many teachers, particularly in rural settings, lacked necessary technical skills for effective online teaching [25]
- 3. **Pandemic anxiety**: General psychological impacts of COVID-19, including fear of infection and uncertainty about the future
- 4. **Isolation effects**: Reduction in collegial support and professional community during quarantine [16]
- 5. **Work-life boundary erosion**: Home-based teaching creating difficulties separating professional and personal spheres [19]

The cumulative impact of these stressors manifested in the substantial increase in negative emotional states (from 4.5% to 30.7%) and the dramatic decline in professional satisfaction (from 78% fully satisfied to only 26.4%).

4.2. Differential impacts and vulnerable subgroups

Our analysis identified several teacher subgroups demonstrating heightened vulnerability to pandemic-related health impacts:

Experience-based vulnerability showed a U-shaped distribution, with early-career (\leq 3 years) and late-career (>20 years) teachers experiencing more adverse effects. This aligns with Pecherkina and Muslumov [18]'s pre-pandemic findings that occupational health vulnerability varies across professional development stages, though our results suggest pandemic conditions created specific challenges for those at career endpoints. Early-career teachers likely lacked established coping mechanisms and professional identities, while late-career teachers may have experienced greater challenges adapting to new digital demands.

Gender differences revealed that female teachers experienced more pronounced health perception changes and greater declines in emotional regulation capacities (from

37.5% to 13.7% reporting stress-relief techniques). This corresponds with international research suggesting gender-differentiated pandemic impacts in educational contexts [12].

School context findings showed that while rural teachers initially reported better health status than urban counterparts, they experienced more significant negative impacts from digital technology use, likely reflecting infrastructural challenges and digital divide issues in rural educational settings.

4.3. Self-regulation capacities and support systems

Perhaps most concerning is our finding regarding declining self-regulation capacities during quarantine. The substantial decrease in teachers reporting active stress-relief strategies (from 34.5% to 13.3%) suggests erosion of psychological resources precisely when they were most needed.

These results emphasize the critical importance of autopsychological competence – the ability to employ self-regulation and emotional control techniques – as a protective factor during periods of heightened stress [23, p. 117]. The quarantine period appears to have overwhelmed teachers' existing self-regulation resources, highlighting the need for systematic psychological support.

However, our findings reveal substantial limitations in psychological support access, with approximately half of teachers reporting limited or no access both before and during quarantine. This support gap occurred precisely as psychological needs increased dramatically, with teachers requesting occupational health assistance rising from 15.3% to 39.9%.

These findings underscore the importance of developing accessible, digitally-mediated psychological support systems for teachers, particularly during crisis periods. The observed increase in medical help-seeking behavior (from 61.5% to 87.1%) suggests teachers were actively seeking assistance, but primarily through physical health channels rather than psychological support systems.

4.4. Digital intervention implications

Our results have significant implications for digital intervention development. The negative impacts of digital technology use reported by 49.3% of teachers during quarantine highlight the need for thoughtful implementation approaches that mitigate technological stress while leveraging digital benefits for support delivery.

The differential impacts observed across teacher subgroups suggest the need for targeted intervention strategies addressing specific vulnerability factors. Rural teachers, for instance, may benefit from foundational digital skills development alongside psychological support, while female teachers may require focused emotional regulation interventions.

These considerations informed our development of the Centre of Pedagogical Consulting framework, designed to provide accessible digital support for teachers' occupational health through multiple channels and formats.

5. The Centre of Pedagogical Consulting framework

Based on our research findings, we developed a comprehensive framework for the Centre of Pedagogical Consulting at Ternopil Volodymyr Hnatiuk National Pedagogical University [7, 8, 21]. The Centre operates as both a physical and digital entity, providing psychological and pedagogical support for teachers through multiple channels.

The Centre's conceptual foundation integrates three key elements:

1. **Professional resilience development**: Strengthening teachers' capacity to maintain stability under external and internal threats without compromising development pace [10]

- 2. **Strategic occupational health management**: Fostering responsible health attitudes and effective self-regulation strategies
- 3. **Digital-mediated accessibility**: Ensuring support reaches teachers regardless of geographical location or quarantine restrictions

The Centre's strategic objectives align directly with needs identified in our research:

- Increase teachers' professional stress resistance through focused intervention
- Develop emotional self-regulation skills, particularly for female teachers
- Foster constructive coping strategies for occupational challenges
- Teach self-rehabilitation and self-healing psychotechnologies
- Shape teachers' subjective positioning as bearers of reasonable lifestyle practices
- Provide accessible digital support channels during quarantine restrictions

The Centre provides educational consulting services through five primary channels:

- 1. **Digital assessment services**: Online diagnostic tools for monitoring occupational health indicators
- 2. **Remote psychological counseling**: Individual and group counseling sessions via digital platforms
- 3. **Digital training programs**: Anti-burnout and anti-stress training delivered through webinars and online workshops
- 4. **Resource development**: Creating accessible self-help materials and guides
- 5. **Community building**: Facilitating peer support through digital communities

Each service area incorporates activities targeting specific needs identified in our research, including specialized approaches for teachers at different career stages and in different school contexts.

The Centre employs multiple digital platforms to ensure accessibility:

- University website and YouTube channel for resource distribution
- Messenger communities and social media groups for peer support
- Google Forms for ongoing assessment and needs identification
- Video conferencing platforms for remote training delivery
- Digital resource libraries for self-directed learning

These digital strategies are designed to overcome geographical barriers and quarantine restrictions while providing timely psychological support for teachers experiencing occupational health challenges.

Initial implementation of the Centre's digital programs shows promising results. During the National Educational Forum in October 2020 [7, 24], 96 teachers participated in remote activities offered by the Centre. Feedback indicated high satisfaction with the digital delivery format and content relevance.

The Centre has successfully developed and implemented several digital interventions:

- Anti-stress training programs delivered via webinar
- Anti-burnout workshops with interactive components
- "How not to burn in the flames of the profession" masterclass series
- Digital resource collections for self-directed learning

Future development plans include expanded digital offerings focusing on selfregulation skills, professional deformation prevention, stress resistance enhancement, and resilience development, all deliverable within quarantine restriction parameters.

6. Conclusions

This study provides comprehensive documentation of COVID-19 pandemic impacts on teachers' occupational health, revealing substantial deterioration across multiple indicators during quarantine periods. Our findings demonstrate that:

- 1. Teachers experienced significant declines in self-reported health status, emotional wellbeing, and professional satisfaction during quarantine periods
- 2. Different teacher subgroups showed varied vulnerability patterns, with earlycareer and late-career teachers, female teachers, and rural teachers demonstrating specific support needs
- 3. Self-regulation capacities and access to emotional management techniques declined precisely when these resources were most needed
- 4. Psychological support access remained limited despite dramatically increasing needs
- 5. Digital technologies presented both challenges (technological stress) and opportunities (remote support delivery) for teachers' occupational health

Based on these findings, we developed and implemented the Centre of Pedagogical Consulting framework, providing digitally-mediated psychological support services for teachers during quarantine restrictions. This approach demonstrates how educational institutions can leverage digital technologies to assess occupational health needs and deliver targeted interventions during crisis periods.

Our results highlight several critical priorities for supporting teachers' occupational health during and beyond the pandemic:

- Developing targeted intervention strategies for identified vulnerable subgroups
- Strengthening teachers' digital competencies while simultaneously addressing technological stress
- Creating accessible, digitally-mediated psychological support systems
- Fostering professional resilience through focused training and resources
- Integrating occupational health considerations into educational policy and practice

Future research should address gender-specific implementation of occupational health strategies and explore optimal approaches for remote psychological support delivery during sustained educational disruptions. Additionally, longitudinal research examining the long-term impacts of pandemic experiences on teachers' occupational health trajectories is needed to inform ongoing intervention development.

As educational systems worldwide continue navigating pandemic aftereffects and preparing for future disruptions, our findings underscore the critical importance of proactive occupational health support for teachers – the essential workforce ensuring educational continuity during crises. Digital technologies, when thoughtfully implemented, offer powerful tools for both assessing teacher needs and delivering timely, accessible interventions to protect this vital human resource.

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