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## PSYCHIATRIKI

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# The impact of COVID-19 pandemic on the elderly with neurocognitive disorders

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Since the COVID-19 pandemic outburst, numerous studies have reported on the holistic approach of the disease, which has negative consequences on physical and mental health as well as short- and long-term effects on cognition, independently of age. The context of the pandemic brought significant demands on public health systems, leading to restrictive measures against coronavirus expansion (quarantines, physical distancing policies, etc.). Such measures are reported to increase perceived loneliness and helplessness and may exacerbate feelings of emotional distress.<sup>1</sup> Elderly diagnosed with neurocognitive disorders, i.e., mild cognitive impairment (MCI) or dementia, may present multifaceted cognitive deficits accompanied by neuropsychiatric symptoms, medical comorbidities, and high mortality rates. Furthermore, the elderly with MCI/dementia are more vulnerable to SARS-COV-2 infection and disease complications due to decreased compliance with protective measures and multimorbidity. Simultaneously, limited access to health care services, distancing from their loved ones, abrupt changes in their daily routines, or cancellation of daycare programs may make them more susceptible to pandemic secondary effects.

According to the World Health Organization, about 55 million people live with dementia globally. Dementia diagnosis was reported as an independent risk factor for increased mortality rate among the elderly infected with SARS-COV-2.<sup>2</sup> Cross-sectional studies conducted all over Europe reported increased cognitive deterioration rate in patients with MCI and dementia during lockdown compared to the pre-lockdown period, as well as among dementia patients infected with COVID-19 compared to those not infected.<sup>3</sup> Exacerbation of pre-existing sleep/appetite dysregulation and aberrant motor behavior, worsened symptoms of apathy, depression, and agitation, a rise in delirium episodes and disease-related falls, and the onset of behavioral symptoms during quarantine occurred.<sup>4</sup> Also, patients living alone expressed excessive worrying and an overall decline in well-being. However, results from a large cohort study conducted in England failed to distinguish COVID-19 effects on dementia patients' psychological state between 2018 and 2020, possibly due to the small number of dementia patients recruited and disease severity.<sup>5</sup>

Among the Greek elderly, dementia prevalence rates range between 5–10.8% and 32.4% for MCI incidence.<sup>6,7</sup> Only a few studies have investigated the impact of COVID-19 quarantine on the mental and psychological health of the Greek elderly diagnosed with cognitive disorders. A longitudinal study was conducted between 2018 and 2020, including many elderly people with MCI or Alzheimer's disease (AD). The authors compared the objectively assessed deterioration difference pre- and during the quarantine in terms of cognition, behavior, and function level. They concluded that no significant quarantine-related changes were detected in cognition between the three-time points, although the possibility that behavioral and psychological deterioration indirectly affected cognitive and functional decline among AD patients cannot be excluded.<sup>8</sup> In a cross-sectional study conducted during the first quarantine period (i.e., February to May 2020), critical aspects of everyday life (mood, physical health, communication), as well as compliance with confinement policies, were examined based on subjective information provided by caregivers of elderly with MCI or dementia. Based on their findings, the authors report that MCI and dementia patients exhibited a significant overall decline, whereas those with dementia were more likely to deteriorate in terms of neuropsychiatric symptoms (apathy, mood changes, psychomotor anxiety), excessive worrying, and limited compliance with measures against COVID-19 expansion.<sup>9</sup>

In an effort to minimize possible deleterious effects of the pandemic-related quarantine on the elderly with neurocognitive disorders, telemedicine was implemented instead. Neuropsychological online testing, systematic monitoring of clinical outcomes (compliance with pharmacotherapy), and motivational interventions such as physical activity programs were accommodated using user-friendly applications and telephone consultations.<sup>10</sup> Nevertheless, limited access to and familiarization with technology, severity of cognitive deficits, and demographic factors (i.e., low educational and socioeconomic status), may have limited positive outcomes in the current population.

In conclusion, the combined effect of neurocognitive disorders and the pandemic exceeds the healthcare system's demands, posing in some cases insurmountable challenges. To minimize the negative effect of future similar conditions, the focus should be given to the following directions:

- Patient-oriented, holistic protocols for systematic monitoring of clinical course, future cognitive decline, and timely psychiatric/neuropsychological interventions when necessary.
- Specialized training for caregivers and nursing staff focusing on the inclusion of self-hygiene measures in patients' daily routines.
- Patients familiarization with online tools for cognitive enhancement programs and diagnostic/monitoring purposes.

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## Άρθρο σύνταξης

# Η επίδραση της πανδημίας COVID-19 στους ηλικιωμένους με νευρονοητική διαταραχή

ΙΣΤΟΡΙΚΟ ΑΡΘΡΟΥ: Παραλήφθηκε 6 Ιουλίου 2023/Δημοσιεύθηκε Διαδικτυακά 14 Ιουλίου 2023

Από την έναρξη της πανδημίας SARS-COV-2, μια πληθώρα ερευνών καταδεικνύει την πολυδιάστατη φύση της νόσου, με βραχυπρόθεσμες και μακροπρόθεσμες συνέπειες στη σωματική, ψυχική και νοητική υγεία των ασθενών, ανεξαρτήτως ηλικίας. Οι νέες συνθήκες που επέβαλε η πανδημία, έθεσαν σε δοκιμασία τα όρια του δημόσιου συστήματος υγείας, οδηγώντας στην επιβολή περιοριστικών μέτρων (καραντίνα, πολιτικές τήρησης φυσικών αποστάσεων). Τα περιοριστικά μέτρα συνέβαλαν σε αυξανόμενο αίσθημα μοναξιάς, αβοηθητότητας και συναισθηματικής δυσφορίας.<sup>1</sup> Από την άλλη πλευρά, οι ηλικιωμένοι που έχουν διαγνωστεί με κάποια νευρονοητική διαταραχή, ήπια νοητική διαταραχή (ΗΓΔ) και άνοια, αντιμετωπίζουν ένα ευρύ φάσμα νοητικών και νευροψυχιατρικών συμπτωμάτων, που δυσχεραίνει τη συμμόρφωση με τα μέτρα αυτοπροστασίας, γεγονός που τους καθιστά περισσότερο ευάλωτους στο να μολυνθούν από τον SARS-COV-2 καθώς και σε πιθανές σοβαρές επιπλοκές και θνητότητα αν νοσήσουν, δεδομένων των πολλών ιατρικών συννοσηροτήτων που συχνά έχουν. Ταυτόχρονα, η δυσκολία ή αδυναμία πρόσβασης ηλικιωμένων με νευρονοητική διαταραχή σε δομές υγείας, η απομάκρυνση από οικείους και φροντιστές, οι αξιολογούμενες μεταβολές στην καθημερινή ρουτίνα και η παύση προγραμμάτων ημερήσιας φροντίδας κάνουν τους ασθενείς αυτούς ακόμη πιο ευάλωτους στις δευτερογενείς συνέπειες της πανδημίας.

Σύμφωνα με τον Παγκόσμιο Οργανισμό Υγείας, 55 εκατομμύρια άνθρωποι ζουν με άνοια παγκοσμίως. Η διάγνωση άνοιας αποτελεί ανεξάρτητο παράγοντα κινδύνου για αυξημένο ποσοστό θνητότητας μετά από τη λοίμωξη με SARS-COV-2.<sup>2</sup> Οι περισσότερες συγχρονικές μελέτες που έχουν πραγματοποιηθεί σε χώρες της Ευρώπης αναφέρουν αυξημένο ρυθμό νοητικής επιδείνωσης σε ασθενείς με ΗΓΔ και άνοια κατά την περίοδο της καραντίνας συγκριτικά με την περίοδο πριν από αυτή, όπως επίσης και μεταξύ ασθενών με άνοια που προσβλήθηκαν από τον ιό, σε σχέση με αυτούς που δεν προσβλήθηκαν.<sup>3</sup> Επιπλέον, κατά την περίοδο της καραντίνας καταγράφηκε επιδείνωση σε προϋπάρχοντα προβλήματα όρεξης και ύπνου, κινητικές συμπεριφορές, συμπτώματα απάθειας, κατάθλιψης και ευερεθιστότητας, και αύξηση στη συχνότητα ντελιρίου και πτώσεων, ενώ παράλληλα καταγράφηκε και έναρξη νέων συμπτωμάτων.<sup>4</sup> Επίταση του αισθήματος ανησυχίας και γενικότερη μείωση στο αίσθημα ευζωίας επισημάνθηκε μεταξύ ασθενών με νευρονοητική διαταραχή που διαβιούν μόνοι τους. Αξίζει ωστόσο να επισημανθεί ότι σε μια μελέτη κοόρτης που διεξήχθη στην Αγγλία δεν διαπιστώθηκαν σημαντικές διαφοροποιήσεις στην ψυχολογική κατάσταση ασθενών με άνοια μεταξύ του 2018 και του 2020, πιθανόν λόγω του μικρού αριθμού συμμετεχόντων και του βαθμού σοβαρότητας της διαταραχής.<sup>5</sup>

Στην Ελλάδα ο επιπολασμός της άνοιας κυμαίνεται μεταξύ 5–10.8%, ενώ της ΗΓΔ προσεγγίζει το 32.4%.<sup>6,7</sup> Παρά την πληθώρα ερευνών που έχουν υλοποιηθεί παγκοσμίως σχετικά με τις επιπτώσεις της πανδημίας COVID-19 και των περιοριστικών μέτρων στη νοητική κατάσταση των ηλικιωμένων, οι αντίστοιχες έρευνες σε ελληνικό δείγμα είναι ελάχιστες. Μια διαχρονική μελέτη διεξήχθη μεταξύ του 2018 και του 2020 σε σχετικά μεγάλο δείγμα ηλικιωμένων με ΗΓΔ και άνοια. Οι συγγραφείς συνέκριναν την αντικειμενική μεταβολή σε νοητικό, συμπεριφορικό και λειτουργικό επίπεδο πριν και κατά τη διάρκεια της καραντίνας. Συμπερασματικά, αναφέρουν ότι δεν βρέθηκαν σημαντικές διαφορές σχετιζόμενες με την περίοδο της καραντίνας.<sup>8</sup> Παρόλ' αυτά, δεν μπορεί να αποκλειστεί το ενδεχόμενο η παρατηρούμενη νοητική και λειτουργική επιδείνωση σε ασθενείς με Alzheimer να δι-αμεσολαβείται από τη συμπεριφορική και ψυχολογική επιδείνωση κατά την περίοδο της καραντίνας. Σε άλλη συγχρονική έρευνα που πραγματοποιήθηκε κατά την περίοδο της πρώτης καραντίνας, αξιολογήθηκαν υποκειμενικά πτυχές της καθημερινότητας (δι-άθεση, φυσική υγεία, επικοινωνία) και η συμμόρφωση με τα μέτρα περιορισμού της πανδημίας σε άτομα με ΗΓΔ και άνοια, μέσω των φροντιστών τους. Με βάση τα ευρήματα, οι συγγραφείς αναφέρουν σημαντική συνολική έκπτωση τόσο σε ασθενείς με ΗΓΔ όσο και άνοια, ενώ σε ασθενείς με άνοια είναι πιο πιθανή η επιδείνωση κυρίως στη νευροψυχιατρική συμπτωματολογία, η αύξηση της ανησυχίας και η μειωμένη εφαρμογή των περιοριστικών μέτρων.<sup>9</sup>

Προκειμένου να περιοριστούν κατά το δυνατόν οι επιπτώσεις της πανδημίας και της καραντίνας σε ηλικιωμένους με νευρονοητικές διαταραχές υλοποιήθηκαν παρεμβάσεις τηλε-ιατρικής (διαδικτυακή νευροψυχολογική εκτίμηση, συστηματική παρακολούθηση της κλινικής πορείας των ασθενών) και προγράμματα κινητοποίησης (με στόχο την αύξηση της φυσικής δραστηριότητας) μέσω φιλικών προς τον χρήστη εφαρμογών και τηλεφωνικών ραντεβού.<sup>10</sup> Αξίζει, ωστόσο, να αναφερθεί ότι η αποτελεσματικότητα της τηλε-ιατρικής ενδέχεται να περιορίζεται από την ηλικία και το επίπεδο εξοικείωσης με τα τεχνολογικά μέσα, δημογρα-

φικούς παράγοντες (π.χ. χαμηλό εκπαιδευτικό, κοινωνικοοικονομικό επίπεδο) όπως επίσης και τη βαρύτητα της νευρονοητικής διαταραχής.

Συμπερασματικά, η συνύπαρξη νευρονοητικών διαταραχών και της πανδημίας μπορεί να υπερκεράσει τις δυνατότητες του δημόσιου συστήματος υγείας προκαλώντας, σε κάποιες περιπτώσεις, ανυπέβλητες προκλήσεις. Για την ελαχιστοποίηση των αρνητικών επιπτώσεων μελλοντικών αντίστοιχων καταστάσεων θα πρέπει να εστιάσουμε στις παρακάτω κατευθύνσεις:

- Κατάρτιση ολιστικών πρωτοκόλλων προσανατολισμένων στις εξειδικευμένες ανάγκες του συγκεκριμένου πληθυσμού με στόχο τη συστηματική παρακολούθηση της κλινικής πορείας, της νοητικής έκπτωσης και την έγκαιρη παρέμβαση σε νευροψυχιατρικό επίπεδο.
- Εξειδικευμένα προγράμματα εκπαίδευσης φροντιστών και νοσηλευτικού προσωπικού, στοχεύοντας σε μέτρα ατομικής υγιεινής στην καθημερινή ρουτίνα των ασθενών.
- Εξοικείωση των ασθενών με τα διαδικτυακά εργαλεία τόσο για προγράμματα νοητικής ενδυνάμωσης όσο και για διάγνωση/ παρακολούθηση των ασθενών.

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## Research article

# The psychological impact of the COVID-19 pandemic on primary health care professionals in Greece

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### ABSTRACT

Pandemics precipitate feelings of discomfort and anxiety in healthcare professionals. This study investigates the prevalence of anxiety and depression among public primary health care professionals (PHCPs) in Greece, along with the demographic risk factors, during the second wave of the COVID-19 pandemic, in order to address work exhaustion and protect frontline professionals' psycho-emotional balance. This cross-sectional study was conducted from June 2021 to August 2021, using an online questionnaire (demographic data, GAD-7, PHQ-9). Eligible participants (medical, nursing, and allied professionals) were PHCPs employed in Greek public PHC facilities. The analysis involved descriptive statistics to present sociodemographic characteristics, participants' experience with COVID-19, and anxiety and depression levels. Univariate analysis was performed to evaluate the association between sociodemographic factors the anxiety and depression levels, and multivariable logistic regression was used to investigate the presence of predictive factors for anxiety and depression. In total, 236 PHCPs participated in the study, with a mean age of 46 (SD 9.3) years and a mean professional experience of 14.71 (SD 9.2) years. Most participants were women (71.4%) and the majority were General Practitioners (38.9%) and Nurses (35.2%). Anxiety (33.1% mild, 29.9% moderate/ severe) and depression (33.9% mild, 25.9% moderate/severe) were prevalent among PHCPs. The female gender is the most important predictor of anxiety manifestations (OR:3.50, 95%CI:1.39–10.7;  $p=0.014$ ). Participants older than 50 years have a lower risk of both anxiety (OR=0.46, 95%CI:0.20–0.99;  $p=0.049$ ) and depression (OR=0.48, 95%CI:0.23–0.95;  $p=0.039$ ). PHCPs working in rural facilities have a lower risk of anxiety (OR:0.34, 95%CI:0.137–0.80;  $p=0.016$ ). Previous infection with SARS-CoV-2 was not associated either with anxiety ( $p=0.087$ ) or with depression ( $p=0.056$ ). Notably, having a friend, relative, or coworker who was hospitalized for COVID-19 or died from it, was not associated with the presence of anxiety or depressive symptoms. Additionally, living with someone in a high-risk group for severe SARS-CoV-2, living with children, or being at high risk for severe COVID-19 was not associated with higher GAD-7 and PHQ-9 scores. Findings indicate concerning levels of psychological distress among PHCPs. Early recognition of emotional discomfort in PHCPs and prompt intervention could reinforce PHCPs' resilience against the pandemic.

**KEYWORDS:** Anxiety, depression, pandemic, primary health care, occupational mental health, family practice.

### Introduction

Pandemics bring uncertainty to daily life, eliciting strong feelings of discomfort and anxiety.<sup>1,2</sup> The angst of contracting and transmitting the infection<sup>3</sup> causes

significant psychological distress in healthy individuals and can even trigger clinical manifestations in mentally vulnerable individuals (panic attacks, generalized anxiety disorder, post-traumatic stress disorder, depression, and even suicides).<sup>1</sup>

As highlighted in previous epidemics,<sup>4,5</sup> a sudden and potentially life-threatening contagious disease may have a greater psychological impact on healthcare professionals (HCPs) than on the general population, as they appear more susceptible to fear, anxiety, depression, post-traumatic stress, and burnout.<sup>6,7</sup> Indeed, during the COVID-19 pandemic, HCPs faced dramatic changes in their daily practice and were requested to provide care under extremely adverse conditions, including increased exposure to the virus, insufficient workforce and exhausting work hours, while also facing social isolation and stigma, as well as morally challenging decisions (even outside their areas of clinical expertise) that added to their psychological distress.<sup>8</sup>

In Greece, several studies demonstrated that the COVID-19 pandemic had a noticeable psychological impact on the general population,<sup>9</sup> as well as on more vulnerable groups, such as frontline HCPs.<sup>2,10</sup> Primary Health Care (PHC) is the backbone of every health system and substantially contributes to the elimination of inequalities in healthcare access. Experience from previous epidemics highlights the substantial role of Primary Health Care Professionals (PHCPs) engagement in effective management of acute and chronic illnesses,<sup>11</sup> as well as, in decision-making procedures and relieving the burden of secondary and tertiary care.<sup>12</sup> Studies have demonstrated a significant impact on the psychological well-being of PHCPs, the majority of whom experience stress, burnout, anxiety, depression, fear of COVID-19, lower job satisfaction, and physical symptoms.<sup>13</sup>

The psychological toll on HCPs varies by position, with nurses reporting higher levels of stress than medical staff and, to a lesser extent, than the rest of the health care staff,<sup>14,15</sup> while, physicians indicated higher levels of secondary traumatic stress compared to nurses.<sup>16</sup> In their research, Fountoulakis et al (2021) found that regarding gender sensitivity, women are at a higher risk of fear, depression, and anxiety symptoms, findings that are in accordance with the those from the general population.<sup>17</sup> Other studies reported gender and age differences: women GPs had poorer psychological outcomes across all domains, and older PHCPs reported greater stress and burnout.<sup>13</sup>

Although, during the COVID-19 pandemic, hospital frontline HCPs' psychological distress has been investigated,<sup>10,18</sup> there is limited data on the prevalence of anxiety and depression among Greek PHCPs, who serve as the health system's first line of defense in the control of the pandemic. The aim of this study was to investigate the levels of anxiety and depression among PHCPs in Greece, along with the demographic risk factors, during the second wave of the COVID-19 pandemic in Greece,

when all regions of the country were similarly affected by the pandemic, in order to suggest appropriate approaches for addressing work exhaustion and protecting frontline professionals' psycho-emotional balance.

## Material and Method

### Participants and procedures

This is a cross-sectional study conducted online, in Greece. Eligible participants in this study were all public PHCPs (medical, nursing, and allied) employed in Health Centers/Group Practices, Solo Medical Practices (most founded between 1985–1990), and Local Health Units (small group practices newly founded in 2018), that comprise the public sector of Primary Health Care, which coped with the pandemic to a major extent.

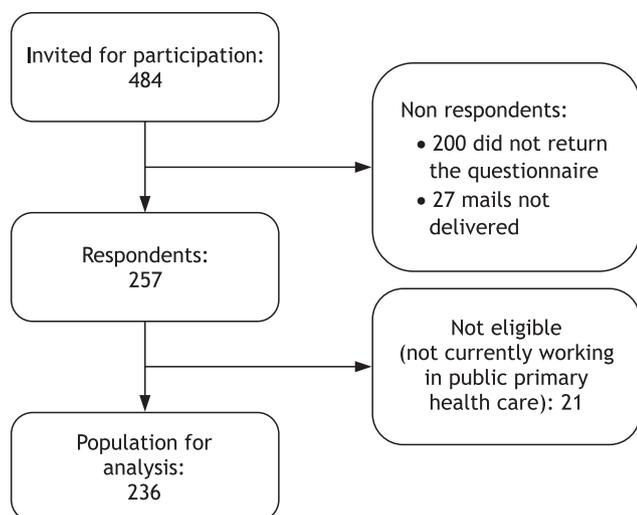
The convenience sampling method was used in this study. The research questionnaire was distributed through email. A mailing list of PHCPs who voluntarily collaborate with the Aristotle University of Thessaloniki in students' clinical training. An email was sent to 484 eligible participants, 257 questionnaires were returned (53.1% response rate) and 236 PHCPs were included in the analysis, after the exclusion of 21 participants who at that time were not employed in a public PHC facility (figure 1). Two reminders were sent, 4 and 6 weeks after the first email. Data collection took place during a three-month period (June 2021 to August 2021) following the lifting of major restrictions due to the second wave of COVID-19.

The study was approved by the Bioethics Committee of the Medical School of the Aristotle University of Thessaloniki (reference number 9.398/22.06.2021) and was performed in accordance with the ethical standards delineated in the Declaration of Helsinki. Participants received a link to access the study, after giving written informed consent. The study was anonymous and confidential, and participants were allowed to terminate the survey at any time.

### Research questionnaire

A self-reported, e-survey questionnaire was designed including: (i) 19 questions on socio-demographic information (gender, age, working experience, profession, education, work environment, vaccination status, vulnerability to COVID-19, and experience coping with the pandemic), (ii) the 7-item General Anxiety Disorder-7 (GAD-7) and, (iii) the 9-item Patient Health Questionnaire-9 (PHQ-9).

The GAD-7, a 7-item self-reported questionnaire, is a short tool for screening general anxiety disorder, assessing the severity of symptoms over a two-week period.<sup>19</sup>



**Figure 1.** Flow-diagram of study participants.

The items are rated on a 4-point Likert scale, ranging from 0 (not at all) to 3 (nearly every day). Total scores range between 0 and 21. A total score of 0–4 is classified as “not at all”, 5–9 as “mildly”, 10–14 as “moderately” and 15 as “severely”. A cut-off point of 10 or above corresponds to moderate to severe anxiety disorder (sensitivity of 89% and specificity of 82% for GAD), indicating the patient needs further assessment. In this study, we used the translated Greek version of the GAD-7 which has been used in other studies, though it has not been validated yet in the Greek population.<sup>20,21</sup> The PHQ-9, a 9-item self-reported instrument, was developed to screen for depression in primary care and assess the severity of symptoms over a period of two weeks and it is being used as a research tool as well.<sup>22</sup> Items are rated on a 4-point Likert scale, ranging from 0 (not at all) to 3 (nearly every day). Scores of 0–4 are rated as “minimal or none”, 5–9 as “mild”, 10–14 as “moderate”, 15–19 as “moderately severe”, and 20–27 as “severe”. A cut-off point of 10 or above is indicative of major depressive disorder and guarantees high sensitivity and specificity (sensitivity 0.88 and specificity 0.85) despite socio-demographic characteristics.<sup>22,23</sup> In this study we used the validated and translated Greek version of the PHQ-9.<sup>24</sup>

#### Data analysis

Statistical analysis was performed using R Statistical software (version 4.1.3) (<https://www.r-project.org/>). Descriptive statistics were initially used to present sociodemographic and other outcome variables including levels of anxiety and depression of the participants. Pearson’s chi-square test or Fisher’s exact test, whenever more appropriate, was used to evaluate the association between sociodemographic factors and the levels

(none, mild and moderate or severe) of anxiety and depression, respectively. Multivariable logistic regression was used to determine the association between independent variables with the dichotomous dependent variables determined by the cut-off point of 10 in the GAD-7 and PHQ-9 indicating clinically significant levels of anxiety and depression, respectively. As candidate independent variables the socio-demographic characteristics and participants’ experience with COVID-19 were considered in case the p-value was less than 0.05 in univariate analysis. Odds ratios (OR) were presented with the corresponding 95% confidence intervals (95%CI). Two-tailed p-values of less than 0.05 were deemed significant.

## Results

### Demographic information of study participants

This study included 236 PHCPs with a mean age of 46 (SD 9.3) years and a mean professional experience of 14.71 (SD 9.2) years. Most participants were women (71.4%) and the majority were General Practitioners (38.9%) and Nurses (35.2%). A high percentage worked in Health Centers (77.7%) and there was an almost equal involvement of PHCPs employed in urban (27.5%), semi-urban (37.3%), and rural (36.0%) facilities. About 34.3% lived with a person at high risk for severe COVID-19 and 55.4% had a relative or a friend who had been admitted for or died from COVID-19. The demographic characteristics of the participants are presented in table 1.

### Participants’ prevalence of Anxiety and Depression by severity

Almost half of the respondents (n=111, 47.0%) scored low in the GAD-7, while approximately a third reported mild (33.1%, n=78) and moderate to severe anxiety (29.9%, n=47), respectively. According to the PHQ-9, 40.3% (n=95) of the participants did not report depression, while approximately a third had mild symptoms of depression (33.9%, n=80), and a quarter presented moderate or severe depressive symptoms (25.9%, n=61).

### Participants’ Anxiety and Depression Levels by Age, Sex, and Occupation

Women were more susceptible to anxiety than men (OR:4; 95%CI:1.5–10.64; p=0.006; table 2), reporting intense stress manifestations more frequently (24.2% women vs. 7.3% men). Similarly, those older than 50 years were less susceptible to anxiety (OR: 0.4, 95%CI: 0.19–0.83; p=0.014). However, there was no difference in depression between women and men PHCPs (p=0.296; table 3), whereas older age (≥50 years old) was still pre-

**Table 1.** Demographic characteristics of participants

	n	%		n	%
Gender			Occupation		
Men	65	28.6	General Practitioners	92	38.9
Women	162	71.4	Internists	7	2.9
Age (years)			Pediatricians	2	0.8
mean 46, SD (9.3)			Microbiologists	2	0.8
20–29	15	6.3	Dentists	3	1.3
30–39	38	16.1	Nursing Staff	83	35.2
40–49	90	38.1	Health visitors/ Community Nurses	10	4.2
≥50	93	39.4	Paramedics/Ambulance Crew	3	1.3
Professional Experience (years)			Laboratory technicians	4	1.7
mean 14.71, SD (9.2)			Midwives	6	2.5
1–5	53	22.4	Nutritionists	3	1.3
6–10	33	14.0	Physiotherapists	1	0.4
11–15	43	18.2	Social workers	1	0.4
16–20	45	19.1	Administrative staff	11	4.7
>20	62	26.3	Social Attributes	n	%
Education			Living with at least one child	161	69.1
High School graduate	36	15.3	Living with a high-risk person	80	34.3
Bachelor degree	137	58.0	COVID-19 Personal Experience and Health Condition		
Postgraduate degree (MSc, PhD)	63	26.7	Having a colleague admitted for COVID-19/deceased from COVID-19	86	36.9
Type of Facility			Having a relative/friend admitted for COVID-19/deceased from COVID-19	129	55.4
Health Center/Group Practice	181	77.7	Vaccinated	209	89.7
Local Health Unit (Small Urban Group Practice)	13	5.6	Contracted SARS-CoV-2	36	15.5
Solo Medical Practice*	39	16.7	In a high-risk group	36	15.5
Facility Location			In a high-risk group	36	15.5
Urban	64	27.5	In a high-risk group	36	15.5
Semi-urban	87	37.3			
Rural	85	36.0			

\*Solo medical practice; a public medical practice involving only a physician who works alone or in collaboration with a nurse.

ventively associated with the presence of depression (OR: 0.5, 95%CI: 0.27–0.95;  $p=0.034$ , table 3).

The work environment seems to influence the occurrence of anxiety symptoms with participants working in rural areas being less susceptible to anxiety (OR: 0.29, 95%CI: 0.13–0.68;  $p=0.004$ ; table 2), as well as to the presence of depressive symptoms (OR: 0.39, 95%CI: 0.18–0.81;  $p=0.012$ ; table 3) than respondents employed in urban facilities.

#### Participants' Anxiety and Depression Levels by COVID-19 experience and social aspects

Previous infection with SARS-CoV-2 was not associated either with anxiety ( $p=0.087$ ; table 2) or with depression ( $p=0.056$ ; table 3). Notably, having a friend, relative,

or coworker who was hospitalized for COVID-19 or died from it, was not associated with the presence of anxiety or depressive symptoms. Additionally, living with someone in a high-risk group for severe SARS-CoV-2, living with children, or being at high risk for severe COVID-19 was not associated with higher GAD-7 and PHQ-9 scores (tables 2 and 3).

#### Predictive Factors for Anxiety and Depression

A multivariable logistic regression analysis was used to determine the presence of predictive factors for moderate to severe anxiety and depression in PHCPs, which would be of clinical importance, alerting physicians about the need to interfere. The results in table 4, showed that older PHCPs ( $\geq 50$  years old) have a lower

**Table 2.** Severity of participants' anxiety (GAD-7) by demographic characteristics.

Variables	None/ Low n (%)	Mild n (%)	Moderate/ Severe n (%)	OR (95%CI)	p-value
<b>Gender</b>					
Women	68 (42.2%)	54 (33.5%)	39 (24.2%)	4 (1.5, 10.64)	0.006*
Men	40 (58.8%)	23 (33.8%)	5 (7.3%)	ref.	
<b>Age</b>					
≥50	59 (41.3%)	48 (33.6%)	36 (25.1%)	0.4 (0.19, 0.83)	0.014*
<50	51 (55.4%)	30 (32.6%)	11 (11.9%)	ref.	
<b>Education</b>					
High School graduate	17 (47.2%)	11 (30.6%)	8 (22.3%)	1.22 (0.5, 2.98)	0.663
Bachelor degree	60 (43.8%)	51 (37.2%)	26 (19%)	ref.	
Postgraduate degree	33 (53.2%)	16 (25.8%)	13 (21%)	1.11 (0.53, 2.34)	0.784
<b>Facility Location</b>					
Rural	39 (46.4%)	35 (41.7%)	10 (11.9%)	0.29 (0.13, 0.68)	0.004*
Semi-urban	39 (44.8%)	31 (35.6%)	17 (19.5%)	0.53 (0.25, 1.13)	0.101
Urban	32 (50%)	12 (18.8%)	20 (31.2%)	ref.	
<b>Occupation</b>					
Medical staff	55 (51.8%)	30 (28.3%)	21 (19.9%)	ref.	
Nursing staff	33 (39.8%)	33 (39.8%)	17 (20.4%)	1.04 (0.51, 2.13)	0.909
Other	26 (55.3%)	12 (25.5%)	9 (19.2%)	0.96 (0.4, 2.29)	0.924
<b>Previously infected with SARS-CoV-2</b>					
Yes	15 (41.7%)	10 (27.8%)	11 (30.5%)	2.00 (0.90, 4.44)	0.087
No	95 (47.7%)	68 (34.2%)	36 (18.1%)	ref.	
<b>Relative/friend hospitalized or deceased from COVID-19</b>					
Yes	63 (48.5%)	43 (33.1%)	24 (18.5%)	0.78 (0.41, 1.5)	0.458
No	43 (43.9%)	33 (33.7%)	22 (22.4%)	ref.	
<b>Colleague hospitalized or deceased from COVID-19</b>					
Yes	37 (43.5%)	32 (37.6%)	16 (18.9%)	0.90 (0.45, 1.77)	0.751
No	68 (48.2%)	44 (31.2%)	29 (20.6%)	ref.	
<b>Living with at least one child</b>					
Yes	75 (46%)	53 (32.5%)	35 (21.4%)	1.39 (0.67, 2.86)	0.372
No	36 (49.3%)	25 (34.2%)	12 (16.5%)	ref.	
<b>Living with a high-risk person</b>					
Yes	36 (45%)	26 (32.5%)	18 (22.5%)	1.22 (0.63, 2.37)	0.554
No	71 (47%)	51 (33.8%)	29 (19.2%)	ref.	
<b>Being in a high-risk group</b>					
Yes	17 (47.2%)	10 (27.8%)	9 (25.0%)	1.37 (0.59, 3.15)	0.464
No	89 (47.1%)	64 (33.9%)	36 (19.1%)	ref.	

CI: confidence interval; OR: odds ratio; ref: reference value; \*Indicates that result is statistically significant at at least the 0.05 level.

risk of anxiety (OR=0.46, 95%CI:0.20–0.99; p=0.049) and depression (OR=0.48, 95%CI:0.23–0.95; p=0.039), while women PHCPs have a higher risk of anxiety (OR=3.50, 95%CI:1.39–10.7; p=0.014) but not for depressive manifestations (p=0.5). Finally, participants working

in rural facilities have a lower risk of anxiety (OR=0.34, 95%CI:0.137–0.80; p=0.016) compared with those in urban areas, although the location of their working facility does not affect the manifestation of depressive symptoms (p=0.077).

**Table 3.** Severity of participants' depression (PHQ-9) by demographic characteristics.

Variables	None/ Low n (%)	Mild n (%)	Moderate/ Severe n (%)	OR (95%CI)	p-value
<b>Gender</b>					
Women	62 (38.5%)	56 (34.8%)	43 (26.7%)	1.44 (0.73, 2.85)	0.296
Men	30 (44.1%)	23 (33.8%)	15 (22.1%)	ref.	
<b>Age</b>					
≥50	37 (40.2%)	38 (41.3%)	17 (18.5%)	0.5 (0.27, 0.95)	0.034*
<50	57 (39.9%)	42 (29.4%)	44 (30.7%)	ref.	
<b>Education</b>					
High School graduate	14 (38.9%)	13 (36.1%)	9 (25%)	0.94 (0.4, 2.18)	0.876
Bachelor degree	53 (39.4%)	48 (35%)	36 (25.6%)	ref.	
Postgraduate degree	27 (43%)	19 (30.6%)	16 (25.4%)	0.96 (0.48, 1.89)	0.895
<b>Facility Location</b>					
Rural	38 (45.2%)	31 (36.9%)	15 (17.9%)	0.39 (0.18, 0.81)	0.012*
Semi-urban	31 (35.6%)	34 (39.1%)	22 (25.3%)	0.53 (0.26, 1.07)	0.078
Urban	25 (39.1%)	15 (23.4%)	24 (37.5%)	ref.	
<b>Occupation</b>					
Medical staff	45 (42.5%)	32 (30.2%)	29 (27.3%)	ref.	
Nursing staff	29 (34.9%)	31 (49.2%)	23 (27.7%)	1.02 (0.54, 1.94)	0.957
Other	20 (42.6%)	18 (38.3%)	9 (19.1%)	0.63 (0.27,1.46)	0.281
<b>Previously infected with SARS-CoV-2</b>					
Yes	8 (22.2%)	14 (38.9%)	14 (38.9%)	2.07 (0.98, 4.37)	0.056
No	86 (43.2%)	66 (33.2%)	47 (23.6%)	ref.	
<b>Relative/ friend hospitalized or deceased from COVID-19</b>					
Yes	49 (37.7%)	42 (32.3%)	39 (30%)	1.61 (0.87, 2.99)	0.132
No	43 (43.9%)	36 (36.7%)	19 (19.4%)	ref.	
<b>Colleague hospitalized or deceased from COVID-19</b>					
Yes	34 (40%)	27 (31.8%)	24 (28.2%)	1.29 (0.7, 2.38)	0.418
No	57 (40.4%)	51 (36.2%)	33 (23.4%)	ref.	
<b>Living with at least one child</b>					
Yes	58 (35.5%)	63 (38.7%)	42 (25.8%)	1.02 (0.58, 1.93)	0.966
No	39 (52%)	17 (22.7%)	19 (25.3%)	ref.	
<b>Living with a high-risk person</b>					
Yes	29 (36.3%)	27 (33.7%)	24 (30%)	1.37 (0.75, 2.51)	0.311
No	64 (42.4%)	51 (33.8%)	36 (23.8%)	ref.	
<b>Being in a high-risk group</b>					
Yes	11 (30.6%)	12 (33.3%)	13 (36.1%)	1.79 (0.84, 3.8)	0.132
No	80 (42.3%)	65 (34.4%)	44 (23.3%)	ref.	

CI: confidence interval; OR: odds ratio; ref: reference value; \*Indicates that result is statistically significant at at least the 0.05 level.

## Discussion

According to our best knowledge, this is the first study seeking to determine the prevalence of anxiety and depression among PHCPs in Greece during the COVID-19 pandemic. Findings indicate a high level of psychological distress among frontline PHCPs, with 63% of the participants scoring mild to severe for anxiety and 59.8% scor-

ing mild to severe for depression. Age and gender appear to influence the identification of anxiety symptoms, with women reporting three times more severe anxiety than men and younger participants reporting anxiety twice as often as older individuals. Age and employment location also affected the identification of depression or anxiety, with those younger than fifty reporting depressive symp-

**Table 4.** Predictive factors for anxiety disorder and depression using multiple logistic regression analysis.

Independent variable	Anxiety disorder		Depression	
	Adjusted OR (95%CI)	p-value	Adjusted OR (95%CI)	p-value
Gender				
Men	ref.	0.014*	ref.	0.5
Women	3.50 (1.39, 10.7)		1.31 (0.64, 2.77)	
Age				
<50	ref.	0.049*	ref.	0.039*
≥50	0.46 (0.20,0.99)		0.48 (0.23,0.95)	
Facility Location				
Urban	ref.		ref.	
Semi-urban	0.59 (0.25,1.33)	0.2	0.6 (0.27, 1.28)	0.2
Rural	0.34 (0.137, 0.80)	0.016*	0.49 (0.22, 1.08)	0.077
Previously infected with SARS-CoV-2				
Yes	1.9 (0.78, 4.51)	0.15	2.02 (0.88, 4.53)	0.091
No	ref.		ref.	
Relative/ friend hospitalized or deceased from COVID-19				
Yes	–	–	1.57 (0.81, 3.08)	0.2
No	–		ref.	
Being in a high-risk group				
Yes	–	–	1.82 (0.79, 4.08)	0.15
No	–			

CI: confidence interval; OR: odds ratio; ref: reference value; \*Indicates that result is statistically significant at at least the 0.05 level.

toms more frequently and those working in cities being more likely to suffer from anxiety. Younger age has been identified as a risk factor for both anxiety and depression, while female gender and working in an urban facility have been identified as anxiety-predictive factors.

HCPs have been at an increased risk for anxiety, depression, alcoholism, and suicidal ideation<sup>25–27</sup> and during the COVID-19 pandemic, due to the accumulated psychological pressure and fear of dying,<sup>28</sup> there was an alarming increase in suicide attempts.<sup>29</sup> Multiple factors trigger anxiety and depression in HCPs and need further investigation.<sup>30</sup> Specifically, fear of infection and infecting others, frustration when patients deteriorated or died, exhaustion from the prolonged use of protective equipment, and the need to support patients, both morally and medically were among the main concerns of first-line HCPs.<sup>31</sup> In Greece, a multi-center study conducted among hospital HCPs, revealed that over 50% and 60% of participants had at least mild depressive or anxiety symptoms respectively, despite the relatively benign course of the pandemic at the time.<sup>18</sup> Those findings are consistent with a recent systematic review and meta-analysis of 13 cross-sectional studies and a total of 33,062 HCPs.<sup>6</sup> However, Samara et al. indicated that only 11.9% and 13% of HCPs reported at least moderate symptoms of anxiety and depression respectively.<sup>32</sup> The psychological impact of working in a healthcare setting during the

COVID-19 pandemic in Greece affected negatively the frontline staff as several research findings underline. In particular, HCPs reported high levels of stress, anxiety, depression, exhaustion, and burnout,<sup>33,34</sup> increased levels of insomnia, while scoring high in significant predictors of posttraumatic stress symptoms such as negative emotion and feelings of being threatened.<sup>35</sup> Other findings suggest that HCPs' professional quality of life and occupational stress were moderate during the pandemic in Greece.<sup>36</sup> Furthermore, personal resilience as well as the adoption of adaptive coping strategies were associated with lower secondary traumatic stress and higher vicarious post-traumatic growth respectively.<sup>37,38</sup>

Our findings are in agreement with recent research conducted among Japanese PHCPs during the COVID-19 pandemic, showing that approximately 30% of PHCPs had anxiety symptoms, whereas about 15% of them were depressed, and seriously considered leaving their job or changing professions.<sup>39</sup> Another study conducted in Italy during the first pandemic wave showed that 36% of the participating PHCPs had symptoms of anxiety and about 18% reported at least moderate depression,<sup>8</sup> findings that keep up with other studies from Italy.<sup>40</sup> Work-related anxiety and depression were even more frequent in a study conducted in the UK, in which nearly 40% of PHCPs experienced emotional distress.<sup>41</sup>

Current research findings indicate a correlation between gender and feelings of anxiety and depression among PHCPs. More specifically, more female than male PHCPs exhibit high levels of anxiety and depression, probably reflecting the already established gender gap for anxious and depressive symptoms in the general population.<sup>42</sup> Our findings are consistent with a study conducted in Lebanon<sup>43</sup> which indicates that women HCPs are at a higher risk of anxiety and intense emotional discomfort than men and studies conducted in PHCPs in Italy<sup>8</sup> and the general population, indicating that women are more prone to stress disorders.<sup>44</sup>

Moreover, several studies have highlighted the relationship between age and emotional distress during the pandemic,<sup>44,45</sup> with older adults being at higher risk of developing stress and depression due to social distancing and isolation that could further deteriorate pre-existing health conditions.<sup>45</sup> This can partly be justified by the higher morbidity and mortality rates of COVID-19 among the elderly. It is not surprising, thus, that older people in endemic areas seemed to experience a lower health-related quality of life than younger individuals.<sup>46</sup> However, older HCPs have longer professional experience, which was associated with lower anxiety and depression levels,<sup>8</sup> while younger age in HCPs was identified as a significant predictor of psychological discomfort.<sup>32</sup> A Finnish study conducted among hospital-based HCPs, showed that the levels of anxiety decreased in participants older than 56 years.<sup>47</sup> Our findings confirm that older HCPs report less anxiety and depression symptoms. Risk perception during the pandemic is related to increased anxiety levels in HCPs<sup>48</sup> and findings from a multi-center study conducted in Primary Health Care in Greece, during the first pandemic wave, showed that older PHCPs have less work-related concerns than younger colleagues and experienced PHCPs frequently reported work-related concerns regarding their safety.<sup>49</sup> These concerns are a main cause of psychological distress for PHCPs that need to be addressed to improve HCPs' wellbeing.<sup>49</sup>

Although current findings did not support a statistically significant difference in anxiety and/or depression levels between medical and nursing staff, other researches reinforce the notion that anxiety and depression are more prevalent among nurses than medical staff.<sup>50-52</sup> These results may be partly confounded by the fact that nurses are mostly women, but could be also attributed to the fact they may be more exposed to COVID-19 patients as they spend more time inwards, provide direct care to patients, and are in charge of collecting samples for virus detection.<sup>31</sup> In our study 71.4% of the participants are women, which is in line with the percentage of women HCPs in Greece and in Europe, 61% and 78% respectively.<sup>53</sup> Also, the level of nurses'

preparedness to handle patients affected by infectious diseases should be taken into account. Moreover, due to their closer contact with patients, they may be more exposed to moral injury pertaining to suffering, death and ethical dilemmas.<sup>54</sup>

The educational level did not seem to be related to the emergence of depression<sup>46</sup> or to the extent of manifestation of fear over the development of the COVID-19 pandemic,<sup>55</sup> possibly because PHCPs constitute a uniform group of university-educated workers.

Work location was identified as a risk factor for the development of depression. Though, findings from an Italian study conducted among PHCPs revealed an association between facility location and anxiety or depression levels with those working in rural areas being more vulnerable to emotional distress.<sup>8</sup> The current research indicates that participants working in cities have a higher risk of anxiety compared to those working in towns and/or villages. This is consistent with other studies indicating regional disparities in patient load to primary healthcare services, which affected the mental health of practitioners working beyond their capacities<sup>32,56</sup> and may also reflect the difficulty of delivering COVID-19 healthcare services in areas with dense and constantly shifting populations, resulting in a poorer PHCP-patient relationship which may increase PHCPs' anxiety. During the pandemic, PHCPs were reassigned from their practices to understaffed COVID-19 emergency departments and units at secondary and tertiary hospitals. The findings of this study may reflect the challenges that PHCPs experienced at tertiary hospitals, which are more commonly located in urban areas.

To the best of our knowledge, this is the first study regarding the prevalence and correlates of anxiety and depression levels among PHCPs in Greece during the COVID-19 pandemic. Nevertheless, this research poses some methodological limitations. This study was a cross-sectional online survey, thus not allowing for causal inferences, which limited our understanding of potential risk factors. The assessment of mental health symptoms was performed using self-reported instruments and may vary from clinical or specialist interviews as reported difficulties may not necessarily translate to a clinical syndrome. Also, online surveys typically exclude participants with low digital literacy. While more representative, the number of participants and the inclusion of different occupational groups from multiple healthcare facilities introduces sample heterogeneity, limiting generalizability. Finally, the lack of baseline mental health information and previous history in the sample is a limitation since individuals with pre-existing mental health problems exposed to COVID-19 pan-

demic-related stress and/or infection may experience a higher mental health burden.<sup>57</sup>

Both emotional and social support are useful for alleviating psychological distress triggered by traumatic situations.<sup>58</sup> Future research should focus on gaining a better understanding of the best types of support to alleviate emotional distress in healthcare professionals during health emergencies and on collecting evidence about the effectiveness of institutions' activities and procedures in supporting the mental health the healthcare professionals. During the pandemic, telehealth mental health services for counseling increased notably, and future applications of e-mental health should recognize the specific needs of PHCP, and be accessible during health emergencies.<sup>59</sup>

Based on current findings, it appears that the majority of the PHCPs experienced mild symptoms both for depression and anxiety, while moderate and severe symptoms were less common among the participants. This highlights the need for future research on standardized operation procedures that protect PHCPs mental health and on the development of mental care services for first-line HCPs,<sup>60</sup> to prevent mental disorders and timely detect and treat the milder clinical mood symptoms or subthreshold syndromes before they evolve into more complex and enduring psychological responses.

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## Conclusion

Our study highlights the impact of COVID-19 on PHCPs' psychological well-being. A year after the pandemic began, Greece's PHCPs had high anxiety and depression rates. Mitigating vulnerability and building resilience through meaningful and timely interventions to promote PHCPs' mental well-being is critical, especially in primary healthcare settings, to alleviate or prevent the emergence of anxiety and depressive symptoms, during the ongoing and future epidemics.

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## Ερευνητική εργασία

# Ο ψυχολογικός αντίκτυπος της πανδημίας COVID-19 στους επαγγελματίες της Πρωτοβάθμιας Φροντίδας Υγείας στην Ελλάδα

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### ΠΕΡΙΛΗΨΗ

Οι πανδημίες προκαλούν αισθήματα δυσφορίας και άγχους στους επαγγελματίες υγείας. Η παρούσα μελέτη διερευνά τον επιπολασμό του άγχους και της κατάθλιψης μεταξύ των επαγγελματιών πρωτοβάθμιας φροντίδας υγείας (ΠΦΥ) στην Ελλάδα, σε σχέση με τους δημογραφικούς παράγοντες κινδύνου, κατά το δεύτερο κύμα της πανδημίας COVID-19, προκειμένου να αντιμετωπιστεί η εργασιακή εξάντληση και να προστατευθεί η ψυχοσυναισθηματική ισορροπία των επαγγελματιών υγείας πρώτης γραμμής. Αυτή η συγχρονική μελέτη διεξήχθη από τον Ιούνιο του 2021 έως τον Αύγουστο του 2021, χρησιμοποιώντας ένα διαδικτυακό ερωτηματολόγιο (δημογραφικά δεδομένα, GAD-7, PHQ-9). Οι επιλέξιμοι συμμετέχοντες (ιατρικοί, νοσηλευτές, συνεργάτες) ήταν επαγγελματίες που απασχολούνταν σε ελληνικές δημόσιες δομές ΠΦΥ. Η ανάλυση περιλάμβανε περιγραφικά στατιστικά, ενώ πραγματοποιήθηκε μονοπαραγοντική ανάλυση για την αξιολόγηση της συσχέτισης μεταξύ κοινωνικο-δημογραφικών παραγόντων και των επιπέδων άγχους και κατάθλιψης και πολυπαραγοντική λογιστική παλινδρόμηση για τη διερεύνηση της παρουσίας προγνωστικών παραγόντων για το άγχος και την κατάθλιψη. Συνολικά, 236 επαγγελματίες ΠΦΥ συμμετείχαν στη μελέτη, με μέση ηλικία τα 46 (SD 9,3) έτη και μέση επαγγελματική εμπειρία 14,71 (SD 9,2) έτη. Οι περισσότεροι συμμετέχοντες ήταν γυναίκες (71,4%) και η πλειοψηφία ήταν Γενικοί Ιατροί (38,9%) και νοσηλευτές (35,2%). Το άγχος (33,1% ήπιο, 29,9% μέτριο/σοβαρό) και η κατάθλιψη (33,9% ήπια, 25,9% μέτρια/σοβαρή) ήταν επικρατέστερα ανάμεσα στους επαγγελματίες της ΠΦΥ. Το γυναικείο φύλο βρέθηκε να είναι ο πιο σημαντικός προγνωστικός παράγοντας των εκδηλώσεων άγχους (OR:3,50, 95%CI:1,39–10,7,  $p=0,014$ ). Οι συμμετέχοντες ηλικίας άνω των 50 ετών έχουν χαμηλότερο κίνδυνο τόσο άγχους (OR=0,46, 95%CI:0,20–0,99;  $p=0,049$ ) όσο και κατάθλιψης (OR=0,48, 95%CI:0,23–0,95,  $p=0,039$ ). Οι επαγγελματίες που εργάζονται σε αγροτικές εγκαταστάσεις έχουν χαμηλότερο κίνδυνο άγχους (OR:0,34, 95%CI:0,137–0,80,  $p=0,016$ ). Η προηγούμενη μόλυνση από SARS-CoV-2 δεν συσχετίστηκε ούτε με άγχος ( $p=0,087$ ), ούτε με κατάθλιψη ( $p=0,056$ ). Σημειωτέον, η ύπαρξη φίλου, συγγενή ή συναδέλφου που νοσηλεύτηκε ή πέθανε από COVID-19, δεν συσχετίστηκε με την παρουσία συμπτωμάτων άγχους ή κατάθλιψης. Επιπλέον, η συμβίωση με άτομο που ανήκει σε ομάδα υψηλού κινδύνου για σοβαρή νόσηση από SARS-CoV-2, η συμβίωση με παιδιά ή η ύπαρξη υψηλού κινδύνου για σοβαρή COVID-19 λοίμωξη δεν συσχετίστηκε με υψηλότερες βαθμολογίες στα ερωτηματολόγια GAD-7 και PHQ-9. Τα ευρήματα υποδεικνύουν τα επίπεδα ψυχολογικής δυσφορίας μεταξύ των επαγγελματιών που εργάζονται στην ΠΦΥ. Η έγκαιρη αναγνώριση της συναισθηματικής δυσφορίας και η έγκαιρη παρέμβαση θα μπορούσαν να ενισχύσουν την ανθεκτικότητα του προσωπικού της ΠΦΥ έναντι της πανδημίας.

**ΛΕΞΕΙΣ ΕΥΡΕΤΗΡΙΟΥ:** Άγχος, κατάθλιψη, πανδημία, πρωτοβάθμια φροντίδα υγείας, επαγγελματική ψυχική υγεία, γενική ιατρική.

## Research article

# GRreek Anaesthesiologists' Burnout EPidemic within the COVID-19 pandemic (GRABEP study); A multicenter study on burnout prevalence among Greek anesthesiologists and association with personality traits

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### ABSTRACT

The COVID-19 pandemic resulted in an unprecedented crisis with extreme distress for frontline physicians and an increased risk of developing burnout. Burnout has a negative impact on patients and physicians, posing a substantial risk to patient safety, quality of care, and physicians' overall well-being. We evaluated burnout prevalence and possible predisposing factors among anaesthesiologists in the COVID-19 referral university/tertiary hospitals in Greece. In this multicenter, cross-sectional study we have included anaesthesiologists, involved in the care of patients with COVID-19, during the fourth peak of the pandemic (11/2021), in the 7 referral hospitals in Greece. The validated Maslach Burnout Inventory (MBI) and Eysenck Personality Questionnaire (EPQ) were used. The response rate was 98% (116/118). More than half of the respondents were females (67.83%, median age 46 years). The overall Cronbach's alpha for MBI and EPQ was 0.894 and 0.877, respectively. The majority (67.24%) of anaesthesiologists were assessed as "high risk for burnout" and 21.55% were diagnosed with burnout syndrome. Almost half participants experienced high levels of all three dimensions of burnout; high emotional exhaustion (46.09%), high depersonalization (49.57%), and high levels of low personal accomplishment (43.49%). Multivariate logistic analysis revealed that neuroticism was an independent factor predicting "high risk for burnout" as well as burnout syndrome, whereas the "Lie scale" of EPQ exhibited a protective effect against burnout. Burnout prevalence in Greek anaesthesiologists working in COVID-19 referral hospitals during the fourth peak of the pandemic was high. Neuroticism was predictive of both "high risk for burnout" and "burnout syndrome".

**KEYWORDS:** Burnout Professional, COVID-19, pandemics, patient safety.

## Introduction

The COVID-19 pandemic commenced in China in December 2019 and rapidly spread world widely, resulting in an unprecedented global healthcare crisis.<sup>1-3</sup> The first case in Greece was recorded in February 2020, when Greek anaesthesiologists were already under significant pressure and at increased risk of developing burnout due to critical workforce shortages, leading to pressing clinical, educational, and research workload and exhausting work hours in and out of operating rooms.<sup>4,5</sup>

In November 2021, while the COVID-19 referral hospitals in Greece were already struggling with the mounting numbers of COVID-19 cases and deaths, the overwhelming working hours, and the demands for a high level of medical acuity, our country experienced the 4th and toughest peak of the pandemic. Hence, the psychological burden of anaesthesiologists and the risk of developing burnout escalated.<sup>2</sup>

According to World Health Organization's International Disease Classification (ICD-10) burnout is categorized as a "syndrome" resulting from "chronic workplace stress that has not been successfully managed". Prolonged and excessive workplace distress may lead to high levels of stress, anxiety, and depression, which if not managed successfully will result in a personal expression of feelings of emotional exhaustion, depersonalization, and/or a low sense of personal accomplishment.<sup>1,4,6-8</sup> When threshold levels of emotional exhaustion and/or depersonalization are being reached this is classified as "high risk for burnout"; "burnout syndrome", also known as "high burnout", is a state characterized by high levels of all three dimensions (emotional exhaustion, depersonalization and low sense of personal accomplishment).<sup>6,8-10</sup> Of note, burnout may be accompanied by physical symptoms such as back aches, migraines, loss of appetite, and disruption of circadian rhythm, while one of the most crucial thoughts that individuals should deal with is that of helplessness ("there is no way out of this").<sup>7</sup> Hence, burnout should be handled as a clinically meaningful condition since it leads to decreased quality of life for physicians and patients, decreased quality of care, unprofessional behavior, increased medical errors and decreased patient safety.<sup>6</sup>

At present, there is a lack of data on burnout prevalence and possible predictors or contributors among anaesthesiologists in Greece. However, several studies have pinpointed high rates of burnout among anaesthesiologists in the United States, Europe, Africa, and Asia.<sup>6</sup> During 2020 burnout prevalence was 13.8% among anaesthesiologists in the United States while

one year later burnout was significantly higher (60%) among healthcare workers in a COVID-19 intensive care unit in Italy.<sup>6,11</sup> At the same time in our country according to Karlafti et al<sup>12</sup> 71.8% of internists working in public hospitals experienced moderate levels of burnout, while according to Pappa et al<sup>13</sup> 13 healthcare personnel working in regions with high transmission rates and mortality experienced high levels of burnout in all three dimensions, respectively.<sup>12,13</sup>

Burnout pathogenesis seems to be multifactorial, however, contributors can be summarized into two main categories: environmental and individual.<sup>4</sup> Most research focuses on environmental factors, also known as stressors, which have been ultimately recognized as the main cause of burnout.<sup>14</sup> However, several individual factors such as female sex, younger age, marital and parental status, and smoking or alcohol consumption have been recognized as significant risk factors for burnout.<sup>4,15</sup> Nevertheless, since 1997, Kam et al<sup>16</sup> have acknowledged a possible relationship between personality traits and burnout in anaesthesiologists, while nine years later Raymond and al<sup>15</sup> found a strong association between personality, work-related stressors, and burnout.<sup>15,16</sup> Despite the fact that the aforementioned relationship has not yet been extensively examined, the hypothesis that personality displays a crucial role in the process of developing burnout, especially in light of the rising awareness about burnout, seems quite reasonable.<sup>14,15</sup> In addition, according to Sanfilippo et al<sup>17</sup> several studies have demonstrated that various occupational stressors may predispose to higher levels of burnout. Among them, lower experience, absence of supervision or job support, excessive work overload, higher career stage, and academic or leadership positions have been consistently related to higher levels of burnout. Current literature suggests that younger consultants may be at increased risk for burnout syndrome due to a "surviving effect" when compared to senior consultants or residents. Younger consultants with lower experience are exposed to a higher degree of responsibility and they may also feel stressed or insecure when facing complex scenarios like the management of difficult airways or critically ill patients.<sup>17,18</sup> In addition, as far as academic practice is concerned, although the results are still scarce, a considerable amount of studies suggest that in our specialty, academic practice should be considered as a predisposing factor for burnout.<sup>4,17</sup> The additional challenge of balancing clinical care, education, research, administrative and compliance responsibilities may lead to an increased workload and a higher degree of low job satisfaction, increasing the risk of developing burnout.<sup>17</sup>

The aims of our study were to:

1. Evaluate the burnout levels of anaesthesiologists working in COVID-19 referral, university/tertiary hospitals during the fourth peak of the pandemic in Greece.
2. Identify possible sociodemographic - and personality - related determinants for burnout.
3. Identify the possible role of working-rank or academic practice in developing burnout.

## Material and Method

Reporting is consistent with the STROBE (Strengthening The Reporting of Observational Studies in Epidemiology) statement for observational, cross-sectional studies.<sup>19</sup> The Scientific Board of University General Hospital of Larissa, Greece waived the need for ethics approval (nr 48811) and the need to obtain consent for the collection, analysis, and publication of the prospectively obtained and anonymized data for this voluntary, purely observational and non-interventional study. Permission to conduct the study was also obtained from each hospital director.

### Participants and procedures

A cross-sectional study was undertaken during the 4th peak of the COVID-19 pandemic in Greece. Anaesthesiologists working in COVID-19 referral, university/tertiary hospitals deemed eligible to participate. A self-reported, anonymous study instrument was distributed by pre-specified colleagues in each hospital, after the consent of the heads of the departments. Colleagues who were not involved in the care of COVID-19 patients and those who refused to participate in the study were excluded. All colleagues were informed that their participation was voluntary, anonymous and that any information provided would be handled with confidentiality.

### Measures

The survey questionnaires consisted of 3 parts. The first comprised 9 questions regarding basic sociodemographic, medical history, and work-related information, including sex, age, marital status, number of children, smoking and alcohol status, any cardiovascular, malignant, or autoimmune comorbidity and the current working rank (resident, locum consultant, junior consultant, senior consultant, director consultant, coordinating director, and academic consultant).

The second part consisted of the validation for the Greek population Maslach Burnout Inventory (MBI) after obtaining consent from the authors. MBI is a well-

established self-reported measurement consisting of 22 statements, designed to assess the three separate dimensions of burnout that are emotional exhaustion (9 statements), depersonalization (5 statements), and/or a low sense of personal accomplishment (8 statements).<sup>20,21</sup> Each of the statements is scored based on a seven-point Likert scale ranging from "never" to "every day". For each of the separate dimensions (subscales) of MBI, a score is awarded. The dimensions of emotional exhaustion (EE) and depersonalization (DP) classify burnout from high to low, while personal accomplishment (PA) classifies the level from low to high.<sup>20,21</sup> The cut-off for high EE was set at 31, while the cut-off for low EE was set at 20, respectively. Accordingly, the cut-off for high DP was set at 11, while the cut-off for low DP was set at 5, respectively. On the other hand, the cut-off for the high level of low PA was set at 35, while the cut-off for the low level of low PA was set at 42, respectively.<sup>6,8,20,21,22</sup> Based on the majority of previous studies on burnout, we considered a high cut-off score of emotional exhaustion and/or depersonalization to be applicable for the diagnosis of "high risk for burnout".<sup>6,8,20,21,22</sup> In addition, based on the definition provided by the World Health Organization (WHO) we classified the combination of a high cut-off score of emotional exhaustion and depersonalization and a low cut-off score of personal accomplishment-that is all three dimensions present with the same cut-off thresholds as used in "high risk for burnout"- as burnout syndrome.<sup>6,8,20-22</sup>

For the third part of the study, the validated for the Greek population Eysenck Personality Questionnaire (EPQ) was used.<sup>22,23</sup> EPQ explores three main aspects of personality: neuroticism, psychoticism, and extraversion. It consists of 84 statements evaluated with a "yes" or "no" answer. Each participant is being assigned a different score for each aspect of personality, as cut-off limits are not applicable.<sup>21-23</sup>

Of note, participants were further categorized based on their working rank into 4 groups, and the following was utilized for our analysis: residents, junior consultants (specialists with less than 8 years of clinical experience), senior consultants (specialists with more than 8 years of clinical experience), and academic staff. All coordinating directors are academic staff in our study sample.

### Statistical analysis

The Shapiro-Wilk test was performed to test for the normal distribution of continuous variables. Results for all quantitative variables are given as median and interquartile range [IQR], whereas all qualitative variables are presented as absolute and/or relative frequencies.

The nonparametric Mann-Whitney U or the Kruskal-Wallis test was deployed for the comparison of continuous variables with two degrees of freedom or higher, respectively. Fisher's exact test was used to compare categorical variables. Integral reliability for both questionnaires was investigated by Cronbach's alpha calculation. Spearman's rank correlation coefficients were estimated to investigate associations between continuous variables. Multivariate logistic regression analysis was finally performed to identify predicting factors of "high risk for burnout" and "burnout syndrome".<sup>24</sup> "High risk for burnout" and "burnout syndrome" were converted to binary variables and served as the dependent variables, whereas gender, age, work ranking, marital status, children, medical history (history of cardiac disease, cancer history or autoimmune disease), smoking status, alcohol consumption and all four dimensions of the EPQ questionnaire served as the independent variables in the stepwise forward procedure. All tests were two-tailed and statistical significance was established at 5% ( $P < 0.05$ ). Data were analyzed using Stata™ (Version 10.1 MP, Stata Corporation, College Station, TX 77845, USA).

## Results

A total of 116 anaesthesiologists working in the 7 COVID-19 referral, university/tertiary hospitals participated in the study (response rate 98%). The majority were females (67.83%), and the median age of all participants was 46 years, with an interquartile range of 33 to 52 years. Detailed participant characteristics are shown in table 1. As expected, age ( $H=73.268$ ,  $p < 0.001$ ), marital (Pearson's  $\chi^2=22.23$ ,  $p < 0.001$ ), and parental status (Pearson's  $\chi^2=35.57$ ,  $p < 0.001$ ) differed between working ranks. Moreover, alcohol consumption was more frequent between residents and junior consultants compared to their elder colleagues (Pearson's  $\chi^2=8.33$ ,  $p=0.02$ ). Likewise, a borderline statistically significant difference in the reported history of autoimmune disease was detected between working ranks, which was higher in academic staff, followed by junior consultants. (Pearson's  $\chi^2=7.8$ ,  $p=0.049$ ).

The majority of Greek anaesthesiologists (67.24%) were classified as "high risk for burnout" based on their answers, while 25 of them had high levels of all three dimensions of burnout, indicating a prevalence of burnout syndrome as high as 21.55% (figure 1). As far as "high risk for burnout" and "burnout syndrome" is concerned, no statistical differences were observed according to working rank (Pearson's  $\chi^2=0.633$ ,  $p=0.87$  and Pearson's  $\chi^2=3.8$ ,  $p=0.284$  for "high risk for burnout" and "burnout syndrome", respectively) or sex (Pearson's

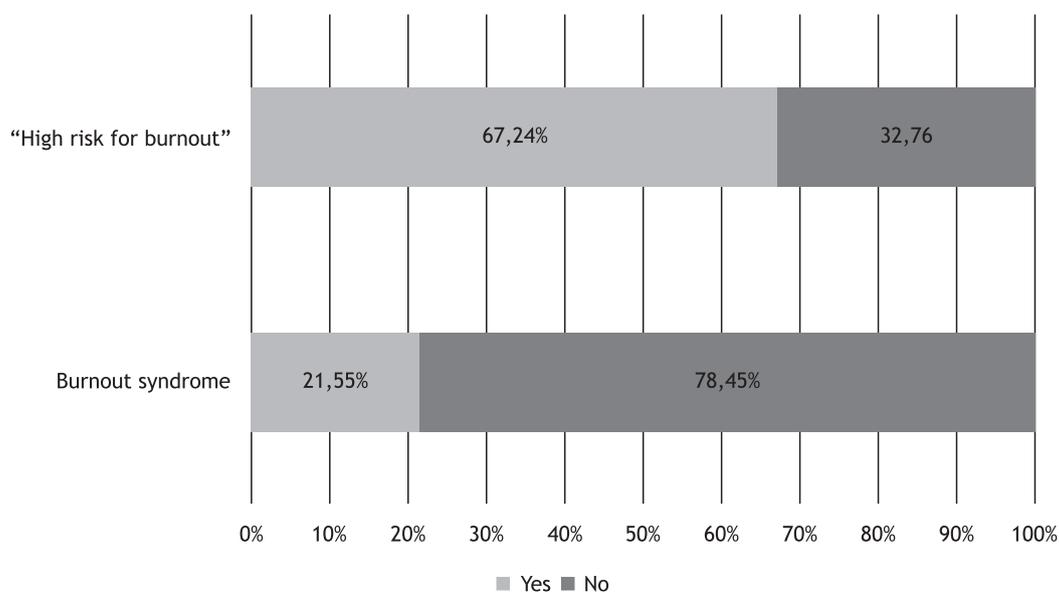
**Table 1.** Participant characteristics.

Sex (male/female)	37 (32.17%)/78 (67.83%)
Age (years)	46 (33–52)
Marital status	
Single	49 (42.98%)
Married/Cohabitation	56 (49.12%)
Divorced	9 (7.89%)
Widowed	–
Children (yes/no)	64 (56.64%)/49 (43.36%)
Number of children	2 (1–2)
Medical history	
Smoking (yes/no)	40 (34.78%)/75 (65.22%)
Alcohol	
None/rarely	61 (53.51%)
Once or twice weekly	39 (34.21%)
Three to four times weekly	13 (11.4%)
More than four times weekly	1 (0.88%)
History of cardiac disease or cancer (yes/no)	7 (6.25%)/105 (93.75%)
History of autoimmune disease (yes/no)	19 (16.52%)/96 (83.48%)
Job characteristics	
Rank	
Resident	28 (24.35%)
Locum consultant	4 (3.48%)
Junior consultant	18 (15.65%)
Senior consultant	16 (13.91%)
Director consultant	39 (33.91%)
Coordinating Director	5 (4.35%)
Academic consultant	5 (4.35%)

Results are presented as median (IQR) and as absolute and relative frequencies accordingly

$\chi^2=0.219$ ,  $p=0.673$  and Pearson's  $\chi^2=0.978$ ,  $p=0.468$  for "high risk for burnout" and "burnout syndrome", respectively). However, both "high risk for burnout" and "burnout syndrome" were more frequently detected in women (69.23% and 76%, respectively) than in men (30.77% and 24%, respectively) and in senior consultants (48.72% and 36%, respectively) compared to the other working ranks. Interestingly, the rate of burnout syndrome among the academic staff was strikingly high; 4 out of 6 academics suffered from burnout syndrome.

Moving on to MBI, the overall Cronbach's alpha was 0.894, and integral reliability was considered good and was found  $>0.8$  across all sections of the questionnaire. Based on the three dimensions of the MBI almost half of



**Figure 1.** Frequency percentage of high risk for burnout and burnout syndrome.

the Greek anaesthesiologists experienced a high level of burnout in emotional exhaustion (46.09%), depersonalization (49.57%), and a high level of low personal accomplishment (43.49%), respectively. Moreover, one-third of them reported symptoms of average emotional exhaustion (30.43%) and personal accomplishment (31.30%). Descriptive statistics of all dimensions regarding MBI were calculated according to working rank (table 2) and according to sex (table 3). Depersonalization and personal accomplishment scores did not differ between the working ranks (table 2). However, differences were detected in emotional exhaustion scores (Fisher's  $\chi^2=16.22$ ,  $p=0.008$ , table 3), where low levels of emotional exhaustion were reported mostly by residents and high levels of emotional exhaustion were detected in almost all working ranks (table 2). Burnout scores were similar between males and females (table 3).

Moving on to EPQ, the overall Cronbach's alpha was 0.877. Table 4 summarizes the different scores of the Eysenck Personality Questionnaire (EPQ) according to working rank and sex. No statistical difference was detected between groups, except for the "Lie scale" where lower values were detected among residents compared to their colleagues ( $H=9.34$ ,  $p=0.025$ , table 4). Concerning Spearman's rank correlations, depersonalization was significantly and positively correlated with psychoticism ( $\rho=0.252$ ,  $p=0.007$ ) and neuroticism ( $\rho=0.292$ ,  $p=0.002$ ), while emotional exhaustion was negatively correlated with extraversion ( $\rho=-0.193$ ,  $p=0.039$ ), positively correlated with neuroticism ( $\rho=0.44$ ,  $p<0.001$ ) and positively but marginally correlated with psychoticism ( $\rho=0.173$ ,  $p=0.06$ ).

Based on the results of the multivariate logistic regression analysis, only neuroticism was identified as a statistically significant independent factor predicting "high risk for burnout" (OR 1.28;  $p=0.001$ ), (table 5). As far as burnout syndrome is concerned, multivariate logistic regression analysis revealed that neuroticism is a statistically significant independent predictor for burnout syndrome (OR 1.20;  $p=0.001$ ), whereas the "Lie scale" exhibited a protective effect against burnout syndrome (OR 0.79;  $p=0.027$ ). Interestingly, academic staff exhibited more than a 5-fold risk for burnout syndrome compared to residents, but this was borderline statistically significant (OR 5.46;  $p=0.078$ ), (table 5).

## Discussion

Our study revealed that the majority (67.24%) of anaesthesiologists working in COVID-19 referral, university/tertiary hospitals during the toughest peak of the pandemic in Greece were identified as "high risk for burnout", while 21.55% of them suffered from burnout syndrome. In analyzing the three dimensions of burnout, almost half of our colleagues experienced a high level of emotional exhaustion (46.09%), depersonalization (49.57%), and a high level of low personal accomplishment (43.49%), while one-third of them responded with symptoms of average emotional exhaustion (30.43%) and personal accomplishment (31.30%). Burnout syndrome was more frequently detected in women (76%) compared to men and in senior consultants (36%) compared to other working ranks. Multivariate logistic analysis revealed neuroticism as an independent prognostic factor for both "high risk for

**Table 2.** Participant Burnout scores extracted from Maslach Burnout Inventory by working rank.

	Total (n=115)	Resident (n=28)	Junior Consultant (n=23)	Senior consultant (n=54)	Academic staff (n=10)	Statistic, p value
Depersonalization score	10 (5–14)	10 (4–17)	11 (6–17)	10 (5–13)	11 (5–14)	H=1.352 p=0.717
Depersonalization subgroups						
Low	31 (26.96%)	8 (28.57%)	4 (17.39%)	15 (27.78%)	4 (40%)	Pearson's $\chi^2=4.638$ , p=0.551
Average	27 (23.48%)	7 (25%)	7 (30.43%)	13 (24.07%)	0	
High	57 (49.57%)	13 (46.43%)	12 (52.17%)	26 (48.15%)	6 (60%)	
Personal accomplishment score	37 (31.5–42)	35.5 (30.5–42)	37 (29–40)	37 (33–43)	36 (32–43)	H=1.417, p=0.701
Personal accomplishment subgroups						
Low	29 (25.22%)	7 (25%)	3 (13.04%)	16 (29.63%)	3 (30%)	Pearson's $\chi^2=4.346$ , p=0.638
Average	36 (31.3%)	7 (25%)	10 (43.48%)	17 (31.48%)	2 (20%)	
High	50 (43.48%)	14 (50%)	10 (43.48%)	21 (38.89%)	5 (50%)	
Emotional exhaustion score	29 (21–36.5)	30 (13.5–35)	31 (23–37]	28 (22–38)	30.5 (20–45)	H=2.409, p=0.492
Emotional exhaustion subgroups						
Low	27 (23.48%)	12 (42.86%)	4 (17.39%)	8 (14.81%)	3 (30%)	Pearson's $\chi^2=16.226$ , p=0.008
Average	35 (30.43%)	2 (7.14%)	7 (30.43%)	24 (44.44%)	2 (20%)	
High	53 (46.09%)	14 (50%)	12 (52.17%)	22 (40.74%)	5 (50%)	

Results are presented as median (IQR) and as absolute and relative frequencies, accordingly.

burnout" and burnout syndrome, and the "Lie scale" exhibited a protective effect against burnout syndrome.

According to the existing literature these results are within the highest burnout rates. Before the COVID-19 pandemic, burnout prevalence among anesthesiologists has been reported within a range of 14–65% in peer-reviewed publications.<sup>4,6</sup> In the largest study of physicians across all specialties, which took place in 2012 in the United States, the mean burnout rate was 45.4%, and substantial differences in burnout rates were observed by specialty.<sup>4,6</sup> Physicians working in high-stress and frontline environments, including anaesthesiology, were at increased risk of developing burnout, compared to those working in less acute care specialties, such as dermatology.<sup>4,6</sup> In the most recent and largest published study to date in anaesthesiology, that took place early in the pandemic (March 2020) in the United States, Afonso et al<sup>6</sup> found that the prevalence of burnout syndrome was 13.8%, while 59.2% of participants had a "high risk for burnout".<sup>6</sup>

Therefore, it seems that even before or early in the course of the pandemic, burnout had reached a critical figure within our specialty, as 1 in 2 anaesthesiologists were at high risk for developing burnout and at least 1 in 10 anaesthesiologists were already suffering from burnout syndrome. Accordingly, experts suggest that "this clinically meaningful situation is rooted in the environment and care delivery system, rather than in the person-

al characteristics of a few susceptible individuals".<sup>4,25</sup> When the COVID-19 pandemic reached its first peak it further stressed the already burdened workforce in our specialty, as anaesthesiologists all around the world were called to play an essential leading role in COVID-19 referral centers due to their exceptional technical and non-technical skills, such as airway and crisis management, and their expertise in critically ill patients management and resuscitation.<sup>4</sup> The highly contagious nature of COVID-19 combined with the initial lack of knowledge concerning virus transmission and pathophysiology of infection, shortage of personal protective equipment, and fears of exposure and transmission to others created a great psychological burden on anaesthesiologists during the COVID-19 pandemic. Furthermore, loss of autonomy, decreased control over the environment, increased workload, and lack of work-life balance were also recognized as strong predisposing factors for mental health issues.<sup>4,6</sup> Hence, a further increase in burnout risk among anaesthesiologists was anticipated. According to our study results (November 2021), the rate of burnout syndrome almost doubled within a 20-month period (21.55% versus 13.8%), when compared with the results of the aforementioned study by Afonso et al (March 2020).<sup>6</sup>

It should be highlighted that the rates of the three dimensions of burnout (emotional exhaustion, depersonalization, and low personal accomplishment) also esca-

**Table 3.** Participant Burnout scores extracted from Maslach Burnout Inventory by sex.

	Total (n=115)	Males (n=37)	Females (n=78)	Statistic, p value
Depersonalization score	10 (5–14)	11 (6–14)	10 (5–13)	H=0.285, p=0.593
Depersonalization subgroups				
Low	31 (26.96%)	9 (24.32%)	22 (28.21%)	Pearson's $\chi^2=0.192$ , p=0.932
Average	27 (23.48%)	9 (24.32%)	18 (23.08%)	
High	57 (49.57%)	19 (51.35%)	38 (48.72%)	
Personal accomplishment score	37 (31.5–42)	36 (33–42)	37 (31–41)	H= 0.496, p=0.481
Personal accomplishment subgroups				
Low	29 (25.22%)	11 (29.73%)	18 (23.08%)	Pearson's $\chi^2=0.76$ , p=0.668
Average	36 (31.3%)	10 (27.03%)	26 (33.33%)	
High	50 (43.48%)	16 (43.24%)	34 (43.59%)	
Emotional exhaustion score	29 (21–36.5)	28 (20–38)	29.5 (21–35)	H=0.063, p=0.801
Emotional exhaustion subgroups				
Low	27 (23.48%)	11 (29.73%)	16 (20.51%)	Pearson's $\chi^2=1.212$ , p=0.576
Average	35 (30.43%)	10 (27.03%)	25 (32.05%)	
High	53 (46.09%)	16 (43.24%)	37 (47.44%)	

Results are presented as median (IQR) and as absolute and relative frequencies, accordingly.

**Table 4.** Eysenck Personality Questionnaire personality scores by working rank and by sex.

	Extraversion	Psychoticism	Neuroticism	Lie
Cronbach's alpha	0.848	0.807	0.801	0.651
Total	12 (8–16)	4 (3–8)	11 (9–14)	12 (9–13)
Working rank				
Resident	14 (8.5–16)	4.5 (3–8.5)	11 (6.5–13)	10 (8–12)
Junior consultant	10 (7–14)	5 (3–11)	11 (10–14)	12 (9–14)
Senior consultant	11.5 (8–16)	4 (3–7)	11 (9–14)	12 (9–14)
Academic staff	12.5 (8–17)	4 (3–5)	11 (7–15)	13 (11–14)
H, P value	3.45, 0.327	1.49, 0.685	1.353, 0.716	9.34, 0.025
Sex				
Males	13 (9–16)	4 (3–6)	10 (8–14)	12 (8–13)
Females	12 (7–16)	5 (3–8.5)	11.5 (10–14)	12 (9–13)
z, P value	-1.022, 0.307	0.662, 0.507	1.481, 0.138	0.025, 0.979

Results are presented as median (IQR).

The Kruskal–Wallis and the Mann–Whitney U test were employed as appropriate

lated during the pandemic. In our study almost half of our colleagues experienced a high level of emotional exhaustion (46.09%) and depersonalization (49.57%) and a high level of low personal accomplishment (43.49%). In the study by Afonso et al during the early phase of the pandemic (March 2020) the rates of depersonalization (37.2%) and low personal accomplishment (25.9%) were lower, while the rate of emotional exhaustion (53.3%) was similar to ours.<sup>6</sup> “A perceived lack of support at work” was found to be the strongest risk factor

for developing burnout in the United States, followed by “perceived lack of support at home”, “working greater than or equal to 40 hours per week”, and “not having a confidant at work”. Emotional exhaustion is defined as “feeling like one cannot meet the demands of their patients, co-workers or loved ones, due to complete lack of energy to engage”. Based on the definition of emotional exhaustion and the recognized risk factors for developing burnout in the study by Afonso, the high levels of emotional exhaustion may look quite reasonable.<sup>4,6</sup>

**Table 5.** Multivariate logistic regression model of factors predicting “high risk for burnout” and “burnout syndrome”.

High risk for burnout	Odds Ratio	Standard Error	z	P> z	95% Conf. Interval
EPQ_L	1.28	0.084	3.82	<0.001	1.13 to 1.46
EPQ_N	0.84	0.076	-1.87	0.061	0.71 to 1
Burnout syndrome					
EPQ_L	0.79	0.085	-2.21	0.027	0.64 to 0.97
EPQ_N	1.2	0.086	2.58	0.01	1.04 to 1.38
EPQ_P	1.12	0.078	1.69	0.092	0.98 to 1.29
Junior consultants vs residents	0.57	0.457	-0.69	0.488	0.12 to 2.724
Senior consultants vs residents	0.76	0.519	-0.4	0.689	0.2 to 2.89
Academic staff vs residents	5.46	5.256	1.76	0.078	0.83 to 36.03

EPQ: Eysenck Personality Questionnaire, L: Lie, N: Neuroticism, P: Psychoticism

In the study of Podhorodecka et al<sup>26</sup> 158 anaesthesiologists from Poland were assessed for burnout during 2022.<sup>26</sup> Burnout prevalence was slightly higher than in our study sample (73% vs 67.24%). Almost all participants (97.3%) reported that the pandemic had a negative influence on their level of burnout.<sup>26</sup> At the same time in Greece 71.8% of internists, working in “AHEPA” University Hospital, were diagnosed with moderate levels of burnout, while the majority of them (88%) suffered from exhaustion.<sup>12</sup> In another study that was conducted in 2020 in “Evangelismos” and “Attikon” General Hospitals in Athens, only 30% of participants, including physicians, nurses, and technicians, from Intensive Care Units, Emergency Departments, and High Dependency Units, were diagnosed with burnout. However, one-third of them had already developed post-traumatic stress disorder, depending on their degree of emotional exhaustion.<sup>27</sup> Of note, during the pandemic, apart from burnout, healthcare personnel also suffered from increased psychological stress. In the study by Samara et al,<sup>28</sup> which was conducted in 2021 and included 1484 participants from Greece, more than 10% reported at least moderate symptoms of depression, anxiety or stress.<sup>28</sup> Women, younger participants, residents in urban areas, and first responders were at increased risk for higher anxiety scores. Moreover, Kalaitzaki and Rovithis<sup>29</sup> studied the positive and negative impact on the mental health of 673 healthcare workers from all nine geographical regions of Greece. According to the authors, almost 8/10 participants experienced at least moderate levels of negative impact, known as vicarious traumatization or secondary traumatic stress. On the other hand, the levels of positive impact, known as

vicarious post-traumatic growth, were relatively low but with a high degree of resilience. The authors concluded that effective screening of the population at high risk for secondary traumatic stress, along with the prevention and intervention programs in an attempt to enhance resilience and to promote successful coping strategies, should be implemented in an effort to safeguard the population and promote posttraumatic growth.<sup>29</sup>

As far as the female sex is concerned, it should be highlighted that, although sex differences regarding burnout have been described in the literature and the female sex is considered an individual risk factor for developing burnout, this should be evaluated with scrutiny. Contrary to a commonly described misconception, women per se do not experience higher levels of burnout, however women, when compared to men, may display the three dimensions of burnout in a distinct way. Women are more likely to suffer from emotional exhaustion, whereas men from depersonalization.<sup>4,26</sup>

In our study, though senior consultants exhibited higher rates of burnout syndrome compared to other working ranks, burnout syndrome percentages among the Academic staff were strikingly high; 4 out of 6 Academics suffered from burnout Syndrome. The role of academic background in emotional exhaustion and depersonalization among anaesthesiologists has long been recognized.<sup>4,14,24</sup> Academic staff have to balance clinical, educational, research, administrative, and compliance responsibilities.<sup>4,26</sup> Based on a survey performed by Fidelity and the Chronicle of Higher Education in 2020, burnout has risen dramatically in academic staff during the pandemic (70%, vs 32% in 2019); academic

staff was suffering from severe stress, while more than 2/3 of responders reported a deterioration of work-life imbalance, especially females as in our study.<sup>20,24</sup> In our study academic staff exhibited a borderline statistically significant 5-fold risk for burnout syndrome compared to residents. On the other hand, our results disagree with the current literature, as senior consultants experienced higher levels of burnout when compared with younger consultants.<sup>24</sup> A possible explanation could be that in the rise of the pandemic senior anaesthesiologists established a protective behavior towards their younger colleagues, risking their own well-being, acknowledging the extremely stressful, vulnerable, and complex clinical situations in which younger consultants, with lower experience had to be exposed, when treating patients suffering from COVID-19.<sup>18,24</sup>

With respect to personality traits neuroticism has been strongly associated with burnout since 1998 and in the study by Raymond et al it was found to be the most important personality trait influencing psychological distress and burnout in anaesthesiologists.<sup>21,31</sup> Although, some of the characteristics of neuroticism such as social anxiety and empathy may be desirable traits for anaesthesiologists, fearfulness and low self-esteem could also be considered as risk factors in terms of poor inhibition of impulses, helplessness and irritability.<sup>21,31</sup> Regarding the protective effect of "Lie scale" there is a paucity of data in current literature. However, a possible explanation might be that persons with a high tendency to distort meanings of the scores in personality tests, may also be able to distort reality as a coping mechanism or protective when put under stress.<sup>4,21</sup>

Our study should be perceived under certain limitations. First, one important limitation is lack of data on pre-pandemic burnout levels. However, the role of the pandemic in the exaggeration of the in- and out-of-hospital challenges, on the top of long-lasting critical work-

force shortages, and in the escalation of the risk for burnout should not be overlooked. Secondly, although validated questionnaires for the Greek population were used, those were self-reported instruments. Hence, a more thorough psychological assessment seems mandatory, along with the implementation of preventive and treatment strategies for burnout. Moreover, as our survey took place during the toughest peak of the pandemic, when anaesthesiologists were lacking personal time, we ought to keep our survey short in order to have a high response rate. Thus, in terms of time management, we did not include any questions about working hours, mandatory days off after night calls, hospital support for childcare, department support for overall well-being or any "open questions" that could give us additional information. These should be further addressed in a future survey regarding burnout, as follow-up studies are needed so as to monitor the course of mental health of our colleagues and raise awareness about burnout. However, to the best of our knowledge, this is the first study attempt to investigate the burnout among anaesthesiologists during the pandemic in Greece, and thus it should be considered as one of the first steps in the deployment of a strategy for supportive leadership, control of work schedules and promotion of balance between personal and professional life to mitigate burnout in anaesthesiology.

To conclude, our study confirms that Greek anaesthesiologists' burnout levels in COVID-19 referral hospitals during the fourth peak of the pandemic were within the highest reported levels. Neuroticism traits were identified as significant predictive factors for both "high risk for burnout" and "burnout syndrome". In the rise of the post-pandemic era, treatment and preventive strategies for burnout, along with the formation of a well-being culture seem mandatory in order to mitigate burnout in our speciality.

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## Ερευνητική εργασία

# Η επιδημία της επαγγελματικής εξουθένωσης των Ελλήνων αναισθησιολόγων στη διάρκεια της πανδημίας COVID-19 (GRABEP μελέτη): Μία πολυκεντρική μελέτη του επιπολασμού της επαγγελματικής εξουθένωσης στους Έλληνες αναισθησιολόγους και συσχέτισης με χαρακτηριστικά της προσωπικότητας

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### ΠΕΡΙΛΗΨΗ

Η πανδημία COVID-19 οδήγησε σε μία άνευ προηγουμένου κρίση με αυξημένο κίνδυνο για εμφάνιση συνδρόμου επαγγελματικής εξουθένωσης στους επαγγελματίες υγείας που εργάστηκαν στην πρώτη γραμμή. Το σύνδρομο επαγγελματικής εξουθένωσης επιδρά αρνητικά στους ασθενείς και στους ιατρούς, θέτοντας σε ιδιαίτερο κίνδυνο την ασφάλεια των ασθενών, την ποιότητα παροχής υπηρεσιών υγείας και τη γενική ευημερία των ιατρών. Στην παρούσα μελέτη αξιολογήθηκαν τα επίπεδα του συνδρόμου επαγγελματικής εξουθένωσης και οι πιθανοί προδιαθεσικοί παράγοντες των αναισθησιολόγων των Πανεπιστημιακών/Τριτοβάθμιων νοσοκομείων αναφοράς για τον COVID-19 στην Ελλάδα. Πρόκειται για μία πολυκεντρική, συγχρονική μελέτη στην οποία συμπεριλήφθηκαν όλοι οι αναισθησιολόγοι που συμμετείχαν στη φροντίδα των ασθενών με λοίμωξη COVID-19, στη διάρκεια του 4ου κύματος της πανδημίας (11/2021) στα 7 πανεπιστημιακά νοσοκομεία αναφοράς στην Ελλάδα. Χρησιμοποιήθηκαν τα σταθμισμένα για τον ελληνικό πληθυσμό ερωτηματολόγια Maslach Burnout Inventory (MBI) και Eysenck Personality Questionnaire (EPQ). Το ποσοστό απόκρισης ήταν 98% (116/118). Περισσότεροι από τους μισούς συμμετέχοντες ανήκαν στο θήλυ φύλο (67,83%, μέση ηλικία 46 έτη). Ο συντελεστής Cronbach's alpha για το MBI και το EPQ υπολογίστηκε στο 0,894 και 0,877, αντίστοιχα. Η πλειοψηφία (67,24%) των αναισθησιολόγων κατηγοριοποιήθηκαν ως «υψηλού κινδύνου για σύνδρομο επαγγελματικής εξουθένωσης», ενώ 21,55% διαγνώστηκαν με σύνδρομο επαγγελματικής εξουθένωσης. Σχεδόν οι μισοί συμμετέχοντες εμφάνιζαν υψηλά επίπεδα επαγγελματικής εξουθένωσης με βάση και τις τρεις διαστάσεις του συνδρόμου, με υψηλή συναισθηματική εξάντληση (46,09%), υψηλή αποπροσωποποίηση (49,57%) και υψηλά επίπεδα έλλειψης προσωπικών επιτευγμάτων (43,49%). Η πολυπαραγοντική ανάλυση ανέδειξε ότι ο νευρωτισμός ήταν ανεξάρτητος προγνωστικός παράγοντας για «υψηλό κίνδυνο επαγγελματικής εξουθένωσης» και για σύνδρομο επαγγελματικής εξουθένωσης, ενώ η «κλίμακα ψεύδους» του EPQ παρουσιάζει προστατευτικό ρόλο έναντι του συνδρόμου επαγγελματικής εξουθένωσης. Τα επίπεδα της επαγγελματικής εξουθένωσης των Ελλήνων αναισθησιολόγων που εργάστηκαν στα νοσοκομεία αναφοράς του COVID-19 στη διάρκεια του 4ου κύματος της πανδημίας ήταν υψηλά. Ο νευρωτισμός αποδείχθηκε προγνωστικός παράγοντας τόσο για «υψηλό κίνδυνο επαγγελματικής εξουθένωσης», όσο και για εμφάνιση συνδρόμου επαγγελματικής εξουθένωσης.

**ΛΕΞΕΙΣ ΕΥΡΕΤΗΡΙΟΥ:** Σύνδρομο επαγγελματικής εξουθένωσης, COVID-19, πανδημία, ασφάλεια ασθενών.

## Research article

# Involuntary psychiatric hospitalizations in Greece: Contemporary research and policy implications

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### ABSTRACT

Involuntary psychiatric hospitalization is a contested issue in mental health care provision. Despite indications of very high rates of involuntary hospitalizations in Greece, no valid national statistical data has been collected. After reviewing current research on involuntary hospitalizations in Greece, the paper introduces the Study of Involuntary Hospitalizations in Greece (MANE), a multi-center national study of the rates, process, determinants and outcome of involuntary hospitalizations, conducted in the regions of Attica, Thessaloniki, and Alexandroupolis, from 2017 to 2020, and presents some preliminary comparative findings regarding the rates and process of involuntary hospitalizations. There is a major difference in the rates of involuntary hospitalizations between Alexandroupolis (around 25%) and Athens and Thessaloniki (over 50%), which is possibly related to the sectorized organization of mental health services in Alexandroupolis and to the benefits of not covering a metropolitan urban area. There is a significantly larger percentage of involuntary admissions that end in involuntary hospitalization in Attica and Thessaloniki compared to Alexandroupolis. Reversely, of those accessing the emergency departments voluntarily, almost everyone is admitted in Athens, while large percentages are not admitted in Thessaloniki and in Alexandroupolis. A significantly higher percentage of patients were formally referred upon discharge in Alexandroupolis compared to Athens and Thessaloniki. This may be due to increased continuity of care in Alexandroupolis and that might explain the low rates of involuntary hospitalization there. Finally, re-hospitalization rates were very high in all the study centers, demonstrating the revolving-door phenomenon, especially for voluntary hospitalizations. The MANE project came to address the gap in the national recording of involuntary hospitalizations, by implementing, for the first time, a coordinated monitoring of involuntary hospitalizations in three regions of the country with different characteristics, so that a picture of involuntary hospitalizations can be drawn at national level. The project contributes to raising awareness of this issue at the level of national health policy and to formulating strategic goals to address the problem of violation of human rights and to promote mental health democracy in Greece.

**KEYWORDS:** Involuntary psychiatric hospitalization, mental health care practices, law implementation, human rights.

## Introduction

The involuntary hospitalization of persons with mental health problems is a contested issue in mental health care provision, mainly due to the restrictions it imposes on the liberty, fundamental rights, and autonomy of these patients. Epidemiological studies in European countries document significant variation in the frequency of involuntary admissions,<sup>1</sup> ranging from 3.2% to 30% of psychiatric hospitalizations, which can be attributed to differences between EU member states regarding the legal framework, psychiatric culture, organization of mental health services, availability of alternative forms of care, patient characteristics, degree of social cohesion, as well as broader socioeconomic indicators.

Despite indications of very high rates of involuntary hospitalizations in Greece, there is no valid national statistical data collected, like in other European countries.<sup>2-5</sup> The lack of national data is cause for concern, especially because of the double condemnation of the country in the European Court of Human Rights, as well as indications from various sources of inadequate implementation of the relevant legal regulations and protection of patients' rights.<sup>6-8</sup> The recent research report of the Five-Year Special Committee of Control for the Protection of the Rights of Persons with Mental Disorders confirms the previous data.<sup>9</sup> Simultaneously, the incomplete character of mental health reform leads to insufficient continuity of care, inadequate community mental health services, poor psychiatric leadership, insufficient implementation of sectorization, and uncoordinated provision of care between psychiatric hospitals, psychiatric departments, and community mental health services; the national health care system has been evaluated by external experts as fragmented, un-integrated and unstable.<sup>10,11</sup>

The aim of this paper is to present the recent data concerning psychiatric hospitalizations in three Greek regions and to propose future national policy mental health plans in order to address this problem.

### Rates, risk factors, and process of involuntary hospitalizations in Greece

There is a small but growing trend of research on involuntary hospitalizations in Greece. The rates and process of involuntary hospitalizations, as well as its associated factors, have been examined in specific psychiatric units in Thessaloniki,<sup>12,13</sup> Patras,<sup>14,15</sup> Ioannina,<sup>16</sup> and Attica.<sup>17</sup> The process of involuntary admission has also been investigated by analyzing court and police records.<sup>18-20</sup> Finally, there are a few studies examining the

views of patients and other stakeholders on involuntary hospitalization.<sup>21-23</sup>

While before the implementation of the current law regulating involuntary hospitalization (Law 2071/1992) the rates of compulsory hospitalizations were estimated to be as high as 97%<sup>24</sup> and did not seem to change much in the subsequent period,<sup>25</sup> more recent studies estimate it at 28% in the region of Ioannina<sup>16</sup> 45% in the region of Patras,<sup>15</sup> 55% in Thessaloniki<sup>13</sup> and around 60% in Attica.<sup>17</sup> This verifies the observation that the rate of involuntary hospitalizations in Greece is much higher than in most European countries. It also indicates differences between geographical regions, between urban and rural areas, as well as between psychiatric hospitals and psychiatric wards in general hospitals. The two longitudinal studies conducted to date reveal a stable course in number of involuntary admissions in Ioannina<sup>16</sup> and a steady increase in Patras,<sup>14</sup> also indicating variable trends within the country.

The persons who are at greater risk of being involuntarily admitted seem to be unmarried men, who are unemployed, self-employed, or workers and lack social support and financial resources.<sup>16,13,15</sup> In terms of clinical factors, the diagnosis of schizophrenia spectrum disorders is most frequently given to involuntarily admitted patients, followed by a diagnosis of mood disorders, most commonly bipolar disorder,<sup>13,15,16,18,26</sup> while a diagnosis of unipolar depression reduces the risk.<sup>17</sup> Severity of symptomatology and aggression precipitate involuntary admission, while suicidality seems to predict involuntary hospitalization.<sup>27</sup> Previous admissions, mainly involuntary, were found to increase the risk of involuntary hospitalization,<sup>13,16</sup> while previous contact with community mental health services operates as a protective factor.<sup>27,17</sup> This supports arguments for the crucial role of community-based continuity of care in reducing involuntary hospitalizations, something that has been repeatedly documented with data from different regions of the country.<sup>28-30</sup>

The very high re-admission rates documented<sup>26</sup> portray a pervasive revolving door process, raising concerns about the efficacy of the mental health service system in dealing with severe and chronic mental health difficulties. On the other hand, the high percentage of involuntary admissions of persons with a first psychotic episode<sup>13,15</sup> indicates system inadequacies in addressing the early stages of severe mental distress and points to the need for early intervention services.<sup>31</sup>

Studies examining the process of involuntary hospitalization provide a clear picture of the procedures followed, with emphasis on the ways in which the law is implemented and the degree to which it safeguards

admitted patients' rights. It seems that the letter of the Law 2071/1992 protects human rights but its enforcement is defective.<sup>7,9</sup> In the majority of cases the process is initiated by relatives,<sup>7,15,17,18</sup> mainly on grounds of deterioration of mental state and lack of adherence to medication. The study by Chatzisimeonidis (2021)<sup>18</sup> portrays two distinct routes into involuntary hospitalization: for younger persons, the process is initiated by the police on grounds of interpersonal conflicts, while for older persons by relatives on grounds of deterioration of mental state; it is not clear whether each route is driven by age or by disorder chronicity. Invariably, transport to the mental health facility is conducted by the police,<sup>18,15</sup> and police officers tend to be present during the psychiatric assessment.<sup>7</sup> Once admitted, patients are not typically informed of their rights<sup>15</sup> and they do not seem to be aware of them.<sup>23</sup> Other coercive measures, usually chemical and mechanical restraint, are typically applied to a significant percentage of involuntarily admitted patients.<sup>16,32,33</sup>

The court hearing, that is by law the process through which involuntary hospitalization is decided, takes place much later, often after discharge, and in some cases geographically far from the patient's residence. Most patients are not informed of their pending hearing, are discouraged from attending and/or declare that they are not interested; the above result in patients not being present in court hearings, nor their lawyers. It is not surprising, then, that in almost all cases the court verdicts agree with the psychiatric assessment.<sup>19,15</sup> Investigation of the legal and court processes is important since it has been shown that proper adherence to legal safeguards and patient legal representation and advocacy reduce the rates of involuntary hospitalization.<sup>2</sup>

Upon discharge, half of the patients are referred to outpatient services of the same hospital, while one-third is not formally referred to any mental health provider.<sup>17</sup> Given the importance of continuity of care in community settings, this might explain the high rates of re-admission.<sup>26</sup> The only follow-up study to date<sup>26</sup> documented significant improvement in symptomatology and functioning from admission to discharge and over the following two years for both voluntarily and involuntarily admitted patients.

### The Study of Involuntary Hospitalizations in Greece (MANE)

Given the dearth of studies on involuntary hospitalizations in Greece in previous decades, the Association for Regional Development and Mental Health (EPAPSY), in collaboration with Panteion University and the Psychiatric Hospital of Attica "Dafni", led the Study of

Involuntary Hospitalizations in Attica (acronym MANA) from 2011 to 2016, conducting a group of related studies, that were presented in the previous review.

The need to expand the investigation to a national level through a comparative examination of various areas led to the implementation of a multi-center national study in the regions of Attica, Thessaloniki, and Alexandroupolis, from 2017 to 2020, named Study of Involuntary Hospitalizations in Greece (acronym MANE).

## Material and Method

### Setting

MANE was conducted in Attica under the auspices of Panteion University and the participating units consisted of the 3rd, 4th, and 5th Units of the Psychiatric Hospital of Attica – Dafni, the Psychiatric Unit of Sismanogleio General Hospital and the Second Department of Psychiatry, University of Athens-Attikon Hospital. In Thessaloniki, the study was conducted under the auspices of the Aristotle University of Thessaloniki. All the public acute psychiatric units in Thessaloniki participated; specifically, the A, B, C, and D Acute Wards and the 2nd Department of Psychiatry of the Psychiatric Hospital of Thessaloniki, the 1st Department of Psychiatry at the General Hospital "Papageorgiou" and the 3rd Department of Psychiatry at AHEPA University General Hospital. In Alexandroupolis, the study was conducted in the University Psychiatric Department and the National Health System Psychiatric Department of the University General Hospital of Alexandroupolis, under the auspices of Democritus University of Thrace. Therefore, it has been a joint venture of many universities and mental health services in the country with the aim to shed light on the underpinnings of compulsory admissions and to place the topic high in the health policy agenda.

### Sample

The sample of the present study consists of all adult patients who had been admitted, voluntarily and involuntarily in the aforementioned participating psychiatric wards, during a 12-month period, from March 2018 to February 2019.

### Procedure

To this end, two interrelated studies were implemented, a cross-sectional survey on the rates and determinants of involuntary hospitalizations, including the extent to which the pertinent legislation is enforced, and a longitudinal study on its outcome. Some preliminary descriptive findings are presented below.

## Results

The preliminary descriptive statistical analysis (main findings can be found in table 1) illustrates interesting findings and important differences across sites.

In Attica, 57% of requests for treatment in psychiatric emergency departments are involuntary and 43% are voluntary. 96.9% of involuntary requests lead to involuntary admission, while 96.1% of voluntary requests lead to voluntary admission. Correspondingly, 57.2% of admissions are involuntary, and 42.8% are voluntary. This is in line with previous findings of 57.4% involuntary hospitalizations in the Psychiatric Hospital "Dafni".<sup>17</sup> The mean hospitalization duration is 18.81 days for voluntary admission and 23.21 days for involuntary admission. At discharge, 36.4% were referred to the outpatient department of the same hospital, 12.4% to community mental health services, while for 41.8% of patients, there was no referral recorded. The percentage of involuntary hospitalizations was higher in the psychiatric hospital (60.5%) than in the psychiatric units of general hospitals (53.2%).

In Thessaloniki, 27% of requests for treatment in psychiatric emergency departments were involuntary and 73% voluntary. There was a large variation between departments in percentages of voluntary (59–82%) and involuntary (18–41%) requests. A higher percentage of voluntary requests (77%) was recorded in psychiatric departments of general hospitals in comparison to one the psychiatric hospitals (71%). Twenty-nine (29%) of voluntary requests led to voluntary admission, while 67.6% of patients were not admitted. There was wide variation between departments regarding the percentages of voluntary requests that lead to voluntary hospitalization (17.5–44%) or to non-admission (46–82%). On the other hand, 88.5% of involuntary requests led to in-

voluntary admission, and 9.5% to negative assessments and non-admission. The percentage of non-admission of involuntary requests suggests that there is no automatism in the process of psychiatric assessment for involuntary admission. It is worth noting, however, that there is wide variation between departments regarding the percentage of involuntary requests that lead to involuntary admission (70–96,5%), to non-admission (1–27%), and to voluntary admission (0–4,5%), indicating differing practices in handling involuntary assessment requests. In Thessaloniki, 53.5% of admissions are involuntary and 46.5% are voluntary, with variation between psychiatric departments in terms of rates of involuntary (47–69%) and voluntary (31–53%) admissions. Also, the percentage of involuntary admissions is slightly higher in the psychiatric hospital (54%) than the general hospitals (51.5%).

The majority of hospitalizations concern residents of Thessaloniki, with 10% of hospitalized persons living in the surrounding area and 24% outside the region. Rates of involuntary hospitalizations are much higher for out-of-region hospitalizations (62.4%) than for residents of the city (51%) or surrounding areas (49.4%). Similarly, the majority of persons requesting hospitalization reside in Thessaloniki, with 10% residing in surrounding areas and 17.8% in other regions. Again, rates of involuntary hospitalizations are much higher for out-of-region requests (42.5%) than for requests of residents of the city (25,2%) or surrounding areas (25,5%).

The mean hospitalization duration is 13,2 days for voluntary admission and 18,5 days for involuntary admission. At discharge, 77% of patients were not formally referred to mental health services. Wide differences in referral rates were recorded between departments (11–73.5%). General hospitals (28%) tended to refer more than psychiatric hospital departments (21%).

**Table 1.** Main descriptive findings regarding involuntary/voluntary requests and hospitalizations, across sites.

	Athens N (%)	Thessaloniki N (%)	Alexandroupolis N (%)
Rates of involuntary requests	480 (57.0)	1539 (27.0)	237 (21.8)
Rates of voluntary requests	362 (43.0)	4171 (73.0)	850 (78.2)
Total requests	842 (100)	5710 (100)	1086 (100)
Rates of involuntary requests turning into involuntary hospitalizations	465 (96.9)	1362 (88.5)	125 (52.7)
Rates of voluntary requests turning into voluntary hospitalizations	348 (96.1)	1209 (29.0)	387 (45.5)
Rates of involuntary hospitalizations	465 (57,2)	1418 (53.5)	125 (24.4)
Rates of voluntary hospitalizations	348 (42.8)	1232 (46.5)	387 (75.6)
Total hospitalizations	813 (100)	2650 (100)	512 (100)
Mean stay for involuntary admissions (days)	23.21	18.5	23.6
Mean stay for voluntary hospitalizations (days)	18.81	13.2	14.3

Most commonly referrals were made to the outpatient department of the same hospital (29%), substance rehabilitation services (17%), and private psychiatrists (16%). Finally, 14% of the involuntary and 25% of voluntary hospitalizations recorded were re-admissions within the 12-month study period. This indicates a high rate of re-admission, especially for voluntary hospitalizations.

In Alexandroupolis, 21.8% of requests for treatment in psychiatric emergency departments were involuntary and 78.2% voluntary. Around forty-five (45.5%) of voluntary requests led to voluntary admission, while 54.5% of patients were not admitted. In terms of involuntary requests, 52.7% led to involuntary admission, and 28% to negative assessments and non-admission. As a result, 24.4% of admissions were involuntary and 75.6% voluntary. Forty-one (41.2%) of persons hospitalized reside outside the region of Evros. The mean hospitalization duration was 14,3 days for voluntary admission and 23,6 days for involuntary admission. At discharge, 86% of patients received a formal referral. Sixty-four (64.1%) of those voluntarily admitted and 41.3% of those involuntarily admitted were referred to their treating clinician in the hospital, and 13.8% and 38.5% respectively were referred to community support services.

## Discussion

The differences in findings between the study centers may be explained by the differences in the settings between Athens as a metropolitan capital, Thessaloniki as a large urban center, and Alexandroupolis as a regional capital city, with different populations and organization of mental health services.

The rates of requests for involuntary admission of those accessing the psychiatric emergency departments in the three study centers are much higher in Athens (57%) than in Thessaloniki (27%) and Alexandroupolis (21.8%). Of those accessing the emergency departments voluntarily, almost everyone is admitted in Attica (96.1%) while only 29% in Thessaloniki and 45.5% in Alexandroupolis are admitted, suggesting that hospitals there operate as primary and secondary care units. On the other hand, the requests for involuntary admission end in involuntary hospitalization in 96.9% of cases in Attica and 88.5% of cases in Thessaloniki as opposed to 52.7% in Alexandroupolis. This is a significant discrepancy, possibly reflecting the differing organization of services, that needs further investigation.

There is a major difference in the rates of involuntary hospitalizations between Alexandroupolis, in which the percentage is around 25% of all hospitalizations, and Athens and Thessaloniki, both of which record a rate of

over 50%, with a significant difference between psychiatric hospitals and general hospitals. The reasons for the significantly reduced rates of involuntary hospitalizations in Alexandroupolis, that are in line with recent data from Ioannina,<sup>16</sup> are possibly related to the sectorized organization of mental health services and definitely merit further study. Alternatively, it may well be the case that Alexandroupolis does not face the challenges of metropolitan areas; it is a more compact region, less diffused, with stronger community cohesion, and as a result of this patients are more easily monitored and supported.

A significant difference was also recorded in post-hospitalization referral practices, with 86% of patients being formally referred upon discharge in Alexandroupolis as opposed to less than 30% in Athens and Thessaloniki. The bulk of referrals is made to the outpatient departments of the same hospitals in all centers, followed by community support services in Alexandroupolis, especially for involuntarily admitted persons. This may indicate increased continuity of care in Alexandroupolis, which might explain the low rates of involuntary hospitalization there. Finally, re-hospitalization rates are very high in both the centers where this data was recorded, demonstrating the revolving-door phenomenon, especially for voluntary hospitalizations.

## Implications of systematically recording involuntary hospitalizations

As mentioned above, involuntary hospitalizations in psychiatric units are alarmingly common in Greece, with percentages at much higher levels than in most European countries. It is also an ethically and scientifically contested practice, since, in order to protect the person's mental health and to prevent actions that would endanger the person and others, the basic human rights of patients are being affected.<sup>3</sup> The MANE project came to address the gap in the national recording of involuntary hospitalizations, by implementing, for the first time, a coordinated monitoring of involuntary hospitalizations in three regions of the country with different characteristics, so that a picture of involuntary hospitalizations can be drawn at national level.

Beyond recording the percentages of involuntary hospitalizations, the study monitors the process of involuntary hospitalizations and related practices, aiming to investigate allegations regarding inadequate and inappropriate implementation of the law, to record the practices utilized during involuntary hospitalizations, and consequently to contribute to the formation of proposals for good practices regarding the management of involuntary hospitalizations.

The participation of three cities which differ between them in terms of social, demographic, and geographical characteristics can bring to light differences in terms of risk factors for involuntary hospitalizations between regions, and thus serve as a more precise guide for addressing them in different parts of the country.

Such an extensive study of the outcome of involuntary hospitalizations is also implemented for the first time in Greece. The longitudinal study is expected to verify the more negative outcome of involuntary hospitalizations, compared to voluntary hospitalizations, which are documented in international literature, and to highlight the factors that are related to this outcome, leading to recommendations for improving its practice and overuse, if not misuse.

Apart from the scientific originality of the study, which in many respects is a unique undertaking for Greece, and thus its expected impact in terms of understanding the phenomenon of involuntary hospitalizations, this research project aims to raise awareness of this problem at the level of national health policy and to formulate strategic goals to address the

problem of violation of human rights and to promote mental health democracy in Greece.<sup>34–36</sup> Actions in this direction may include using the definitions of human rights and fundamental freedoms in the United Nations Convention on the Rights of Persons with Disabilities as a tool to change the legal status of the procedure of involuntary hospitalization, engaging with and empowering mental health service users, family, and carers, changing mental health practice culture through training mental health professionals, justice officers, police officers, organizations and communities, creating a national observatory to monitor involuntary hospitalization.<sup>37</sup> Encouraging family involvement and psychoeducation as part of routine mental health care may change carers' attitudes and practices regarding recourse to coercive psychiatric treatment.<sup>38,39</sup>

Ultimately, through tackling the thorniest issue of the mental health care system, the research project aims to contribute to the improvement and upgrading of the dysfunctional mental health reform in Greece, especially during a long period of consecutive crises.

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# Ερευνητική εργασία

## Ακούσιες ψυχιατρικές νοσηλείες στην Ελλάδα: Σύγχρονη έρευνα και επιπτώσεις στην πολιτική

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### ΠΕΡΙΛΗΨΗ

Η ακούσια ψυχιατρική νοσηλεία είναι ένα αμφιλεγόμενο ζήτημα στην παροχή φροντίδας ψυχικής υγείας. Παρά τις ενδείξεις για πολύ υψηλά ποσοστά ακούσιων νοσηλειών στην Ελλάδα, δεν έχουν συλλεχθεί έγκυρα εθνικά στατιστικά στοιχεία. Μετά από μία ανασκόπηση της τρέχουσας έρευνας σχετικά με τις ακούσιες νοσηλείες στην Ελλάδα, η παρούσα εργασία παρουσιάζει την Μελέτη Ακούσιων Νοσηλειών στην Ελλάδα (MANE), μια πολυκεντρική εθνική μελέτη των ποσοστών, της διαδικασίας, των καθοριστικών παραγόντων και της έκβασης των ακούσιων νοσηλειών, που διεξήχθη στις περιοχές της Αττικής, της Θεσσαλονίκης και της Αλεξανδρούπολης, από το 2017 έως το 2020, και περιγράφει κάποια προκαταρκτικά συγκριτικά ευρήματα σχετικά με τα ποσοστά και τη διαδικασία των ακούσιων νοσηλειών. Υπάρχει μεγάλη διαφορά στα ποσοστά των ακούσιων νοσηλειών μεταξύ της Αλεξανδρούπολης (περίπου 25%) και της Αθήνας και της Θεσσαλονίκης (άνω του 50%), η οποία ενδέχεται να σχετίζεται με την τομεακή οργάνωση των υπηρεσιών ψυχικής υγείας και με τα οφέλη της μη κάλυψης μιας μητροπολιτικής αστικής περιοχής στην Αλεξανδρούπολη. Σημαντικά μεγαλύτερο ποσοστό ακούσιων προσελεύσεων καταλήγουν σε ακούσια νοσηλεία στην Αθήνα και τη Θεσσαλονίκη σε σύγκριση με την Αλεξανδρούπολη. Αντιθέτως, από όσους εισέρχονται εθελοντικά στα τμήματα επειγόντων περιστατικών, σχεδόν όλοι νοσηλεύονται στην Αττική, ενώ μεγάλα ποσοστά δεν εισάγονται στη Θεσσαλονίκη και την Αλεξανδρούπολη. Ένα σημαντικό υψηλότερο ποσοστό ασθενών παραπέμφθηκε επίσημα κατά τη διάρκεια του εξιτηρίου στην Αλεξανδρούπολη σε σύγκριση με την Αθήνα και τη Θεσσαλονίκη. Αυτό μπορεί να οφείλεται στην αυξημένη συνέχεια της φροντίδας στην Αλεξανδρούπολη, που μπορεί να εξηγήσει τα χαμηλά ποσοστά ακούσιας νοσηλείας εκεί. Τέλος, τα ποσοστά επανανοσηλείας είναι πολύ υψηλά σε όλα τα κέντρα μελέτης, καταδεικνύοντας το φαινόμενο της περιστρεφόμενης πόρτας, ειδικά για τις εκούσιες νοσηλείες. Το έργο MANE ήρθε να καλύψει το κενό στην εθνική καταγραφή των ακούσιων νοσηλειών, εφαρμόζοντας, για πρώτη φορά, μια συντονισμένη παρακολούθηση των ακούσιων νοσηλειών σε τρεις περιοχές της χώρας με διαφορετικά χαρακτηριστικά, έτσι ώστε να μπορεί να σχεδιαστεί μια εικόνα των ακούσιων νοσηλειών σε εθνικό επίπεδο. Το ερευνητικό αυτό έργο συμβάλει στην ευαισθητοποίηση για το θέμα αυτό σε επίπεδο εθνικής πολιτικής υγείας και στη διαμόρφωση στρατηγικών στόχων για την αντιμετώπιση του προβλήματος της παραβίασης των ανθρωπίνων δικαιωμάτων και την προώθηση της δημοκρατίας της ψυχικής υγείας στην Ελλάδα.

**ΛΕΞΕΙΣ ΕΥΡΕΤΗΡΙΟΥ:** Ακούσια ψυχιατρική νοσηλεία, πρακτικές ψυχικής υγείας, εφαρμογή νόμου, ανθρώπινα δικαιώματα.

## Research article

# Diagnoses in the Psychiatric Hospital of Kerkyra (Corfu) (1838–2000)

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### ABSTRACT

The Psychiatric Hospital of Corfu was founded in 1838 by the (British) Ionian State and was joined in Greek territory in 1864. It was the unique psychiatric hospital in Greece, until the establishment of Dromokaition Hospital of Athens, in 1887. In its long history many of the patients' admissions had a local character, mainly from Corfu, the Ionian Islands, and later from Western Greece. Until the 1950s, we can follow efforts to improve buildings and patient care, but we note also long hospitalizations of men and women and high death rates. It had been an isolated institution until it joined the National Health System in 1983. It closed its doors in 2006 after a long reform process started in 1986. In its place today there is a network of community psychiatric care and rehabilitation units. Based on the medical and social hospital books data, this paper focuses on the time of appearance and eventual withdrawal of the main diagnoses. 15,844 admissions were recorded from 1838 to 2000. We note the time of the first description of a diagnosis in European and Greek literature. In the 19th century, the wide diagnosis of dementia also included cases of chronic schizophrenia of our days. The diagnoses of lipomania (from 1855 to 1888), monomania (from 1845 to 1885), and degeneration insanity (from 1902 to 1952) depended on the scientific audience of these theories. Schizophrenia, as expected, was the leading diagnosis, from 1915. Dementia praecox (πρωτόγονος άνοια in Greek) and precocious dementia were present from 1862 to 1945. Throughout the history of this institution, a large number of cases of mania and melancholia were also observed. Since 1859, the intermittent or cyclic nature of these two symptoms has been recorded, as well as since 1916, Kraepelin's manic-depressive insanity. From 1950, with the use of antibiotics, general paralysis (syphilis of the CNS) will disappear. The presence of many other diagnoses is discussed. From the end of the 19th century, the concept of widely used psychosis gradually replaced insanity and phrenitis. From the 1940s, we also observe the use of "syndrome" in order also to describe clinical pictures of psychosis and affective disorders. This use of syndrome is probably related to the will of the medical directors of a freer use of diagnoses, compared to those included in the known nosography criteria. The homogenization of diagnoses in Greece was essentially accomplished by introducing ICD-10 in the 1990s.

**KEYWORDS:** Psychiatric hospital of Corfu, psychiatric diagnosis, history of psychiatry, nosology, classification, psychopathology.

### Introduction

The Psychiatric Hospital of Corfu was founded in 1838 by the (British) Ionian State, the unique one after the union of the Ionian Islands with Greece in 1864. Only in 1887 a second psychiatric hospital was founded in Greece, the Dromokaition of Athens.<sup>1–3</sup>

In its long history we can remark a strong local character of patients' admissions from Corfu and the Ionian Islands, and later from the proximate western Greece.<sup>4</sup> We remark a long process of improvements.<sup>4,5</sup> A first essential one was under the direction of Chr. Tsirigotis (1876–1887), visible in his four annual statistics, pub-

lished from 1877 to 1880.<sup>6</sup> He was an Esquirol's disciple, who visited Italy in order to rebuild the initial ex-bar-racks, into Corfu hospital. He was following A. Verga's<sup>7</sup> classification of mental diseases (Imola's congress, in 1874). In 1887 was called to Athens, to direct the newly established psychiatric hospital, Dromokaition. He implemented a paternalistic direction, according to the standards of that time,<sup>8</sup> that was followed by his successors too. Only one "phrenologist" (neurologist- psychiatrist), mostly with the aid of an assistant, assured the medical service. Since 1956–60, we note an essential improvement in the psychiatric and medical services.<sup>5,9</sup> Its integration from 1983 into the National Health System (NHS) brought a further modernization, the establishment of three psychiatric departments and one of internal medicine, and the improvement of the microbiological and radiological laboratories.<sup>5</sup> Through multiple programs of psychiatric reform from 1986, the psychiatric hospital closed its doors in 2006, in favor of a unit of acute indoor care in the general hospital of Corfu and a network of community-based psychiatric units of care and rehabilitation.<sup>10–12</sup>

The chair of Historical Demography of the Ionian University has supervised postgraduate studies on this hospital,<sup>13,14</sup> as well as the thesis of I. Triantafylloudis<sup>4</sup> whose some of the essential findings, we present here.

Number of admissions: 38 in the first year, increased mainly after 1919, decreased from 1940 to 1959, and

increased explosively from 1960 to 1980. Numerous admissions after 1980 and a constant decrease of chronic patients were observed in the context of the psychiatric reform in Greece.<sup>4</sup>

*Duration of hospitalization:* From the beginning to 1959 the mean duration was 3.45–5.20 years for men and 3.48–5.74 for women, while from 1960 to 1979 it was 2.44 years for men and 1.96 for women. For 1980–2000, after the application of the psychiatric reform, it fell to 0.66 years for men, and 0.89 for women.<sup>4</sup>

*Rates of death:*<sup>4</sup> High rates of death have been observed before the 1950s, due to bad surrounding health (malaria, dysentery, tuberculosis), social conditions, and the subsequent conditions of care in the institution. They reached dramatic rates of death in 1900–1919, and mostly in the years 1911–1920,<sup>4</sup> with 67.4% of discharged men and 71.7% of women, probably due to the aggravating factor of the forced retreat of 180,000 Serbian soldiers and civilians in Corfu, in 1916.<sup>15</sup> The main causes of death are "μαρσμός" (lan-guishment), dysentery, and pulmonary diseases.<sup>4</sup> In 1940–1959 the rates of death were lower (men: 21.4%, women: 21.1%) but very high in 1940–1942.<sup>4</sup> In the year of 1941, 287 inmates (43.9%) died from malnutrition and related diseases.<sup>16</sup> Following the general amelioration of health conditions in Greece, deaths decreased to 10.0% for men and 14.3 % for women in 1960–1979, and to 0.3% for men and 0.2% for women

**Table 1.** Descriptive statistics for patients' age and gender by admission period (I. Triantafylloudis 2017).

		Minimum in years	Maximum in years	Median in years	Standard deviation
1838–1879	Men: 316	12	82	36,00	12,157
	Women: 284	14	94	40,77	12,252
	Total: 1037	12	94	37,30	12,934
1880–1899	Men: 770	12	86	34,59	11,622
	Women: 200	8	67	36,72	13,423
	Total: 970	8	86	35,31	12,029
1900–1919	Men: 922	9	85	34,73	11,764
	Women: 283	8	75	34,00	12,666
	Total:1205	8	85	34,56	11,981
1920–1939	Men: 1325	7	87	34,59	12,379
	Women: 570	7	80	34,40	12,968
	Total:1895	7	87	34,53	12,556
1940–1959	Men: 1567	5	86	37,34	15,636
	Women: 1063	4	93	38,53	16,529
	Total: 2630	4	93	37,82	16,010
1960–1979	Men: 1634	10	93	43,62	16,982
	Women: 1311	12	90	48,96	17,343
	Total: 2946	10	93	46,00	17,313
1980–2000	Men: 3340	17	88	41,83	14,104
	Women: 1626	14	95	49,95	17,564
	Total: 4966	14	95	44,47	15,780

**Table 2.** Age groups and gender of patients (I. Triantafylloudis, 2017).

Age groups (in years)		Men	Women
Up to 25	N	1727	815
	%	11.9	5.6
26–35	N	2761	1062
	%	19.1	7.3
36–45	N	2200	934
	%	15.2	6.4
46–55	N	1383	859
	%	9.6	5.9
56–65	N	814	608
	%	5.6	4.2
66–75	N	428	482
	%	3.0	3.3
75+	N	164	244
	%	1.1	1.7

in 1980–2000, the years of development of the NHS and of psychiatric reform.<sup>4</sup>

### Research on diagnoses

Related to the Greek and international literature, this research focuses on the time of apparition and withdrawal, if there was one, of a diagnosis in Corfu. This long recording, from 1838 to 2000, allows us to notice if essential diagnoses were mentioned and if there were any regional peculiarities in their use. I. Triantafylloudis in his thesis,<sup>4</sup> presented detailed data on that period of admissions. In this research we have used his excel-sheets with 15,844 entries, also counting readmissions since 1970. The diagnosis was not reported in 204 of these entries, while gender and age values were missing for two and 325 participants, respectively.

We have registered 843 different diagnoses. Many of them, counting 1–4 admissions, were symptoms (e.g., numerous types of delusions, hallucinations, anxiety, hysteric, dementia manifestations) that are encountered in a main diagnosis. Numerous diagnoses were related to different clinical pictures of Neurology, most of them with a small number of admissions, as well as some diagnoses of internal medicine. As in modern Greek essential changes have occurred in that 170 years, we have grouped similar diagnoses having only grammatical differences, mostly avoiding forming groups of diagnoses. Their noted numbers are indicative, as there were some minor uncertainties on variations of used terms, while the double diagnoses were recorded once. Table 3 presents the twenty-five more frequent diagnoses, with five of them being grouped.

Also, essential but less frequent diagnoses are noted in the narrative of this text.

Simple diagnosis of “*παραφροσύνη*” (insanity) (1838–1870; 24 entries) will be frequently linked to another diagnosis, e.g., *hysteric insanity* (1869), and *religious insanity* (1869). Also, *phrenitis*, a term referring to the renewal of Hippocratic tradition in the 18th century,<sup>17,18</sup> is linked to other diagnoses, e.g., *epileptic phrenitis*. At the same time, we can see diagnoses which are focusing only on the absence of serious clinical manifestations, such as without signs of phrenitis (68 entries), *without signs of psychosis*, or *without psychosis* (from 1950; 32 entries). Also, the broad diagnosis of “*ψυχονεύρωσις*” (1953–1993; 55 entries).

We notice “*μαρασμός*” (languishment) (from 1852 to 1865; 34 entries) as an unexpected entry diagnosis, indicating exhausted people not far from “*μαρασμός*”, which is a frequent cause of death.

Initially, Esquirol's<sup>19,20</sup> nosology criteria and the relative ones of A. Verga (Milan)<sup>7</sup> was used in Corfu. The more frequent among women<sup>4</sup> diagnoses of *melancholia* (from 1838; 800 entries) and *mania* (from 1838; 827 entries) will remain dominant. Diagnosis of “*περιοδική*” (periodic) *mania* (first in 1859), *dimorphic insanity* (first in 1880), *dimorphic paranoia* (first in 1881), and “*διαλείπουσα*” (intermittent) phrenitis (1911–1944; 21 entries) can be related to J.P. Falret's circular insanity and J. Baillarger's double form of insanity (1854),<sup>21</sup> presented in A. Verga's classification.<sup>7</sup> We have to notice a broader use of mania in the 19th century, rooted in the medical tradition,<sup>22</sup> which will be mainly specified in Kraepelin's manic depressive insanity, and later in the group of affective disorders.

Esquirol's<sup>19,20</sup> influence is also observable through the use of *lipomania/melancholia*<sup>23</sup> (1855–1888; 198 entries) and in total of 95 entries of *monomanias* (1845–1885), e.g., “*δοξομανία*” (glorymania) (1863), *religious mania* (1872) *monomania of persecution* (1875), *nymphomania* (1845), and *erotomania* (1864). Esquirol's views on manias were gradually abandoned in the 1870's. Erotomania has survived in a different context.

The diagnoses of hysteria (from 1846) are limited in number, approximately 57, but “mixed” diagnoses designating more serious clinical manifestations are added, to justify better the admission: *hysteric insanity*, *hysteric phrenitis*, *hysteric mania* (1869–1926; 94 entries). *Hysteric psychosis* with 16 entries, last in 1939, has been mainly integrated into the group of schizophrenia.<sup>24</sup>

The *alcoholic insanity and phrenitis* (1893–1946, 86 entries), and alcoholic psychosis (from 1855, 372 entries) outline more serious clinical manifestations of

**Table 3.** The twenty-six most frequently reported diagnoses: 1838–2000.

Diagnosis	Total	First in:	Last in:
Schizophrenia (group of) *	2144	1915	2000
Psychotic syndrome	1982	1936	2000
Mania	827	1838	1986
Melancholia	800	1838	1998
“Πρωτόγονος άνοια” (dementia praecox, primitive dementia)	679	1862	1945
Paranoia and (mis)interpretation paranoia*	486	1887	1984
Alcoholic psychosis	383	1855	2000
Manic depressive psychosis	379	1916	2000
Mental retardation and related diagnoses, e.g., stupidity*	351	1859	2000
Affective disorder	338	1957	2000
Degeneration phrenitis, insanity, paranoia, psychosis*	283	1902	1968
Alcoholism	237	1922	2000
Depressive syndrome	253	1962	2000
Progressive paralysis of the insane and syphilis insanity, psychosis*	246	1893	1949
Psycho-organic syndrome (distinct from senile dementia)	233	1964	2000
Epileptic psychosis	203	1878	1999
“Άνοια” (dementia)	199	1845	2000
“Πρεσβυτική, γεροντική άνοια” (Senile dementia)	199	1912	2000
Lipomania (Esquirol’s)	198	1855	1888
Epilepsy	192	1846	1996
“Ισχιαλγία” (Sciatica)	173	1943	1976
Elderly psychosis	155	1940	1998
Paranoid syndrome	125	1956	1989
Periodic psychosis	118	1922	1982
Personality disorder	110	1950	2000

\*Grouped related diagnoses

alcoholism, justifying the admission to a psychiatric hospital. From 1922, we note admissions simply for alcoholism, with 237 entries, and delirium tremens with 30 entries.

“Προϊούσα γενική παράλυσις” (progressive paralysis of the insane) (1905–1973, 87 entries), also *progressive paralysis* (1897–1932, 71 entries), *syphilis insanity* (1889–1922, 43 entries), *syphilis psychosis* (1931–1949, 23 entries). Approximately 246 entries, which are limited, in comparison to the corresponding admissions in the Athenian psychiatric hospital of Dromokaition.<sup>25</sup> The use of penicillin annihilated entries related to the syphilis of CNS,<sup>26</sup> from the late 1940s.

“Διανοητική Υστέρηση” (mental retardation) from 1872 and “βλακεία”, “ηλιθιότητα” (stupidity) from 1859, represent a limited number of entries, approximately 351, as in Corfu psychiatric hospital priority was given to acute problems of admission and the patients’ crowding that

was taking place in the Athenian psychiatric hospitals, was undesirable.<sup>5,27,28</sup> Mental retardation was included in the criteria of degeneration insanity and the law 6,077 of 1934 opened officially the doors of psychiatric hospitals to these patients. Almost all of the 39 admissions under the age of 10 had a diagnosis of mental retardation, epilepsy, or both, while the same was noted for the 101 entries of those aged 11–14, except for six diagnoses of mania, hysteria, and schizophrenia. From 1951, “επιπωματική σχιζοφρένεια” (schizophrenia with mental retardation) with 115 entries figures as an aggravating cause of internment.

*Epilepsy* (from 1846; 151 entries), also *epileptic insanity* (1882–1922; 73 entries), *epileptic phrenitis* (1920–1942; 28 entries), and *epileptic mania* (1873), have been replaced later by *epileptic psychosis* (1878–1999; 201 entries), indicating the more serious clinical manifestations, as a criterion of admission.

The term psychosis was introduced from 1841-1845 by German psychiatry<sup>29</sup> (Canstatt and Feuchtersleben), which renewed the approach of serious insanities, having in parallel the long discussion on endogenous psychosis.<sup>30</sup> Psychosis gradually replaced insanity and phrenitis, giving diagnoses such as alcoholic psychosis, a new clinical gravity.

"Εκφυλογενής φρενοπάθεια" (1902-1921), "εκφυλογενής" or "εκφυλιστική φρενίτις" (1906-1952), "εκφυλογενής ψύχωση" (1929-1968) (degenerative insanity, phrenitis, psychosis), in total 283 entries, reflect the influence of Morel's (1857) and Magnan's degeneration theory.<sup>31,32</sup> In Greece, the first S. Apostolidis<sup>33</sup> (1886) was referred to his book to this theory, while Chr. Tsirigotis in 1888 used a variant of Magnan's classification.<sup>34</sup> Later, references to degeneration theory met scientific criticism, and its influence from the end of 1910s declined. Eugenics needs a separate study.<sup>35,36</sup>

Single diagnosis of "άνοια" (*dementia*) (first 1845; 199 entries), also "αυτοπαθής άνοια" (*autogenic dementia*) (1871) was used as a synonymous of insanity, as it was given to patients 60, 70 but also 20, years old. Tsirigotis mainly regrouped under "άνοια" cases of chronic mental disease. "Άνοια" will be more specified later, e.g., "απότοκος" (*consecutive*) (1866-1941; 125 entries), or "δευτερογενής" (*secondary*) *dementia* (1896-1980; 89 entries), including dementias of multiple etiologies. We observe increasing entries of "πρεσβυτική" or "γεροντική" (*senile dementia*) (from 1912, 199 entries), *elderly psychosis* (from 1940; 155 entries), and also the diagnosis of the psycho-organic syndrome,<sup>37</sup> first in 1964, with 233 entries. All these admissions reflect social changes, which have reduced the possibilities of care for the elderly in rural, but also in urban, families. In table 2 we remark on a considerable number of women aged 66+ admissions.

Advances in clinical psychiatry in France and in Germany are visible in Corfu before their incorporation into Greek literature: first in the translated book of H. Schüle<sup>38</sup> (1894) and the textbook of Prof. M. Katsaras (1898) of Athens University.<sup>39</sup> In the medical press of that time we also find brief references to these new clinical entities.

*Paranoia*, described by Kahlbaum in 1863, fined by Kraepelin till 1921,<sup>40</sup> and chronic delusional insanity of systematic evolution, key diagnoses in the classification of Magnan- Serieux (1890),<sup>41</sup> are present in Corfu as "παράνοια" (1887-1984; 486 entries) and "χρόνιο συστηματικό παραλήρημα" (chronic systematic delusions) (1904-1946; 32 entries).

Diagnoses of "διαλείπουσα" (*intermittent*) (a) *phrenitis* (1911-1944; 21 entries), (b) *mania* (1930-1973; 24 entries), and (c) *psychosis* (1940-1972; 41 entries) refer

to anterior theories on intermittent mental diseases. Kraepelin's major contribution, with the successive from 1883 to 1926 descriptions of *manic-depressive insanity*,<sup>42</sup> registered as *manic-depressive phrenitis* (1921-1923, 3 entries) and *manic-depressive psychosis* (from 1916; 379 entries).

Kraepelin's *dementia praecox* from 1893 to 1899,<sup>43</sup> is present as "πρωτόγονος άνοια" (1862-1945, 679 entries). *Dementia praecox* was first presented in Greece in 1906, by M. Oikonomakis<sup>44, 45</sup> and G. Zillanakis.<sup>46</sup> A sustainable explanation for this earlier diagnosis is that under the same term have been also incorporated anterior clinical entities: B. Morel's precocious dementia (1852)<sup>47</sup> seen also in Corfu as "πρώιμος άνοια" (1941-1946, 32 entries), "προϊούσα άνοια" (*progressive dementia*, 1918-1925, 11 entries), "εφηβική άνοια" (*adolescence dementia*, 1900-1905, 14 entries), E. Hecker's (1871) *hebephrenia*<sup>48</sup> with 21 entries from 1956 to 1988, and *hebephrenic precocious dementia* (1931-1935, 2 entries). Kahlbaum and Kraepelin's *paraphrenia*<sup>49</sup> is also present with 44 entries, from 1920 to 1950.

The group of schizophrenia (E. Bleuler, 1911)<sup>50</sup> was expected to dominate and incorporate anterior clinical entities, as "πρωτόγονος άνοια". In Corfu, we observe the first entry of schizophrenia in 1915, while papers on schizophrenia in Greek were published in 1929 and 1933.<sup>51,52</sup> In total, we have recorded 2,144 entries, including its different clinical forms, such as "υπολειμματική" (*residual*) (from 1937), *hebephrenic* (1944), *catatonic* (1947), and *paranoid* (1948).

We mention an extensive use of "σύνδρομο" (*syndrome*), especially in key diagnoses related to schizophrenia, namely *psychotic syndrome* (from 1936; 1982 entries), *catatonic syndrome* (1943-1985; 22 entries), *paranoid syndrome* (1952-1989; 125 entries), *schizo-affective syndrome* (from 1969; 83 entries).<sup>53</sup> We meet also *manic syndrome* (1949-1997; 88 entries), *melancholic syndrome* (1949-1978; 79 entries), and *depressive syndrome* (from 1962; 253 entries). This extensive use of syndromes concerning frequently psychotic states, but also affective disorders, does not correspond to the known nosography guidelines, even those known in Greece. That probably reflects the will for a freer evaluation of clinical manifestations, even of contestation of classic psychiatry, especially visible in the context of the psychiatric reform of the 1980s. In the same context we note also "ψυχωτικό επεισόδιο" (*psychotic episode*) from 1985, 95 entries, "οριακή" (*borderline*) *psychosis* (1999; 5 entries), *single depression* (1946-1966; 50 entries) and "συναισθηματική διαταραχή" (*affective disorder*) (from 1957; 338 entries), announcing the extensive use of disorders.

Limited cases of personality disorder (from 1950; 124 entries) and *behavioral disorder* (from 1982; 64 entries) denote the limited expectations of indoor care, which can also explain the tardive entries of *neurasthenia*<sup>39</sup> (1943–1967; 23 entries) and *psychasthenia*<sup>39</sup> (1950–1958; 9 entries). We note a limited number of entries for substance use (39, from 1926). Numerous admissions in Neurology (1943–1982; sciatica 178, in total 338 entries) are observed mainly in the department of internal medicine, from 1960 till the integration of the hospital in the NHS (ESY).

## Discussion

The psychiatric hospital of Corfu has been a lonely institution, well rooted in local society and representative of the classic care of insanity. We can note the hard initial conditions of care and the essential improvement which followed its reorganization in the 1960s and its integration into the NHS in 1983. The full application of the psychiatric reform from 1986 ended with its closure in 2006, in favor of a unit of indoor care in the general hospital of Corfu and a network of community-based units of care and rehabilitation. The gradual amelioration of social, public health, and care conditions is visible in indicators, such as death rates.

Diagnoses in Corfu first followed Esquirol's and the Italian guidelines and gradually integrated the French and German directions in nosography and the new clinical entities. For a long period of time and before their description in Greek, new diagnoses were integrated by the medical director in Corfu, through his personal affiliations. Basic, concise diagnoses are frequent, e.g., insanity, dementia, mental retardation, schizophrenia, psychotic syndrome, mania, and melancholia, as well as diagnoses specifying the clinical context. Several diagnoses were focusing on the absence of major psychopathological manifestations, such as "without phrenitis" and "without signs of psychosis".

Common guidelines in nosography have been gradually introduced in Greece. Along these lines, we note the laws of 1955 officializing the training of neurologist-psychiatrists and the separation of the specialties of neurology and psychiatry, in 1981. A further establishment of common criteria is related to the translation in 1980, of the 1978's ICD-9.<sup>54</sup> The homogenization of diagnostic criteria has progressed after the adoption of DSM-III (in 1980, and DSM-III-R in 1987) and mainly ICD-10 (1990), edited in Greek in 1997.<sup>55</sup>

Diagnoses that met scientific criticism, such as degeneration insanity and monomania, were set aside with some delay. The progressive paralysis of the insane

(syphilis of CNS) disappeared in the 1950s, following antibiotic treatment.

Schizophrenia is the leading diagnosis, much more if we transcribe schizophrenia many of the affiliated anterior ones, as dementia praecox.<sup>56</sup> Affective disorders were very frequent, and they occupy a central place if we add together the different names used to record them.

The term psychosis replaced insanity and phrenitis, mainly from the end of the 19th century. Its widespread use came with the new concepts of classification and new clinical entities, frequently present in Corfu before their description in Greek literature. "Syndromes" are also widely used, mainly from the 1940s. Namely, the frequent use of psychotic syndrome, with 1982 entries, in the place of schizophrenia, probably expresses the non-academic character of the institution and the will for a freer use of diagnoses instead of the known systems of nosography. We note three medical directors since 1940s, P. Zis, K. Kouris, and A. Gousis.<sup>5</sup> The last one, from 1954 to 1984, has been very active in the development of the institution and the introduction of occupational therapy. In his book<sup>5</sup> pays his respect to H. Ey, allowing us to mention the opinion of the latter on syndromes: "which make the boundaries between the large nosological entities more flexible and allow a more humane and Hippocratic pathology".<sup>57</sup> "Syndromes" were widely used in the 1980-1990s, years of psychiatric reform, offering not only the possibility of freer use of diagnoses but also a desired reduction of stigma. This is also visible in the 338 entries of "affective disorder" from 1957, before the widespread use of disorders in DSM's and ICD-10 in Greece.

Increasing entries of the elderly reflect social changes in the structure and the role of families. The rather limited entries of mental retardation, epilepsy, hysteria, personality disorders, and even less of neurasthenia and psychasthenia, are indicative of the limited expectations of care in a classical psychiatric hospital. We note the almost exclusive diagnosis of mental retardation and epilepsy in 140 admissions aged 4–10 and 11–14, at a time when very little could be done for their psychosocial improvement. In 1980–2000, years of the psychiatric reform, no more entries of so young people were observed (table 1).

Further investigation of the registries could enrich the study on the potential relation of diagnoses with social and medical parameters. A study on admissions in the Dromokaition psychiatric hospital of Athens,<sup>25</sup> indicates similarities in diagnoses, but a comparative study presupposes a new protocol of research.

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## Ερευνητική εργασία

# Διαγνώσεις στο Ψυχιατρικό νοσοκομείο Κέρκυρας (1838–2000)

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### ΠΕΡΙΛΗΨΗ

Το Ψυχιατρικό Νοσοκομείο Κέρκυρας ιδρύθηκε το 1838 από την Ιόνιο Πολιτεία. Ο εσωτερικός κανονισμός του ψηφίστηκε το 1860 και μετά την ένωση των Ιονίων νήσων το 1864, υιοθετήθηκε από το ελληνικό κράτος. Ήταν το μοναδικό ψυχιατρικό Νοσοκομείο μέχρι την ίδρυση του Δρομοκαΐτειου στην Αθήνα το 1887. Στη μακρά ιστορία του διακρίνουμε έναν τοπικό χαρακτήρα των εισαγωγών του, κυρίως από την Κέρκυρα και τα νησιά του Ιονίου και αργότερα από τη γειτονική Ήπειρο και Δυτική Ελλάδα. Ως τη δεκαετία του 1950, σημειώνουμε προσπάθειες βελτίωσης των κτιρίων και της φροντίδας των ασθενών, αλλά επίσης μακρούς χρόνους νοσηλείας και υψηλά ποσοστά θανάτων. Απομονωμένο ίδρυμα μέχρι την ένταξή του το 1983 στο Εθνικό Σύστημα Υγείας. Έκλεισε το 2006, μετά από μια μακρά διαδικασία μεταρρύθμισης, που ξεκίνησε το 1986. Στη θέση του υπάρχει σήμερα ένα δίκτυο κοινοτικών ψυχιατρικών μονάδων φροντίδας και αποκατάστασης. Η παρούσα ερευνητική εργασία μελετά τον χρόνο εμφάνισης, αλλά και απόσυρσης, των κυριότερων διαγνώσεων, στα βιβλία ασθενών του νοσοκομείου. Συνολικά έχουν καταγραφεί 15844 εισαγωγές, από το 1838 έως το 2000. Σημειώνουμε τον χρόνο πρώτης περιγραφής μιας διάγνωσης στην Ευρωπαϊκή και Ελληνική βιβλιογραφία, σε σχέση με την παρουσία της στα μητρώα του ιδρύματος. Η ευρεία διάγνωση της άνοιας τον 19ο αιώνα περιέγραφε και εικόνες χρόνιας σχιζοφρένειας. Οι διαγνώσεις της λυπομανίας (από το 1855 ως το 1888), των μονομανιών (από το 1845 ως το 1885) και της εκφυλογενούς φρενοπάθειας (από το 1902 και καθυστερημένα ως το 1952) συνδέθηκαν με την τύχη των σχετικών θεωριών. Είναι αναμενόμενος ο μεγάλος αριθμός διαγνώσεων σχιζοφρένειας, με την πρώτη το 1915. Η συγγενής προς τη σχιζοφρένεια πρωτόγονος άνοια (dementia praecox) και πρώιμος άνοια καταγράφονται από το 1862 ως το 1945. Σε όλη τη διάρκεια της λειτουργίας του νοσοκομείου παρατηρείται ένας μεγάλος αριθμός περιστατικών μανίας και μελαγχολίας. Από το 1859 καταγράφεται επίσης ο διαλειπών ή κυκλικός χαρακτήρας αυτών των συμπτωμάτων και από το 1916 η μανιοκαταθλιπτική φρενοπάθεια/ ψύχωση του Kraepelin. Η προϊούσα γενική παράλυση (σύφιλη του ΚΝΣ) θα εξαφανιστεί το 1950, με τη χρήση αντιβιοτικών. Από το τέλος του 19ου αιώνα, η έννοια της ψύχωσης αντικατέστησε σε μεγάλο βαθμό τη φρενοπάθεια, ή τη φρενίτιδα. Παρουσιάζονται επίσης οι καταγραφές πολλών άλλων διαγνώσεων. Από τη δεκαετία του 1940, παρατηρούμε εκτεταμένη χρήση του «συνδρόμου» για να περιγραφούν, τόσο κλινικές εικόνες ψύχωσης, όσο και συναισθηματικών διαταραχών. Αυτό πιθανά σχετίζεται με τη διάθεση της ιατρικής διεύθυνσης για μια πιο ελεύθερη χρήση των διαγνώσεων, σε σχέση με τα γνωστά νοσογραφικά συστήματα. Η ομογενοποίηση των διαγνώσεων στην Ελλάδα έγινε ουσιαστικά με τη χρήση του ICD 10, από τη δεκαετία του 1990.

**ΛΕΞΕΙΣ ΕΥΡΕΤΗΡΙΟΥ:** Ψυχιατρικό νοσοκομείο Κέρκυρας, ψυχιατρική διάγνωση, ιστορία ψυχιατρικής, νοσολογία, ταξινόμηση, ψυχοπαθολογία.

## Research article

# Associations of somatic symptom disorder with pain, disability and quality of life in patients with chronic low back pain

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### ABSTRACT

Literature findings have suggested that psychological factors, including anxiety, depression, and somatic symptom disorder (SSD), are predictors of poor outcomes in individuals with chronic low back pain (CLBP). The aim of this study was to examine the correlations between anxiety, depression, and SSD with pain, disability, and health-related quality of life (HRQoL) in Greek CLBP patients. Ninety-two participants with CLBP were recruited using random systematic sampling from an outpatient physiotherapy department, who completed a battery of paper-and-pencil questionnaires that included items on demographic characteristics, as well the Numerical Pain Rating Scale (NPRS) for pain, the Rolland-Morris Disability Questionnaire for disability (RMDQ), the EuroQoL 5-dimension 5-level (EQ-5D-5L) for health status, the Somatic Symptom Scale-8 (SSS-8) for SSD, the Hospital Anxiety and Depression Scale (HADS) for anxiety and depression. A Mann-Whitney test and a Kruskal-Wallis test were used for the comparison of continuous variables between two groups and among more than two groups, respectively. Moreover, Spearman correlation coefficients were used to explore the association between subjects' demographics, SSS-8, HADS-Anxiety, HADS-Depression, NPRS, RMDQ, and EQ-5D-5L indices. Predictors of health status, pain, and disability were assessed using multiple regression analyses, whereas the level of statistical significance was set at  $p < 0.05$ . The response rate was 94.6% (87 participants, 55 of whom were women) and the mean age of the sample was 59.6 years ( $SD = 15.1$ ). A tendency of weak negative associations was noted between scores of SSD, anxiety, and depression with EQ-5D-5L indices, whereas only a weak positive correlation was found between levels of SSD with pain and disability. After examining a multiple regression analysis, only SSD emerged as a prognostic factor of poor HRQoL, greater levels of pain, and disability. In conclusion, the elevated scores of SSD significantly predict worse HRQoL, intense pain, and severe disability in Greek CLBP patients. Further research is needed to test our findings in larger and more representative samples of the Greek general population.

**KEYWORDS:** Somatic symptoms disorder, chronic low back pain, pain, disability, quality of life.

### Introduction

According to the Global Burden of Diseases Study 2019, low back pain (LBP) was the leading cause of disability for all ages and responsible for 64 million disability-adjusted life-years, an increase of 47% since 1990.<sup>1,2</sup> In Greece, LBP was one of the top five causes of years lived with a disability during 2000–2016.<sup>3</sup> Therefore, LBP calls for intensified research efforts and specific at-

tention from health policymakers to address its burden as a public health problem.<sup>4</sup>

Many studies have suggested that sociodemographic (age, sex, marital and employment status, educational background), lifestyle (excess body mass, lack of physical activity), and psychological factors, notably depression, anxiety, and somatization or somatic symptom disorder (SSD), are risk factors of LBP and predictors of poor outcomes, thus shaping the concept of a “biopsy-

chosocial pain syndrome<sup>5–14</sup>. In particular, older age, high values of Body Mass Index (BMI), and less frequent physical exercise have been linked with lower quality of life, pain, and disability severity in patients with chronic low back pain (CLBP).<sup>11,15–20</sup>

Additionally, the potential importance of the aforementioned psychological factors is supported by a systematic review of LBP (25 cohort studies) that found depression, anxiety, and somatization to be consistently correlated with persisting pain and disability.<sup>21</sup> Similarly, a systematic review including 25 cohort studies identified depression as the most frequently observed prognostic risk factor for CLBP and to a lesser extent somatization.<sup>14</sup> Likewise, a systematic review of 10 observational studies highlighted the moderate association of depression and anxiety with high levels of pain and disability in patients with CLBP.<sup>22</sup> More recently, a systematic review of 21 studies (19 cross-sectional and 2 cohorts) identified anxiety and depression as determinants of quality of life (inverse correlations) in individuals having CLBP.<sup>23</sup> Notwithstanding, the role of psychological factors in CLBP has not been widely explored in Greece.<sup>24,25</sup> A Greek cross-sectional study of 645 residents within an urban setting found that depressed participants reported 2.3 times higher LBP severity than those without depression.<sup>24</sup> In addition, cross-sectional data from Greece (a representative sample of 3,125 people) showed that anxiety was predictive of pain intensity in LBP patients, while both anxiety and depression were not associated with disability.<sup>25</sup> In summary, no study to date has examined the role of SSD in Greek CLBP patients.

Therefore, the aim of the present cross-sectional study was to investigate the associations of sociodemographic and lifestyle factors, SSD, anxiety, and depression with pain, disability, and health-related quality of life (HRQoL) in patients with CLBP. We hypothesized that a higher somatic symptom burden, anxiety and depression, and, in addition, advancing age, excess body mass, and lack of habitual exercise might be associated with worse HRQoL and higher levels of pain and disability.

## Material and Method

This cross-sectional study was conducted at TYPET (Mutual Health Fund of National Bank of Greece Personnel) outpatient physiotherapy department in Athens (Greece). Between 1 April 2021 and 20 December 2021, 92 participants, aged 26–94 years old, were recruited with random systematic sampling from patients, who had been referred to the above department for physical therapy evaluation and treatment of CLBP (defined as having pain, discomfort and stiffness

beyond 3 months at T12 or lower, including radiating pain into the buttocks and lower extremity).

Exclusion criteria were insufficient Greek language skills, gestation, and presence of “red flags” such as history of cancer or surgery, rheumatoid and psoriatic arthritis, ankylosing spondylitis, spinal fracture, cauda equina syndrome, spondylolisthesis, fibromyalgia, and scoliosis  $\geq 20^\circ$ . All included patients were informed by the researcher about the anonymity and confidentiality of the paper-and-pencil questionnaire and were provided with their written consent. The study was approved by the medical ethics board of TYPET and the National and Kapodistrian University of Athens and was conducted according to the principles of the Declaration of Helsinki.<sup>26</sup> The study followed the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement for reporting cross-sectional studies.<sup>27</sup>

## Measures

The administered by hand paper-and-pencil questionnaire included items on demographic characteristics, namely gender, age, body weight, height, marital status, education background, employment status, physical activity (during the last year, how often did you work out more than 30min a day per week), as well as patient-reported outcome (PRO) measures for somatic symptom burden, anxiety, depression, pain, disability, and HRQoL. In particular:

The Somatic Symptom Scale-8 (SSS-8) is an instrument to assess the burden of 8 common somatic complaints in primary care within the last week. Each item is scored on a five-point Likert-type scale; sum scores range from 0 to 32, with higher values denoting greater somatic symptom severity (0–3 no to minimal; 4–7 low; 8–11 medium; 12–15 high; 16–32 very high).<sup>28</sup>

The Hospital Anxiety and Depression Scale (HADS) is a measure of the severity of anxiety and depression (7 items for each subscale) within the last seven days in clinical research, using a four-point Likert-type scale. Total scores range from 0 to 21, with higher values indicating greater degrees of anxiety and depression.<sup>29</sup>

The Pain Numerical Rating Scale (PNRS) is a measure of pain intensity (most severe pain and average level of pain for the past week), ranging from 0 (no pain) to 10 (worst pain you can imagine).<sup>30</sup>

The Roland-Morris Disability Questionnaire (RMDQ) consists of 24 items that assess the functional status of LBP patients over the past 24 hours. Total scores range from 0 to 14, with higher greater a range of 0 (no disability due to LBP) to 14 (maximum disability due to LBP), with higher scores corresponding to greater levels of disability due to LBP.<sup>31</sup>

The EQ-5D-5L is a standardized measure of health status developed by the EuroQoL Group to provide a simple, generic measure of health for clinical and economic appraisal. It is composed of a descriptive system, consisting of five dimensions assessing mobility, self-care, usual activities, pain/discomfort, and anxiety/depression, which defines a unique health status (3,125 levels) ranging from 11 111 (best health) to 55 555 (worst health), and a thermograph-like scale rated from 0 (the worst imaginable health) to 100 (the best imaginable health).<sup>32,33</sup>

All PRO measures have previously been cross-culturally validated within the Greek population and have been recommended for utilization across patients with CLBP.<sup>34–37</sup>

### Statistical analysis

Quantitative variables were expressed as mean (Standard Deviation) or as median (interquartile range). Qualitative variables were expressed as absolute and relative frequencies. Mann-Whitney test was used for the comparison of continuous variables between two groups and the Kruskal-Wallis test for the comparison of continuous variables among more than two groups. Spearman correlation coefficients were used to explore the association of two continuous variables. Spearman's correlation coefficient values (*r*s) greater than 0.7, of 0.69–0.4, and less than 0.39–0.1 were considered strong, moderate, and weak correlations, respectively.<sup>38</sup> Multiple linear regression analyses were conducted with dependent the health status, disability, and pain scales in a stepwise method (*p* for entry 0.05, *p* for removal 0.10). The factors that were included as independent variables in the model were sociodemographic (age, sex, marital and employment status, educational level), lifestyle (Body Mass Index, physical exercise), SSD, depression, and anxiety as measured by the SSS-8 and HADS questionnaires, respectively. Adjusted regression coefficients ( $\beta$ ) with standard errors (SE) were computed from the results of the linear regression analyses. Multiple linear regression analyses were conducted after having the dependent variables logarithmically transformed. All reported *p* values are two-tailed. Statistical significance was set at *p*<0.05 and analyses were conducted using SPSS statistical software (version 22.0).

### Results

The sample consisted by 87 participants (response rate 94.6%), 32 men and 55 women, with mean age of 59.6 years (SD=15.1 years). Their characteristics are presented in table 1. The mean BMI was 27 kg/m<sup>2</sup> and 23% were

obese. Married 59.8% of the participants and 34.5% were employed. Also, 29.1% of the participants had a postgraduate degree. More than two times a week working out 49.4% of the sample, during the last year, for more than 30 minutes. The median SSS-8 score was 9 (IQR: 6–12) and the median RMDQ score was 7 (IQR: 4–10). Also, the median depression score was 6 (IQR: 4–8) and the median anxiety score was 5 (IQR: 2–7). Mean EQ-5D-5L index value score for all participants was 0.68 (SD=0.15) and the mean EQ-5D-5L VAS was 70.39 (SD=15.24).

Higher SSS-8, depression, and anxiety scores are associated with lower EQ-5D-5L index value scores, indicating worse hconditionsdition (table 2). Also, more frequent physical exercise was significantly associated with better health status. Moreover, higher SSS-8, depression, and anxiety scores are associated with worse health status.

Greater age and greater SSS-8 scores were significantly associated with greater scores in the RMDQ (table 3).

**Table 1.** Sample characteristics.

	N (%)
Gender	
Men	32 (36.8)
Women	55 (63.2)
Age (years), mean (SD)	59.6 (15.1)
BMI (kg/m <sup>2</sup> ), mean (SD)	27 (5.7)
BMI	
Normal	35 (40.2)
Overweight	32 (36.8)
Obese	20 (23.0)
Married	52 (59.8)
Educational level	
At most college	37 (43.0)
University	24 (27.9)
Postgraduate studies	25 (29.1)
Employed	30 (34.5)
During the last year, how often did you work out more than 30min a day?	
None	15 (17.2)
1–2 times per month	15 (17.2)
Once a week	14 (16.1)
More than two times a week	43 (49.4)
SSS-8 score, median (IQR)	9 (6–12)
HADS-Depression score, median (IQR)	6 (4–8)
HADS-Anxiety score, median (IQR)	5 (2–7)

SD: Standard Deviation; BMI: Body Mass Index; SSS-8: Somatic Symptom Scale-8; HADS: Hospital Anxiety and Depression Scale.

**Table 2.** Association of EQ-5D-5L index value and health status (EQ-5D-5L VAS) score with participants' demographics and their scores in SSS-8 and HADS scales

	EQ-5D-5L index value			Health status (EQ-5D-5L VAS)				
	Mean (SD)	Median (IQR)	Statistic value	P	Mean (SD)	Median (IQR)	Statistic value	P
Total sample	0.68 (0.15)	0.69 (0.69 – 0.78)		–	70.39 (15.24)	70 (60 – 80)		–
Gender								
Men	0.69 (0.12)	0.70 (0.6 – 0.78)	841.5	0.735 <sup>+</sup>	72.41 (14.68)	72 (65 – 80)	760.5	0.290 <sup>+</sup>
Women	0.68 (0.16)	0.69 (0.6 – 0.78)			69.22 (15.57)	70 (55 – 80)		
Age, r <sup>†</sup>		–0.11		0.304				0.946
BMI, r <sup>†</sup>		–0.15		0.180				0.322
BMI								
Normal	0.71 (0.16)	0.71 (0.67 – 0.82)	4.05	0.132 <sup>++</sup>	70.83 (16.82)	75 (60 – 85)	2.07	0.355 <sup>++</sup>
Overweight	0.68 (0.12)	0.70 (0.57 – 0.78)			72.84 (12.53)	72 (65 – 82.5)		
Obese	0.64 (0.15)	0.68 (0.51 – 0.74)			65.7 (15.99)	69.5 (55 – 80)		
Married								
No	0.67 (0.14)	0.68 (0.56 – 0.77)	795.5	0.322 <sup>+</sup>	68.74 (15.52)	70 (60 – 80)	848.5	0.592
Yes	0.69 (0.15)	0.71 (0.65 – 0.78)			71.50 (15.10)	70 (62.5 – 80)		
Educational level								
At most college	0.68 (0.17)	0.71 (0.59 – 0.78)	1.57	0.455 <sup>++</sup>	72.05 (12.48)	75 (60 – 80)	0.45	0.799 <sup>++</sup>
University	0.67 (0.13)	0.68 (0.59 – 0.76)			70.21 (15.98)	72 (60 – 80)		
Postgraduate studies	0.71 (0.12)	0.74 (0.67 – 0.78)			68.32 (18.56)	70 (65 – 80)		
Employed								
No	0.68 (0.15)	0.70 (0.59 – 0.77)	846.5	0.939 <sup>+</sup>	71.46 (12.99)	70 (60 – 80)	797.0	0.602 <sup>+</sup>
Yes	0.68 (0.13)	0.69 (0.67 – 0.78)			68.37 (18.89)	70 (60 – 85)		
More frequent physical exercise, r <sup>†</sup>		–0.01		0.893				0.006
SSS-8 score, r <sup>†</sup>		–0.32		0.002				0.022
HADS-Depression score, r <sup>†</sup>		–0.30		0.005				<0.001
HADS-Anxiety score, r <sup>†</sup>		–0.26		0.013				0.003

Mann-Whitney test (U statistic value is provided); ++Kruskal-Wallis test (Chi-square with df=2 is provided); #Spearman correlation coefficient; SD: Standard Deviation; IQR: Interquartile Range; BMI: Body Mass Index; SSS-8: Somatic Symptom Scale-8; HADS: Hospital Anxiety and Depression Scale.

**Table 3.** Association of RMDQ and PNRS score with participants' demographics and their scores in SSS-8 and HADS scales.

	RMDQ			PNRS (0-10 scale)			P	Statistic value	P
	Mean (SD)	Median (IQR)	Statistic value	Mean (SD)	Median (IQR)	Statistic value			
Total sample	7.45 (4.47)	7 (4-10)		4.67 (1.97)	5 (3-6)		-	-	
Gender									
Men	7.28 (4.01)	7 (5-9)	862.0	4.69 (1.69)	5 (3-6)	855.5	0.874 <sup>+</sup>	0.827 <sup>+</sup>	
Women	7.55 (4.76)	7 (4-11)		4.65 (2.14)	5 (3-6)				
Age, r <sup>†</sup>	0.22			0.08			0.047	0.453	
BMI, r <sup>†</sup>	0.01			0.26			0.944	0.014	
BMI									
Normal	7.40 (4.79)	7 (4-11)	0.30	4.09 (2.03)	4 (3-6)	6.07	0.861 <sup>++</sup>	0.048 <sup>++</sup>	
Overweight	7.69 (4.15)	7.5 (5-10)		4.75 (1.78)	5 (3-6.5)				
Obese	7.15 (4.60)	6.5 (4.5-9)		5.55 (1.90)	5.5 (5-6)				
Married									
No	7.77 (3.87)	8 (5-10)	805.5	4.60 (1.99)	5 (3-6)	852.0	0.364 <sup>+</sup>	0.610 <sup>+</sup>	
Yes	7.23 (4.87)	6 (4-10.5)		4.71 (1.98)	5 (4-6)				
Educational level									
At most college	8.03 (5.32)	7 (4-11)	2.42	4.70 (2.23)	5 (3-6)	1.69	0.298 <sup>++</sup>	0.431 <sup>++</sup>	
University	8.00 (4.01)	7.5 (4.5-11)		4.17 (1.86)	4.5 (3-5.5)				
Postgraduate studies	6.20 (3.30)	7 (4-8)		4.92 (1.44)	5 (4-6)				
Employed									
No	7.96 (4.94)	8 (4-11)	723.0	4.61 (2.18)	5 (3-6)	821.5	0.237 <sup>+</sup>	0.761 <sup>+</sup>	
Yes	6.47 (3.29)	7 (4-8)		4.77 (1.55)	5 (4-6)				
More frequent physical exercise, r <sup>†</sup>	-0.13			-0.18			0.245	0.102	
SSS-8 score, r <sup>†</sup>	0.22			0.23			0.046	0.035	
HADS-Depression score, r <sup>†</sup>	0.20			0.14			0.059	0.197	
HADS-Anxiety score, r <sup>†</sup>	0.12			0.01			0.281	0.899	

+Mann-Whitney test (U statistic value is provided); ++Kruskal-Wallis test (Chi-square with df=2 is provided); +Spearman correlation coefficient; SD: Standard Deviation; IQR: Interquartile Range; BMI: Body Mass Index; RMDQ: Roland-Morris Disability Questionnaire; PNRS: Pain Numerical Rating Scale; SSS-8: Somatic Symptom Scale-8; HADS: Hospital Anxiety and Depression Scale

Greater BMI was significantly associated with greater pain, based on the 0–10 scale. Also, worse somatic symptoms, i.e., greater SSS-8 score, were significantly associated with greater pain.

When multiple regression analysis was conducted it was found that higher SSS-8 was significantly associated with worse health, greater pain, and greater disability (table 4). Also, more anxiety symptoms and less frequent physical exercise were associated with worse health status. Greater BMI was significantly associated with more intense pain. Furthermore, greater age was significantly associated with greater disability.

## Discussion

To the best of our knowledge, this was the first cross-sectional study examining the associations of psychological factors with pain, disability, and health-related quality of life (HRQoL) in Greek chronic low back pain (CLBP) patients. Overall, the findings demonstrated that a higher somatic symptom burden, anxiety, and depression correlated with worse HRQoL and, in addition, only higher Somatic Symptom Scale-8 (SSS-8) scores relatively correlated with lower levels of HRQoL, greater levels of pain and disability in the multivariate regression models.

In the study sample, it was observed a medium somatic symptom severity using SSS-8, which is consistent with the findings of Petrelis & Domeyer<sup>36</sup> in Greek patients with CLBP and of a cross-sectional study of Japanese individuals with CLBP.<sup>39</sup> The respective low HADS-Anxiety and HADS-Depression scores are in accordance with several cross-sectional studies in developed and developing countries,<sup>35,40–44</sup> except the results of Billis et al<sup>25</sup> and Bean et al,<sup>45</sup> which have yielded low

to moderate scores of the two subscales in a sample of four hundred seventy-one people reported LBP and eighty-eight CLBP patients, respectively. This discrepancy may reflect the differences in pain and disability severity of the study samples; our lower levels of pain and disability may exhibit lower scores of HADS, because of the predictive role of anxiety and depression in those outcomes.<sup>21,22,46</sup>

It is generally recognized that the elevated scores of SSD, anxiety and depression are relatively important predictors of poor HRQoL in individuals with CLBP.<sup>23,39,44,46–48</sup> Notably, a weak to moderate negative correlation of SSS-8 with EQ-5D-5L indices was found in the study of Petrelis & Domeyer.<sup>36</sup> Moreover, Fujii et al<sup>39</sup> noted in their cross-sectional study that SSS-8 total scores were negatively moderately associated ( $r_s = -0.55$ ) with lower EQ-5D-3L index value. Additionally, Tsuji et al<sup>47</sup> reported that CLBP patients with depression, using Patient Health Questionnaire-9 (PHQ-9), had significantly worse HRQoL, while Guclu et al<sup>48</sup> highlighted the weak negative associations between both anxiety and depression with HRQoL. Similarly, a recent pooled analysis of 21 studies (19 cross-sectional and 2 cohort), discussed possible determinants of quality of life and revealed anxiety and depression as predictors of poor quality of life due to their inverse correlation.<sup>23</sup> Apart from differences in the methodological design, the current study extends this body of knowledge, showing significant but less pronounced associations between SSD, anxiety, and depression with EQ-5D-5L indices. This was further examined in a multiple regression analysis to predict HRQoL, emerging only SSD and anxiety as predictors of EQ-5D-5L indices and EQ-5D-5L VAS, respectively. Parallel to the literature, regular exercise (like walking or running for 30 minutes more than two times per week) was also significantly correlated with

**Table 4.** Multiple linear regression results.

Dependent variable	Independent variables	$\beta^+$	SE <sup>++</sup>	P
EQ-5D-5L index value	SSS-8 score	-0.002	0.001	0.049
Health status (EQ-5D-5L VAS)	SSS8 score	-0.006	0.003	0.026
	Anxiety score	-0.007	0.003	0.023
	During the last year, how often did you work out more than 30min a day?	0.026	0.009	0.005
RMDQ	SSS-8 score	0.014	0.007	0.030
	Age	0.004	0.002	0.040
PNRS (0-10 scale)	SSS-8 score	0.012	0.004	0.006
	BMI	0.008	0.003	0.025

Note. Regressions were made after logarithmic transformation of the data +regression coefficient; ++Standard Error; BMI: Body Mass Index; RMDQ: Rolland-Morris Disability Questionnaire; PNRS: Pain Numerical Rating Scale; SSS-8: Somatic Symptom Scale-8; HADS: Hospital Anxiety and Depression Scale

better health status in our study, which was identified to a greater extent based on the multiple regression analysis.<sup>11,17,18,20</sup>

To date, no study has examined the associations between SSS-8 and self-reported disability and pain in individuals with CLBP. SSS-8 showed weak positive associations with RMDQ and PNRs and, in addition, these relationships remained relevant after controlling for multiple comparisons, indicating that greater somatic symptom severity significantly predict greater levels of disability and pain. A similar correlation has been reported among people with CLBP in previous studies and a recent systematic review of 10 observational studies, using different reference measures (Depression Somatic Symptom Scale and Somatization subscale of Symptom Check-List-90 for SSD, Oswestry Disability Index, Chronic Graded Pain Questionnaire and German Pain Questionnaire for disability and pain, respectively).<sup>22,40,43</sup> Notably, a German prospective cohort study of four hundred eighty-four CLBP patients found that higher values of somatization and age predicted disability in a multiple regression analysis.<sup>43</sup> However, cross-sectional data from Taiwan (a sample of two hundred fifteen participants with CLBP) showed that somatic symptoms severity, due to the Somatic subscale of the Depression Somatic Symptom Scale, did not independently relate to disability based on the regression models.<sup>40</sup> Finally, our results strengthen the findings of previous studies among CLBP patients, reporting weak correlations between greater age and BMI with severe disability and intense pain respectively.<sup>14–16,25,40,49,50</sup>

Furthermore, although it is established that the elevated scores of depression and anxiety are consistently correlated with greater scores of disability and pain, we were not able to replicate it in the present study.<sup>25,41,47,49,51</sup> An Egyptian cross-sectional study of fifty CLBP patients detected a moderate positive association between depression by the Beck Depression Inventory (BDI) and each pain (VAS) and disability (Oswestry Disability Index).<sup>49</sup> Billis et al<sup>25</sup> observed a weak positive correlation for both anxiety and depression with pain intensity across a sample of four hundred twenty-one Greek residents with LBP, whereas only anxiety was noted as a prognostic factor of higher scores of pain. An equivalent tendency was also found in two cross-sectional studies, involving two hundred individuals with CLBP and one hundred and twenty-three CLBP residents in rural Nigeria and Spain each in order, denoting that depressed and anxious CLBP patients had importantly higher levels of self-reported disability. These were further investigated in the multivariate regression

models, indicating anxiety as a significant predictor of disability.<sup>41,51</sup>

Our differing results compared to these aforementioned findings might be explained by our lower disability and pain severity profile of the sample.<sup>25</sup> Additionally, there are methodological differences in the study measures and statistical analysis of those researches and ours that might explain the divergent results, due to different population characteristics, sampling methods and study sizes, dissimilar self-reported questionnaires for pain, anxiety, depression, and SSD, as well as lack of simultaneous assessment of SSD, depression and anxiety in these studies, despite the reporting high comorbidity and partial overlap of SSD, depression and anxiety disorders.<sup>10,39,52,53</sup> These are essential since the outcomes of multiple regression analysis are always determined by the selection of predictor variables that have significant correlations with dependent variables from the results of the linear regression analysis.<sup>43,54</sup>

The present study was subject to some limitations. First, the sample may not be representative of the general population in Greece and the generalization of the results to CLBP patients in other clinical settings or Greek regions should be faced cautiously, as a result of conducting the study at a single primary healthcare unit in Athens. Second, the cross-sectional design of this study did not permit clarifying cause-and-effect relationships between SSD, anxiety, and depression with pain, disability, and HRQoL. Further prospective cohort studies are needed to better understand those associations on a national scale. Third, the low sample size and the over-representation of women may affect the conclusions drawn from the study, which restricts the representativeness and generalizability of the results.

In summary, our findings provide important evidence that the contribution of SSD, anxiety, and depression is substantial to poor HRQoL in Greek primary care patients with CLBP. Of all psychological variables examined in multiple regression analysis, only somatic symptom burden was consistently found to be a significant prognostic factor of lower levels of HRQoL and greater scores of pain and disability, underscoring the need to screen for SSD in CLBP individuals as an essential part of the clinical management of CLBP, which is paramount in planning better target treatment interventions and using more defined dosages. Future large and long-term prospective studies are needed to clarify the causality and clearly establish which psychological factors are the most appropriate predictors of poor outcomes to more representative samples of the Greek general population.

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## Ερευνητική εργασία

# Οι συσχετίσεις της διαταραχής σωματικών συμπτωμάτων με τον πόνο, την ανικανότητα και την ποιότητα ζωής ασθενών με χρόνια οσφυαλγία

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### ΠΕΡΙΛΗΨΗ

Τα ευρήματα από τη βιβλιογραφία έχουν προτείνει τους ψυχολογικούς παράγοντες, συμπεριλαμβανομένου του άγχους, της κατάθλιψης και των διαταραχών των σωματικών συμπτωμάτων (somatic symptom disorder, SSD), ως παράγοντες πρόβλεψης φτωχής έκβασης των ατόμων με χρόνια οσφυαλγία. Ο σκοπός αυτής της μελέτης ήταν να εξεταστούν οι συσχετίσεις μεταξύ του άγχους, της κατάθλιψης και των SSDs με τον πόνο, την ανικανότητα και την σχετιζόμενη με την υγεία ποιότητα ζωής σε Έλληνες ασθενείς με χρόνια οσφυαλγία. Με συστηματική τυχαία δειγματοληψία επιλέχθηκαν ενενήντα δύο συμμετέχοντες με χρόνια οσφυαλγία από ένα τμήμα φυσικοθεραπείας εξωτερικών ασθενών, οι οποίοι συμπλήρωσαν ένα πλήθος έντυπων ερωτηματολογίων, όπου περιλάμβαναν δημογραφικά χαρακτηριστικά, όπως επίσης των κλιμάκων για τον πόνο (Numerical Pain Rating Scale, NPRS), την ανικανότητα (Rolland-Morris Disability Questionnaire, RMDQ), την ποιότητα ζωής (EuroQoL 5-dimension 5-level, EQ-5D-5L), τη διαταραχή των σωματικών συμπτωμάτων (Somatic Symptom Scale-8, SSS-8), το άγχος και την κατάθλιψη (Hospital Anxiety and Depression Scale, HADS). Χρησιμοποιήθηκαν τα κριτήρια Mann-Whitney test και Kruskal-Wallis για τον έλεγχο δυο μεταβλητών μεταξύ δύο ομάδων και περισσότερων από δύο ομάδων αντίστοιχα. Επίσης, χρησιμοποιήθηκε ο συντελεστής συσχέτισης του Spearman για να διερευνηθεί η σχέση μεταξύ των δημογραφικών χαρακτηριστικών και των μετρήσεων των ατόμων στις κλίμακες SSS-8, HADS-Anxiety, HADS-Depression, NPS, RMDQ and EQ-5D-5L. Οι προγνωστικοί παράγοντες του επιπέδου υγείας, του πόνου και της ανικανότητας αξιολογήθηκαν χρησιμοποιώντας την πολλαπλή ανάλυση παλινδρόμησης, ενώ το επίπεδο στατιστικής σημαντικότητας ορίστηκε στο  $p < 0,05$ . Ο δείκτης απόκρισης ήταν 94,6% (87 συμμετέχοντες, εκ των οποίων οι 55 ήταν γυναίκες) και η μέση ηλικία του δείγματος ήταν τα 59,6 έτη ( $SD=15,1$ ). Παρατηρήθηκε μια τάση μικρών αρνητικών συσχετίσεων μεταξύ των βαθμολογιών της SSD, του άγχους και της κατάθλιψης με τους δείκτες του EQ-5D-5L, ενώ βρέθηκε μόνο μια μικρή θετική σχέση των επιπέδων της SSD με τον πόνο και την ανικανότητα. Συμπερασματικά, οι υψηλές βαθμολογίες της SSD προβλέπουν στατιστικά σημαντικά φτωχότερη σχετιζόμενη με την υγεία ποιότητα ζωής, έντονο πόνο και σοβαρή ανικανότητα σε Έλληνες ασθενείς με χρόνια οσφυαλγία. Περαιτέρω έρευνα απαιτείται σε μεγαλύτερα και αντιπροσωπευτικότερα δείγματα του γενικού πληθυσμού της Ελλάδας.

**ΛΕΞΕΙΣ ΕΥΡΕΤΗΡΙΟΥ:** Διαταραχή σωματικών συμπτωμάτων, χρόνια οσφυαλγία, πόνος, ανικανότητα, ποιότητα ζωής.

## Review

# The efficacy of psychoeducation in managing low back pain: A systematic review

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### ABSTRACT

Low back pain is a relatively common health problem that afflicts many adults, and its prevalence increases with age. Several studies have indicated that psychosocial factors are of importance in low back pain. The aim of this study was to carry out a systematic review of the efficacy of psychoeducation in managing low back pain from the evidence provided by randomized controlled trials. The inclusion criteria for studies included in this systematic review were randomized controlled trials; patients with low back pain, with or without sciatica; the inclusion of a psychoeducation (treatment) arm; and the age of patients  $\geq 17$  years. Data extraction revealed the heterogeneous nature of the psychoeducational interventions. Accordingly, it was deemed inappropriate to carry out a formal meta-analysis. Ultimately, nine studies, corresponding to 10 publications, were included in the systematic review. When possible, group contrast means different effect sizes were calculated for the studies. Overall, favorable outcomes were associated with personalized telephone coaching, while unfavorable outcomes were associated with both Transtheoretical Model-based counseling and motivational enhancement treatment. Other forms of one-to-one counseling were associated with intermediate outcomes. Psychoeducation via personalized telephone coaching was particularly associated with reduced low back pain, reduced daily living disability, improved function, and improved recovery expectation. On the basis of this review, the following suggestions are made relating to the design and publication of future studies on the efficacy of psychoeducation in the management of low back pain. First, it would be good to use an experimental design that blinds both the patients and the assessors to group status. Second, it is recommended that all the relevant outcome data from a study are published, either in the corresponding paper or in an online supplement. Third, it is important to ensure that the intervention and control groups are matched at baseline. Clearly, baseline group differences can emerge following the random allocation of patients into two groups. It may be useful, therefore, to carry out all baseline assessments immediately prior to the randomization process; an independent assessor could then examine the degree of matching at baseline before the rest of the study proceeds. It is also important that sufficiently large sample sizes be recruited.

**KEYWORDS:** Adult low back pain, randomized controlled trials, mood, psychoeducation, disability.

### Introduction

Low back pain is a relatively common health problem that afflicts many adults, and its prevalence increases with age.<sup>1</sup> Worldwide, it is estimated to affect one in five of those aged between 20 and 59 years,<sup>2</sup> while for those

aged 60 years or older a Brazilian study has reported a prevalence of over one in four.<sup>3</sup> It has a major adverse economic effect, often being reported as the most important cause of both sick leave and medical rehabilitation.<sup>4</sup> So serious is the situation, accentuated as it is

worldwide by both an increasing population and an aging population, that in 2018 the Lancet medical journal issued a call for action regarding low back pain.<sup>5</sup>

Several studies have indicated that psychosocial factors are of importance in low back pain.<sup>6,7</sup> Indeed, a recent systematic review reported that fear-avoidance beliefs, self-efficacy, pain coping, catastrophizing, and depressed mood are predictive, in patients with low back pain, of disability status.<sup>8</sup>

The goal of educational and informational treatments is to provide patients with an understanding of their painful diseases which will support them in coping with the situation more effectively. Psychoeducation describes approaches that emphasize the application of psychological information and counseling, in person or in groups. In the context of pain management, part of the objective of psychoeducation is to teach patients fundamental information about pain, and how it functions, leading to increased understanding and reduced anxiety and ambiguity regarding the pain. In addition, educational activities nearly always aim to modify patients' behavior to improve their ability to cope with pain.<sup>9</sup> Thus, psychoeducation for pain management can be considered to encompass interventions such as counseling, motivational interviewing, education, skills building, and health or nurse coaching; indeed, psychoeducational interventions have been shown to diminish pain in patients with advanced cancer.<sup>10</sup> The counseling itself is often based on the transtheoretical model of behavior change, also known as the stages of change, and may include facilitative or stage-based motivational methodologies.<sup>11–15</sup> Strict operational criteria defining the above psychoeducational interventions are not in current use; for example, health or nurse coaching is not strictly defined and, indeed, such intervention need not be administered in person but may be given by telephone (when it is sometimes referred to as telehealth coaching).<sup>16–18</sup>

Given that pain-related psychoeducation has been found to transform thought patterns and coping strategies and to reduce pessimistic attitudes in patients dealing with acute or chronic pain symptoms,<sup>19</sup> it is reasonable to hypothesise that psychoeducation may be efficacious in the management of low back pain.

The aim of this study was to carry out a systematic review of the efficacy of psychoeducation in managing low back pain from evidence provided by randomised controlled trials.

## Material and Method

The inclusion criteria for studies included in this systematic review were randomised controlled trials; patients with low back pain, with or without sciatica; the

inclusion of a psychoeducation (treatment) arm; and age of patients  $\geq 17$  years. Studies of children, cognitive-behavioural therapy or pregnancy were excluded, as were any studies for which an English translation of the paper was not available.

On 30th March 2022, the National Library of Medicine PubMed was searched using the following Boolean search strategy: (“randomized controlled trial”[Publication Type]) OR (“clinical trial”[Publication Type]) OR (“controlled clinical trial”[Publication Type]) OR (“comparative study”[Publication Type]) OR (“randomized”[-Title/Abstract]) OR (“randomised”[Title/Abstract]) OR (“trial”[Title/Abstract]) OR (“placebo”[Title/Abstract])) AND (“psychoeducation”[All Fields]) OR (“psychological”[All Fields]) OR (“coaching”[All Fields]) OR (“coach”[All Fields])) AND (“low back pain”[All Fields]) OR (“back pain”[All Fields]) OR (“sciatica”[All Fields])) AND (Filter: Humans[Species]). Since the PubMed database included the MEDLINE database, the latter was not searched separately. ClinicalTrials.gov was searched using the primary search term “Back Pain, Low” and the filters “Adult” and “Older Adult”. CENTRAL (The Cochrane Central Register of Controlled Trials) was also searched, using the MeSH descriptor [Low Back Pain] + therapy + [psychoeducation OR counselling]. The PubMed search strategy was carried out using the SCOPUS database on 11th July 2022; no new publications were forthcoming. A similar strategy using the database APA Psycinfo via EBSCO on 15th August 2022 also revealed no new publications.

The full texts were assessed for eligibility for inclusion in the systematic review after duplicates were removed and the study abstracts and titles screened. Data extraction revealed the heterogeneous nature of the psychoeducational interventions. Accordingly, it was deemed inappropriate to carry out a formal meta-analysis.<sup>20</sup> Instead, the effect size formula for group contrast mean difference effect size shown in the following equation:

$$d = (\Delta\bar{x}_i - \Delta\bar{x}_c) \sqrt{\frac{\sum_{k=1}^4 n_k - 4}{\sum_{k=1}^4 (n_k - 1) s_k^2}}$$

was calculated for each study, based on the mean difference effect size calculated in meta-analytic studies.<sup>20</sup>

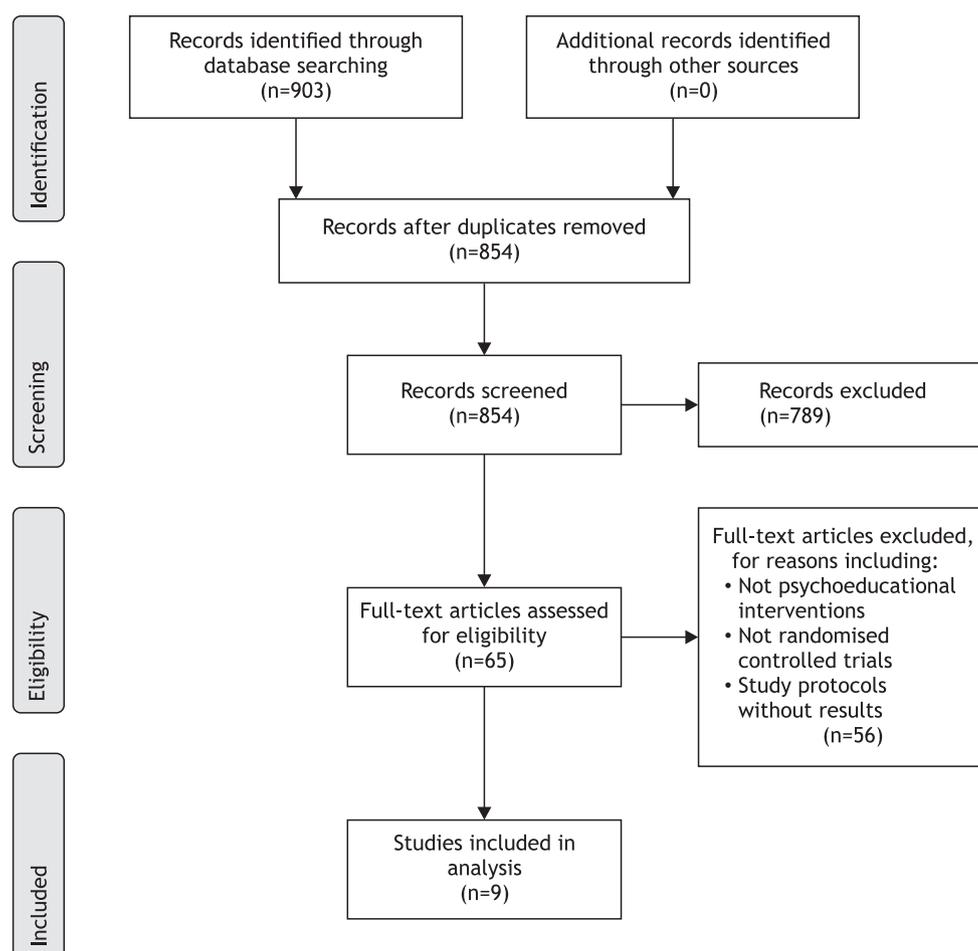
In this formula, the subscript *i* refers to the intervention group and the subscript *c* refers to the control group. On the right-hand side, the first term, in parentheses, represents the difference between the mean change in the intervention group and the mean change in the control group. The second term on the right-hand side, namely the square root of a quotient, represents the reciprocal of the pooled standard deviation, with *n* being the number of subjects, and *s* being the standard deviation.

## Results

As shown in figure 1, 65 studies were potentially eligible for inclusion in this systematic review. Ultimately, nine studies, corresponding to 10 publications,<sup>21–30</sup> were included in the systematic review. The first authors, country locations and details of the participants in these studies are given in table 1. Although identified as two different studies, the German studies by Leonhardt et al<sup>22</sup> and Becker et al.<sup>23</sup> refer essentially to the same cluster randomised controlled trial; they have therefore been paired together in the table and have been treated as one study in this systematic review. This German study included three groups, namely a multifaceted guideline implementation group, a second group which consisted of multifaceted guideline implementation plus motivational counselling (by trained practice nurses), and a third group who received guidelines by post.<sup>22,23</sup> Since the only difference between the first two groups is the inclusion of a psychoeducation element in one of them, for this review the second group has been treated as the intervention group while the first group has been treated as the corresponding control group.<sup>22,23</sup> The duration

of low back pain was not given in this study; all patients had presented to their general practitioners with low back pain and the researchers reported the mean number of days of such pain experienced during the previous year for each group, as given in table 1.

The treatment, if any, received by the intervention and control groups in each of the reviewed studies is given in table 2. The duration of the intervention the principal and secondary dependent variables and results in each of the studies are also given in this table. In those studies, in which there were two follow-up time-points, the time-point closer to six months was chosen. The corresponding effect sizes for the group contrast mean differences are given as Cohen's *d*.<sup>31</sup> The signs of these differences, and therefore of the effect sizes, were positive for beneficial increases and vice versa. For example, an improvement in physical action duration corresponded to a positive change in difference scores. On the other hand, an increase in days in pain corresponded to a negative change in difference scores. Overall, this means that a positive effect size in table 2 corresponds to a change between the time-points in favour of the inter-



**Figure 1.** Flowchart of exclusions and inclusions of studies in the systematic review.

**Table 1.** Baseline demographic and symptom duration details of participants in the studies.

First author	Year	Country	Intervention group			Control group				
			n	% F	Mean (sd) age (y)	Symptom duration	n	% F	Mean (sd) age (y)	Symptom duration
Basler <sup>21</sup>	2007	Germany	86	63	70.1 (4.2)	Chronic	84	65	70.6 (4.6)	Chronic
Leonhardt <sup>22</sup> & Becker <sup>23</sup>	2008	Germany	489	61	47.4 (13.5)	103 (123) days in previous year	479	59	49.1 (13.3)	101 (132) days in previous year
Iles <sup>24</sup>	2011	Australia	15	47	39.5 (11.7)	25.5 (17.9) days	15	33	39.5 (12.7)	25.1 (15.5) days
Vong <sup>25</sup>	2011	China	38	58	44.6 (11.2)	41.6 (56.8) months	38	68	45.1 (10.7)	51.0 (71.5) months
Jensen <sup>26</sup>	2012	Denmark	110	51	46.2 (9.5)	Not given	114	59	44.6 (10.3)	Not given
Tse <sup>27</sup>	2013	China	30	93	75.9 (6.4)	≥ 3 months	23	96	77.2 (5.1)	≥ 3 months
Suni <sup>28</sup>	2018	Finland	55	100	46.4 (6.4)	4 weeks to 7 months	55	100	46.7 (7.2)	4 weeks to 7 months
Kim <sup>29</sup>	2021	S. Korea	21	71	61.3 (11.5)	≥ 3 months	22	77	54.5 (12.8)	≥ 3 months
Shimo <sup>30</sup>	2021	Japan	20	0	47.8 (12.8)	≥ 12 weeks	17	0	41.4 (11.9)	≥ 12 weeks

vention group, while a negative effect size corresponds to a change in favour of the control group.

In the studies by Basler et al<sup>21</sup> and by Leonhardt et al<sup>22</sup>/Becker et al,<sup>23</sup> functional capacity (as a percentage of normal function) was assessed using the Hanover Functional Disability Scale, which assesses activities of daily living in relation to back pain-related disability.<sup>32</sup> In the study by Basler et al., the motion range refers to the degree of flexion of the trunk and was assessed using ultrasound topometry by a physiotherapist blinded to group allocation.<sup>21</sup>

In the Leonhardt/Becker study, the overall activity was calculated as a weighted metabolic equivalent based on the first eight items of the 12-item Freiburg Questionnaire on Physical Activity.<sup>22,23,33</sup> While the follow-up sick leave in this study referred to the mean number of days of sick leave during the previous six months, the duration of time over which the number of sick days were assessed at baseline was not clear from either published paper.<sup>22,23</sup> Quality of life was assessed in this study using a German version of the EuroQol instrument.<sup>34</sup>

The primary outcome variable in the study by Iles et al. was activity limitation indexed by the Patient Specific Functional Scale, which gives a total score between zero and 10.<sup>24,35</sup> The primary non-leisure activity was also assessed using the Patient Specific Functional Scale, also measured on a scale of zero to 10.35 Iles et al. reported the 95% confidence interval for the group difference of the primary non-leisure activity scores at 12 weeks as extending from -0.6 to 5.0; the authors calculated this difference after covarying for the corresponding baseline scores.<sup>24</sup> The modified Oswestry Disability Index was given as a percentage, while the Pain Self-Efficacy Questionnaire was scored out of 60.<sup>36,37</sup>

In the study by Vong et al, the following subscales of the Pain Rehabilitation Expectations Scale, a clinical tool designed to assess expectations in patients with back pain regarding rehabilitation treatment and outcome, were assessed after the first session (denoted as "Session 1" in table 2) and after the final (tenth) session (labelled "End" in table 2) of integrated motivational enhancement therapy plus physical therapy (the intervention group) or physical therapy alone (the control group): proxy efficacy (scaled from zero to 40); working alliance (zero to 44); and treatment expectancy (zero to 56).<sup>25,38</sup> Assessments for these three subscales were carried out neither at baseline (before the first session) nor at one-month follow-up.<sup>25</sup> These three subscales, together with the Pain Self-Efficacy Questionnaire (see above), constituted the primary outcome variables of this study.<sup>25,37,38</sup> In terms of the secondary outcomes of this study shown in table 2, the level of pain was assessed



Table 2. Continued.

First author	Intervention group [Length of intervention]	Control group	Dependent variable	Time-point	Effect size (Cohen's d)
Tse <sup>27</sup>	Integrated motivational interviewing counselling (pain education) and physical exercise (pain controlling & coping skills) programme for 8 weeks in a community centre [8 weeks]	Regular activities for 8 weeks in a community centre	Pain (numerical rating scale) Pain Self-Efficacy Questionnaire State anxiety Trait anxiety Depression Happiness Mobility SF-12 physical SF-12 mental Full data unavailable	Baseline/8 weeks Baseline/8 weeks Baseline/8 weeks Baseline/8 weeks Baseline/8 weeks Baseline/8 weeks Baseline/8 weeks Baseline/8 weeks Baseline/8 weeks	0.46 0.25 1.44 -0.05 0.60 0.00 0.79 0.00 -0.04
Sun <sup>28</sup>	48 neuromuscular exercise sessions (each 60 min) twice per week for 24 weeks + 10 sessions of back care counselling (based on cognitive behavioural therapy; each 45 min) once per week for first month and then every 3rd week for remainder of 24 weeks [24 weeks]	48 neuromuscular exercise sessions (each 60 min) twice per week for 24 weeks			
Kim <sup>29</sup>	Provided with an educational brochure on low back pain + biweekly personalised telephone & face-to-face education for 8 weeks [8 weeks]	Provided with an educational brochure on low back pain	Maximum low back pain over previous 24 h Average low back pain over previous 24 h Current low back pain Minimum low back pain over previous 24 h Daily living disability (%) Back muscle strength (%) Medication adherence Steps per day Motor activity (kcal/day) Pain (visual analogue scale) Roland-Morris Disability Questionnaire 6-min walking distance (m) Seated forwards bends (cm)	Baseline/8 weeks Baseline/8 weeks Baseline/8 weeks Baseline/8 weeks Baseline/8 weeks Baseline/8 weeks Baseline/8 weeks Baseline/6 months Baseline/6 months Baseline/6 months Baseline/6 months Baseline/6 months Baseline/6 months Baseline/6 months	0.90 1.00 0.84 0.68 1.06 0.24 0.74 0.89 0.93 0.13 0.73 -0.09 0.20
Shimo <sup>30</sup>	Accelerometer worn around waist + weekly one-to-one counselling sessions for 12 weeks [12 weeks]	Accelerometer worn around waist			

using a 10-cm visual analogue scale; the lifting capacity was determined from the mean of two trials of the maximum pain-free lifting force in a standardised test;<sup>39</sup> a Hong Kong Chinese version of the 24-item self-reported Roland-Morris Disability Questionnaire assessment of lower back pain (rated between zero and 24);<sup>40,41</sup> and exercise compliance, which was not assessed at baseline or at one-month follow-up, and was calculated from the product of the number of home exercises carried out per day and the number of days of practice per week.

In table 2 for the study by Jensen et al. the primary outcomes were the level of low back pain over the previous three months; both the bodily pain and the physical function assessments of the Short Form 36 (SF-36) instrument;<sup>42–44</sup> the Roland-Morris Disability Questionnaire (see above);<sup>40</sup> and both the proportion of patients who had accumulated at least eight weeks' sick leave and the cumulated sick leave duration.<sup>26</sup> The results of the last of these did not readily fit into the format of table 2 and are therefore given here: there was a significant reduction in both the proportion of patients who had accumulated at least eight weeks' sick leave and the cumulated sick leave duration in the intervention group, whether measured via self-report or based on register data.<sup>26</sup> The explanatory variables were maximum oxygen uptake and both the five-item work factor (measured from zero to 30) of the Fear-Avoidance Beliefs Questionnaire and the four-item physical activity factor (measured from zero to 24) part of this questionnaire; this questionnaire was specifically designed for patients suffering from low back pain.<sup>45,46</sup>

In the Hong Kong Chinese study by Tse et al., pain intensity was assessed using an ordinal rating scale, from zero to 10, with verbal descriptions given in Cantonese for each of the 11 points, from "no pain" for zero to "unimaginably unspeakable pain" for 10.<sup>27,47</sup> A Chinese version of the Pain Self-Efficacy Questionnaire was used.<sup>37,48</sup> State anxiety and trait anxiety, each scored between 20 and 80 (inclusive), with lower scores corresponding to lower anxiety levels, were assessed using a Chinese version of the State-Trait Anxiety Inventory.<sup>49,50</sup> The level of depression was assessed using a Chinese version of the 15-item Geriatric Depression Scale – Short Form, giving total scores between zero and 15.<sup>51,52</sup> A Chinese translation of the four-item Subjective Happiness Scale was used to assess happiness, with scores ranging from four (lowest level of happiness) to 28.<sup>53,54</sup> Mobility was assessed using the Elderly Mobility Scale, scoring between zero (lowest level of mobility and balance) and 20.<sup>55</sup> A Chinese version of the Short Form 12 (SF-12) was used, with each component (physical and mental) scoring from zero to 100, with a mean of 50 and standard deviation of 10.<sup>56,57</sup>

Only the baseline means and standard deviations of the outcome measures were published in the paper by Suni et al.<sup>28</sup> Four relatively small graphs appeared in one of their published figures showing mean values and corresponding 95% confidence intervals at six-month and 12-month follow-up for four outcomes; unfortunately, it was not possible to derive accurate figures from these graphical representations.<sup>28</sup> Adjusted P-values based on generalised linear mixed modelling were given for each of the four outcome measures, based not on the two groups identified in table 1, but rather on four groups; the two additional groups were counselling only and a "control" group, the members of which did not receive any intervention.<sup>28,58</sup> From the published paper, it was not possible formally to report on the difference between the intervention ("combined") and control ("exercise") groups.

A Korean version of the Brief Pain Inventory (originally the Wisconsin Brief Pain Questionnaire) was used in the study by Kim et al. to assess the maximum, average and minimum levels of low back pain over the previous 24 hours, as well as the current level of low back pain.<sup>29,59,60</sup> Similarly, a Korean version of the Oswestry Disability Index was used to assess the percentage daily living disability, with lower scores corresponding to lower levels of functional disability.<sup>61,62</sup> The mean back muscle strength was assessed blindly using a lumbar extension machine.<sup>29</sup> Medication adherence was scored from zero to four, with a lower score corresponding to higher adherence, using a Korean translation of a self-report instrument.<sup>63,64</sup>

The primary outcomes in the study by Shimo et al were related to physical activity and consisted of the mean number of steps per day and the mean rate of motor activity, both assessed using an accelerometer worn around the waist.<sup>30</sup> The secondary outcomes were low back pain severity, assessed using a 10-cm visual analogue scale; low back pain-related disability, assessed using a Japanese version of the Roland-Morris Disability Questionnaire; endurance, assessed by the six-minute walking distance; and flexibility, assessed using a seated forwards arrangement from the fingertip to toe distance with the legs in maximum extension at the knee joints, with zero corresponding to the fingertips just reaching the toes, and positive or negative readings corresponding to the fingertips surpassing or not reaching this level, respectively.<sup>30,40,65,66</sup> In their original paper Shimo et al. calculated group differences using median and range values.<sup>30</sup>

The overall quality of the body of evidence reviewed was assessed using the latest Grades of Recommendation, Assessment, Development and

Evaluation (GRADE) guidelines.<sup>67</sup> All nine studies were (cluster) randomised controlled trials. This corresponds to a GRADE level of high certainty. In terms of the first GRADE criterion of risk of bias or limitations in the detailed design and implementation, it was noted that all studies entailed random allocation of patients and observer blindness to group allocation, and it was decided not to downgrade the quality of the body of evidence at this stage. Regarding the second GRADE criterion of unexplained heterogeneity or inconsistency of results, as has been noted above it was not appropriate to carry out a formal meta-analysis.<sup>20</sup> Therefore, for example, the I2 measure which could otherwise have been used to index inconsistency was not calculated.<sup>20,31</sup> On balance, it did not seem reasonable to downgrade the quality of the body of evidence at this stage. The third GRADE criterion refers to indirectness of evidence. There was no evidence of indirect comparisons or a restricted version of the main review question in the studies and therefore the body of evidence was not downgraded at this stage. The fourth GRADE criterion refers to imprecision of results. From the data published in the studies, it can be inferred that some of the corresponding confidence intervals are relatively wide; taking a conservative approach, it seemed appropriate to downgrade the quality of the body of evidence on this criterion. Finally, the fifth GRADE criterion refers to a high probability of publication bias. Had a formal meta-analysis been appropriate, then it would have been possible formally to investigate the level of publication bias by, for example, constructing a funnel plot and carrying out an Egger regression test.<sup>20</sup> Notwithstanding the fact that, as mentioned above, the studies by Leonhardt et al<sup>22</sup> and Becker et al<sup>23</sup> referred essentially to the same cluster randomised controlled trial, it was considered inappropriate to downgrade the body of evidence at this stage. Hence, overall, the GRADE quality of the body of evidence was assessed as moderate.

## Discussion

The group contrast mean difference effect size data (table 2) show a large variation in the efficacy of psychoeducation. Categorising these effect sizes as large ( $d \geq 0.8$ ), medium ( $0.5 \leq d < 0.8$ ), small ( $0.2 \leq d < 0.5$ ), very small ( $0 < d < 0.2$ ), nil ( $d = 0$ ) or negative ( $d < 0$ ), it is clear from table 2 that only two of the published psychoeducation intervention results showed predominantly large-medium effect sizes, namely those by Iles et al<sup>24</sup> and Kim et al<sup>29</sup>. In the former study, psychoeducation was administered through telephone health coaching, while in the latter study biweekly personalised telephone education was also used, but in conjunction with face-to-

face education and with the provision of an educational brochure.<sup>24,29</sup>

In the weekly one-to-one counselling study by Shimo et al., the accelerometer-derived outcomes of the number of steps per day, motor activity and disability showed improvements at six-month follow-up associated with medium to large corresponding effect sizes.<sup>30</sup> However, the effect sizes for the remaining three dependent variables ranged from small to negative.<sup>30</sup>

The improvements reported at eight weeks in the community centre-based study by Tse et al in state anxiety, level of depression and mobility were associated with medium to large effect sizes.<sup>27</sup> The remaining six dependent variables, however, were associated with effect sizes which varied from small, at best, to negative at worst; indeed, for physical and mental symptoms (scored with the SF-12) and trait anxiety, the effect sizes were either zero or negative.<sup>27</sup>

In the study by Jensen et al., entailing counselling, a status interview and, if required, a workplace visit, the improvement in fear-avoidance beliefs in relation to physical activity was associated with a medium effect size.<sup>26</sup> However, all remaining six dependent variables were associated with small or very small effect sizes.<sup>26</sup>

In the remaining three studies for which suitable data were available, the effect sizes were predominantly small, very small, null or negative. In the case of two of these studies, namely those by Basler et al<sup>21</sup> and Leonhardt et al/Becker et al,<sup>22,23</sup> the psychoeducational intervention consisted of counselling sessions based on the Transtheoretical Model. The psychoeducational intervention in the third study, by Vong et al, was motivational enhancement treatment.<sup>25</sup>

Overall, the results show favourable outcomes with personalised telephone coaching, but unfavourable outcomes with both Transtheoretical Model-based counselling and motivational enhancement treatment. Other forms of one-to-one counselling were associated with intermediate outcomes.

Those embarking on future studies of the efficacy of psychoeducation in the management of low back pain might wish to draw the following lessons from this systematic review. First, it would be good to use an experimental design which blinds both the patients and the assessors, so far as possible, to group status. For example, this was clearly not the case in the study by Jensen et al., in which the control group did not receive counselling sessions or workplace visits.<sup>26</sup> Second, it is recommended that all the relevant outcome data from a study are published, either in the corresponding paper or in an on-line supplement. It has been mentioned above that not all such outcome data are readily avail-

able for the study by Suni et al.<sup>28</sup> Third, it is important to ensure that the intervention and control groups are matched at baseline. In the study by Vong et al., there were significant group differences at baseline in four out of their seven main outcome measures.<sup>25</sup> Clearly, such baseline group differences can emerge following random allocation of patients into two groups. It may be useful, therefore, to carry out all baseline assessments immediately prior to the randomisation process; an independent assessor could then examine the degree of matching at baseline before the rest of the study proceeds. Given that the level of the body of evidence was moderate according to the GRADE criteria, although one can be moderately confident in the above conclusions, further clinical research should be carried out as it is likely to impact upon the confidence one has in the benefits of psychoeducation in the management of low back pain in adults.<sup>67</sup> Larger sample sizes would be likely to lead to narrower confidence intervals and a higher GRADE level. Finally, the results of the studies reviewed in this paper indicate that it may be useful to carry out future studies in which the intervention is administered for around seven weeks. Two follow-up time-points, one at seven weeks and one at, say, six months, would give information both on the efficacy of the psychoeducational intervention and on the longevity of the improvements.

If psychoeducational interventions are shown to be effective in the management of adult low back pain, their implementation would be expected to have a number

of beneficial consequences. Suffering would be alleviated relatively quickly, perhaps in less than two months. Patients would become more mobile and less disabled; suffer less from anxiety and from depressive symptomatology; develop improved back muscle strength; increase their daily activity; and be more likely to return to work. Health services would benefit by having fewer patients in the corresponding clinics; issuing fewer prescriptions for analgesics and hypnotics; dealing with fewer patients suffering from the side-effects of prescription analgesics and hypnotics; and having fewer patients who, owing to their low back pain, develop obesity and, subsequently, related disorders such as type 2 diabetes mellitus. The reduced morbidity would also have wider socio-economic effects. Given that psychoeducational interventions, particularly if administered by telephone, are relatively inexpensive, not only would there accrue financial benefits to the taxpayer (in those countries with a well-developed social security system) in terms of reduced expenditure on healthcare and sickness and/or unemployment benefits, but by returning to work some patients would turn into net contributors to the tax base.

In sum, it is important to recognise that psychosocial issues may play a role in the development and maintenance of low back pain. This systematic review provides good evidence in favour of the hypothesis that some forms of psychoeducation, particularly those administered by telephone, may be efficacious in the management of low back pain.

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# Ανασκόπηση

## Η αποτελεσματικότητα της ψυχοεκπαίδευσης στη διαχείριση της οσφυαλγίας: Συστηματική ανασκόπηση

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### ΠΕΡΙΛΗΨΗ

Η οσφυαλγία είναι ένα σχετικά συχνό πρόβλημα υγείας που πλήττει πολλούς ενήλικες και ο επιπολασμός της αυξάνεται με την ηλικία. Αρκετές μελέτες έχουν δείξει ότι οι ψυχοκοινωνικοί παράγοντες είναι σημαντικοί στον πόνο στη μέση. Σκοπός της παρούσας μελέτης ήταν η συστηματική ανασκόπηση της αποτελεσματικότητας της ψυχοεκπαίδευσης στην αντιμετώπιση του πόνου στην οσφυαλγία από στοιχεία που παρέχονται από τυχαίοποιημένες ελεγχόμενες μελέτες. Τα κριτήρια ένταξης των μελετών που συμπεριλήφθηκαν σε αυτή τη συστηματική ανασκόπηση ήταν τυχαίοποιημένες ελεγχόμενες μελέτες- ασθενείς με πόνο στη μέση, με ή χωρίς ισχιαλγία- η συμπερίληψη ενός σκέλους ψυχοεκπαίδευσης (θεραπείας)- και η ηλικία των ασθενών  $\geq 17$  ετών. Η εξαγωγή δεδομένων αποκάλυψε την ετερογένεια των ψυχοεκπαιδευτικών παρεμβάσεων. Κατά συνέπεια, κρίθηκε ακατάλληλο να πραγματοποιηθεί επίσημη μετα-ανάλυση. Τελικά, εννέα μελέτες, που αντιστοιχούν σε 10 δημοσιεύσεις, συμπεριλήφθηκαν στη συστηματική ανασκόπηση. Όπου ήταν δυνατόν, υπολογίστηκε για τις μελέτες η μέση διαφορά της αποτελεσματικότητας (effect sizes) μεταξύ των ομάδων. Συνολικά, τα ευνοϊκά αποτελέσματα συσχετίστηκαν με την εξατομικευμένη τηλεφωνική καθοδήγηση, ενώ τα δυσμενή αποτελέσματα συσχετίστηκαν τόσο με τη συμβουλευτική με βάση το Διαθεωρητικό Μοντέλο όσο και με τη θεραπεία ενίσχυσης των κινήτρων. Άλλες μορφές ατομικής συμβουλευτικής συσχετίστηκαν με ενδιάμεσα αποτελέσματα. Η ψυχοεκπαίδευση μέσω εξατομικευμένης τηλεφωνικής καθοδήγησης συνδέθηκε ιδιαίτερα με μειωμένο πόνο στη μέση, μειωμένη αναπηρία στην καθημερινή ζωή, βελτιωμένη λειτουργία και βελτιωμένη προσδοκία ανάκαμψης. Βάσει της παρούσας ανασκόπησης, διατυπώνονται οι ακόλουθες προτάσεις σχετικά με το σχεδιασμό και τη δημοσίευση μελλοντικών μελετών για την αποτελεσματικότητα της ψυχοεκπαίδευσης στη διαχείριση του πόνου στη μέση. Κατ'αρχάς, θα ήταν καλό να σχεδιαστεί μία διπλά-τυφλή πειραματική μελέτη τόσο ως προς την ομάδα των ασθενών όσο ως προς τους αξιολογητές. Δεύτερον, συνιστάται να δημοσιεύονται όλα τα σχετικά δεδομένα έκβασης μιας μελέτης, είτε στην αντίστοιχη δημοσίευση είτε σε ένα ηλεκτρονικό συμπλήρωμα. Τρίτον, είναι σημαντικό να διασφαλιστεί ότι οι ομάδες παρέμβασης και ελέγχου αντιστοιχίζονται κατά την έναρξη της μελέτης. Είναι σαφές ότι οι διαφορές των ομάδων κατά την έναρξη μπορεί να προκύψουν μετά την τυχαία κατανομή των ασθενών σε δύο ομάδες. Συνεπώς, μπορεί να είναι χρήσιμο να διενεργούνται όλες οι αξιολογήσεις κατά την έναρξη αμέσως πριν από τη διαδικασία τυχαίοποίησης. Θα ήταν σημαντικό στη συνέχεια ένας ανεξάρτητος αξιολογητής να εξετάσει το βαθμό αντιστοίχισης κατά την έναρξη, πριν προχωρήσει η υπόλοιπη μελέτη. Είναι επίσης σημαντικό να προσλαμβάνονται επαρκώς μεγάλα μεγέθη δείγματος.

**ΛΕΞΕΙΣ ΕΥΡΕΤΗΡΙΟΥ:** Οσφυαλγία ενηλίκων, τυχαίοποιημένες ελεγχόμενες μελέτες, διάθεση, ψυχοεκπαίδευση, αναπηρία.

## Special article

# Modelling disruptions of intentionality in psychosis

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### ABSTRACT

In philosophy, intentionality involves directedness, aboutness, or reference of mental states. It seems to have intense connections with mental representation, consciousness, as well as evolutionary selected functions. Naturalizing intentionality, in terms of tracking or functional roles, is one of the most important goals in philosophy of mind. Such what-matters models would be useful, employing a combination of the principles of intentionality and causality. For example, the brain contains a seeking system that is responsible for its capacity of having an instinct-like urge towards something or towards wanting. Reward circuits are linked with emotional learning, reward seeking, reward learning, as well as with the homeostatic system and the hedonic system. We may suggest that such brain systems reflect components of a broad intentional system, whereas non-linear dynamics can explain the complex behavior of such chaotic or fuzzy systems. Historically, the cusp catastrophe model has been used to predict health behaviors. It can explain why relatively small changes in a parameter can result in catastrophic changes in the state of a system. If distal risk is low, then proximal risk will be linearly related to psychopathology. If distal risk is high, then proximal risk is nonlinearly related to a severe psychopathology and small changes in proximal risk predict a sudden lapse. The phase of hysteresis can explain how a network stays active long after the events in the external field that triggered its activation have waned. It seems that in psychotic patients there is a failure of intentionality, due to the inappropriateness of an intentional object or connection, or due to the absence of an intentional object altogether. In psychosis, these failures seem to occur through a non-linear and multifactor fluctuating pattern of intentionality. The ultimate goal is to provide a better understanding of relapse. The sudden collapse can be explained by an already fragile intentional system rather than by a novel stressor. The catastrophe model may help individuals remove themselves from a hysteresis cycle, and strategies for sustainable management of such cases should focus on maintaining resilience. Focusing on disruptions of intentionality can deepen and enrich our understanding of radical disturbances involved in different psychopathologies, including psychosis.

**KEYWORDS:** Intentionality, psychosis, aboutness, directedness, cusp catastrophe model, non-linear modelling.

### Intentionality

The term intentionality is derived from the Latin verb *intendo* (“aim,” “hold out,” or “stretch”), and refers to the way consciousness can be about things. It is the feature of the mind through which mental states are directed at, or are about or of, or refer to, states of affairs in the world. Intentionality plays a central role in subjective experience and permeates all human activities. Dennett<sup>1</sup> proposes intentional stance as so powerful that it can be developed into a valid intentional theory. For

Brentano<sup>2</sup> all psychological phenomena and only them are intentional. The crucial concept in Husserl’s<sup>3</sup> theory of intentionality is the noema of consciousness, while for Heidegger,<sup>4</sup> intentionality is a feature of Dasein’s entire way of being-in-the-world. Merleau-Ponty<sup>5</sup> extended to motor intentionality, the intentional constitution of the body and its role in perceptual experience.

Intentionality seems to have essential connections with both consciousness and evolutionary selected functions.<sup>8</sup> Searle<sup>6,7</sup> extended to collective intentionality, a biologically primitive phenomenon that we

humans share with other social animals, adding that without a pre-intentional sense of community there would not have been collective intentionality and social reality. Our ability to participate with others in collaborative activities with common goals is called shared intentionality. Kesebir<sup>9</sup> used the superorganism (such as ants or bees) metaphor to reflect on human sociality. According to her, cultural meaning systems, shared intentionality, norm compliance, deference to authority, social identity processes, religiosity, and morality, can be understood as manifestations of the same dynamics that create superorganism-like social structures. For Watsuji,<sup>10</sup> intentionality is a relational property of the whole person engaging with the things, spaces, and other people in a common world. The quality of our intentional acts is strongly regulated by betweenness. For example, in the betweenness of seeing another person, one's activity of seeing, is a seeing determined by its being seen by the other. The characterization of the social character of intentionality is useful for illuminating subtle experiential anomalies typical of schizophrenia.<sup>11,12</sup>

Intentionality guides all voluntary thought and behavior, and is also implicated in every meaning and value.<sup>13</sup> Bolton<sup>14,15</sup> considered whether mental disorders might be specified by a class of "radical failures" of intentionality. He suggested that the mind is in good working order to the extent that its intentional objects and connections are appropriate. Any failure of intentionality, because of inappropriateness of an intentional object or connection, or absence of an intentional object altogether, may result in a mental disorder.

### Naturalizing intentionality

Naturalizing intentionality is of the most important items in philosophy of mind. Spinoza<sup>16</sup> asserts that every individual thing strives to persevere its existence, adding that when this striving (conatus) is related only to the mind, it is called will and when it is related to the mind and body simultaneously, it is called appetite. The concept of the conatus was first developed by the Stoics who used the word *ὁρμή* (hormê, translated in Latin by *impetus*) to describe the movement of the soul towards an object, and from which a physical act results. Nowadays, the archaic concept of conatus is being reconciled with modern biology and neuroscience and is explained in terms of chemistry and neurology,<sup>17</sup> whereas the Spinozistic conception of a conatus is a historical precursor to modern theories of autopoiesis.<sup>18</sup> Conscious desire presupposes a kind of primordial orectic orientedness of the organism, whereas orectic states can finally give rise to conscious conations or desires.<sup>19</sup> *Orexis* is the Aristotelian term for appetite,

sometimes signifying appetite in general and at other times the power of the will. Additionally, instinct contains impulse or appetite, for realizing what is targeted by the conative element. Conation, urge and drive are terms that are used almost interchangeably to indicate the forceful or impulsive aspect of appetites, while feeling and affectivity are generally used to indicate the felt quality connected with appetitive activity.<sup>20</sup>

However, is there a common ground, conceptual or physiological, for both intentionality and conatus? Is there an intentional system running in parallel with specific brain networks and functions, linked to will, appetite or reward? Moreover, is that intentional system a higher order system, having a monitoring or regulatory role on brain or behaviour?

For Millikan,<sup>21,22</sup> intentionality has been related to purposiveness and such purposes help us to understand intentionality in a naturalistic way. She explains intentionality using the explanatory resources of natural selection: what thoughts and sentences and desires are 'about' is ultimately elucidated by reference to what has been selected and what it has been selected for, i.e., what advantage it conferred on ancestors who possessed it. For biologists, intentionality of all sorts is ultimately the result of evolution via natural selection. Fitch<sup>23</sup> suggested intrinsic intentionality as a thoroughly materialistic and derived through evolution, pointing out that the ion flux in the human nervous system has a form of intrinsic intentionality, a type of "aboutness". Moreover, he proposed nano-intentionality, a microscopic form of aboutness, inherent in individual eukaryotic cells, that includes a goal-directed capacity to respond in an adaptive manner to novel circumstances. The nano-intentional ability of cells to rearrange their structure in response to their circumstances represents a basic, primitive type of goal-directed aboutness that predated neurons, brains and minds. Fitch<sup>23</sup> noticed that "without nano-intentionality intentionality proper can never emerge; without such a capacity, all of the information processing in the world will not make a system intentional".

The brain contains an exploration seeking system that is responsible for having an instinct-like behavior towards something or towards wanting it.<sup>24</sup> In parallel with its homeostatic function, eating can also be a pleasurable experience, which is related to the brain's core reward circuits, implicated also in drug use and sexuality. Reward circuits include the dopaminergic ventral tegmental area, signaling motivation and reward seeking, the amygdala, associated with emotional learning; the nucleus accumbens, involved in reward learning, and the lateral hypothalamus, which inte-

grates motivation signals and links homeostatic and hedonic system.<sup>25</sup>

Appetite and feeding are controlled by the homeostatic system, which ensures that a person gets enough calories to survive, and the hedonic system, which regulates the pleasure and reward aspects of eating.<sup>25</sup> Orexigenic and anorexigenic neurons (from Latin *orexis* [appetite] and Greek *órexis* [desire]), stimulate and suppress food-seeking behaviors, respectively, are located in the arcuate nucleus of the hypothalamus, and project to the paraventricular nucleus, promoting catabolism, to the ventromedial hypothalamus, suppressing feeding behavior, and to the lateral hypothalamus, promoting calorically dense food and locomotor activity, through melanin-concentrating hormone and orexin.<sup>25</sup>

The Lateral Hypothalamic Area (LHA) plays a role in arousal, feeding, motivation, and reward. LHA lesions reduce food intake and cause weight loss, while electrical stimulation of the LHA increases feeding.<sup>26</sup> In addition, the hypothalamic agouti-related peptide (AgRP) neurons control neuronal pathways that regulate higher-order brain functions during development and in adulthood.<sup>27</sup> Finally, the comorbidity between diabetes and psychotic disorders is well-known, but not fully understood. There is some, but limited and inconsistent, evidence that non-CNS alterations are associated with CNS changes and symptoms in first episode psychosis,<sup>28</sup> whereas a high prevalence of impaired fasting glucose and metabolic syndrome in patients with psychosis.<sup>29</sup>

### Linear and non-linear modelling of psychopathology

Non-linear dynamics describe the complex behavior of chaotic or fuzzy systems. Looking at history through mathematics, Rashevsky<sup>30</sup> developed a theory of bifurcation, which he applied to the complexity and divergence of human behavior. He stated: "A change in the behavior of a single individual may precipitate in an unstable social configuration, a process that leads to a finite, sometimes radical change". Catastrophe theory, as described by Thom<sup>31</sup> in 1972, is derived from topology, a field of mathematics that studies the properties of surfaces in numerous dimensions. Catastrophe theory has been applied to situations where gradual changes in the environment correspond to abrupt changes in the expressed behavior. The type of cusp catastrophe model describes a sudden behavioral change observed once a predictor variable crosses the cusp threshold. The slightest disruption can precipitate a fall from which there is no return.

The cusp catastrophe model contains the main qualities of bimodality, and the behavioral outcome is par-

tioned into three modes, (a) divergence, where small changes in the input parameters leads to dramatic changes in behavior, (b), quick transitions or jumps, where the transition from one mode of behavior to the other may happen rapidly and (c) hysteresis, where the transition from one mode to the other mode does not occur at the same place on the surface.<sup>32</sup> For those with high distal risk, for example, the suicidal ideation pathways follow path B (see figure 1), where even a small increase in proximal risk may push an individual "over the edge," leading to suicidal episode.<sup>33</sup> After that, a pro-lapse requires a substantially larger reduction in proximal risk to help the individual regain a healthier level.<sup>34</sup> When a certain threshold level of stress is reached, a "catastrophic" transition from low to high risk occurs, while the system is slowly getting less and less resilient. The sudden jump can be better explained by an already fragile system (distal factors) rather than a novel stressor (proximal factor).<sup>35</sup>

In order to get back from a high to a low-risk phase, it is not sufficient to restore stress levels to the level prior to the collapse. This dependence of the current state of the system on the previous state is called hysteresis, a term derived from the Greek word *υστέρησις*, meaning "deficiency" or "lagging behind", and coined in 1881 by Sir James Alfred Ewing, after showing that magnetization of a sample will remain magnetically polarized even when the external field is removed. Hysteresis explains how a network can stay active long after the events in the external field that triggered its activation have waned. Hysteretic systems are regarded to have "memory" of previous events or a dependence on its history. The dynamic character of the voltage dependence ion channels seems to be rooted in its hysteretic behavior and has important consequences on the physiology and pharmacology. For example, hysteresis in ion channels behavior can make the deactivation of KV-related conductance more resilient to closing at resting and to developing hyperpolarized potentials during repolarization.<sup>36</sup>

Moreover, mental disorders may arise due to the presence of hysteresis in strongly connected symptom networks, which implies that symptoms continue to activate one another, even after the triggering cause of the disorder has disappeared. According to Borsboom,<sup>37</sup> "hysteresis is a very plausible feature of psychopathology networks, because –in many cases of psychopathology– triggering events can cause pervasive problems long after triggers themselves have disappeared". Important examples would be the etiology of post-traumatic stress disorder, the development of major depression, or the effects of childhood abuse.

Historically, the cusp catastrophe model has been used to predict health behaviors.<sup>38</sup> The ultimate goal is to provide a better understanding of relapse and this model can help individuals remove themselves from a hysteresis cycle. Furthermore, critically slowing down indicators can help predict attacks in chronic diseases such as asthma, heart arrhythmias, migraine, epilepsy, depression and suicidality. When a system approaches a critical transition, it returns more slowly to its stable attractor under small perturbations. The return time to the stable state can thus be used as an index, that shows whether a critical change is about to happen or not. On the other hand, when a patient suddenly becomes disordered, we tend to look for major changes that caused the transition, but for some patients, it might be that the system was slowly getting less and less resilient, and that the sudden collapse can be explained by an already fragile system rather than a novel stressor (table 1, figure 1).<sup>39</sup>

### **Non-linear disruptions of intentionality in psychosis**

In the cusp catastrophe model, distal risk factors are defined as background predisposing factors that create an increased statistical risk of relapse. Proximal risk factors actualize the statistical risk, indicating the time of relapse and may include situational threats to self-efficacy, affective states, stressful life events, emotional traumas, or the rapid deterioration of social support. The increasing level of distal risk will create a bifurcation, whereby the potential for relapse is greatly increased if the level of proximal risk is also high. Depression, drug use and suicidality have been studied according to this model, as complex systems where a small change in mood can have a large effect on the situation someone is in.<sup>33,40,41</sup> The cumulative and proliferation dynamics of trauma are more powerful bifurcation control factors in these non-linear dynamics.<sup>33</sup> Focusing on disruptions of intentionality can deepen and enrich our understanding of core disturbances involved in different psychopathologies, including psychosis.<sup>42,43</sup> As an intentional and self-organizing process, the temporal microstructure of consciousness, comprised of both a retention and a protention, can become fragmented in psychotic patients.<sup>44,45</sup> Patients suffering from Capgras and Cotard delusions lose conscious access to normal intentional objects of affective experience, since the patient's affective experience is restricted to a subset, or null-set, of appropriate intentional objects.<sup>14,15,46</sup>

Delusions represent a cognitive effort by the patient to comprehend aberrantly salient experiences, whereas hallucinations reflect a direct experience of the ab-

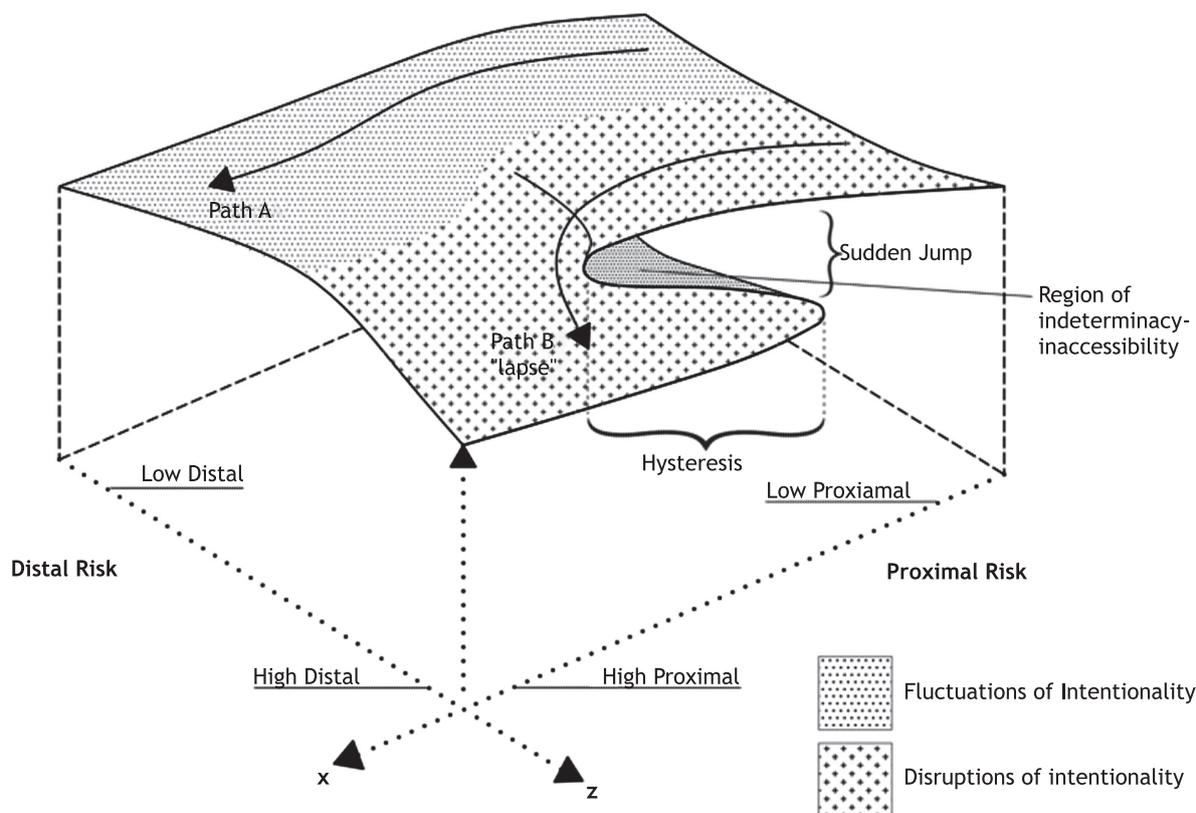
errant salience of internal representations.<sup>47-49</sup> In the case of the Muller-Lyer illusion lines,<sup>50</sup> the intentional content of the visual experience is in conflict with and is overridden by the intentional content of our beliefs. In the case of hallucinations, the perceiver has the same experience, but no intentional object is present. Maybe, the capacity to misrepresent is often thought to be essential for representing: no possibility of misrepresentation, no representing.<sup>51</sup> A capacity to misrepresent may require a basic capacity to represent non-existent objects<sup>52</sup> and in psychosis there is a loss of both the intentional object and the capacity to misrepresent. In psychosis a permanent loss or lack of intentionality dominates, including an absence of intentional object, from the beginning, or even from the primordial phase of the disorder. This might be the reason for their difficulty in recovering from the inaccessibility region (see figure 1).<sup>42,43,53,54</sup>

In the Sino-Japanese study of *ningen*, the English term for human being, the character *nin* signifies two men supporting each other, whereas *gen* implies "between" or "among".<sup>12</sup> We not only engage with the world; the world, in turn, engages with us. Schizophrenia is more than just a brain disorder; it is a self-disorder, a multi-level disturbance of an individual's relationship with their world. Self-disturbances in schizophrenia are thus equally relational disturbances or disturbances of betweenness.<sup>10-12</sup> The individual intentionality is derived from collective intentionality, which is a shared intentionality that shares mental states like emotions, intentions, and beliefs with others.<sup>6,7</sup> Two forms of shared intentionality have been proposed: joint intentionality and we-intentionality. Unlike joint intentionality, we-intentionality relies on the agents' capacity to understand themselves as group members and to adopt the group's perspective. In psychotic patients we-intentionality has been found to be impaired, as opposed to joint intentionality which remains unaffected.<sup>55</sup>

This manuscript focuses on a rather neglected issue, that concerns both aspects of philosophy and neurobiology, relating to the phenomenon of intentionality, and its specific role in psychosis. Methodologically designed studies of intentionality in psychosis have revealed a variety of findings: The subjective experience of psychotic patients with body-affecting first-rank psychotic symptoms is rooted in the disturbance of intentionality and diminished sense of agency.<sup>56</sup> Moreover, psychotic patients exhibited a striking bias to over attribute intentionality, and especially an inability to inhibit the automatic attribution of intentionality.<sup>57</sup> In a philosophical analysis of intention, tested through fMRI experiments, a hyper-intentionality state was prominent in patients with paranoid schizophrenia and a hy-

**Table 1.** The biological, psychological, and socio-cultural (distal and proximal) factors interacting with the intentional system, in psychosis. If distal factors are not serious (low risk), the intentional system will be usually headed (depending on the proximal factors' severity) in a fluctuating and linear way, accompanied by inappropriateness of an intentional object or connection (A). If distal factors are severe (high risk) the intentional system will be headed in disruption or collapse (also depending on the proximal factors' severity), in a non-linear way, accompanied by an absence of intentional object and/or loss of conscious access to normal intentional objects (B) (as visualized in figure 1).

Intentional System	Distal Risks – Predisposing Factors		
	Biological	Psychological	Socio-cultural
Low pre-intentional sense of community	Genes	Early life adversity	Low sense of community
Inappropriateness of an intentional object or connection	Autoimmune disorders	Anticipatory anxiety	Neglect
	Aberrant salience	Delusional mood	Social alienation
Absence of intentional object	Proximal Risks – Accelerating Factors		
	Viruses	Late life events	Lack of social support
	Psychoactive substances	Threat	Lose
Loss of conscious access to intentional objects	Homeostatic imbalance	Entrapment	Defeat



**Figure 1.** A visualization of the intentional system in psychosis, according to the cusp catastrophe model. Distal risk was defined as a predisposing factor that increases the probability of relapse. Proximal risk included any accelerating factor that immediately precipitated relapse, actualizing the statistical risk, and indicating the timing of relapse. If distal risk is low, then proximal risk will be linearly related to psychopathology (shown as Path A). If distal risk is high, then proximal risk is non-linearly related to psychopathology, and small changes in proximal risks may predict sudden relapse (Path B). The sudden collapse can be explained by an already fragile intentional system rather than a novel stressor. Most of the psychotic patients may be entrapped in the inaccessibility-indeterminacy region.<sup>30-33</sup>

po-intentionality state in autistic spectrum disorders.<sup>58</sup> Moreover, it seems that the flow of information evoking spontaneous attributions of intentionality is disrupted in schizophrenia, with flow-on detrimental effects on accurate theory of mind reasoning. This finding may indicate that referential and persecutory ideation motivates inappropriate mentalising when objective cues of intentionality are absent.<sup>59</sup> Research findings indicate that intentionality is a complex phenomenon that requires a complex theory. Therefore, we may think of an intentional system, as a higher order system, which has a main regulatory and monitoring role in brain and behavior.<sup>60</sup>

## Conclusion

Our intentionality is profoundly originating from genes. In order for them to be able to survive, people composed of these genes have to produce intentional states. Intentional stance is a strategy that allows prediction and explanation of the observed behaviour of a system. It compares predictive strategies, (i.e., physical vs design stance), whereas theory of mind compares different mental states (e.g., true vs false beliefs).<sup>1,61</sup> On the other hand, in the real-world changes in many outcomes are rarely linear.<sup>62–64</sup> The cusp catastrophe model

can explain why relatively small changes in a parameter can result in catastrophic changes in the state of a system. If distal factors are low, the intentional system will be heading in a fluctuating and linear way, depending on the proximal factors' severity), and characterized by inappropriateness of an intentional object or connection. If distal factors are severe, the intentional system will be heading towards a disruption or collapse, in a non-linear way, also depending on the proximal factors' severity, and characterized by an absence of intentional object and/or loss of conscious access to normal intentional objects. This sudden collapse can be explained by an already fragile system rather than by a novel stressor. Focusing on disruptions of intentionality theories can deepen and enrich our understanding of core disturbances involved in different psychopathologies, including psychosis, while strategies for sustainable management of such cases should focus on maintaining resilience.<sup>35</sup> We proposed an intentionality failure theory for psychosis, which occurs through a multifactor and usually non-linear fluctuating pattern of intentionality. This what-matters model would be useful, employing a combination of the principles of intentionality and causality, and opening new directions for research, treatment and prevention.<sup>13,41,60,64,65</sup>

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## Ειδικό άρθρο

# Μοντελοποιώντας τις διαταραχές της προθετικότητας στην ψύχωση

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### ΠΕΡΙΛΗΨΗ

Στη φιλοσοφία, η προθετικότητα σχετίζεται με την κατευθυντικότητα τη σχετικότητα ή την αναφορικότητα των ψυχικών φαινομένων. Φαίνεται να έχει στενή σχέση με την ψυχική αναπαράσταση, τη συνειδητότητα, καθώς και με εξελικτικά επιλεγμένες λειτουργίες. Η φυσικοποίηση της προθετικότητας με περιγραφικούς ή λειτουργικούς όρους αποτελεί έναν απο τους σημαντικότερους σκοπούς της φιλοσοφίας του νου. Τέτοια αιτιακά μοντέλα είναι χρήσιμα, συνδέοντας τις αρχές της προθετικότητας και της αιτιότητας. Για παράδειγμα, ο εγκέφαλος περιέχει ένα σύστημα αναζήτησης που είναι υπεύθυνο για την ικανότητα για εγγενή ορμή προς κάτι ή προς το να θέλουμε κάτι. Αυτό συνδέεται με τη συναισθηματική μάθηση, τη συμπεριφορά αναζήτησης, την αναζήτηση μάθησης, αλλά και με τα συστήματα ομοιόστασης και ηδονής. Μπορούμε να υποθέσουμε ότι τέτοια συστήματα του εγκεφάλου αναπαριστούν κομμάτια ενός ευρέως συστήματος προθετικότητας, ενώ μη-γραμμικές δυναμικές μπορούν να εξηγήσουν την πολύπλοκη συμπεριφορά αυτών των χαοτικών και ασαφών συστημάτων. Ιστορικά, το μη-γραμμικό μοντέλο καταστροφής έχει χρησιμοποιηθεί στην πρόβλεψη συμπεριφορών στο χώρο της υγείας. Το μοντέλο αυτό μπορεί να εξηγήσει γιατί σχετικά μικρές αλλαγές μιας παραμέτρου μπορεί να καταλήξουν σε καταστροφικές αλλαγές στην κατάσταση του συστήματος. Εάν η απώτερη επικινδυνότητα είναι χαμηλή, τότε η εγγύς επικινδυνότητα θα συνδέεται γραμμικά με την ψυχοπαθολογία. Εάν όμως η απώτερη επικινδυνότητα είναι υψηλή, τότε η εγγύς επικινδυνότητα θα συνδέεται μη-γραμμικά με την ψυχοπαθολογία. Μικρές αλλαγές της εγγύς επικινδυνότητας θα προδικάζουν μια ξαφνική υποτροπή και μια ελάχιστη διατάραξη θα προδιαθέτει σε κατάρριψη χωρίς επιστροφή. Η φάση της υστέρησης εξηγεί επίσης γιατί το δίκτυο παραμένει ενεργές, αν και τα γεγονότα που οδήγησαν στην ενεργοποίηση έχουν εκλείψει. Φαίνεται ότι στους ψυχωτικούς ασθενείς υπάρχει διαταραχή της προθετικότητας εξαιτίας ακαταλληλότητας του προθετικού αντικειμένου ή σύνδεσης, ή παντελούς απουσίας του προθετικού αντικειμένου. Στην ψύχωση, η διαταραχή αυτή φαίνεται να συμβαίνει μέσω ενός πολυπαραγοντικού, μη-γραμμικού και κυμαινόμενου προτύπου προθετικότητας. Απώτερος σκοπός είναι η καλύτερη κατανόηση της υποτροπής. Η αιφνίδια κατάρριψη στο μοντέλο αυτό μπορεί να εξηγηθεί από την ύπαρξη ενός ευάλωτου προθετικού συστήματος, παρά από την εμφάνιση ενός στρεσογόνου γεγονότος. Το μοντέλο καταστροφής μπορεί να βοηθήσει τα άτομα να μετακινηθούν πέρα από τον υστερετικό κύκλο, και οι στρατηγικές για βιώσιμο χειρισμό αυτών των καταστάσεων θα πρέπει να βασίζονται στη διατήρηση της ανθεκτικότητας. Εστιάζοντας στις διαταραχές της προθετικότητας μπορούμε να εμβαθύνουμε και να εμπλουτίσουμε την κατανόησή μας σχετικά με τις πυρηνικές διαταραχές που ενέχονται σε ποικίλες ψυχικές διαταραχές, περιλαμβανομένης της ψύχωσης.

**ΛΕΞΕΙΣ ΕΥΡΕΤΗΡΙΟΥ:** Προθετικότητα, ψύχωση, σχετικότητα, κατευθυντικότητα μοντέλο καταστροφής, μη-γραμμική μοντελοποίηση.