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PRESS POST (X+7) PRESS POST
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ΕΝΤΥΠΟ ΚΛΕΙΣΤΟ ΑΡ. ΑΔΕΙΑΣ 2931 ΚΕΜΠΑ
Κωδικός 016951
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Κατεχάκη & Αδριανείου 3 – 115 25 ΑΘΗΝΑ

Περιοδικό "Ψυχιατρική"
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Τηλ.: 210-77 58 410 • Fax: 210-77 09 044 • e-mail: editor@psychiatriki-journal.gr

The Journal "Psychiatriki"
17, Dionisiou Eginitou str., 3rd floor, 115 28 Athens, Greece
Tel.: (+30) 210-77 58 410 • Fax: (+30) 210-77 09 044 • e-mail: editor@psychiatriki-journal.gr

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ΨΥΧΙΑΤΡΙΚΗ Τόμος 32 (4) 253-336 Οκτώβριος-Δεκέμβριος 2021

PSYCHIATRIKI

Quarterly journal published by the Hellenic Psychiatric Association, Volume 32, No 4, October-December 2021

BHTA medical art

GR ISSN 1105-2333

Καταχωρείται και περιλαμβάνεται στα MEDLINE/PubMed, Index Copernicus, PsychINFO, Scopus, SCImago, Google Scholar, EMBASE/Excerpta Medica, EBSCOhost™ και στο Iatrotek, (Scopus CiteScore 2020=0,8)

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Εργασίες για δημοσίευση υποβάλλονται μέσω του παραπάνω ιστότοπου ή εναλλακτικά μέσω ηλεκτρονικού ταχυδρομείου στην ηλεκτρονική διεύθυνση editor@psychiatriki-journal.gr

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Quarterly journal published by the Hellenic Psychiatric Association
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Tel.: +30-210-77 58 410, Fax: +30-210-77 09 044

Publisher:
Hellenic Psychiatric Association
11, Papadiamantopoulou str., 115 28 Athens
Tel.: +30-210-72 14 184

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Annual subscriptions of the Journal:
€ 40.00 or $ 80.00 + postage – each separate issue € 10.00
are payable by check to the treasurer
of the Hellenic Psychiatric Association:
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EDITING
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PSYCHIATRIKI

Quarterly journal published by the Hellenic Psychiatric Association

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https://doi.org/10.22365/jpsych.2021.041 / Psychiatriki 2021, 32:267–270

Editorial

The impact of the COVID-19 pandemic on the Greek population: Suicidal ideation during the first and second lockdown

ARTICLE HISTORY: Received 24 October 2021/Published Online 26 November 2021

More than a year has passed since World Health Organization (WHO) declared COVID-19 as a pandemic, and during this period over 237 million cases and more than 4.8 million deaths have occurred worldwide due to COVID-19.[1] This unprecedented pandemic not only has burdened health systems but it also constitutes a major stressful event both due to the threat of illness and death that it poses, and to the drastic impact on human relations, financial activity, access to health services, etc. Additional factors that may contribute to stress include the protection measures against COVID-19, social distancing, and mobility restrictions.

The impact of the pandemic on suicidal behavior, especially on the Greek population, is of critical importance, due to the increase in suicidality during the recent financial crisis in the country.[2] The impressive decline in the GDP during the first months of the COVID-19 pandemic (-9% of GDP),[3] unemployment, isolation, reduced social contacts, problems in accessing mental health services, and also the limitations in terms of psychological support may increase the risk of suicidal behavior.[4]

With a view to investigating the psychosocial effects of the COVID-19 pandemic, an online questionnaire was developed in March 2020 by the Second Department of Psychiatry of the National and Kapodistrian University of Athens (NKUA) and the Postgraduate Program "Liaison Psychiatry: Integrated Care of Physical and Mental Health" of NKUA. This questionnaire included items regarding demographic characteristics, physical and mental health data, and issues related to the pandemic and the imposed restriction measures, such as perceived changes in participants' biorhythms, habits, and relationships with their colleagues, friends, and family. In addition, participants were asked to complete psychometric scales with regard to anxiety, depression and suicidal ideation, family functioning, anger and resilience. During the first national lockdown in Greece (April 7 to May 3) a total of 5,748 adults from the community participated in the survey by anonymously completing the aforementioned questionnaire on a secure website of NKUA. A considerable effort was devoted to make the sample as representative as possible and to include members of the community who do not usually participate in such surveys, as individuals of older age or individuals with health conditions.

The 5.20% two-week prevalence of suicidal ideation found in our study is an intermediate rate with respect to the 2.4% one-month prevalence in 2008, the 6.7% in 2011 and the 2.6% prevalence in 2013.[5] Among the respondents, 14.1% were potential cases of anxiety, while 26.5% of depression. Independent risk factors for suicidal ideation included anxiety, depression, impaired family functioning, being unmarried or divorced, having a mental health history, as well as a poor perceived quality of physical health. In contrast, higher resilience, positive feelings with regard to the lockdown measures, relationship with friends, and faith in a Supreme Being emerged as protective factors for suicidal ideation.[6] Investigating the risk and protective factors for suicidal ideation is especially important during this difficult period of the pandemic.

There was an additional significant finding in this study: individuals who completed the questionnaire during the last two weeks of the first lockdown reported statistically significantly higher suicidal ideation, depression, and anxiety than those who completed it in the previous two weeks, while a similar finding was revealed in a study from USA.[7]

Therefore, we were looking forward to the results of our survey conducted during the second lockdown.[8] From the 5,116 individuals who had fully completed our questionnaire with respect to suicidal ideation during the first lockdown, 811 fully completed it for the second time from November 22 to December 21, 2020. Suicidal ideation was not found significantly different compared to the first lockdown. Independent risk factors for suicidal ideation during the second lockdown were depression, anxiety, living with a person with frail health and vulnerable for COVID-19 and suicidal ideation during the first lockdown.

It is noted that during the second lockdown the rates of potential depression cases remained unchanged, whereas anxiety rates increased. Greater accessibility to health services, state financial support and increased mobility might have contributed to the stability of suicidal ideation despite the greater severity of the second wave of the COVID-19 pandemic.

The aforementioned studies determined the prevalence of suicidal ideation and its association with various demographic, clinical, social, familial, and psychopathological factors in a cohort context at different stages of the COVID-19 pandemic, with the relevant literature being rather poor. We consider that the provision of such data is critical for the plans of health system in pandemic conditions, while this longitudinal study is in progress during the subsequent waves of the pandemic.

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Άρθρο σύνταξης

Οι επιπτώσεις της πανδημίας COVID-19 στον ελληνικό πληθυσμό: Ο αυτοκτονικός ιδεασμός κατά το πρώτο και δεύτερο lockdown

ΙΣΤΟΡΙΚΟ ΑΡΘΡΟΥ: Παραλήφθηκε 24 Οκτωβρίου 2021/Δημοσιεύθηκε Διαδικτυακά 26 Νοεμβρίου 2021

Ενάμιση έτος περίπου από την ημέρα που ο Παγκόσμιος Οργανισμός Υγείας (ΠΟΥ) ανακήρυξε τη νόσο COVID-19 ως πανδημία έχουν ήδη σημειωθεί περισσότερα από 237 εκατομμύρια κρούσματα και πάνω από 4,8 εκατομμύρια θάνατοι παγκοσμίως.[1] Αυτή η πρωτοφανής, εδώ και πολλές δεκαετίες, πανδημία, έχει επιβαρύνει όχι μόνο τα συστήματα υγείας, αλλά επιπρόσθετα αποτελεί μείζονα ψυχοπιεστικό παράγοντα τόσο λόγω της άμεσης απειλής νόσησης και θανάτου που εμβάλλει, όσο και λόγω της δραστικής επίδρασης στις σχέσεις των ανθρώπων, στην οικονομική δραστηριότητα, στην πρόσβαση στις υπηρεσίες υγείας, κ.ά. Επιπλέον, τα ίδια τα μέτρα προφύλαξης, κοινωνικής αποστασιοποίησης και περιορισμού της κινητικότητας αποτελούν και αυτά με τη σειρά τους έναν σοβαρό ψυχοπιεστικό παράγοντα.

Η επίδραση της πανδημίας στην αυτοκτονική συμπεριφορά, ιδιαίτερα στον ελληνικό πληθυσμό αποτελεί κορυφαίο ερώτημα λόγω της αύξησης της αυτοκτονικότητας κατά τη διάρκεια της πρόσφατης μεγάλης οικονομικής κρίσης.[2] Η εντυπωσιακή μείωση του ΑΕΠ κατά τους πρώτους μήνες της πανδημίας (–9% του ΑΕΠ),[3] η ανεργία, η απομόνωση, οι μειωμένες κοινωνικές επαφές, τα προβλήματα στην πρόσβαση σε υπηρεσίες ψυχικής υγείας αλλά και οι περιορισμοί ως προς την πνευματική υποστήριξη θα μπορούσαν να αποτελέσουν επιβαρυντικό παράγοντα για αυτοκτονική συμπεριφορά.[4]

Για τη διερεύνηση των ψυχοκοινωνικών επιπτώσεων της πανδημίας COVID-19 από τον Μάρτιο του 2020 η Β′ Ψυχιατρική Κλινική ΕΚΠΑ του ΠΓΝ «Αττικόν» και το Πρόγραμμα Μεταπτυχιακών Σπουδών «Διασυνδετική Ψυχιατρική: Απαρτιωμένη Φροντίδα Σωματικής και Ψυχικής Υγείας» του ΕΚΠΑ ανέπτυξαν ένα σχετικό ηλεκτρονικό ερωτηματολόγιο. Το ερωτηματολόγιο αυτό περιελάμβανε λήμματα πάνω σε δημογραφικά στοιχεία, στη σωματική και ψυχική υγεία και πάνω σε θέματα σχετιζόμενα με την πανδημία, τα περιοριστικά μέτρα, τους βιορυθμούς, τις έξεις αλλά και σχετιζόμενα με τις σχέσεις των συμμετεχόντων, τις συναδελφικές, φιλικές και οικογενειακές. Επιπροσθέτως, οι συμμετέχοντες κλήθηκαν να συμπληρώσουν ψυχομετρικές κλίμακες για το άγχος, την κατάθλιψη και τον αυτοκτονικό ιδεασμό, την οικογενειακή λειτουργικότητα, τον θυμό και την ψυχική ανθεκτικότητα. Κατά τη διάρκεια του πρώτου lockdown (7 Απριλίου έως 3 Μαΐου) συνολικά 5.748 άτομα από την κοινότητα συμμετείχαν στην έρευνα συμπληρώνοντας ανωνύμως το προαναφερθέν ερωτηματολόγιο σε ασφαλή ιστοσελίδα του Εθνικού και Καποδιστριακού Πανεπιστημίου Αθηνών. Καταβλήθηκε σημαντική προσπάθεια το δείγμα μας να είναι όσο το δυνατόν πιο αντιπροσωπευτικό και να συμπληρωθεί από άτομα της κοινότητας που συνήθως δεν συμμετέχουν στη συμπλήρωση τέτοιων ερωτηματολογίων, όπως είναι οι ηλικιωμένοι ή οι ασθενείς.

Ο επιπολασμός δύο εβδομάδων του αυτοκτονικού ιδεασμού βρέθηκε στο επίπεδο του 5,2%, κατείχε δηλαδή μια ενδιάμεση θέση ανάμεσα στο επίπεδο επιπολασμού 2,4% ενός μηνός του 2008, στο 6,7% του 2011 και στο 2,6% του 2013.[5] Ένα ποσοστό 14,1% έπασχε πιθανώς από αγχώδη διαταραχή, ενώ ένα ποσοστό 26,5% από κατάθλιψη. Ανεξάρτητοι παράγοντες κινδύνου για αυτοκτονικό ιδεασμό αναδείχθηκαν το άγχος, η κατάθλιψη, η χαμηλή οικογενειακή λειτουργικότητα, καθώς και το να είναι κανείς ανύπανδρος ή διαζευγμένος, να έχει ιστορικό διαγνωσμένης ψυχικής νόσου ή να αντιλαμβάνεται τη σωματική του υγεία ως πτωχή. Αντιθέτως, ως ανεξάρτητοι προστατευτικοί παράγοντες για τον αυτοκτονικό ιδεασμό αναδείχθηκαν η ψυχική ανθεκτικότητα, οι σχέσεις με φίλους, η πίστη σε μια ανώτερη δύναμη καθώς και τα θετικά συναισθήματα για τα μέτρα του lockdown.[6] Η διερεύνηση των παραγόντων κινδύνου αλλά και των προστατευτικών παραγόντων του αυτοκτονικού ιδεασμού είναι σημαντική σε αυτή τη δύσκολη περίοδο της πανδημίας.

Σε αυτή τη μελέτη υπήρξε ένα επιπλέον σημαντικό εύρημα: όσοι συμπλήρωσαν το ερωτηματολόγιο κατά τις τελευταίες δύο εβδομάδες του πρώτου lockdown ανέφεραν στατιστικά σημαντικά υψηλότερο αυτοκτονικό ιδεασμό, κατάθλιψη και άγχος σε σχέση με αυτούς που το συμπλήρωσαν κατά τις δύο εβδομάδες που προηγήθηκαν, ενώ αντίστοιχο εύρημα υπήρξε και σε μελέτη από τις ΗΠΑ.[7]

Με πολύ ενδιαφέρον λοιπόν (και αγωνία) περιμέναμε τα αποτελέσματα της ερευνητικής μας εργασίας, κατά το δεύτερο lockdown.[8] Από τα 5.116 άτομα που αρχικά συμπλήρωσαν πλήρως το ερωτηματολόγιό μας, 811 το συμπλήρωσαν πλήρως για δεύτερη φορά από 22 Νοεμβρίου έως 21 Δεκεμβρίου 2020. Ο αυτοκτονικός ιδεασμός δεν βρέθηκε να παρουσιάζει στατιστικώς

σημαντική διαφορά σε σχέση με το πρώτο lockdown. Ως ανεξάρτητοι προβλεπτικοί παράγοντες του αυτοκτονικού ιδεασμού κατά το δεύτερο lockdown αναδείχθηκαν η κατάθλιψη, το άγχος, το να ζει κανείς με ευπαθές άτομο σε λοίμωξη COVID-19 και ο αυτοκτονικός ιδεασμός κατά το πρώτο lockdown.

Σημειώνεται ότι σε αυτό το δεύτερο lockdown το ποσοστό των πιθανώς πασχόντων από κατάθλιψη έμεινε ουσιαστικά αμετάβλητο, ενώ αυξήθηκε το ποσοστό αυτών που έπασχαν από άγχος. Θεωρούμε ότι η καλύτερη πρόσβαση στις υπηρεσίες υγείας, η οικονομική στήριξη από το κράτος και η μεγαλύτερη κινητικότητα αντιρρόπησαν τη μεγαλύτερη βαρύτητα του δεύτερου κύματος της πανδημίας.

Αυτές οι ερευνητικές εργασίες προσδιόρισαν τον επιπολασμό του αυτοκτονικού ιδεασμού και τις συσχετίσεις του με ποικίλες δημογραφικές, κλινικές, κοινωνικές, οικογενειακές και ψυχοπαθολογικές παραμέτρους σε πλαίσιο μελέτης κοόρτης σε διαφορετικές φάσεις της πανδημίας COVID-19, με τη βιβλιογραφία να είναι πτωχή σε παρόμοιες εργασίες. Θεωρούμε ότι η παροχή παρόμοιων στοιχείων είναι κρίσιμη για τους σχεδιασμούς του συστήματος υγείας σε συνθήκες πανδημίας, ενώ η προοπτική αυτή μελέτη συνεχίζεται και στα επόμενα κύματά της.

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https://doi.org/10.22365/jpsych.2021.044 / Psychiatriki 2021, 32:271–281

Research article

COVID-19 psychological impact, knowledge and perceptions of healthcare professionals in Greece: A nationwide cross-sectional study

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ARTICLE HISTORY: Received 7 June 2021/Revised 13 September 2021/Published Online 26 November 2021

ABSTRACT

The impact of the COVID-19 pandemic on the mental health of healthcare professionals is currently under research and prevalence of mental health symptoms across the world vary a lot. Moreover, knowledge and perceptions of healthcare professionals towards the new coronavirus is yet to be explored since very few data have been published to date. Thus, we decided to conduct a cross-sectional, web-based survey to measure the levels of depressive, anxiety and stress symptoms using the Depression, Anxiety and Stress Scale-21. The knowledge and perceptions of healthcare professionals towards the new coronavirus were also examined with a self-constructed questionnaire. Data were collected between April 19th and May 31st 2020. In total, 1484 professionals participated in the survey and 1064 completed it in full; 60.8% were females, 66.5% were physicians and 24.3% were first-line healthcare workers. The prevalence of at least moderate symptoms was 13% for depression, 11.9% for anxiety, and 11.3% for stress. Women, younger participants, residents in urban areas, having lower income and worse self-reported health status had higher scores in all outcomes. First-line healthcare workers also indicated higher anxiety scores compared to those who were not first responders. Regarding knowledge and perceptions, most participants agreed with the asymptomatic nature of the virus and its heightened danger for older individuals and those with underlying health conditions. Different views were expressed regarding the possibility of airborne transmission, its similarity to common flu, and the statements that the new coronavirus is manufactured and serves a specific purpose and that it is out of control. In conclusion, the results of our study suggest that the prevalence of depressive, anxiety and stress symptoms in Greek healthcare professionals is placed in the lower end of the range reported from various recent studies across the world. Nevertheless, professionals at risk should be monitored closely and supported when needed.

KEYWORDS: Mental health impact, healthcare workers, depression, anxiety, stress, coronavirus.

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Introduction

WHO declared a pandemic on March 11th and suggested strict transmission control measures such as quarantine[1] and social distancing.[2] During this time, hospitals in highly affected areas were already overcrowded and healthcare workers overwhelmed by the increased workload, constrained hospital capacity and inability to cure patients and the fear of contracting and transmitting the infection to others, a situation expected to cause severe psychological distress.[3–7] But even in places with low numbers of reported cases, videos and reports from hospitals around the world overflowing with patients with a non-negligible fatality ratio[8] predisposed healthcare professional to a worst-case scenario.

Research on the impact of the COVID-19 pandemic on the well-being of healthcare professionals is currently emerging. Most of the studies have been undertaken in China,[9] and fewer in Italy,[10] Singapore,[11] Spain,[12] and Turkey.[13] The majority of them reported a high prevalence of depressive, anxiety and insomnia symptoms in healthcare professionals, consonant with meta-analyses of early evidence.[9,14–16]

In contrast, research on knowledge and perceptions of healthcare professionals towards the new coronavirus is yet to be explored. Knowledge and perceptions can affect implementation of preventive strategies, identification of suspected cases and quality of information provided to the public. A single relevant study found insufficient level of healthcare workers' knowledge, especially regarding transmission mode and time to symptom onset,[17] raising important concerns for public health authorities.

In Greece, the first case of the new coronavirus was reported on February 26th and, by the end of August 2021, the number of confirmed cases exceeded 581,315 with more than 13,581 deaths.[18] To date, few studies have assessed the impact of the pandemic on the mental health of healthcare workers in Greece,[19–21] whereas none explored the knowledge and perceptions of this professional group towards the new virus and their possible association with mental health symptoms.

Therefore, the aim of our study was to explore: (1) prevalence of depressive, anxiety, and stress symptoms in healthcare professionals during the pandemic; (2) level of knowledge and perceptions towards the new virus; (3) association of various sociodemographic, occupational and health-related characteristics with mental health symptoms; and (4) association of knowledge and perceptions with mental health symptoms.

Material and Method

Participants

This was a cross-sectional, web-based survey designed to obtain information on the psychological and mental health impact of the coronavirus pandemic among Greek healthcare professionals and to assess their knowledge and perceptions. Data were collected between April 19th and May 31st, through an online questionnaire distributed via social media and targeted e-mails, using the snowball technique. In particular, emails were sent to various professional associations of health workers, e.g., Panhellenic Medical Association, inviting them to distribute the survey to their members. All healthcare professionals such as physicians, nurses, pharmacists, and ambulance paramedics were eligible to participate. The study was approved by the Ethics Committee of the University of the Peloponnese and was performed in accordance with the ethical standards delineated in the Declaration of Helsinki 1964/2013.

Measures

Questionnaire included: (i) sociodemographic and health-related characteristics, (ii) mental health symptoms, and (iii) knowledge and perceptions towards the current virus. Sociodemographic, occupational and health-related characteristics included gender, age, area of residence, type of healthcare profession, whether the responded was a first-line healthcare worker or not, education, weekly working-hours, income, marital status, number of household members, presence of underage children in the household, vulnerability to the virus of the responder or a household member, self-reported health status, smoking and alcohol use. Mental health symptoms were measured using the self-reported Depression, Anxiety and Stress Scale (DASS-21)[22,23] which has been validated for the Greek population and used in previous work.[24,25] The DASS-21 includes three constructs, each of which ranges from 0 to 42 points: the Depression subscale, the Anxiety subscale and the Stress subscale. Based on cut-off scores, there are four different severity labels for each subscale (mild, moderate, severe, extremely severe).

As for healthcare professionals' knowledge and perceptions towards the current virus, we asked participants six questions related to (i) the asymptomatic nature of the coronavirus, (ii) the coronavirus being dangerous for those who have an underlying disease and are older, (iii) the coronavirus being out of control, (iv) the coronavirus being engineered and serving a purpose, (v) the coronavirus being like a flu, and (vi) the coronavirus being airborne. Respondents were asked to indicate whether they agree or not with each sen-

tence on a 5-point Likert scale (1=Strongly disagree; 5=Strongly agree). The items were self-constructed and resonated with existing evidence about the coronavirus, as reported by the World Health Organization as well as with similar instruments in international literature (e.g. 26, 27).

Statistical analysis

We initially conducted a descriptive analysis to explore the sociodemographic, occupational and health-related characteristics of the study participants. We then similarly analyzed respondents' knowledge and perceptions related to the new coronavirus and the DASS-21 scores for the Depression, Anxiety, and Stress constructs. Finally, we used multivariate negative binomial regressions to estimate the association between respondents' knowledge and perceptions and the three DASS-21 constructs. We used a negative binomial regression model due to the non-normal distribution (right-skew) of the three outcomes which ranged from 0 to 42.[28] We used Akaike's Inclusion Criteria (AIC) to evaluate the choice of the negative binomial regression over alternative count models (i.e. Poisson, zero-inflated count models), which confirmed the choice of this model. We also included and accounted for all sociodemographic, occupational and health-related characteristics included in the descriptive analyses. Finally, we used geographic-level fixed effects and clustered standard errors at the geographical region of residence to control for unobserved time-invariant regional variation. Incidence rate ratios (IRR) and their 95% confidence intervals (95% CI) were calculated. An alpha level of p=.05 was used for significance testing. Participants with missing data were excluded from the analysis. Data were collected in Excel and all statistical analyses were conducted using Stata (version 16.1; StataCorp, College Station, TX).

Results

Response rate and sociodemographic, occupational and health-related characteristics of respondents

In total, 1484 healthcare professionals participated in the survey and 1064 completed it in full (response rate: 71.7%). The majority were females, aged 40 to 54 years (table 1). Area of residence was balanced between urban and suburban areas. More than half were medical staff, with tertiary or post-tertiary education level. About one-quarter (24.3%) were first-line healthcare workers and 39.4% of participants worked 40 to 45 hours per-week. Most participants reported average or higher-than average income, while only 7.6% indicated low or very low income. 67.4% of participants were

Table 1. Sociodemographic, occupational and health-related characteristics of respondents.

	Participants (n=1064)
Gender (%)	
Male	39.2
Female	60.8
Age categories (%)	
18 to 39	27.8
40 to 54	52.7
55 or more	19.5
Place of Residence (%)	
Urban	50.8
Non-urban	49.2
Healthcare Profession	
Medical staff	66.5
Nursing staff	10.4
Pharmacist	7.6
Other	15.4
First-line healthcare worker	
No	75.7
Yes	24.3
Education (%)	
Post-tertiary (Masters/Doctoral)	43.2
Tertiary	48.1
High School	8.7
Weekly working hours (%)	
More than 50	15.9
46 to 50	14.5
40 to 45	39.4
Less than 40	30.3
Income (%)	
Higher than average	40.7
Average	43.3
Low to Average	8.4
Low/Very low	7.6
Marital status (%)	
Married/Living together	67.4
Not married	23.7
Divorced/Widowed	8.9
Number of people in household	2.9 (1.5)
Underage children in household (%)	
No	54.4
Yes	45.6

Continues

Table 1. (*Continued*).

	Participants (n=1064)
Respondent is vulnerable to COVID due to underlying health problem (%)	
No	79.7
Yes	20.3
Household member is vulnerable to COVID due to underlying health problem (%)	
No	69.6
Yes	30.4
Perceived health status (%)	
Very good	28.8
Good	51.7
Medium	16.3
Ver bad/bad	3.2
Smoker (%)	
No	68.0
Yes	32.0
Alcohol use (regular) (%)	
No	90.4
Yes	9.6

married. The average household size was 2.9 (SD=1.5) individuals and 45.6% of households included underage children. About one-fifth of respondents indicated that they were vulnerable to the current virus due to an underlying healthcare condition, while 30.4% reported that a member of their household was vulnerable to the new virus due to an existing health condition. About half deemed their health status as good, while 28.8% perceived having very good health and only 3.2% reported having bad or very bad health. About one-third were currently smoking and 9.6% were regular alcohol users.

Mental health symptoms of participants

Table 2 presents participants' mental health outcomes. Average scores on the three DASS-21 subscales were 3.32 (SD=5.17) for anxiety, 9.34 (SD=7.99) for stress, and 6.37 (SD=7.33) for depression. Most reported normal scores across all three mental health outcomes; 83.0% for the anxiety subscale, 80.7% for the stress subscale, and 74.3% for the depression subscale. However, 11.9% of healthcare professionals reported at least moderate anxiety symptoms, 11.3% reported at least moderate stress symptoms, and 13% at least moderate depressive symptoms, with 4 to 5% of participants being identified as having severe or extremely severe anxiety, stress, or depression scores. A robustness statistical check based on the timing of each response was applied, but no change in the results was observed.

Table 2. The Depression, Anxiety and Stress Scale-21 (DASS-21) score of respondents for anxiety, stress, and depression.

Anxiety	
DASS-21 score - average (SD)	3.32 (5.17)
DASS-21 score (%)	
Normal (0-7)	83.0
Mild (8-9)	5.1
Moderate (10-14)	8.0
Severe (15-19)	1.8
Extremely Severe (20+)	2.1
Stress	
DASS-21 score - average (SD)	9.34 (7.99)
DASS-21 score (%)	
Normal (0-14)	80.7
Mild (15-18)	8.0
Moderate (19-25)	6.6
Severe (26-33)	3.0
Extremely Severe (34+)	1.7
Depression	
DASS-21 score - average (SD)	6.37 (7.33)
DASS-21 score (%)	
Normal (0-9)	74.3
Mild (10-13)	12.7
Moderate (14-20)	7.8
Severe (21-27)	2.7
Extremely Severe (28+)	2.5

Knowledge and perceptions related to the new coronavirus

Table 3 presents respondents' knowledge and perceptions related to the new coronavirus. Healthcare professionals almost unanimously agreed with the asymptomatic nature of the virus (96.1%) and its heightened danger for older individuals and those with underlying health conditions (92.2%). More than half perceived that the virus is transmitted by air (58.5%) while a similar share (59.5%) of respondents disagreed with the view that the new coronavirus is manufactured and serves a purpose. Most disagreed with the similarity between coronavirus and common flu (47.7%), while around one-third (30.0%) supported the opposite. Finally, while 43.5% thought the virus is not out of control, 31.4% were neutral and 25.1% agreed with this statement.

Table 3. Respondents' knowledge and perceptions related to the current virus.

	Participants (n=1064)
The virus may be asymptomatic (%)	
Agree	96.1
Neutral	1.8
Disagree	2.1
The virus is dangerous for older people and for those with underlying health problems (%)	
Agree	92.2
Neutral	2.9
Disagree	4.9
The virus is airborne (%)	
Agree	58.5
Neutral	15.6
Disagree	25.9
The virus is manufactured and serves specific purposes (%)	
Agree	17.0
Neutral	23.5
Disagree	59.5
The virus is similar to common flu (%)	
Agree	30.0
Neutral	22.3
Disagree	47.7
The virus is out of control (%)	
Agree	25.1
Neutral	31.4
Disagree	43.5

Association between sociodemographic, occupational and health-related characteristics and mental health outcomes

The results of the three multivariate negative binomial regressions for each mental health subscale separately are presented in table 4. Higher scores across all three DASS-21 Anxiety, Stress, and Depression subscales were observed for females, for those who were less than 55 years of age, particularly for those younger than 39 years of age, compared to those who were 55 years or older, and for urban residents. First-line healthcare workers also indicated higher Anxiety scores compared to those who were not first responders. Nursing staff reported lower Depression scores and pharmacists higher Anxiety scores compared to medical staff. Participants with tertiary education had lower scores in the Stress subscale compared to those with post-tertiary education. Also, scores across all three DASS-21 subscales tended to be higher for individuals with income lower than those in the 'higher than average' category. Single (unmarried) individuals reported higher scores in the Stress subscales compared to those who were married. As expected, compared to healthcare professionals with very good self-reported health status, those with worse health status ("good", "moderate", "bad/very bad") had consistently higher scores across all three subscales. Systematic alcohol users reported lower Anxiety and higher Depression scores. Increased Anxiety was also observed among healthcare professional whose member of their household was vulnerable to the virus due to underlying health conditions. All other associations were not significant.

Association between respondents' knowledge and perceptions related to the current virus and mental health outcomes

Lower scores in the Stress subscale were observed for healthcare professionals who disagreed with the asymptomatic nature of the virus as compared to those who supported this statement. Healthcare professionals who agreed with the similarity of the coronavirus with the common flu had lower Anxiety and Stress scores compared to those who reported disagreement. Professionals who were neutral regarding the statement that the current virus is out of control had higher Stress and Depressive scores compared to those who disagreed with this statement. Finally, no other significant association was observed between DASS scores and the remaining examined knowledge and perceptions.

Discussion

This cross-sectional study evaluated the psychological impact of COVID-19 pandemic on healthcare professionals in Greece, using a large number of participants and various independent characteristics. Moreover, it is the first study to explore the relationship between depressive, anxiety and stress symptoms with knowledge and perceptions of this group towards the new coronavirus.

Healthcare professionals suffer from increased psychological distress,[29–31] with high rates of psychiatric disorders.[32–34] Especially during pandemic outbreaks, the exposure of healthcare professionals to stressors is increased.[35] In our study, 11% to 13 % of healthcare professionals reported at least moderate depressive, anxiety, and stress symptoms. Prevalence estimates across the world vary a lot and stratified analyses by country cannot so far explain this high heterogeneity.[36] Our results are placed in the lower end of the prevalence

Table 4. Multivariate negative binomial regression estimates between DASS-21 anxiety, stress, and depression scales and respondents' knowledge and perceptions on the virus and their sociodemographic, occupational and health-related characteristics.

	Anxiety				Stress				Depression			
	IRR	p	95%	CI	IRR	p	95%	CI	IRR	p	95%	CI
Sociodemographic, occupational and health-related characteristics												
Gender (Ref: Male)												
Female	1.85	<0.001	1.49	2.30	1.41	<0.001	1.18	1.68	1.43	<0.001	1.23	1.67
Age categories (Ref: ≥55)												
40–54	1.16	0.361	0.85	1.58	1.24	0.001	1.09	1.42	1.10	0.427	0.87	1.40
18–39	1.48	0.012	1.09	2.02	1.34	<0.001	1.14	1.57	1.35	0.005	1.09	1.66
Place of Residence (Ref: non-urban)												
Urban	1.35	0.019	1.05	1.73	1.27	<0.001	1.11	1.44	1.18	0.042	1.01	1.39
Healthcare profession (Ref: Medical staff)												
Nursing staff	1.01	0.946	0.77	1.32	0.89	0.284	0.72	1.10	0.85	0.034	0.73	0.99
Pharmacist	1.61	0.004	1.17	2.22	1.18	0.071	0.99	1.41	0.93	0.527	0.74	1.17
Other	0.63	0.166	0.33	1.21	0.87	0.214	0.70	1.08	0.79	0.103	0.60	1.05
First-line worker (Ref: No)												
Yes	1.41	0.038	1.02	1.94	1.06	0.204	0.97	1.15	1.05	0.538	0.90	1.21
Education (Ref: Post-tertiary)												
Tertiary	0.89	0.264	0.73	1.09	0.93	0.010	0.89	0.98	0.97	0.625	0.87	1.08
High School	1.15	0.466	0.80	1.65	0.96	0.670	0.78	1.18	0.93	0.706	0.63	1.37
Weekly working hours (Ref: >50)												
46 to 50	0.87	0.346	0.65	1.16	0.93	0.228	0.83	1.04	0.97	0.800	0.77	1.22
40 to 45	1.09	0.544	0.83	1.42	1.01	0.892	0.88	1.16	1.10	0.402	0.88	1.36
Less than 40	0.88	0.341	0.68	1.14	0.95	0.460	0.83	1.09	1.02	0.848	0.85	1.23
Income (Ref: Higher than average)												
Average	1.16	0.122	0.96	1.41	1.11	0.107	0.98	1.25	1.23	<0.001	1.12	1.36
Low to average	1.43	0.044	1.01	2.02	1.29	<0.001	1.15	1.45	1.44	<0.001	1.29	1.61
Very low//Low	1.14	0.621	0.67	1.94	1.01	0.963	0.72	1.41	1.30	0.281	0.81	2.09
Marital status (Ref: Married)												
Not married	1.10	0.561	0.79	1.53	1.14	0.012	1.03	1.27	1.24	0.102	0.96	1.59
Divorced/Widowed	0.85	0.435	0.57	1.27	0.84	0.170	0.66	1.08	0.87	0.405	0.64	1.20
Underage children in household (Ref:No)												
Yes	1.05	0.807	0.72	1.53	0.99	0.874	0.84	1.16	0.94	0.419	0.80	1.10
Respondent is vulnerable to COVID due to underlying health problem (Ref: No)												
Yes	1.10	0.617	0.75	1.63	0.95	0.539	0.80	1.13	0.98	0.823	0.79	1.21
Household member is vulnerable to COVID due to underlying health problem (Ref: No)												
Yes	1.25	0.039	1.01	1.56	1.03	0.559	0.93	1.15	1.02	0.723	0.90	1.16

Continues

Table 4. (Continued).

	Anxiety				Stress				Depression			
	IRR	p	95%	CI	IRR	p	95%	CI	IRR	p	95%	CI
Perceived health status (Ref: Very good)												
Good	1.81	<0.001	1.32	2.49	1.34	<0.001	1.19	1.51	1.32	<0.001	1.18	1.48
Moderate	2.54	<0.001	1.77	3.64	1.68	<0.001	1.36	2.08	1.89	<0.001	1.38	2.59
Very bad/bad	2.30	<0.001	1.48	3.57	1.61	0.002	1.19	2.19	2.54	<0.001	1.67	3.87
Smoker (Ref: No)												
Yes	1.16	0.320	0.87	1.55	1.11	0.147	0.97	1.27	1.12	0.231	0.93	1.33
Alcohol use-regular (Ref: No)												
Yes	0.81	0.008	0.70	0.95	1.06	0.434	0.91	1.24	1.42	<0.001	1.24	1.62
Knowledge and perceptions												
The virus may be asymptomatic (Ref: Agree)												
Neutral	1.14	0.673	0.62	2.08	1.00	0.988	0.66	1.54	0.74	0.457	0.34	1.62
Disagree	0.96	0.875	0.57	1.61	0.63	0.006	0.45	0.87	0.84	0.448	0.54	1.32
The virus is dangerous for older people and for those with underlying health problems (Ref: Agree)												
Neutral	0.97	0.860	0.65	1.43	1.11	0.632	0.73	1.70	1.43	0.115	0.92	2.24
Disagree	1.03	0.885	0.66	1.61	1.10	0.643	0.73	1.65	1.03	0.890	0.67	1.58
The virus is airborne (Ref: Disagree)												
Neutral	0.89	0.240	0.74	1.08	0.98	0.758	0.88	1.09	1.05	0.602	0.87	1.28
Agree	0.91	0.422	0.71	1.15	0.92	0.214	0.82	1.05	0.94	0.343	0.83	1.06
The virus is manufactured and serves specific purposes (Ref: Disagree)												
Neutral	1.14	0.372	0.85	1.54	1.11	0.065	0.99	1.24	1.16	0.113	0.97	1.40
Agree	0.97	0.625	0.85	1.10	1.07	0.270	0.95	1.21	0.91	0.147	0.80	1.03
The virus is similar to common flu (Ref: Disagree)												
Neutral	1.20	0.193	0.91	1.57	1.02	0.778	0.90	1.15	1.06	0.395	0.93	1.21
Agree	0.74	<0.001	0.62	0.87	0.85	0.003	0.76	0.95	0.90	0.218	0.76	1.07
The virus is out of control (Ref: Disagree)												
Neutral	1.02	0.815	0.84	1.25	1.08	0.023	1.01	1.16	1.18	0.001	1.07	1.30
Agree	1.24	0.057	0.99	1.54	1.06	0.144	0.98	1.14	1.12	0.206	0.94	1.33

Notes: All regression models control for geographic-level fixed effects; DASS-21: Depression, Anxiety and Stress Scale-21; IRR: Incidence Rate Ratio; CI: Confidence Intervals

range reported from various recent studies[9,36] which could be explained by the low infection and death rate in Greece at that time, similarly to other countries like Singapore which reported even lower DASS-21 scores.[11] Nevertheless, these estimates are much lower than other studies in Greek healthcare professionals during the same period of time: Pappa et al found that approximately one third of frontline healthcare professionals reported at least moderate depression, anxiety and traumatic stress;[19] Kalaitzaki and Rovithis assessed the secondary traumatic stress and found that almost 80% of healthcare professionals suffered from at least moderate secondary stress;[20] and Alexopoulos et al reported increased severity of anxiety symptoms in back-

stage and frontline hospital workforce (27% and 45% respectively), but this was not the case for the severity of depressive symptoms (15% and 12% respectively).[21] Alternatively, it may be the case that healthcare professionals are under a continuously increased psychological burden.[37] Identified risk factors such as female gender, younger age, being a first-line healthcare worker, living in urban areas, having lower income and worse self-reported health status agree with the literature.[38]

As for the respondents' knowledge and perceptions towards the new coronavirus, the vast majority acknowledged that the virus may be asymptomatic and that it is dangerous for older people and for those with underlying health problems. Furthermore, almost two thirds of respondents agreed with its airborne transmission although this topic was still controversial among researchers by that time with some data supporting this mode of transmission,[39–41] while other studies did not.[42–44] Moreover, more than half of respondents agreed or were neutral towards the statements that the virus is similar to common flu and that it is out of control. Both these statements are open to various interpretations. COVID-19 and influenza (flu) are both contagious respiratory illnesses, caused by RNA viruses, and share many similarities like symptoms, transmission routes, characteristics of people at high risk for severe illness, and complications.[45] Despite the similarities, there are also important differences between the two like the possibility of airborne transmission route,[46] of higher spread[47] and death rate[8] for COVID-19, and the availability of approved vaccines and antiviral drugs for the prevention and treatment of flu. These differences became apparent in our findings where healthcare professionals who supported the similarity between COVID-19 and the common flu exhibited lower rates across all three mental health outcomes. Comparably, the statement that the virus is out of control could be considered ambiguous. On the one hand, WHO reports almost everyday record daily increases in coronavirus cases worldwide[18] despite sounding global alarm months ago; on the other hand, countries like Singapore and Greece, when strict preventive and/or containment measures were imposed , managed to control it.

Last but not least, approximately 40% of respondents agreed or were neutral towards the statement that the virus is manufactured and serves specific purposes. A positive correlation has been shown between conspiracy beliefs and unwillingness to follow guidelines and engage in health-protective behaviors,[48–51] highlighting the important implications of these findings for individuals and society. Comparable rates of endorsement of conspiracy beliefs regarding the cause of the virus were reported by a study in the general public in UK,[52] but the prevalence reported in our study is even more worrisome as it refers to healthcare professionals who are supposed to be more knowledgeable, follow guidelines and inform the public. High levels of anxiety and stress have been proposed as causative of conspiracy beliefs.[53] Interestingly, in our study, no difference in any of mental health outcomes was shown for professionals who endorsed or refuted this specific conspiracy belief. Similarly, a recent study in the general public found no relationship between COVID-19 conspiracy beliefs and self-reported stress.[54] These results imply that belief in conspiracy theories is a more complex phenomenon and numerous factors may underlie it such as personality traits, individual characteristics like educational level and political ideology, a need to feel safe and to maintain a positive image, source of information, and belief in previous conspiracy theories.[53,55] To the best of our knowledge and despite the emerging literature on the impact of the coronavirus pandemic, this is the first study examining the prevalence of a common conspiracy belief about the cause of the virus among healthcare professionals.

In our analysis, broad inclusion criteria were applied since all workers relevant to the provision of healthcare such as physicians, nurses, pharmacists, and ambulance paramedics were eligible to participate. To enhance participation in our study, social media pages targeting healthcare professionals were used and emails via relevant professional associations were sent. In our final sample, more than half of participants were physicians and no difference in any of the mental health outcomes between the various healthcare professions was observed. Nevertheless, many other reports on the topic have identified increased severity of psychological symptoms in nurses,[9,15] possibly because of the direct and intense contact with patients and increased risk of contagion. A possible explanation for not corroborating this finding in the present study could be the low number of nurses in the sample, which increased the possibility of failing to detect a difference although it might be present (type 2 error).

Owing to many limitations, our results are not conclusive. Firstly, participants were not randomly selected from the population of healthcare professionals and the self-selection process applied might be associated with specific personality, mental-health or other individual characteristics that could not be identified, quantified and adjusted for; therefore, selection bias might exist and the sample cannot be considered representative. Furthermore, the cross-sectional design of our study, with no follow-up data, could be affected by the timing of data collection. As the epidemic evolves, the mental health impact on healthcare professionals might

also change depending on severity of each epidemic phase, medical developments, and emergency measures imposed by the state. The time period covered by the present study was extended, i.e., 6 weeks, which allowed for a robustness statistical check based on the timing of each response, but no change in the results was observed. Moreover, the use of self-reported questionnaires rather than face-to-face diagnostic assessments by mental health professionals has itself a number of disadvantages such as social desirability bias, response bias, honesty and interpretation of the questions. Finally, the assessment of many other psychological symptoms like insomnia, self-harm behaviors and post-traumatic stress symptoms was not included.

In conclusion, protecting mental health of healthcare professionals is crucial for safeguarding the provision of sustainable healthcare services, especially during pandemic outbreaks. Our analysis suggests that being female and young, living in urban areas, and having lower income and worse self-reported health status increase the risk of adverse mental health outcomes. Thus, professionals with such characteristics should be monitored closely and supported when needed. Furthermore, online trainings, targeted campaigns and simulation exercises should be provided to healthcare professionals to improve their knowledge and perceptions and enable them to make informed choices based on the best available evidence at any given time.

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Ερευνητική εργασία

Ψυχική κατάσταση, γνώσεις και αντιλήψεις των επαγγελματιών υγείας κατά τη διάρκεια της πανδημίας COVID-19 στην Ελλάδα: Μια εθνική μελέτη διατομής

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ΙΣΤΟΡΙΚΟ ΑΡΘΡΟΥ: Παραλήφθηκε 7 Ιουνίου 2021/Αναθεωρήθηκε 13 Σεπτεμβρίου 2021/Δημοσιεύθηκε Διαδικτυακά 26 Νοεμβρίου 2021

ΠΕΡΙΛΗΨΗ

Ο αντίκτυπος της πανδημίας COVID-19 στην ψυχική υγεία των επαγγελματιών υγείας βρίσκεται υπό διερεύνηση και οι εκτιμήσεις ανά τον κόσμο σχετικά με τον επιπολασμό των διαφόρων ψυχικών συμπτωμάτων ποικίλλουν σημαντικά. Επιπλέον, οι γνώσεις και οι αντιλήψεις των επαγγελματιών υγείας για τον νέο κορωνοϊό δεν έχουν ακόμη διερευνηθεί, καθώς υπάρχουν πολύ λίγα δημοσιευμένα δεδομένα έως και σήμερα. Έτσι, αποφασίσαμε να πραγματοποιήσουμε μια συγχρονική, διαδικτυακή έρευνα για να μετρήσουμε τα επίπεδα των συμπτωμάτων κατάθλιψης, άγχους και στρες χρησιμοποιώντας την Κλίμακα Κατάθλιψης, Άγχους και Στρες (DASS-21). Οι γνώσεις και οι αντιλήψεις των ερωτηθέντων εξετάστηκαν επίσης με ένα αυτοσχέδιο ερωτηματολόγιο. Τα δεδομένα συλλέχθηκαν μεταξύ 19 Απριλίου και 31 Μαΐου 2021. Συνολικά 1484 επαγγελματίες υγείας συμμετείχαν στην έρευνα και 1064 την ολοκλήρωσαν. Το 60,8% των συμμετεχόντων ήταν γυναίκες, το 66,5% ήταν ιατροί και το 24,3% ήταν επαγγελματίες υγείας πρώτης γραμμής. Ο επιπολασμός των κατ' ελάχιστον μέτριων συμπτωμάτων ήταν 13% για την κατάθλιψη, 11,9% για το άγχος και 11,3% για το στρες. Οι γυναίκες, οι νεότεροι συμμετέχοντες, οι κάτοικοι σε αστικές περιοχές, όσοι είχαν χαμηλότερο εισόδημα και όσοι ανέφεραν χειρότερη κατάσταση υγείας εμφάνισαν υψηλότερες βαθμολογίες σε όλα τα αποτελέσματα. Οι υγειονομικοί πρώτης γραμμής ανέφεραν επίσης υψηλότερα ποσοστά άγχους. Όσον αφορά στη γνώση και τις αντιλήψεις, οι περισσότεροι συμμετέχοντες συμφώνησαν με την πιθανή ασυμπτωματική φύση του ιού καθώς και με τον αυξημένο κίνδυνο για τα ηλικιωμένα άτομα και τα άτομα με υποκείμενες παθήσεις. Διαφορετικές απόψεις εκφράστηκαν σχετικά με τη δυνατότητα μετάδοσης του κορωνοϊού μέσω του αέρα, την ομοιότητά του με την κοινή γρίπη και τις δηλώσεις ότι είναι κατασκευασμένος και εξυπηρετεί συγκεκριμένο σκοπό καθώς και ότι είναι εκτός ελέγχου. Συμπερασματικά, τα αποτελέσματα της μελέτης μας υποδηλώνουν ότι ο επιπολασμός των συμπτωμάτων κατάθλιψης, άγχους και στρες στους Έλληνες επαγγελματίες υγείας τοποθετείται στο κατώτερο άκρο του εύρους που αναφέρεται από διάφορες πρόσφατες μελέτες σε όλο τον κόσμο. Ωστόσο, οι επαγγελματίες υγείας που βρίσκονται σε αυξημένο κίνδυνο πρέπει να παρακολουθούνται στενά και να υποστηρίζονται όταν αυτό είναι απαραίτητο.

ΛΕΞΕΙΣ ΕΥΡΕΤΗΡΙΟΥ: Ψυχική υγεία, υγειονομικοί, κατάθλιψη, άγχος, στρες, κορωνοϊός.

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https://doi.org/10.22365/jpsych.2021.045 / Psychiatriki 2021, 32:282–289

Research article

Working conditions, lifestyle and mental health of Brazilian public-school teachers during the COVID-19 pandemic

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ARTICLE HISTORY: Received 28 April 2021/Revised 21 July 2021/Published Online 26 November 2021

ABSTRACT

This study aimed to describe the working conditions, lifestyle and mental health of Brazilian public-school teachers during the COVID-19 pandemic. This is an epidemiological websurvey, carried out from August to September 2020. Teachers from public schools in rural and urban areas in the state of Minas Gerais, Brazil, participated in the study. A digital questionnaire was used and the study addressed variables related to four major thematic topics: sociodemographic and economic profile, working conditions, lifestyle and health conditions, and mental health problems during the pandemic. The sample consisted of 15,641 teachers, of which 13.3% worked in rural areas, 81.9% were women, 56.2% were aged 41–60 years, 66.8% were married, 99.2% were working remotely and 79.8% adhered to social distancing. During the pandemic, 40.6% showed a decrease in family income, 33.7% were dissatisfied with their work, 58% reported increased body weight, 47.9% did not exercise, 35.8% were part of at least one risk group for COVID-19, 40.5% had some flu-like symptoms during the pandemic and 1.2% tested positive for COVID-19. Regarding mental health problems, 25.9% of teachers self-reported formal diagnosis of anxiety and/or depression during the pandemic. In addition, 7.1% of teachers were drinking more alcohol than usual, 33.4% started having sleep problems, 30.4% were using relax/sleep/anxiety/depression medications, 67.1% reported that their quality of life worsened and 43.7% reported having severe fear of COVID-19. It was also found that 82.3% of teachers had at least one mental health problem during the pandemic, such as increased alcohol consumption, sleep problems, use of psychotropic medication, decreased quality of life, and fear of COVID-19. The results of this study reveal the numerous challenges and the extent of the impact of the pandemic on working conditions, lifestyle, and especially on the mental health of teachers.

KEYWORDS: Coronavirus, education, health conditions, work stress, epidemiology.

Introduction

In 2019, the SARS-CoV-2 pandemic started and quickly spread around the world. In January 2020, COVID-19 was announced by World Health Organization WHO as a public health emergency.[1] The first case of COVID-19 was confirmed in Brazil in February 2020 and after three weeks, all Brazilian states presented at least one case of the disease.[2]

As a result of the increase in the number of deaths, the most widely adopted public health measure was social

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distance.[3] Social distancing was applied to reduce contact between people. Many measures were adopted during the pandemic, such as border closures, non-essential commercial establishments have been closed, and the prohibition of public events.[4] COVID-19 caused damage even to the educational system.[5] Teachers faced financial, physical, and mental problems, due to changes in the routine of life and work.[6]

As a result of the pandemic extension in Brazil, in April 2020, the National Council of Education approved an emergency strategy on the reorganization of the school calendar and the possibility of remote classes, aiming at fulfilling the country's annual workload.[7] This "new normal" generated consequences and concerns for teachers, directly affecting working conditions, life habits, and health,[8] especially those of public basic education, who work in schools with precarious structures, with high working hours, and sometimes in more than one educational institution.[9]

Although the pandemic is recent, the literature already presents studies on the impact caused on the population's health and work.[10–13] However, the extent of the changes caused in the health and working conditions of basic education teachers is still unclear. Therefore, this study aimed to describe the working conditions, lifestyle, and mental health of Brazilian teachers during the COVID-19 pandemic.

Material and Method

This study is part of the ProfSMoc Project - Minas Covid Stage "Health and work conditions among teachers from the state education system of Minas Gerais during the COVID-19 pandemic". This is a cross-sectional study, carried out with teachers of elementary, middle, and high school from public schools in the state of Minas Gerais, Brazil. The state of Minas Gerais had approximately 90,000 teachers of basic education in 2020 working in 3,441 schools.[14] This study followed the Checklist for Reporting Results of Internet E-Surveys.[15]

The sample calculation was made considering infinite populations. A prevalence of 50% was considered aiming to obtain the largest sample size and inference power. The tolerable error adopted was 3%. The sample was duplicated deff=2, as it is a conglomerate. A 20% increase was made in the sample size to compensate for possible losses. Thus, a minimum sample of 2,564 teachers was estimated.

Organizationally, the state of Minas Gerais is divided into six regional centers and each center is subdivided into Regional Teaching Superintendencies (RTS). Altogether, the state has 45 RTS. Access to the number of teachers and to which RTS the teacher was linked was made available by the Department of Education of Minas Gerais (DE-MG). Thus, it was possible to guarantee the proportionality of teachers by RTS, stipulating the minimum number of teachers to be studied in each of the RTS.

Authorizations were obtained from the DE-MG and 45 RTS to carry out the research. A pilot study was carried out with 20 teachers from five different cities in Minas Gerais to test and adjust the data collection. Data collection took place from August 20 to September 11, 2020, using a digital form. The link to the digital form was sent to the institutional e-mail of all teachers in the state, which had the support of DE-MG in sending them. To avoid automatic filling of the form by computer systems, a reCAPTCHA was used, preventing the form from being sent by robots. All questions on the form were mandatory, minimizing information loss. The study also guaranteed the teachers' anonymity.

This study included teachers working in elementary, middle, and/or high school, and those who accepted to participate in the research. Teachers deviating from the teaching function and those who answered "no" when asked if they agreed to participate in the study were excluded.

The study addressed four major thematic groups of variables: sociodemographic and economic profile, working conditions, lifestyle and health conditions, mental health problems, including the Fear of COVID-19 Scale (FCV-19S), which is an instrument that investigates people's fear of COVID-19. The total score was obtained from the sum of the items, being categorized from 7 to 19 points as "little fear", from 20 to 26 points "moderate fear" and 27 to 35 points "severe fear".[16]

The data were analyzed using the Statistical Package for Social Sciences, version 22.0. Simple frequencies were presented, the prevalence and 95% confidence interval 95% CI were calculated for the variables studied.

The project was approved by a research ethics committee of the State University of Montes Claros (4,200,389/2020). The research also complied with resolution 466/12 of the National Health Council/Ministry of Health.

Results

The questionnaire was accessed by 16,210 teachers, of which 15,641 agreed to participate in the survey, resulting in a recruitment rate of 96.5% and a 100% completion rate. Most of the teachers (86.7%) worked in the urban area, while 13.3% worked in schools located in rural areas. The sociodemographic and economic profiles of the sample are shown in table 1. The majority of the teachers were female (81.9%), 56.2% were aged 41 to 60 years, 59.5%

Table 1. Sociodemographic and economic profile of public-school teachers (n=15,641).

	n	% (CI 95%)
Gender		
Female	12,817	81.9 (81.2–82.5)
Male	2,824	18.1 (17.4–18.7)
Age years		
21–40	6,447	41.2 (40.4–41.9)
41–60	8,793	56.2 (55.4–56.9)
>60	401	2.6 (2.3–2.8)
Skin color/ethnicity		
White	7,642	48.9 (48.1–49.6)
Brown	6,321	40.4 (39.6–41.1)
Black	1,246	8.0 (7.5–8.4)
Asian	359	2.3 (2.0–2.5)
Indigenous	73	0.5 (0.3–0.6)
Living area		
Urban area	13,565	86.7 (86.1–87.2)
Rural area	2,076	13.3 (12.7–13.8)
Family income before the pandemic (minimum wage) #		
1–2	3,969	25.4 (24.7–26.0)
3–5	9,301	59.5 (58.7–60.2)
6–9	1,945	12.4 (11.8–12.9)
>10	426	2.7 (2.4–2.9)
Family income during the pandemic		
Increased	304	1.9 (1.6–2.1)
Remained the same	8,947	57.2 (56.4–57.9)
Decreased	6,350	40.6 (39.8–41.3)
Lost the income	40	0.3 (0.2–0.3)
Marital status		
Married	10,453	66.8 (66.0–67.5)
Not married	5,188	33.2 (32.4–33.9)
Children		
Yes	11,350	72.6 (71.9–73.2)
No	4,291	27.4 (26.7–28.0)

*Variation in n due to loss of information
#Quantity of minimum wages received by the family. Brazilian national minimum wage=$ 212.6/month.

had family incomes of 3 to 5 minimum wages, 40.6% had a decrease in family income during the pandemic, 66.8% were married and 72.6% had children.

Table 2 shows data on working conditions. A quarter of the teachers worked as teachers for 21 years or more, 15.8% worked more than 40 hours per week, 4.4% had a MSc and/or PhD degree, 99.2% were doing remote work and 33.7% were dissatisfied with work during the pandemic.

Table 2. Working conditions of public-school teachers (n=15,641)

	n	% (CI 95%)
Years of teaching work *		
1 - 10	5,941	38.0 (37.2-38.7)
11- 20	5,788	37.0 (36.2-37.7)
> 21	3,911	25.0 (24.3-25.6)
Weekly hours of teaching work *		
≤19	3,613	23.1 (22.4-23.7)
20–39	9,554	61.1 (60.3-61.8)
≥40	2,472	15.8 (15.2-16.3)
Graduate degree		
Master's and/or PhD	692	4.4 (4.0-4.7)
Specialization	11,115	71.1 (70.3-71.8)
No	3,834	24.5 (23.8-25.1)
Performing remote work during the pandemic		
Yes	15,520	99.2 (99.0-99.3)
No	121	0.8 (0.6-0.9)
Work satisfaction during the pandemic		
Satisfied	3,375	21.6 (20.9-22.2)
Neither satisfied nor dissatisfied	6,995	44.7 (43.9-45.4)
Dissatisfied	5,271	33.7 (32.9-34.4)

* Variation in n due to loss of information

Regarding the lifestyle and health conditions, 79.8% fully adhered to social distancing, 47.9% were not exercising, 53% were not performing leisure activities, 58% had gained weight, 35.8% were part of at least one risk group for COVID-19, 40.5% had some flu-like symptoms during the pandemic and 1.2% tested positive for COVID-19. These and other data are included in table 3.

Table 4 presents topics related to mental health. It was observed that 25.9% of teachers reported a formal diagnosis of anxiety and/or depression during the COVID-19 pandemic. Before the pandemic, 32.3% of teachers reported that they had been previously diagnosed by a doctor with anxiety and/or depression. Furthermore, during the pandemic, 7.1% of the teachers were drinking more alcohol than usual, 33.4% started having sleep problems, 30.4% were using drugs to relax/sleep/anxiety/depression, the perception of quality of life of 67.1% of teachers worsened and 43.7% reported having severe fear of COVID-19. It was also found that 82.3% of teachers had at least one condition related to mental health during the pandemic, such as increased alcohol consumption, sleep problems, use of psychotropic medication, quality of life, and fear of COVID-19. Those who reported a formal diagnosis of depression and/or anxiety during the pandemic were not included in the analysis.

Table 3. Lifestyle and health conditions of public-school teachers during the pandemic (n=15,641).

	n	% (CI 95%)
Adherence to social distance		
Totally	12,486	79.8 (79.1–80.4)
Partially	3,096	19.8 (19.1–20.4)
Did not adhere	59	0.4 (0.3–0.5)
Food Consumption		
More vegetables and fruits; less processed food	7,737	49.5 (48.7–50.2)
Less vegetables and fruits; more processed food	7,904	50.5 (49.7–51.2)
Practice exercise		
Yes	8,144	52.1 (51.3–52.8)
No	7,497	47.9 (47.1–48.6)
Leisure Activities		
Increased	876	5.6 (5.2–5.9)
Did not change	3,005	19.2 (18.5–19.8)
Decreased	5,033	32.2 (31.4–32.9)
Not doing leisure activities	6,727	43.0 (42.2–43.7)
Body weight * #		
Remained the same	4851	31.5 (30.7–32.2)
Decreased	1611	10.5 (10.0–10.9)
Increased	8933	58.0 (57.2–58.7)
Risk group for COVID–19		
No	10,047	64.2 (63.4–64.9)
Yes	5,594	35.8 (35.0–36.5)
Flu-like symptoms		
No	9,312	59.5 (58.7–60.2)
Yes	6,329	40.5 (39.7–41.2)
Tested positive for COVID–19		
Did not test	13,627	87.1 (86.5–87.6)
No	1,788	11.4 (10.9–11.8)
Did not receive the result	41	0.3 (0.2–0.4)
Yes	185	1.2 (1.0–1.3)
A friend or family member has died because of COVID–19		
No	12,442	79.5 (78.8–80.1)
Yes	3,199	20.5 (19.8–21.1)

* Variation in n due to loss of information
# Pregnant women were excluded from the analysis n=232

Table 4. Mental health problems of public-school teachers during the pandemic (n=15,641).

	n	% (CI 95%)
A medical diagnosis of anxiety and/or depression during the pandemic		
No	11,597	74.1 (73.4–74.7)
Yes	4,044	25.9 (25.2–26.5)
Formal diagnosis of anxiety and/or depression before the pandemic		
No	10,594	67.7 (66.7–68.4)
Yes	5,047	32.3 (31.5–33.0)
Alcohol consumption		
Did not consume before and not consuming during the pandemic	8,052	51.5 (50.7–52.2)
Not drinking alcohol	1,238	7.9 (7.4–8.3)
Drinking less	2,027	13.0 (12.4–13.5)
Same consumption as before	3,165	20.2 (19.5–20.8)
Drinking more	1,112	7.1 (6.6–7.5)
I had stopped drinking but started drinking again	47	0.3 (0.2–0.4)
Sleep problems		
Did not affect, still sleeping well	6,554	41.9 (41.1–42.6)
Had sleep problems, but they improved	138	0.9 (0.7–1.0)
Continued to have the same sleep problems	1,956	12.5 (12.3–12.6)
Had sleep problems and they got worse	1,767	11.3 (10.8–11.7)
Started having sleep problems	5,226	33.4 (32.6–34.1)
Use of medication to relax/sleep/anxiety/depression		
No	10,891	69.6 (68.8–70.3)
Yes	4,750	30.4 (29.6–31.1)
Perception of quality of life		
Improved	1,359	8.7 (8.2–9.1)
Remained the same	3,789	24.2 (23.5–24.8)
Worsened	10,493	67.1 (66.3–67.8)
Fear of COVID–19		
Little fear	4,364	27.9 (27.1–28.6)
Moderate fear	4,446	28.4 (27.6–29.1)
Severe fear	6,831	43.7 (42.9–44.4)
Mental health problems during the pandemic*		
No	2,050	17.7 (17.1–18.3)
Yes	9,547	82.3 (81.7–82.9)

*Teachers who previously reported a formal diagnosis of depression and/or anxiety during the pandemic were excluded

Discussion

This study aimed to describe the working conditions, lifestyle, and mental health of Brazilian public-school teachers during the COVID-19 pandemic. The results show that, during the pandemic, teachers suffered from financial difficulties and changes in many aspects, including their mental health.

The sociodemographic profile of the participants was consistent with the profile of Brazilian teachers verified in other studies.[13,17] This study shows that financial difficulties have affected an important portion of teachers dur-

ing the pandemic. Almost half of the teachers reported a decrease in family income during the pandemic.

The pandemic has also brought considerable changes in teachers' working conditions. The data show that 99.2% of the teachers worked virtually during the pandemic. This finding was consistent with a previous study on remote work conducted among Brazilian teachers during the pandemic, which showed that 87% of the professionals were teaching online classes.[13] The classroom activities encompass several possibilities, while remote education presents serious limitations, which makes it difficult to meet all the criteria needed according to the national curriculum guidelines.[18]

As for the satisfaction with their work before the COVID-19 pandemic, 4.3% reported dissatisfaction, and during the pandemic, it increased to 33.7%. Dissatisfaction with work appears to be associated with problems related to physical, mental, and social health, resulting in lower quality of service, increased absenteeism, and evasion from the profession.[19] Considering the pandemic, dissatisfaction with the teaching work may be related to the urgency of changes in the teacher's work routine. The distance between the teacher and the student can also be a reason for dissatisfaction with the work. Literature shows that teachers develop a feeling of affection and care for students.[20,21] Casacchia et al[22] evaluated the impact and the relationship between distance education and the emotional well-being of teachers during the period of home confinement in Italy. The absence of "face-to-face" eye contact and the difficulty of assessing students' attention was a complaint among the teachers. Therefore, remote education stimulated the weakening of the affective bond between them. In any case, this considerable increase in dissatisfaction with the teaching work deserves attention.

Total adherence to social distance, staying at home and going out only for health care needs, and/or shopping in supermarkets and pharmacies were reported by approximately 80% of the teachers in the present study. In line with the data shown in this study, another previous study also observed that the adult Brazilian population in general adhered to social distance, with 60% reporting intense restriction of contact with people and 15% only leaving home for health care.[23] In this sense, it is believed that the high prevalence of adherence to social distance by teachers, when compared to the general population, is linked to the positive behavior of the teaching class, pointed out as examples for parents and students, being good "models" to be followed.

More than 87% of the teachers did not test for COVID-19, and more than 40% reported flu-like symptoms during the pandemic and 1.2% tested positive. It must be considered, however, that this study took place in 2020 when the pandemic was still recent and there were not enough tests available for the whole population. A previous study, an online survey with adults, found that 28.1% had flu-like symptoms after the arrival of the pandemic in Brazil, and 1.3% of those who reported flu-like symptoms tested positive for COVID-19.[24] These results reveal that the teachers did not differ from the adult population towards the issues related to COVID-19. Possibly, this similarity was due to the shutdown of educational institutions and respect for social distance.

A prior study comparing the teachers' perception of quality of life before and during the pandemic shows that their perception has been negatively affected by COVID-19, presenting a significant decrease during the pandemic compared to the pre-pandemic measurement.[25] In our study, most of the teachers reported a decrease in their quality of life during the pandemic. Among them, 39.8% started having sleep problems, 8.9% consumed more alcohol and 48% did not carry out recreation activities. According to Dankel et al,[26] lifestyle interferes with the population's quality of life. In this sense, the data from the present study show that there was a worsening in the quality of life of teachers due to the negative changes in their routine acquired during the pandemic.

In general, teachers experienced a worsening in their behaviors and life habits. In this study, there was a high prevalence of physical inactivity, increased body weight, inadequate diet, and increased time dedicated to screens. Other studies have also shown increased health risk behaviors in the daily life of the population during the pandemic, highlighting sedentary behavior and poor health habits.[27,28] According to Malta et al,[12] the frequent increase in inappropriate lifestyle during the pandemic is alarming and can cause several health risks, among them, the emergence of chronic non-communicable diseases.

As for mental health problems, more than a quarter of the teachers in our study reported having received a formal diagnosis for anxiety and/or depression during the pandemic. The findings also showed that approximately one-third were consuming medication to relax/sleep/anxiety/depression, and a third started to have sleep problems after the beginning of the pandemic. A study that analyzed the levels of stress, anxiety, and depression of teachers in Spain found that 32.2% of the teachers showed a certain degree of depressive symptoms.[29] Other studies with teachers also show similar results, highlighting the mental health impacts of the pandemic.[22,30] Many negative psychological aspects were seen during the pandemic, such as the fear of infection, frustration, boredom, and inadequate information.[31]

A previous study showed that there was a significant prevalence of Brazilians who felt sad or depressed (40.4%) and anxious or nervous (52.6%) during the pandemic. In the same study, 43.5% of the population started having sleep problems during the pandemic, with a higher prevalence in women and people with a formal diagnosis of depression.[32] These data show that there was a considerable worsening in the quality of sleep of the general population during the pandemic, and should be considered alarming since sleep problems are associated with a worse quality of life, higher occurrence of hypertension, alcohol consumption, physical inactivity, and increased demand for health services.[33–37]

Stachteas and Stachteas[38] showed that 34% of teachers experienced a high and a very high degree of fear during the pandemic. Regarding the fear of COVID-19 in our study, it was observed a higher prevalence for severe fear, and among them 86.5% were women, 57.4% were aged 41 to 60 years, 25.7% lost a family member or friend because of COVID-19 and 34.8% had a medical diagnosis of anxiety and/or depression during the pandemic. According to Shigemura et al,[39] fear, especially during pandemic times, raises the levels of anxiety and depression in healthy people, with greater severity in psychiatric patients.

Moreover, the study that validated the Fear of COVID-19 Scale for Brazil[40] showed that 29.4% of the participants presented severe fear. According to our result, the teachers had a higher prevalence for severe fear of COVID-19 when compared to the Brazilian adult population in general. Thus, it is assumed that these results may make it difficult for teachers to return to classroom activities at school, making it necessary for education managers to be aware of this situation.

The present study has a limitation concerning internet data collection, which brings the possibility of selection bias. However, the literature shows that the research carried out via the internet is promising, as a result of the low costs and the possibility of knowing the health conditions of the population in real-time.[12,23] The study also presents a limitation based on the self-report response, leading to the possibility of memory bias. On the other hand, this limitation was minimized by the robustness of the sample, support from DE-MG, and good sample distribution, reaching 93.2% of the state's municipalities and coverage of 13.3% of teachers working in the rural area.

The results reveal the dimension of the negative impact of the pandemic on the health and working conditions of teachers, showing the financial difficulties, dissatisfaction with work, the worsening of quality of life and mental health, the increase in body weight, and the intensification of health risk behaviors. Therefore, the COVID-19 pandemic has caused numerous challenges to them.

The findings also show that the course of the pandemic among teachers was not different from the general adult population. However, some issues are specific to teachers, such as increased dissatisfaction with work, remote teaching, being distant from the students and the classroom, and the fear of COVID-19, which was higher among the teachers when compared to the Brazilian population in general.

Furthermore, these results may assist in the development of coherent strategies for the return of classroom activities, health promotion measures, and better working conditions for teachers of public schools, with special emphasis on the most vulnerable teachers. Education is fundamental for the development of the nation and teachers are the protagonists of this process. There will be no quality education without health care and teacher well-being.

Acknowledgements

We thank the teachers of the State of Minas Gerais for participating in the ProfSMoc Project; the Department of Education of Minas Gerais; the State University of Montes Claros; and the Coordination of Improvement of Higher Education Personnel-Brazil CAPES-Finance Code 001.

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Ερευνητική εργασία

Συνθήκες εργασίας, τρόπος ζωής και ψυχική υγεία των Βραζιλιάνων δασκάλων σε δημόσια σχολεία κατά τη διάρκεια της πανδημίας COVID-19

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ΙΣΤΟΡΙΚΟ ΑΡΘΡΟΥ: Παραλήφθηκε 28 Απριλίου 2021/Αναθεωρήθηκε 21 Ιουλίου 2021/Δημοσιεύθηκε Διαδικτυακά 26 Νοεμβρίου 2021

ΠΕΡΙΛΗΨΗ

Η παρούσα μελέτη είχε στόχο να περιγράψει τις συνθήκες εργασίας, τον τρόπο ζωής και την ψυχική υγεία των Βραζιλιάνων δασκάλων σε δημόσια σχολεία κατά τη διάρκεια της πανδημίας COVID-19. Πρόκειται για μία επιδημιολογική διαδικτυακή έρευνα, που διεξήχθη από τον Αύγουστο μέχρι τον Σεπτέμβριο 2020. Δάσκαλοι από δημόσια σχολεία σε αγροτικές και αστικές περιοχές της πολιτείας Minas Gerais της Βραζιλίας συμμετείχαν στην έρευνα. Χρησιμοποιήθηκε ένα ηλεκτρονικό ερωτηματολόγιο και συλλέχθηκαν στοιχεία σχετιζόμενα με τέσσερα μείζονα θεματικά πεδία: κονωνικο-δημογραφικό και οικονομικό προφίλ, συνθήκες εργασίας, τρόπο ζωής και συνθήκες υγείας και προβλήματα ψυχικής υγείας κατά τη διάρκεια της πανδημίας. Το δείγμα αποτέλεσαν 15.641 δάσκαλοι, εκ των οποίων το 13,3% εργάζονταν σε αγροτικές περιοχές, 81,9% ήταν γυναίκες, 56,2% ήταν ηλικίας 41–60 ετών, 66,8% ήταν παντρεμένοι, 99,2% εργάζονταν εξ αποστάσεως και 79,8% συμμορφώνονταν με τα μέτρα κοινωνικής απόστασης. Κατά τη διάρκεια της πανδημίας το 40,6% υπέστη μείωση στο οικογενειακό εισόδημα, 33,7% ήταν ανικανοποίητοι με την εργασία τους, 58% ανέφερε αύξηση του σωματικού βάρους, 47,9% δεν ασκούνταν, 35,8% ανήκαν σε τουλάχιστον μία ομάδα κινδύνου για COVID-19, 40,5% είχαν ορισμένα γριπώδη συμπτώματα στην πανδημία και 1,2% είχαν βρεθεί θετική για COVID-19. Όσον αφορά στα προβλήματα ψυχικής υγείας, 25,9% των δασκάλων ανέφερε επίσημη διάγνωση αγχώδους διαταραχής ή/και κατάθλιψης κατά τη διάρκεια της πανδημίας. Επιπροσθέτως, 7,1% των δασκάλων έπιναν περισσότερο αλκοόλ από το συνηθισμένο, 33,4% άρχισαν να έχουν προβλήματα ύπνου, 30,4% χρησιμοποιούσαν ηρεμιστική/υπναγωγική/αντικαταθλιπτική φαρμακευτική αγωγή, 67,1% ανέφερε ότι η ποιότητα ζωής τους χειροτέρεψε και 43,7% ανέφερε σοβαρό φόβο για την COVID-19. Βρέθηκε επίσης ότι το 82,3% των δασκάλων είχε τουλάχιστον ένα πρόβλημά ψυχικής υγείας κατά τη διάρκεια της πανδημίας, όπως αυξημένη κατανάλωση αλκοόλ, προβλήματα ύπνου, χρήση ψυχοτρόπου αγωγής, μείωση της ποιότητας ζωής και φόβο για COVID-19. Τα αποτελέσματα αυτής της μελέτης αναδεικνύουν τις πολλές προκλήσεις και την έκταση του αντίκτυπου της πανδημίας σε συνθήκες εργασίας, τρόπος ζωής και ειδικά στην ψυχική υγεία των δασκάλων.

ΛΕΞΕΙΣ ΕΥΡΕΤΗΡΙΟΥ: Κορωνοϊός, εκπαίδευση, συνθήκες υγείας, εργασιακό στρες, επιδημιολογία.

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https://doi.org/10.22365/jpsych.2021.029 / Psychiatriki 2021, 32:290–299

Research article

Stress management and In Vitro Fertilization (IVF): A pilot randomized controlled trial

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ARTICLE HISTORY: Received 16 November 2020/Revised 23 February 2021/Published Online 5 August 2021

ABSTRACT

The objective of the study was to evaluate the psychological effect of an intervention of 8 stress-management sessions in women undergoing in vitro fertilization (IVF). Moreover, the overall IVF success was assessed against the fluctuation of the participants' stress levels. A total of 144 women participated in the study with 74 of them in the intervention group and 70 women in the control group. Demographics and medical history of all participants were recorded. The intervention group only underwent 8 weekly stress management sessions. During the 1st and 8th week of the study, both groups completed the Depression, Anxiety, Stress Scale 21 (DASS-21), the Perceived Stress Scale 14 (PSS-14) and the Fertility Problem Inventory (FPI). Following the intervention, the outcome of the IVF cycles, as defined by clinical pregnancy rates, were recorded. Our results indicated that total stress in the intervention group declined significantly ($p<0.001$) in respect to all the parameters of the PSS-14, DASS-21 and FPI scales, with the exception of the need for parenthood dimension that did not change significantly in the intervention group ($p=0.002$), while significantly increased in the control group ($p<0.001$). The difference of stress levels between the two groups for each scale as well as in total was also significant. There were no significant differences in the demographic data, lifestyle and medical history of the participants and their spouses between the two groups. The IVF success rate was found to be related to the levels of perceived stress on the PSS-14 scale ($p=0.029$) but not to any of the dimensions of DASS-21($p=0.197$) and FPI ($p=0.611$) scales. Definitive factors affecting the IVF success were the participants' age ($p=0.046$), which was negatively correlated to IVF success, and the spouses' medical history of cryptorchidism (undescended testicles) ($p=0.05$). The high significance of these variables probably limited the effect of the intervention for stress relief on IVF success. This pilot study revealed encouraging results regarding the positive effect of interventions for stress management in women undergoing fertility treatment, however the possible contribution of such interventions to overall IVF success rates requires further investigation.

KEYWORDS: Stress management, psychosocial intervention, perceived stress, infertility stress, In Vitro Fertilization.

Introduction

The rate of infertility among couples worldwide is increasing, thus a significant number of couples resort to the Assisted Reproductive Technology (ART).[1] ART procedures, are considered to be time consuming, painful and often non effective, thus causing severe psychological burden on the infertile couple.[2] During the procedure of assisted reproduction, the couple has been reported to experience increased stress and anxiety regarding the result, while a failed attempt may be accompanied with feelings of sadness, loss, anger and failure.[3] These feelings are intensified in cases of repeated

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failed attempts and may lead to serious psychological consequences, such as depression,[2,4] while the psychological burden may lead numerous couples to abandon the attempts.[5] These psychological consequences do not only have personal but also social dimensions, since they also affect the social life of the couple as well as their own relationship.[6,7] Especially the infertile women profess a feeling of intense physical fatigue, embarrassment, guilt, loss of femininity and sexual disposition. Recent studies ascertain that infertile women, and especially the ones undergoing multiple ART cycles, present with a higher risk of developing mental disorders.[8,9] Infertility stress and the psychological fatigue during ART treatment, may also impact the physiology of the female reproductive system as they have been associated with an increase in oxidative stress and inflammatory factors. This may cause a vicious cycle phenomenon further decreasing female fertility.[10–12] It has been reported that levels of biomarkers related to increased stress –such as cortisol– may present with a significant predictive value in assisting in, the management of decreased fertility.[13] Thus, a variety of studies have been conducted aiming to investigate the correlation between the psychosocial health of women and the success of ART.[14–19] These studies examine methods of stress management and reinforcement of the emotional welfare, based on a variety of protocols of selection, analysis and result evaluation.[7,20,21] Even though correlations have been observed, the majority of studies have not reach a conclusion that may be universally applied. It should be noted that hetergenous results have been reported, which may be attributed to different study designs and statistical analysis methods.[22,23] In addition, several meta-analyses report unclear results.[24–27] However, all studies so far agree that psychological support interventions, regardless if they are individual, binary or group oriented[22] and irrespective of the techniques employed,[17] offer a positive impact on the mental health of the infertile women. It should be noted that women who receive mental support persevere more and are less likely to abandon the attempts for pregnancy, thus increasing the likelihood of assisted reproduction success.[28,5]

Numerous programs and stress management techniques have been applied on assisted reproduction patients. The pilot randomized controlled trial presented herein attempts to examine whether the combination of psychological interventions and stress management techniques during an 8 week program improves the mental health of infertile women who undergo in vitro fertilization (IVF), as well as the clinical pregnancy rates. The lack of data regarding the efficiency of this combination is what fuelled the conduction of this study.[7,20,21] Moreover, the necessity for the incorporation of this interventionary program in the standard operating protocol of IVF centers should be investigated, due to the dettering effects of stress on quality of life of the infertile women.[29,30]

Material and Method

The study was conducted in the Private IVF Clinic "Genesis of Athens", Medical Providence Gynecology and Surgical Anonymous Company, between 01/11/2016 and 01/11/2019. The patients were allocated either into the intervention or the control group through randomization. A total of 144 women participated in the study: 74 allocated in the intervention group and 70 allocated in the control group. The inclusion criteria were female sex, the written participation consent, permanent residence in Athens, the ability of communication both orally and in written in the Greek language, the abstinence from any kind of contractual or alternative therapy related to mental health during the study and consent to initiation of an IVF cycle. Exclusion criteria were age of over 42 years old, employment of alternative relaxation methods such as meditation or yoga, use of alcohol or substance abuse, diagnosis of mental disorder according to DSM-IV axes I and II and use of psychotropic medication. Women presenting with infertility due to genetic etiology, couples diagnosed with sexually transmitted diseases, and couples undergoing donation cycles were similarly excluded from the study.

All women signed an informed consent, according to the prerequisites of the Ethics and Deontology Committee of the Medical School of the National and Kapodistrian University of Athens, the National Data Protection Authority and the Science Committee and the Legal Department of the clinic. Following consent, the participants were randomly assigned either to the intervention or the control group. Demographic data, regarding the medical history and the lifestyle of the participants were recorded in order to evaluate possible cofactors between the groups. It should be highlighted that the medical history recorded constitutes of both pathological and non-pathological data of the gynecological history such as previous pregnancies, method of labor or number of IVF attempts. Eight weekly sessions were conducted, for the intervention group, while during the 1st and 8th session both groups were requested to complete the questionnaires of the study.

Intervention

1st session: completion of the initial questionnaires from both groups. The intervention group, however, al-

so received informative leaflets referring to tools, techniques and methods for stress management, while it was informed about the availability of 50 minute weekly individual sessions with a psychologist specialized in stress management. Every next session thereafter included a short conversation about the personal experiences and possible problems following the application of the given instructions.

2nd session: A demonstration of the Biofeedback machine Nexus 10 Mark II application was performed. Control of the physical symptoms of stress (heartbeat, respiration rhythm) through biofeedback techniques has been shown to assist on stress management.[37] Patients were encouraged to apply the technique twice daily (morning and night).

3rd session: Application of the 10-minute diaphragmatic respiration technique in combination with a 15-minute progressive muscular relaxation. The details of the techniques were also given to the participants in a CD form for home exercise. It was recommended to the patients to apply the techniques twice per day (morning and night).

4th session: The significance of a balanced diet was discussed, mainly focused on fertility reinforcing nutrition.

5th session: Examples of cognitive restructuring were provided through exercises. Moreover, an emotion calendar was provided in order to record personal emotional fluctuations.

6th session: Application of the 10-minute diaphragmatic respiration technique combined with the 15-minute guided visualization technique. The details of the techniques were also given to the participants in a CD form for home exercise. It was recommended to the patients to apply the technique daily (morning and night).

7th session: A discussion was facilitated and an overall re-evaluation of all the methods and techniques introduced in the previous sessions was performed.

8th session: Both groups were requested to complete the questionnaires for a second time.

Measures

Data collection was performed through questionnaires including the following scales:

Depression, Anxiety, Stress Scale (DASS-21)[31,32] Assessment of the negative emotions of depression, anxiety and stress based on 21 statements of a 4-graded Likert type scale, depicting the mental and emotional welfare of the patient.

Perceived Stress Scale (PSS-14)[33,34] Assessment of the perceiving stress based on 14 questions of a 5-graded Likert type scale, depicting the participant's perception of the infertility-related stress experienced.

Fertility Problem Inventory (FPI)[35,36] Infertility stress evaluation based of a 6-graded Likert type scale, examining: (a) relationship concerns due to infertility, (b) social concerns of the infertile couple, (c) sexual concerns of the infertile couple, (d) need for parenthood, and (e) rejection of child-free lifestyle. The total score depicts the total infertility related stress.

Clinical pregnancy was defined as the presence of fetal heartbeat, assessed via ultrasonography during 6th-8th week.

Statistical analysis

For the comparison of the categorical dichotomous outcomes Pearson's x^2 test or Fisher's exact test were used. For the comparison of the continuous variables between the groups the Student's t-test or the non-parametric Mann-Whitney-U test were used. Pearson's correlation coefficient (r) was used to assess associations between variables. Repeated measures ANOVA was used to assess the differences in study measures between the groups as well as within the intervention group. The independent variables related to successful IVF outcome were evaluated according to time via a logistic regression analysis and odds ratio. The confidence interval was set at 95%. The significance level was set at $p<0.05$. The statistical program SPSS 22.0 was used for all statistical analysis.

Results

There was no statistically significant difference between the groups in the demographic data, including the medical prescription, the medical history, the gynecological history, the infertility etiology and the number of previous IVF failed attempts.

Based on PSS-14, DASS-21 and FPI scores, the correlations of levels of stress, anxiety and depression were proportionate. Specifically, regarding PSS-14 scale, while the initial measurements of the two groups provided similar results ($p=0.108$), during the second measurement the intervention group presented with significantly lower stress ($p<0.001$) in comparison to the control group. Comparing within groups differences, between the two measurements, it was noted that the control group presented with increased stress level, while the intervention group showed a significant decrease in their stress level ($p<0.001$). As a consequence, the variance of the PSS-14 scale showed significant difference between the groups (table 1).

Table 1. Perceived stress (PSS-14) in the intervention group and the control group.

		1st measurement	2nd measurement	Variance		
		Mean (SD)	Mean (SD)	Mean (SD)	p^2	p^3
Perceived stress (PSS-14)						
Group	Control	24.5 (6.5)	28,4 (5.6)	39 (5.5)	<0.001	<0.001
	Intervention	26.5 (8.1)	18.6 (7.1)	–7.9 (7.1)	<0.001	
p^1		0.108	<0.001			

p^1 (Difference between groups), p^2 (Difference between measurements), p^3 (Difference of variations of measurements between groups), PSS-14 (Perceived Stress Scale 14)

Regarding depression, anxiety and stress based on the DASS-21 scores, the initial measurement did not show any statistically significant difference between the groups (p= 0.080), while during the second measurement the intervention group presented with a statistically significant decrease in symptoms of depression, anxiety and stress and overall measurements compared to the control group (p<0.001). Evaluation of within group differences between the two measurements, revealed a significant symptom increase in the control group (p<0.001), and a significant decrease in the intervention group (p<0.001). As a result, the variance in all dimensions, and also the total score appear to be significantly different between the groups (table 2).

Regarding the infertility related anxiety, based on the FPI score, during the initial measurement the intervention group showed significantly higher levels of "social concern" and "need for parenthood" (p=0.003), implying more intense stress symptoms in these aspects, in comparison to the control group. On the contrary, during the second measurement women of the intervention group exhibited significantly decreased values in all aspects, as well as in total score (p<0.001), implying less anxiety levels, compared to the control group.

Regarding within group differences, a statistically significant increase was observed in all measures in the control group (p<0.001). On the contrary, in the inter-

Table 2. Depression, anxiety and stress (DASS-21) in the intervention group and the control group.

		1st measurement		2nd measurement	Variance		
		Mean (SD)		Mean (SD)	Mean (SD)	p^2	p^3
Depression							
Group	Control	5.66 (5.55)		7.24 (5.87)	1.6 (3.6)	0.005	<0.001
	Intervention	6.3 (6.33)		1.76 (2.97)	–4.5 (5.4)	<0.001	
p^1		0.521		<0.001			
Anxiety							
Group	Control	5.29 (5.34)		7.1 (5.75)	1.8 (3.1)	<0.001	<0.001
	Intervention	4.66 (5.43)		1.7 (3.17)	–3 (4.3)	<0.001	
p^1		0.487	<0.001				
Stress							
Group	Control	8.44 (5.55)	10.79 (5.5)	2.4 (3.2)	<0.001	<0.001	
	Intervention	7.85 (5.98)	3.38 (4.29)	–4.5 (4.6)	<0.001		
p^1		0.540	<0.001				
Total DASS-21 score							
Group	Control	19.4 (15.3)	25.1 (16.2)	5.7 (8.5)	<0.001	<0.001	
	Intervention	19 (16.3)	6.8 (9.6)	–12.2 (13)	<0.001		
p^1		0.880	<0.001				

p^1 (Difference between groups), p^2 (Difference between measurements), p^3 (Difference of variations of measurements between groups), DASS-21 (Depression, Anxiety, Stress Scale 21)

vention group a statistically significant decrease was observed (p<0.001). Only exception constitutes the value in the dimension of "need for parenthood" in which there was no statistically significant difference (p=0.02). Thus, the variance in all dimensions, and also the total score appeared to be significantly different between the groups (table 3).

The IVF outcome, following completion of the intervention, was assessed with a multifactor logistic regression analysis employing clinical pregnancy, as the dependent value and the demographic and clinical data of the participants as well as the psychological scales, as independent variables. The parameters observed to be associated with the clinical pregnancy were age of the participants (p=0.046), cryptorchidism (p=0.05) and the perceived stress (p=0.006) (table 4). It should be highlighted that the perceived stress, based on the PSS-14 score, constituted the only psychological factor that was associated with clinical pregnancy (p=0.029), while no significant correlation was observed with the remaining psychological measures (table 5).

Discussion

The results of our study showed that there is a positive effect of the suggested intervention on participants' mental health. This may prove beneficial for women undergoing infertility treatments, according to the literature.[38,39] Specifically, there was significant decrease (p<0.001) of the perceived stress in the intervention group (PSS-14) indicating that women may perceive differently the infertility problem that they face as well as the respective treatment. On the other hand, the significant increase (p<0.001) of the perceived stress observed in the control group suggests that the women undergoing ART treatments may experience severe stress, which without the necessary support increases even more during the treatment, as also has been shown in the literature.[9] Similarly, women who received psychological support exhibited significantly decreased stress, anxiety and depression symptoms in contrast to the control group who showed a symptom increase. It may be safely concluded that infertile women undergoing ART treatment who receive support, experience less psychological

Table 3. Infertility anxiety (FPI) in the intervention group and the control group.

		1st measurement	2nd measurement	Variance		
		Mean (SD)	Mean (SD)	Mean (SD)	p^2	p^3
Social concern						
Group	Control	33.8 (8.5)	40.6 (11)	6.8 (8.8)	<0.001	<0.001
	Intervention	41.8 (16.6)	35.9 (12.7)	–5.9 (9.1)	<0.001	
p^1		<0.001	0.018			
Spousal concern						
Group	Control	34.9 (11)	41.1 (13.5)	6.2 (7.6)	<0.001	<0.001
	Intervention	36.3 (13.1)	30.7 (9.9)	–5.6 (8.7)	<0.001	
p^1		0.491	<0.001			
Need for parenthood						
Group	Control	29.4 (4.9)	30.6 (4.1)	1.2 (3.1)	0.002	0.086
	Intervention	27 (4.8)	27.3 (4.5)	0.3 (3)	0.467	
p^1		0.003	<0.001			
Rejection of childfree lifestyle						
Group	Control	46.8 (11.2)	48.9 (13.5)	2.1 (7.9)	0.027	<0.001
	Intervention	42.9 (13.4)	38 (13.4)	-4.9 (7.4)	<0.001	
p^1		0.060	<0.001			
Global stress						
Group	Control	145 (25.8)	161.1 (34.4)	16.1 (21.6)	<0.001	<0.001
	Intervention	148 (38.1)	131.9 (29.6)	-16.1 (19.1)	<0.001	
p^1		0.582	<0.001			

p^1 (Difference between groups), p^2 (Difference between measurements), p^3 (Difference of variations of measurements between groups), FPI (Fertility Problem Inventory)

Table 4. Multifactorial logistic regression with the successful pregnancy as a dependent variable and the demographic, clinical data and the psychological measures as independent variables.

		OR (95% ΔE)+	p
Age		0.91 (0.83–0.99)	0.046
Partner's age		0.91 (0.8–1.04)	0.160
Family situation			
	Unmarried (report)		
	Married	0.5 (0.09–2.79)	0.430
Smoker			
	No (report)		
	Yes	0.68 (0.20–2.32)	0.536
History			
	No (report)		
	Yes	2.16 (0.64–7.29)	0.217
Spouse's history			
	No (report)		
	Yes	0.23 (0.05–1.01)	0.050
Ages of attempts		1.10 (0.93–1.29)	0.268
Pregnancies		0.24 (0.02–2.37)	0.222
Automatic abortion		5.60 (0.56–56.03)	0.143
Artificial abortion		2.39 (0.13–43.73)	0.556
In Vitro Fertilization (IVF) in the past			
	No (report)		
	Yes	0.41 (0.14–1.22)	0.107
Intrauterine Insemination (IUI) in the past			
	No (report)		
	Yes	0.8 (0.23–2.79)	0.729
Inexplicable Infertility			
	No (report)		
	Yes	0.19 (0.03–1.30)	0.091
Fallopian Tube Factor			
	No (report)		
	Yes	0.38 (0.03–4.45)	0.442
Male Factor			
	No (report)		
	Yes	0.30 (0.04–2.04)	0.219
Endometriosis			
	No (report)		
	Yes	0.48 (0.11–2.30)	0.363
Polycystic Ovary Syndrome			
	No (report)		
	Yes	2.09 (0.24–18.29)	0.504
Age			
	No (report)		
	Yes	0.23 (0.03–1.94)	0.176
Perceived stress (1st measurement)		0.90 (0.83–0.97)	0.006

Table 5. DASS-21, FPI, PSS-14 scores in relation to the outcome of the in vitro fertilization.

1st measurement	Successful pregnancy				p (t-test)
	No		Yes		
	Mean	SD	Mean	SD	
Depression (DASS-21)	5.61	5.59	6.57	6.49	0.348
Anxiety (DASS-21)	4.54	5.11	5.63	5.75	0.240
Stress (DASS-21)	7.52	5.38	9.11	6.24	0.108
Total value DASS-21	17.82	14.69	21.30	17.15	0.197
Social concern (FPI)	35.92	14.53	36.02	12.08	0.830
Spousal concern (FPI)	35.26	11.94	36.25	12.42	0.634
Need for parenthood (FPI)	28.10	4.99	28.36	5.03	0.766
Rejection of childfree lifestyle (FPI)	45.30	12.08	44.02	13.21	0.552
Global stress (FPI)	25.25	7.13	25.89	7.76	0.611
Perceived stress (PSS-14)	28.10	7.06	24.82	7.32	0.029

DASS-21 (Depression, Anxiety, Stress Scale 21), FPI (Fertility Problem Inventory), PSS-14 (Perceived Stress Scale 14)

consequences and maintain a better quality of life. This finding is supported by other studies such as those by Seyedi et al who reported improved quality of life in women who receive psychological support.[40] The preservation of a good mental health during the treatment may play an especially crucial role in case of ART failure. In this case the woman may have to manage a severe psychological trauma in order to minimize the risk of serious consequences, such as depression.[41,38,4] Additionally, the preservation of the emotional well-being has been proven particularly beneficial during longtime treatments requiring waiting periods and bearing significant failure probability, such as the ART.[42,7] Interestingly, the need for parenthood remained constant following the intervention, reflecting the undiminished desire for a child, while all the other parameters that relate to expression of stress with personal and social aspects were decreased. The undiminished need for parenthood, regardless the outcome of the infertility treatment, has also been confirmed by Gameiro & Finnigan,[43] who similarly highlighted the need for psychosocial support of the infertile women, especially in case of ART failure. It should be noted that the psychological support does not aim at the reconsideration of the need for reproduction. Psychological support aims at the management of stress caused on women regarding their perception of their partner and social circle, along with a reconsideration of their beliefs on the probability of accepting a future without kids.[43] Thus, while this psychological need seems covered in supported women, the same need and the accompanying negative emotions seem to be magnified progressively in women of the control group.

Evaluating the direct effect of the intervention in IVF outcome was not possible due to the independent variables that were pivotal for the result. The medical history of the partner and especially the cryptorchism seemed to affect IVF success, presenting with a decrease in IVF success rates by 77% in both groups. Similarly, the age of the participants also constituted a significant parameter, since the success of the outcome was reversely proportional to the maternal age (table 4). In this case, the selection of participants with a similar age, with a clear partner's health history may provide more robust conclusions on the possible correlation between psychological support and successful IVF outcome. A possible concern is the fact that inevitably IVF may present with better results for younger women with an idiopathic etiology for infertility. On the contrary, the benefit of psychological support for maintenance of mental health relates all infertile women regardless of the outcome.[29]

Meta-analyses focusing on the effect of psychosocial support interventions on infertile women regarding ART outcome led to non-conclusive results. While Matthiessen et al[25] and Frederiksen et al[24] highlighted a small but existing connection, the meta-analyses by Boivin et al[44,27] as well as that by Nicoloro-SantaBarbara et al[45] suggest that such connection is not observed, despite the confirmed positive effect of the psychosocial interventions on the emotional well-being of the participants. These contradictory results may stem from the heterogeneity of the design of the individual studies included, as well as the methodology of the meta-analyses themselves. Similarly, the evaluation of a possible association between psycho-

social interventions and improvement of fertility, also results in limitations due to statistical deviation, as highlighted in the meta-analyses by deLiz & Strauss[22] and by Hämmerli et al.[23] Hämmerli et al, specifically, highlighted that the positive effect of the psychosocial support on the increase of fertility is more important in the prime stages of the infertility management and more limited in women who have exhausted the natural methods and are undergoing ART. In the same direction the meta-analysis by Purewal et al[18] confirms that the increased stress is related to the decreased effectiveness of ART, since it has been observed that the transient psychological stress during ART do not impact on the result. Consensus point of all the meta-analyses is that the psychosocial interventions present with a positive impact on the psychological and emotional wellbeing of the infertile women indeed, but further investigation is required through better designed clinical studies based on strict set criteria for the assurance of conclusive results.[46] The clarification of this correlation is conceived of outmost importance, considering the fact that the alternative, non-pharmaceutical interventions that include exercises of stress management, meditation, counselling and yoga have already been confirmed to offer significant benefits to mental and emotional health of the infertile women.[21,20,47] Additionally, such interventions may be implemented easily in ART standard operating protocols. Moreover their impact on the improvement of the efficacy of ART would reinforce the development of such programs.[48] Thus, future studies should be designed based on stricter sample selection criteria. Further to this, it may be important for studies to evaluate specific groups of infertile women, namely women with unexplained infertility or a primary ovarian insufficiency or poor ovarian response to controlled ovarian stimulation protocols. Similarly, it may be of interest the conduction of studies employing heterologous genetic material (donation of oocytes, sperms or embryos) or surrogate motherhood.

Acknowledgements

Evgenios Koumantakis, MD, Professor of Obstetrics and Gynecology Emeritus, Univeristy of Crete, Chair of Hellenic Society Reproductive Medicine (HSRM). Athanassios Pappas, MD, PhD, Genesis Athens Clinic, Athens, Greece. Their support, encouragement and guidance in the process of completing the study was crucial and valuable. Their suggestions and remarks helped to complete the elaboration of the present work. Involvement of infertile women was undoubtedly equally important at each stage of the study.

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Ερευνητική εργασία

Διαχείριση στρες και εξωσωματική γονιμοποίηση: Τυχαιοποιημένη κλινική μελέτη

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ΙΣΤΟΡΙΚΟ ΑΡΘΡΟΥ: Παραλήφθηκε 16 Νοεμβρίου 2020/Αναθεωρήθηκε 23 Φεβρουαρίου 2021/Δημοσιεύθηκε Διαδικτυακά 5 Αυγούστου 2021

ΠΕΡΙΛΗΨΗ

Στόχος της μελέτης ήταν η αξιολόγηση των ψυχολογικών επιδράσεων μίας παρέμβασης 8 συνεδριών διαχείρισης του stress σε γυναίκες κατά τη διαδικασία εξωσωματικής γονιμοποίησης καθώς και της πιθανής συσχέτισης της διακύμανσης του stress με την επιτυχία έκβασης της υποβοηθούμενης αναπαραγωγής. Στη μελέτη συμμετείχαν 74 γυναίκες ως ομάδα παρέμβασης και 70 γυναίκες ως ομάδα ελέγχου. Αρχικά, καταγράφηκαν κοινωνικο-δημογραφικά δεδομένα και το ιστορικό υγείας όλων των συμμετεχουσών καθώς και των συντρόφων τους. Ακολούθησε σειρά 8 εβδομαδιαίων συνεδριών διαχείρισης stress, στις οποίες συμμετείχε μόνο η ομάδα παρέμβασης. Κατά τη διάρκεια της 1ης και 8ης συνεδρίας και οι δύο ομάδες συμπλήρωσαν τις κλίμακες μέτρησης κατάθλιψης, άγχους, στρες (Depression, Anxiety and Stress Scale-21, DASS-21), προσλαμβανόμενου στρες (Perceived Stress Scale 14, PSS-14) και εκτίμησης του στρες υπογονιμότητας (Fertility Problem Inventory, FPI). Μετά τη λήξη της παρέμβασης καταγράφηκε η έκβαση της προσπάθειας εξωσωματικής γονιμοποίησης όλων των συμμετεχουσών. Διεξήχθηκε στατιστική ανάλυση αναλογιών αρχικών και τελικών δεδομένων, ποσοτικών μεταβλητών και των σχέσεών τους, και ανάλυση διασποράς επαναλαμβανόμενων μετρήσεων, ενώ η στατιστική σημαντικότητα ορίστηκε στο $p<0,05$. Η ομάδα παρέμβασης παρουσίασε σημαντική μείωση του στρες ($p<0,001$) σύμφωνα με τις μετρήσεις όλων των παραμέτρων βάσει κλιμάκων PSS-14, DASS-21 και FPI, με εξαίρεση την παράμετρο ανάγκης για γονεϊκότητα στην κλίμακα FPI, στην οποία δεν καταγράφηκε σημαντική μεταβολή ($p=0,002$). Η ομάδα ελέγχου παρουσίασε σημαντική αύξηση σε όλες τις παραμέτρους και των τριών κλιμάκων ($p<0,001$). Η διαφορά επιπέδων στρες μεταξύ των δύο ομάδων, ανά κλίμακα και συνολικά, αξιολογήθηκε επίσης ως σημαντική, ενώ δεν εντοπίστηκαν στατιστικά σημαντικές διαφορές αναφορικά με τα κοινωνικο-δημογραφικά στοιχεία, καθώς και το ιστορικό υγείας των συμμετεχουσών μεταξύ των ομάδων ($p>0,05$) για όλες τις παραμέτρους. Αναφορικά με την επιτυχία έκβασης της εξωσωματικής γονιμοποίησης, βρέθηκε ότι συσχετίζεται με το προσλαμβανόμενο στρες βάσει κλίμακας PSS-14 ($p=0,029$), άλλα όχι με τη βαθμολογία στις κλίμακες DASS-21($p=0,197$) και FPI ($p=0,611$). Καθοριστικό ρόλο στην έκβαση έπαιξαν οι ανεξάρτητες μεταβλητές που αφορούσαν στην ηλικία των συμμετεχουσών ($p=0,046$), η αύξηση της οποίας ήταν αντιστρόφως ανάλογη του ποσοστού επιτυχούς έκβασης, καθώς και το ιστορικό κρυψορχίας των συντρόφων τους ($p=0,05$), γεγονός που επηρέασε την αξιολόγηση της επίδρασης της παρέμβασης. Η μελέτη αποτελεί πιλοτική έρευνα με ενθαρρυντικά αποτελέσματα για το όφελος από παρεμβάσεις ψυχικής υποστήριξης γυναικών υπό διαδικασία υποβοηθούμενης αναπαραγωγής, ενώ η πιθανή συμβολή της διαχείρισης στρες στην επιτυχία έκβασης της παρέμβασης απαιτεί περαιτέρω διερεύνηση.

ΛΕΞΕΙΣ ΕΥΡΕΤΗΡΙΟΥ: Διαχείριση στρες, ψυχοκοινωνική παρέμβαση, προσλαμβανόμενο στρες, στρες υπογονιμότητας, Εξωσωματική Γονιμοποίηση.

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https://doi.org/10.22365/jpsych.2021.026 / Psychiatriki 2021, 32:300–310

Research article

Depressive symptoms in involuntary hospitalized patients in Cyprus: Socio-demographic and psychopathological characteristics

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ARTICLE HISTORY: Received 11 December 2020/Revised 8 April 2021/Published Online 5 August 2021

ABSTRACT

The severity and variation of depressive symptoms (DS), among psychotic individuals under involuntary hospitalization is unclear. We investigated the socio-demographic and clinical characteristics of psychotic adults with DS, involuntarily hospitalized for compulsory treatment in Cyprus. We also evaluated the psychometric properties (internal consistency reliability, known-group and discriminant validity) of the HDRS-17 and HAM-A for the assessment of depressive and anxiety symptoms, respectively. A descriptive correlational study with cross-sectional comparisons was applied. Data on demographics, cognitive functioning (MoCA scale), depressive (HDRS-17 scale), anxiety (HAM-A scale) and psychotic (PANSS scale) symptoms were collected (December 2016–February 2018). Following informed consent, the sample included 406 patients. Among them, 21 males and 23 females reported DS (HDRS-17 total score ≥8). The majority were Greek-Cypriots (61.4%), 45-65 years old (38.6%), single (77.3%), unemployed (72.7%), admitted due to aggressiveness towards others (47.7%), and diagnosed with a bipolar disorder (59.1%). The mean score (M) in the HDRS-17 was 30.72 (scale range: 8-50; Standard Deviation [SD]: 10.42). The highest mean score (M) per item was in the variables "Suicidal behavior" (M:3.09; SD:1.09) and "Depressive mood" (M=2.95; SD=1.07). The DS group (HDRS-17 score≥8) reported higher PANSS positive symptoms subscale score (t-test, p=0.003) and HAM-A total score (t-test, p=0.05) compared to the non-DS group (HDRS-17 score<8). In multivariable logistic regression analysis only female sex [OR (95%CI) = 3.28 (1.33–8.04), p=0.01)] and a mood disorder diagnosis [OR95% CI: 15.22 (4.13–56.14), p<0.0001)] retained a statistically significant association with DS. Cronbach' s alpha was 0.827 for the HDRS, and 0.763 for the HAM-A. The present findings partially support the known-group validity of the HDRS-17 and the HAM-A, and the discriminant validity of the HDRS-17 in psychotic patients under involuntary hospitalization. Additionally, the most frequent diagnosis in the DS group was a bipolar disorder, and the most frequent admission cause was aggressiveness towards others; it is possible that the majority of the DS group participants were patients with a bipolar disorder in episodes with mixed features, presenting simultaneously depressive symptoms and aggressiveness. Further studies on relapse prevention regarding this clinical group are proposed, as well as studies on specificity and sensitivity of the HDRS-17 and HAM-A.

KEYWORDS: Depressive symptoms, compulsory admission, demographic characteristics, HAM-A, HDRS-17.

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Introduction

Although evidence shows that the incidence of severe mental disorders in the general population is increasing globally,[1] data regarding the factors associated with serious mental disturbances leading to compulsory treatment have not been described adequately in Southern European and Mediterranean countries.[2,3] Involuntary or compulsory psychiatric treatment is applied to individuals with mental disturbances lacking their consent, when the severity of the symptoms is jeopardizing personal or social safety.[4] Suicide behavior is one of the most common reasons for involuntary psychiatric treatment, most of the times present in people with depressive symptomatology (DS).[5] Similarly, the socio-demographic and clinical characteristics of those involuntary hospitalized with DS in Mediterranean and Southern European countries, including Cyprus, have been understudied.[6–8]

It is worth noting that a significant proportion of individuals facing DS are reluctant to seek help from formal mental health services because of either social stigma associated with mental illness, or due to mental health illiteracy.[9] Subsequently, DS may be deteriorated, leading many of these people to involuntary hospitalization for compulsory treatment.[10] Identification of the demographic and clinical profile of patients with DS, who (a) receive formal mental health services for the first time via involuntary hospitalization, and (b) are involuntarily readmitted for compulsory treatment may be relevant in formulating preventive targeted interventions.[11] Nevertheless, interventions in clinical populations aiming to empower ill health self-management skills and prevent relapse, need to be culturally relevant, also taking into account the clinical and socio-demographic profile of these populations.[12]

The context of the Republic of Cyprus

The Psychiatric Compulsory Hospitalization Act of the Republic of Cyprus entitles involuntary hospitalization as one's admission in a special psychiatric unit for care and treatment following a judicial decree; this decree is based on the assessment of one psychiatrist lacking the consent of the patient [on Psychiatric Hospitalization Act of 1997].[13] Thus, for an involuntary hospitalization to take place all the following need to be contented: (a) a mental disorder diagnosis, (b) incapacity of judgment regarding one's own health, (c) receiving no treatment may either severely affect one's safety and/or recovery, or pose a high risk for violence against one's own self or others. According to this legislation, involuntary hospitalization for compulsory treatment under a judicial decree is provided only in high security settings within psychiatric hospitals. Specifically, the Athalassa Psychiatric Hospital is the reference center for compulsory treatment in the Republic of Cyprus. The duration of involuntary hospitalization may range from 1 to 28 days, based on the judicial decree, and it may be verified by the assigned psychiatrist at the clinical setting in which the patient is hospitalized.[13]

Since there is no epidemiological data in people who are involuntarily hospitalized for compulsory treatment in the Republic of Cyprus, to the best of our knowledge, it would be useful to report on the socio-demographics and clinical characteristics of this group of patients including individuals with DS. Relevant data may form a national database and will also support comparisons with international data. Moreover, relevant data may support the development of health policy not only nationally, but internationally as well.

The aim of the present study was to investigate in those involuntary admitted with DS: (a) their socio-demographic and clinical characteristics, and the association of these variables with the degree of DS, (b) the socio-demographic and clinical predictors of DS, and (c) the metric properties of the Hamilton Depressive Rating Scale (HDRS-17) and Hamilton Anxiety Scale (HAM-A). The psychometric properties of the HDRS-17 and HAM-A have not been studied before in patients with psychosis under involuntary hospitalization.

Material and Method

Participants

A descriptive, cross-sectional and correlational study design was applied. The study environment was the Athalassa Psychiatric Hospital (APH) accessible to approximately 875,900 citizens based on the Republic of Cyprus;[14] its capacity includes 132 beds, distributed to one admission unit for females (19 beds), one admission unit for males (19 beds), a high safety ward (2 beds) and three rehabilitation wards (92 beds). Approximately, 395 individuals are involuntary hospitalized per year in the APH.[14]

Data were collected via a census sampling method (December 2016–February 2018). The study participants were adults who were involuntarily admitted to the APH with psychotic, mood or substance use-induced symptoms and diagnosed with one or more of the following diagnoses: schizophrenia, psychotic disorder of the spectrum of schizophrenia, mood disorder, substance/medication-induced disorder (DSM-5 classification).[15] The inclusion criteria were (a) age: 18 to 65 years; (b) signed informed consent for participation in the study; (c) longer than 3 days hospitalization.

Patients with one or more of the following diagnoses were excluded: (a) neuro-cognitive disorder, (b) developmental disorder, (c) intellectual disability, (d) personality disorder. The latter were not included since their hospitalization is 24 hours in most of the cases. Nevertheless, patients with a personality disorder and prominent psychotic or substance use-related symptoms who were hospitalized for more than 72 hours were included in the study.

A total of 761 admissions were recorded in the APH. Nine patients were younger than 18 years and 13 patients were older than 65 years, while 152 were diagnosed with a personality disorders (less than 24 hours of hospitalization) and 21 patients were diagnosed with an intellectual disability. Moreover, 43 patients were excluded because informed consent was not completed due to inadequate degree of insight during discharge, and 43 patients were excluded because the researcher did not manage to have a meeting with them to discuss informed consent process. Two patients passed away during hospitalization. The sample encompassed 406 individuals (figure 1).

Procedures

The data collection interview, independently conducted by two members of the research team (EB, KK), took place within the first 72 hours after admission. The duration was approximately 15–20 minutes. Each data sheet was saved into the medical file of the responder until signed informed consent was given for inclusion in the present study. Attainment of signed informed consent took place at the day of discharge, since by then it was expected from the responders to have achieved the ability to fully understand the information provided in the research protocol. When informed consent was given data were anonymized and included in the study. This information was given both printed and orally, since the primary researcher (KK) explained the objectives and procedures of the study, confidentiality issues as well as the fact that participation in the study was voluntary and irrelevant to the clinical outcome or therapy issues. In those cases where the native language of patients was neither English nor Greek (4.3%), a translator supported the process of data collection and informed consent.

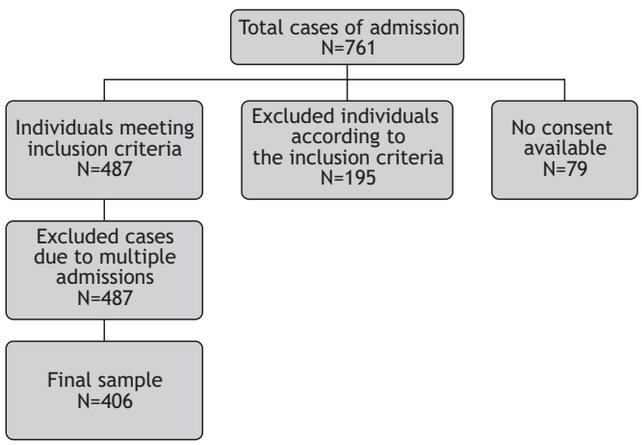

Figure 1. Flowchart of the sample included in the present analysis.

Data collection sheet encompassed socio-demographic (age, sex, nationality, mother language, marital status, place of residence, occupational status and receiving financial reimbursement, educational level) clinical data, and structured assessment tools for the measurement of the severity of symptomatology. The following clinical variables were recorded: personal history of mental health problems (first diagnosed mental health disorder, serious mental health problems prior to current hospitalization), family history of mental illness, current psychiatric diagnosis, main relapse symptomatology, involuntary admission history. Additionally, BMI and personal history of substance use (type, number and frequency) were recorded. Data on substance use included current and past use, with focus on the period just before the onset of relapse symptoms. Data discriminating heavy (heroin, cocaine, ecstasy, cannabis, magic mushrooms, etc.) from light (alcohol) substances were also recorded. As for relapse symptoms, the most prominent, according to the phenomenology of the symptoms and the medical record, was recorded. Regarding admission diagnosis the following grouping was applied for data analysis: (a) Schizophrenia, (b) Other psychotic disorder of the spectrum of schizophrenia (including substance/medication-induced psychotic disorder), (c) Mood disorders (including substance/medication-induced bipolar or depressive disorder), (d) Other (psychotic disorders due to medical condition, anxiety disorders).

The study protocol was approved by the Cyprus National Bioethics Committee (EEBK/EP/2014/08).

Measures

The following tools were used for the measurement of the severity of admission symptomatology: the Hamilton Depressive Rating Scale[16,17] (HDRS-17) (17 items/symptom groups, rated 0–2 or 0–4; Scale Range [SR]: 0-50; unidimensional scale; values equal or above 8 indicate clinical DS); the Montreal Cognitive Assessment[18] scale (MoCA)(30 items; SR: 1-30; unidimensional scale), the Positive and Negative Syndrome Scale[19] (PANSS)(30 items/groups of symptoms, rated 1-7; SR: 7-210; including three subscales: positive symp-

toms subscale [7 items], negative symptoms subscale [7 items], general symptoms subscale [16 items]), and the Hamilton Anxiety Rating Scale[20] (HAM-A) (14 items rated 0-4; SR: 0-56; unidimensional) for the assessment of DS severity, cognitive functioning, psychotic symptoms severity and anxiety symptoms severity, respectively. The MoCA was used to allow an assessment of possible differences in terms of cognitive functioning between the main groups of interest, and further control this factor for potential confounding effect regarding the predictors of DS severity.

Statistical analysis

Confirming normal distribution of all variables in normality test, t-test and ANOVA were applied to examine the differences between the DC group (HDRS-17 total score ≥8) and the non-DC group (HDRS-17 total score <8)[16,17] regarding HAM-A, MoCA, PANSS scores. Forward stepwise multivariable logistic regression models were used to select the final set of variables (among a large number) associated with manifestation of DS (dependent variable), controlling for the potential confounding effect of the rest of the variables in the final model, according to established guidelines.[21] Scores in the MoCA [total scale/ "Speech fluency"; "Visuo-constructional Skills (Cube); "Visuo-constructional Skills (Clock)" items] were measured in order to control their possible confounding effect regarding the predictors of DS severity.

For all statistical tests, p values of 0.05 or lower were considered statistically significant. Data were analyzed through the Statistical Package for Social Sciences (SPSS, Inc, Chicago, IL version 20.00).[22]

Internal consistency reliability score via Cronbach's alpha value was assessed for the HDRS-17 and the HAM-A tool, respectively. Scores in the PANSS scale/subscales were used to assess the known-group and discriminant validity of the HDRS-17 and HAM-A tools.

Results

Socio-demographic and clinical characteristics

A total of 44 individuals out of 406 reported DS. The sociodemographic and clinical characteristics of both DC group and non-DC group are presented in table 1. Table 1 also presents statistically significant differences between these two groups in socio-demographic and clinical variables.

Clinical characteristics in the DC group

The main causes of admission were aggressive behaviour towards others (47.7%), suicidal behaviour (29.5%), disorganized behaviour along with non-adherence to pharmacotherapy (15.9%), disorganized behaviour and substance use (6.8%). Approximately, 75% were involuntary admitted for the first time, and 59.1% reported a positive history of mental disorders. The mean duration of illness was 4.36 years [minimum: 0 (first episode)-maximun: 40 years]. Approximately 13.6% reported more than 11 years of illness duration and 22.7% reported 1 to 10 years of illness duration; 38.6% reported substance use, and 29% of them reported more than one substance used. The main substances used were alcohol (52.9%) and cannabis (41.2%). Approximately 25% were prescribed with antipsychotic and anxiolytic agents, 20.45% with a combination of antidepressants and anxiolytics, 11.36% with a combination of antidepressants, mood stabilizers and anxiolytics, 11.36% with antipsychotics, 9.09% with a combination of antidepressants and mood stabilizers, 6.82% with antidepressants, 6.82% with a combination of antidepressants and antipsychotics, 2.27% with mood stabilizers and anxiolytics, 2.27 with anxiolytics only, while 4.55% were not prescribed any pharmacotherapy.

The mean score in the HDRS-17 was 30.72 (range: 8–50, SD: 10.42). The highest values [M(SD)] per item were recorded in the variables "Suicidal behaviour" [3.09(1.09)], "Depressive mood" [2.95(1.07)], "Work and interests" [2.79(1.3)], Psychiatric anxiety [2.25(1.2)] "Guilt" [2.22(1.3)] and "Somatic anxiety" [2.00(1.0)]. The majority (81.9%) reported a total HDRS-17 score 22–50, 4.6% a score between 15 and 18, and 6.9% between 19 and 21. Cronbach' s alpha score was 0.82 for the HDRS, and 0.76 for the HAM-A, both indicating adequate internal consistency.

Association of DS with socio-demographic and clinical measures

Table 2 presents mean differences between DS group and non-DS group in PANSS total score, PANSS subscales scores, HAM-A and MoCA. There were no statistically significant differences between these two groups in MoCA total score, the "Speech fluency", "Visuo-constructional Skills (Cube)" and "Visuo-constructional Skills (Clock)" items of the MoCA scale, PANSS total score, PANSS general symptoms subscale score and PANSS negative symptoms subscale score. These results denote that both groups have comparable cognitive functioning. Since no association was reported between DS, and negative psychotic symptoms, one may argue that HDRS-17 actually measures a construct different than negative psychotic symptoms, partially supporting the discriminant validity of the HDRS-17.

Table 1. Socio-demographic and clinical characteristics of the sample: Comparisons between the group with clinical depressive symptoms and the group with non-clinical depressive symptoms.

	Group with clinical depressive symptoms (HDRS-17 total score ≥8) (n=44)	Group with non-clinical depressive symptoms (HDRS-17 total score <8) (n=362)	x^2	p
	% (n)	% (n)		
Sex				
Male	45.5 (21)	66.6 (241)	6.08	0.014
Female	54.5 (23)	33.4 (121)		
Age group years				
20-24	6.8 (3)	13.8 (50)	2.62	0.453
25-34	36.4 (16)	31.2 (113)		
35-44	18.2 (8)	22.7 (82)		
45-65	38.6 (17)	32.3 (17)		
Ethnicity				
Greek-Cypriot	61.4 (27)	74.0 (268)	4.38	0.036
Other	38.6 (17)	26.0 (94)		
Spoken language				
Greek	65.9 (29)	84.0 (304)	8.68	0.003
Other	34.1 (15)	16.0 (58)		
Religion				
Christian Orthodox	75.0 (33)	82.0 (297)	1.27	0.258
Other	25.0 (11)	18.0 (65)		
Marital Status				
Married	77.3 (34)	12.7 (46)	3.31	0.069
Single	22.7 (10)	87.3 (316)		
Residence				
Nicosia	40.9 (18)	38.1 (138)	3.59	0.464
Limassol	29.5 (3)	26.5 (96)		
Larnaca	22.7 (10)	18.8 (68)		
Pachos	2.3 (1)	11.0 (40)		
Famagusta	4.5 (2)	5.5 (20)		
Educational level				
Primary school	18.2 (8)	14.4 (52)	3.60	0.307
Lower secondary school	13.6 (6)	21.3 (77)		
Higher secondary school	34.1 (15)	23.8 (86)		
Tertiary education	34.1 (15)	40.6 (147)		
Vocational status				
Employed	27.3 (12)	21.8 (79)	0.67	0.413
Unemployed	72.7 (32)	78.2 (283)		
Financial reimbursement				
Yes	45.5 (20)	50.0 (181)	0.32	0.569
No	54.5 (24)	50.0 (181)		

Continues

Table 1. (*Continued*).

	Group with clinical depressive symptoms (HDRS-17 total score ≥8) (n=44)	Group with non-clinical depressive symptoms (HDRS-17 total score <8) (n=362)	x^2	p
	% (n)	% (n)		
BMI				
Underweight (<18.5 kg/m^2)	12.8 (5)	4.9 (16)	1.58	0.662
Normal (18.5–25 kg/m^2)	59.0 (23)	45.1 (147)		
Overweight (25–30.5 kg/m^2)	15.4 (6)	30.1 (98)		
Obese (>30.5 kg/m^2)	12.1 (5)	19.9 (65)		
Psychiatric diagnosis				
Schizophrenia	6.8 (3)	52.5 (190)	57.30	<0.001
Schizoaffective disorder	18.2 (8)	26.0 (94)		
Mood disorder	59.1 (26)	19.9 (72)		
Other	6.9 (3)	1.7 (6)		
Main symptomatology led to the current involuntary hospitalization				
Disorganized behavior not otherwise specified	0 (0)	5.5 (20)	114.77	<0.001
Non-adherence to pharmacotherapy & disorganized behavior	15.9 (7)	58.3 (211)		
Disorganized behavior along with substance use	6.8 (3)	23.8 (86)		
Suicidal/Self-harming behavior	29.5 (13)	7.5 (27)		
Aggressive behavior towards others	47.7 (21)	5.0 (18)		
Personal history of involuntary hospitalization				
First admission	75.0 (33)	44.8 (162)	14.38	<0.001
Readmission	25.0 (11)	55.2 (200)		
Personal history of mental health problems				
1st episode of a mental health problem	40.9 (18)	27.9 (101)	3.20	0.073
Positive history of mental health problems	59.1 (26)	72.1 (261)		
Psychiatric family history				
Positive	54.5 (24)	45.3 (164)	4.13	0.126
Negative	29.5 (13)	40.6 (147)		
Unknown	14.3 (7)	14.1 (51)		
Diagnosis of psychiatric family history				
Schizophrenia and/or other related psychotic disorder	16.7 (4)	47.3 (70)	10.88	0.059
Mood disorder	54.2 (13)	29.1 (43)		
Schizophrenia or other psychotic disorder and Mood disorder	8.3 (2)	8.1 (12)		
Other	20.8 (5)	15.5 (23)		
Personal history of substance use				
Yes	38.6 (17)	43.4 (157)	0.35	0.549
No	61.4 (27)	56.6 (205)		
Time of year of the admission				
Winter	40.9 (8)	30.9 (112)	3.05	0.383
Spring	22.7 (10)	21.3 (77)		
Summer	22.7 (10)	24.0 (87)		
Autumn	13.6 (6)	23.8 (86)		

Table 2. Comparisons between the participants with clinical depressive symptoms (HAMD score ≥8) and the participants with non-clinical depressive symptoms (HAMD score <8) regarding cognitive functioning.

						95% CI		
		Mean (SD)	t	df	p (2-tailed)	S.E. Difference	Lower	Upper
Hamilton Anxiety Scale score	Clinical depressive symptoms	21.66 (8.9)	1.9	404	0.05	1.35	–0.05	5.26
	Non-clinical depressive symptoms	19.01 (8.4)						
PANSS sub-scale of positive symptoms score	Clinical depressive symptoms	24.27 (6.4)	–3.0	296	0.003	–6.99	2.33	–11.57
	Non-clinical depressive symptoms	31.26 (7.6)						
PANSS sub-scale of negative symptoms score	Clinical depressive symptoms	25.54 (8.0)	0.54	295	0.586	2.69	–3.83	6.76
	Non-clinical depressive symptoms	24.07 (8.8)						
PANSS sub-scale of general symptoms score	Clinical depressive symptoms	55.18 (12.1)	0.49	294	0.618	3.84	–5.64	9.47
	Non-clinical depressive symptoms	53.27 (12.5)						
PANSS total score	Clinical depressive symptoms	105.0 (21.9)	–0.49	293	0.621	7.49	–18.45	11.03
	Non-clinical depressive symptoms	108.7 (24.5)						
MoCA score for the item "Verbal Fluency"	Clinical depressive symptoms	0.41 (0.5)	0.98	258	0.326	0.98	–0.09	0.29
	Non-clinical depressive symptoms	0.51 (0.5)						
MoCA score for the item "Visuoconstructional Skills (Cube)"	Clinical depressive symptoms	0.55 (0.5)	-0.63	258	0.52	0.09	–0.25	0.13
	Non-clinical depressive symptoms	0.49 (0.5)						
MoCA score of the item "Visuoconstructional Skills (Clock)"	Clinical depressive symptoms	2.55 (0.7)	–0.75	258	0.45	0.16	–0.46	0.20
	Non-clinical depressive symptoms	2.42 (0.8)						
MoCA total score	Clinical depressive symptoms	22.92 (4.1)	1.03	255	0.30	1.07	–1.00	3.22
	Non-clinical depressive symptoms	21.81 (5.4)						

In contrast, the DS group reported statistically significantly lower mean score in PANSS positive symptoms subscale (p=0.003) and statistically significantly higher mean score in the HAM-A (p=0.05) (table 2). These results support the known-group validity of the HDRS-17 scale.

Females reported more frequently DS compared to males (52.3% vs. 47.7%, respectively, p=0.014), as did those with (a) a negative personal history of involuntary readmissions for compulsory treatments compared to those with a positive history (75.0% vs. 25.0%, respectively, p<0.001), (b) Greek-Cypriot ethnicity compared to foreigners (59.1% vs. 40.9%, respectively, p=0.0036), (c) a mood disorder diagnosis compared to those with a diagnosis of Schizophrenia, other psychotic disorder of the spectrum of schizophrenia, or any other psychiatric diagnosis (70.5% vs. 6.8%, 20.5%, 2.3%, respectively, p<0.001), and d) aggressive behaviour towards others as the main admission cause, compared to those with suicidal behaviour, disorganized behaviour and substance use or non-adherence to pharmacotherapy or not otherwise specified (47.7% vs. 29.5%, 6.8%, 15.9%, 0%, respectively, p<0.001).

Predictors of clinical depressive symptoms

In forward stepwise multivariable logistic regression analysis in which the dependent variable was "Depressive symptoms" and predictors the variables presented in table 1, only female sex and a mood disorder diagnosis retained a statistically significant association with DS. Specifically, it was shown that females were more than three times more likely to manifest DS during involuntary admission for compulsory treatment compared to males, while those with a mood disorder were more than 15 times more likely to describe DS during involuntary admitted compared to those with a diagnosis of schizophrenia (table 3). These results support the known-group validity of the HDRS-17 scale. Moreover, MoCA scale/individual items did not show any association with DS in the multivariable model, as expected, since there were no relevant statistically significant associations in the univariable model (table 2).

Table 3. Predictors of clinical depressive symptoms in the sample (N=406).

	B	S.E.	Wald	df	p	Exp(B)	95% CI	
							Lower	Upper
Sex								
Male								
Female	1.18	0.45	6.70	1	0.01	3.28	1.33	8.04
Psychiatric diagnosis								
Schizophrenia			16.72					
Mood disorder	2.72	0.67		1	0.000	15.22	4.13	56.14
Constant	-23.14	8529.7	0.00	1	0.99	0.00		

Discussion

The present study identified, for the first time, predictors of DS in patients with psychosis involuntarily hospitalized for compulsory treatment in Cyprus, i.e., female sex and a mood disorder diagnosis, and the metric properties of the HDRS-17 and HAM-A in this clinical population. The findings showing female sex and a mood disorder diagnosis as predictors of DS confirm previous studies in clinical populations,[23] but most importantly support these evidence for those involuntarily hospitalized.[24] Additionally, these findings may partially support the known-group validity of the HDRS-17, along with the observed lower total score in the PANSS subscale of positive symptoms in the DS group, compared to the non-DS group. Moreover, the reported lack of association between DS and negative psychotic symptoms may partially support the discriminant validity of the HDRS-17 in involuntarily hospitalized patients. Additionally, the observed higher total score in the HAM-A scale in the DS group compared to the non-DS group may partially support the known-group validity of the HAM-A in this clinical group. The internal consistency reliability of both scales was adequate herein, supporting data from culturally diverse samples;[25] yet for the first time in a sample of involuntarily hospitalized patients. Further studies regarding the specificity and sensitivity of the HAM-A and HDRS-17 are needed. The present data could not support such measurements due to the relatively small group of the responders with DS, compared to those with no DS.

Nevertheless, the differential diagnosis of DS and negative psychotic symptoms remains demanding; especially in clinical environments of acute care, and particularly during involuntary admission. At the same time, data from family history and psychomotor development history to distinguish the neurodevelopmental, neurodegenerative or acute nature of relevant symptoms are often vague or inadequate. Therefore, it seems that there is a need for clinical methods with high specificity for the evaluation of DS in those under compulsory treatment.

The present data also showed that the most common psychiatric diagnosis in the DS group was a bipolar disorder, while the most frequent admission cause was aggressive behaviour towards others. Thus, it is possible that the majority of the DS group participants were patients with schizoaffective disorder or bipolar disorder in mixed episodes presenting both symptoms of depression and aggressive behaviour. Further studies on relapse prevention strategies regarding patients with bipolar disorder with mixed episodes are proposed.

The finding showing aggressive behaviour as the most frequent admission cause is in contrast with previous studies showing that suicidal behaviour is the leading cause for compulsory treatment in people with severe DS.[24] This difference may be attributed to the finding that the most frequent diagnosis in the present DS group was bipolar disease instead of unipolar depression. Indeed, individuals with a bipolar disorder have an increased incidence of both violent behaviour and suicide attempts,[26,27] compared to patients diagnosed with unipolar depression who seem to be more frequently involuntarily hospitalized due to suicidal behavior.[24] Overall, it seems that people with severe DS who do not manifest aggressive behaviour are less frequently involuntarily admitted for compulsory hospitalization in Cyprus. Indeed, this clinical population probably seeks help voluntarily from the community mental health services, or they are voluntarily hospitalised in psychiatric clinics during relapse. The increased rate of aggressive behavior leading to involuntary hospitalization in those with severe DS herein may be also explained by the higher frequency of substance use in them, probably triggering aggression towards others. Specifically, more than one out of three in the DS group reported substance use, most frequently alcohol and cannabis. There is lack of previous data regarding

comorbid of DS and substance use in those involuntarily admitted for treatment. Most of the studies in patients under compulsory treatment focus on samples with psychotic or manic symptoms.[2,28] Nevertheless, these studies report a link between positive history of substance use and aggressiveness in involuntarily admitted clinical groups.[2,28]

Furthermore, one out of three in the entire sample and approximately half of the participants in the DS group reported that the present involuntary hospitalization was their first documented episode of mental disorder. This may reflect the fact that a significant number of people with serious mental health problems remain in the community without receiving care until symptoms worsen to the extent that compulsory treatment is required. Compulsory hospitalisation is a traumatic experience for patients and families, and a key factor for social stigma.[29] Most importantly, data show that the vast majority of young patients under involuntary hospitalization report a negative impact of compulsory treatment on their willingness to disclose suicidal thoughts and intentions.[30] Thus, the need for interventions to prevent involuntary admission is of paramount importance. Interventions towards this aim may include mental health literacy strategies for the public integrated into community mental health services, as well as revision of the educational interventions provided to clinical populations and their families.

The most common pharmacotherapy in the group with DS was a combination of antipsychotic and anxiolytic agent. Bearing in mind that the most pronounced symptom in this group was aggressive behaviour, this finding is in line with previous data showing that the most frequent therapy for aggression and impulse control in acute psychiatric compulsory treatment is combination of anti-psychotics and benzodiazepines.[31] Additionally, other studies show that patients in mania or mixed episodes under involuntary admission are less likely to be prescribed with anticonvulsants or lithium.[28]

The second most common therapeutic schema reported herein included a combination of antidepressants and benzodiazepines. Although antidepressants are not included in published clinical guidelines for antipsychotic treatment, this seems to be a standard clinical practice in Cypriot state mental health services, while the high frequency of benzodiazepine prescribing may be due to the clinical finding that patients under benzodiazepines exhibit better adherence to antipsychotic treatment.[31]

In conclusion, the present data on the metric properties of HDRS-17 and HAM-A are the first to be reported in patients with psychosis under involuntary hospitalization. Further studies on specificity and sensitivity of the HAM-A and HDRS-17 in this group of patients are suggested. Additional studies to assess the implementation of clinical guidelines regarding DS relapse prevention and involuntary hospitalization are also proposed with focus on females and individuals diagnosed with bipolar disease with mixed episodes. Enhancement of mental health literacy and implementation of educational programs regarding DS self-management skills are also proposed.

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Ερευνητική εργασία

Καταθλιπτικά συμπτώματα σε ακούσια νοσηλευόμενους στην Κύπρο: Κοινωνικο-δημογραφικά χαρακτηριστικά και υποκείμενη ψυχοπαθολογία

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ΙΣΤΟΡΙΚΟ ΑΡΘΡΟΥ: Παραλήφθηκε 11 Δεκεμβρίου 2020/Αναθεωρήθηκε 8 Απριλίου 2021/Δημοσιεύθηκε Διαδικτυακά 5 Αυγούστου 2021

ΠΕΡΙΛΗΨΗ

Ασαφής παραμένει η έκταση στην οποία διαφοροποιείται η ένταση των συμπτωμάτων κατάθλιψης (ΣΚ) μεταξύ ατόμων με διαταραχές διάθεσης, σχιζοφρένεια, ή άλλες συναφείς ψυχωτικές διαταραχές υπό συνθήκες υποχρεωτικής νοσηλείας. Διερευνήθηκαν η σχέση ΣΚ με τα δημογραφικά και κλινικά χαρακτηριστικά ενηλίκων ακουσίως νοσηλευόμενων στο Ψυχιατρικό Νοσοκομείο Αθαλάσσας (ΨΝΑ) Κύπρου, καθώς και μετρικές ιδιότητες (αξιοπιστία εσωτερικής συνοχής, εγκυρότητα γνωστών ομάδων, εγκυρότητα διάκρισης) των εργαλείων αξιολόγησης ΣΚ και άγχους, HDRS-17 και HAM-A, αντίστοιχα. Εφαρμόστηκε περιγραφική, συγχρονική μελέτη σε απογραφικό δείγμα 406 ατόμων (Δεκέμβριος 2016–Φεβρουάριος 2018). Το δομημένο ερωτηματολόγιο συλλογής δεδομένων περιλάμβανε: (α) δημογραφικά και κλινικά χαρακτηριστικά, (β) τις κλίμακες HDRS-17, MoCA, PANSS και HAM-A για την αξιολόγηση βαρύτητας ΣΚ, επάρκειας νοητικών λειτουργιών, βαρύτητας ψυχωτικών συμπτωμάτων και συμπτωμάτων άγχους, αντίστοιχα. Συμπτώματα κατάθλιψης (HDRS-17 ≥8) καταγράφηκαν στα 44 από τα 406 άτομα (21 άνδρες, 23 γυναίκες), τα οποία συχνότερα ήταν Ελληνοκύπριοι (61,4), ηλικίας 45-65 ετών (38,6%), άγαμοι (77,3%) και άνεργοι (72,7%). Η συχνότερη κλινική διάγνωση και αιτία εισαγωγής μεταξύ τους ήταν η διπολική διαταραχή (59,1%) και η ετεροκαταστροφική συμπεριφορά (47,7%), αντίστοιχα. Υψηλότερες μέσες τιμές (ΜΤ) στο HDRS-17 σημειώθηκαν στις μεταβλητές «συμπεριφορά αυτοκτονίας» [ΜΤ=3,09, Τυπική Απόκλιση (ΤΑ)=1,09)], και «καταθλιπτική διάθεση» (ΜΤ=2,95, ΤΑ=1,07). Τα άτομα με ΣΚ είχαν χαμηλότερες τιμές στην υποκλίμακα θετικών συμπτωμάτων PANSS (t-test, p=0.003), και υψηλότερη συνολική τιμή στην κλίμακα HAM-A (t-test, p=0,05) συγκριτικά με το υπόλοιπο δείγμα. Επίσης, στην πολυπαραγοντική ανάλυση λογιστικής παλινδρόμησης, στατιστικά σημαντική σχέση παρέμεινε μεταξύ ΣΚ και (α) γυναικείου φύλου [OR95%CI:3,28 (1,33–8,04), p=0,01)], και (β) διάγνωσης διαταραχής διάθεσης [OR95%CI:15,22 (4,13–56,14), p<0,0001)]. Ο δείκτης Cronbach's alpha για την κλίμακα HDRS-17 ήταν 0,827, και για την κλίμακα HAM-A ήταν 0,763. Τα παρόντα αποτελέσματα υποστηρίζουν μερικώς την εγκυρότητα γνωστών ομάδων των κλιμάκων HDRS-17 και HAM-A, και την εγκυρότητα διάκρισης της HDRS-17 σε ακουσίως νοσηλευόμενους. Δεδομένου ότι στην ομάδα με ΣΚ η συχνότερη διάγνωση ήταν η διπολική διαταραχή και η συχνότερη αιτία εισαγωγής ήταν η επιθετική συμπεριφορά προς τους άλλους, φαίνεται ότι τα άτομα αυτά στην πλειοψηφία τους ήταν πάσχοντες από διπολική διαταραχή σε μικτά επεισόδια. Προτείνονται περαιτέρω μελέτες για την αποτελεσματική αντιμετώπιση των πασχόντων αυτών στην κοινότητα, καθώς και για τη διερεύνηση της ευαισθησίας και της ειδικότητας των κλιμάκων HDRS-17 και HAM-A στα άτομα υπό ακούσια νοσηλεία.

ΛΕΞΕΙΣ ΕΥΡΕΤΗΡΙΟΥ: Καταθλιπτική συμπτωματολογία, ακούσια νοσηλεία, δημογραφικά χαρακτηριστικά, HAM-A, HDRS-17.

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https://doi.org/10.22365/jpsych.2021.033 / Psychiatriki 2021, 32:32:311–316

Research article

Validity and reliability of the Greek version of the semistructured Schedule Clinical Interview for personality disorders (SCID-II)

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ARTICLE HISTORY: Received 24 October 2020/Revised 30 March 2021/Published Online 5 August 2021

ABSTRACT

The semistructured Schedule of Clinical Interview for Personality Disorders (SCID-II) is a useful tool for measuring personality disorders according to DSM criteria. Personality traits and their assessment are culturally sensitive. Because of this, it is important for clinicians and researchers to have a clearer view of the performance of such instruments in their own culture. Despite the fact that the SCID-II interview has been translated to the Greek language, the psychometric properties of this version have yet to be tested. To address this need, we conducted this study to assess the validity and reliability of the SCID-II interview in its DSM-III-R version in the Greek population. A total of 32 patients, 13 men and 19 women, were involved in this study. Sixteen patients were interviewed three times by three different interviewers. The first two interviewers used the Greek version of the SCID-II, and the third interviewer used the International Personality Disorder Examination (IPDE), which was used as the gold standard. Of the remaining 16 patients, 14 were interviewed with the SCID-II by two interviewers, and 2 were unable to complete the interview and were excluded from the study. A total of 69 interviews were performed. The internal consistency of the interview was acceptable, with a Cronbach's alpha coefficient of 0.623. The SCID-II also demonstrated good reliability. Cohen's Kappa score ranged between 0.375 for histrionic disorder and 1.000 for defeatism and antisocial personality disorder. Pearson's correlation coefficient was also very strong for both the individual criteria score and the overall diagnosis between the interviewers. There was an exception for the not otherwise specified personality disorder, where there was no agreement in any of the reliability measures between the interviewers. The interview validity was high when measured against the gold standard. The specificity of the SCID-II ranged from 79–100%, with the expectation of not otherwise specified personality disorder being 66%. The overall sensitivity was moderate and ranged from 0-100%. The Greek version of the SCID-II is a reliable, valid and easy-to-use instrument that can be adopted by various mental health professionals for clinical as well as research purposes.

KEYWORDS: Personality, semistructured interview, validity, reliability, SCID-II, Greece.

Introduction

Personality disorders are important and common psychiatric conditions. Epidemiological studies have revealed that personality disorders have prevalence between 4 and 12% for the general population.[1,2]

It is a well-known that the presence of a personality disorder in a person has a significant negative impact on both their quality of life and on the prognosis of any comorbid mental health problem. Thus, it is important to assess patients for the possible presence of a personality disorder.[3,4]

Standardized clinical interviews are one of the most reliable methods for the diagnosis of personality disorders, but they are also quite time-consuming.[5] A commonly

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used semistructured interview is the Schedule Clinical Interview for personality disorders (SCID-II). The SCID-II for the Diagnostic and Statistical Manual in its third revised edition (DSM-III-R) covers ten personality disorders as well as the passive aggressive and defeatism personality disorders that are described in DSM-III-R supplement.[6] This interview has been standardized in English as well as in other languages.[7–9] Despite the fact that this semistructured interview has been translated to Greek, neither this nor any other semistructured personality interview for DSM disorders have ever been tested regarding their psychometric properties and, more specifically, their reliability and validity in the Greek population.[10]

The aim of this study was to assess the reliability and validity of the Greek version of the SCID-II for DSM-III-R in the Greek population. The International Personality Disorder Examination (IPDE) was used as the gold standard since it is also a semistructured interview that is used internationally in various languages and cultural settings. It has been culturally adapted to the Greek language and has also been used for this purpose according to the literature.[11,12]

Materials and Method

Sample

This study was performed between 2011 and 2013 in the Alexandroupolis area. A total of 32 individuals, including 13 males and 19 females, were interviewed two or three times each. Their ages ranged from 22–59. A total of 69 interviews were performed.

Individuals were randomly selected from the general population, while a few were patients in the psychiatric department. Each participant was informed about the study through the informed consent document, and participation was strictly voluntary. The main exclusion criterion was the presence of an active mental health disorder during the time frame of the interviews. A full clinical interview from a specialized psychiatrist was performed for each individual before inclusion in the study.

The study was approved by the Democritus University of Thrace ethics committee, and permission for this study was granted from the translators of the instrument in the Greek language.

Instruments

Schedule of Clinical Interview for Personality Disorders (SCID-II)

The interview is divided into three parts. The first part is a self-administered questionnaire that includes 120 questions regarding subjects' views about their personality traits. This questionnaire was administered before the rest of the interview. The mean time that a person needs to complete it is approximately 20 minutes. According to the manual of the interview, if someone is unable to complete this questionnaire, then the individual is not a good candidate for the SCID-II because the interview is based on the ability that someone has to recognize his or her own personality traits. The second part consists of a leaflet that includes 120 criteria regarding personality traits that can be scored as absent (score 1), subthreshold (score 2), or present (score 3). Each of these criteria corresponds to one question from the self-administered questionnaire. If the interviewee gave a positive response to a question in the self-administered questionnaire, then the criterion that corresponded to this particular answer was discussed in detail with the interviewer according to the second part of the leaflet instructions. This happens to determine if the patient fulfils the criteria for the specific personality trait to be rated as present, subthreshold or absent. Additionally, the answers in the questionnaire can also be discussed if a certain personality trend becomes apparent in the interview. Demographic data as well as the sum of the total scores are marked on different papers that are also included in the SCID-II and compose the third part of the interview.

International Personality Disorder Examination (IPDE)

This interview was also used for the diagnosis of personality disorders. It is compatible with the International Classification of Disorders Manual in its tenth edition (ICD-10). This is a tool designed for use by clinicians, including either psychiatrists or clinical psychologists, who have experience in the evaluation of personality disorders. The IPDE consists of 157 questions that are classified into the following six categories. Work, Self, Interpersonal Relationships, Mood, Reality Checking, Impulsivity. The questions are open-ended, and further instructions are included to obtain a better rating. The responses are scores on a scale ranging from 0 to 2. If the answer is negative, then a score of 0 is given; if it is subthreshold, a score of 1 is given; and if it is above threshold, a score of 2 is given. The entire interview lasts approximately one hour. Overall, the results take into account the number of criteria that are scored as above the threshold and whether they are sufficient to diagnose a personality disorder.[13]

Procedure

At the beginning of the interview, each individual completed the SCID-II questionnaire. Then, the full SCID-II interview was administered. Two interviewers were present for each interview. During the interview, each interviewer independently scored the SCID-II. One of them was asking the questions. If the other one needed any more information regarding any of the criteria in the interview, he

could also ask the interviewee. Each interviewer was unaware of the other's score. The above procedure was used to ensure reliability between the raters of the instrument.

Half of the participants were also interviewed within a three-month time frame with the International Personality Disorder Examination (IPDE), which was considered the gold standard, by a third interview who was trained and certified in its use.

Out of the 32 initial participants, interviews were administered to 30 of them; one participant was found to have an active mental health disorder despite the initial screening, and another participant provided unreliable answers on the questionnaire.

Statistical analysis

The internal consistency of the instrument was rated with Cronbach's alpha coefficients. Interrater correlation was assessed with Pearson's correlation coefficient (r), and Cohen's kappa was used to assess interrater reliability. The specificity and sensitivity of the SCID-II compared with IPDE were assessed using crosstabs.

Results

Reliability

The internal consistency score of the SCID-II calculated with Cronbach's alpha coefficient was 0.623. This score is considered acceptable.

The reliability of the SCID-II was calculated with the following measures. Initially, we calculated Cohen's kappa, which is a strong measure of interrater reliability. The diagnosis set by the two raters was used for this calculation. Cohen's kappa ranged from 0.375 for histrionic personality disorder to 1.000 for defeatism and antisocial personality disorder. In the cases of schizoid personality disorder and schizotypal personality disorder, it was not possible to calculate the K value since no interviewees received such a diagnosis. Furthermore, for not otherwise specified personality disorder, there was no agreement between raters (table 1).

Then, we calculated the correlation of the diagnosis between the two interviewers. Pearson's r was used since our data followed a normal distribution. The diagnosis set by the two raters was used for this calculation. Pearson's r ranged from 0.375 for histrionic personality disorder to 1.000 for defeatism and antisocial personality disorder. In the cases of schizoid personality disorder and schizotypal personality disorder, it was not possible to calculate the interrater correlation since no interviewees received such a diagnosis. Furthermore, for not otherwise specified personality disorder, there was a statistically significant correlation (table 2).

Table 1. Interrater reliability measured with Cohen's Kappa.

Personality disorder	Kappa	p
Avoidant	0.710	<0.001
Dependent	0.783	<0.001
Obsessive-Compulsive	0.651	<0.001
Passive-Aggressive	0.526	0.001
Defeatism	1.000	<0.001
Paranoid	0.760	<0.001
Schizoid	n/a	
Schizotypal	n/a	
Histrionic	0.375	0.040
Narcissistic	0.667	<0.001
Borderline	0.489	<0.001
Antisocial	1.000	<0.001
Not Otherwise Specified	–0.410	0.789

Table 2. Correlation of the diagnosis and each item score between the two interviewers measured by Pearson's correlation coefficient (r).

Personality disorder	Diagnosis		Item score	
	r	p	r	p
Avoidant	0.742	<0.001	0.833	<0.001
Dependent	0.802	<0.001	0.791	<0.001
Obsessive-Compulsive	0.695	<0.001	0.788	<0.001
Passive-Aggressive	0.598	<0.001	0.808	<0.001
Defeatism	1.000	<0.001	0.789	<0.001
Paranoid	0.760	<0.001	0.793	<0.001
Schizoid	n/a		0.682	<0.001
Schizotypal	n/a		0.390	0.033
Histrionic	0.390	0.033	0.606	<0.001
Narcissistic	0.375	0.041	0.811	<0.001
Borderline	0.489	0.006	0.765	<0.001
Antisocial	1.000	<0.001	0.691	<0.001
Not Otherwise Specified	–0.049	0.797		

Last, the correlation between the scores for each criterion, not in the diagnosis, for the two interviewers was calculated. Pearson's r was used since our data followed a normal distribution. The correlation between interviewers was, on average, higher for the individual items than for the overall diagnosis, ranging from 0.390 for items related to schizoid personality traits to 0.833 for items related to avoidance personality disorders (table 2).

Validity

The criterion validity of the SCID-II was calculated by measuring its sensitivity and specificity against IPDE, which served as the gold standard. The SCID-II had high specifici-

ty, ranging from 66% for not otherwise specified personality disorder to 100% for dependent, schizoid and histrionic personality disorders. However, it had moderate sensitivity, ranging from 0% for obsessive-compulsive, schizoid, antisocial and not otherwise specified personality disorders to 100% for borderline personality disorder (table 3).

Discussion

The results of the validation of this scale in the Greek population were overall positive. The Greek version of the IPDE was used as a gold standard because its psychometric properties have been tested and it has been adapted in the Greek population.[14] Its overall characteristics, although not ideal, were deemed to be adequate for our study. Its cultural applicability, which is a form of transcultural validity,[15] was tested against DSM-IV criteria and was quite satisfactory; its interrater reliability was also quite good.

The interview was relatively easy in its use. Despite the fact that it was time-consuming for the interviewers both during the interview and in the scoring procedure, it was proven to be highly reliable. This reliability was found regarding the overall diagnosis as well as the separate individual criteria since the correlation criteria scoring and overall setting of the diagnosis between interviewers was very satisfactory.

Schizotypal and schizoid personality disorders were not detected since it is relatively rare and difficult for individuals with these disorders to engage in a study.[16,17] To overcome this shortcoming, correlations between the individual criteria were used to calculate the reliability of the interview regarding these personality traits. This is an acceptable method that can yield a fair reliability measure.[18]

Regarding the lack of reliability that was observed in the diagnosis of for not otherwise specified personality disorder; it can be argued that this is considered generally a problematic diagnosis, because it is heterogenic and because there is no real agreement regarding its description in the various diagnostic systems.[19]

Table 3. Criterion validity of Schedule of Clinical Interview for Personality Disorders (SCID-II) against International Personality Disorder Examination.

Personality disorder	Specificity %	Sensitivity %
Avoidant	85	25
Dependent	93	33
Obsessive-Compulsive	92	0
Paranoid	82	33
Schizotypal	100	0
Histrionic	100	43
Borderline	81	100
Antisocial	94	0
Not Otherwise Specified	66	0

The internal consistency of the interview was satisfactory, although the levels were not high. We have to point out here although that the current study did not include the translation of the instrument but only psychometric testing of the translated interview, there was not a real way to correct this feature.

Regarding the criterion validity of the SCID-II against the IPDE, we calculated specificity and sensitivity.[20] The specificity of the SCID-II is quite satisfactory, and in many cases, there was complete agreement with the IPDE. The sensitivity of the instrument is poor. Of course, it would be more satisfactory its sensitivity was better, but this semistructured interview is not supposed to be used as a screening tool. In such use, specificity is a more important characteristic than sensitivity.[21]

There were some concerns about the time frame of validity testing since the time between the SCID and the IPDE was up to three months. We believe that this delay did not affect the results since we assessed personality characteristics that tend to be stable over time. Furthermore, there is a significant latency between two tests regarding psychometric testing of semistructured personality interviews.[22]

Limitations

The main limitation of this study was the relatively small sample size, especially when comparing the SCID-II with the gold standard. The main reason for this was small sample size was that there was only one researcher who was certified to use the IPDE. In addition, some of the patients were unwilling to engage in an interview procedure again. In the international literature, there is substantial variance between the sample sizes in personality questionnaire testing. On many occasions, including the psychometric assessment of the Greek version of the IPDE, small samples were also used.[23–25]

Another restriction was the lack of test-retest reliability. When designing the study, it was considered impractical for the individuals to engage in repeated lengthy interviews. Furthermore, it was considered that personality traits are usually stable features and that little would be gained from a test-retest design.[26]

Another limitation was the lack of complete agreement regarding the classification of disorders of the two interviews. The IPDE, which served as the gold standard, is based on the ICD-10, while SCID-II is based on the DSM-III-R. This leads to some problems regarding validity comparisons. More specifically, defeatism and passive aggressive disorder are not truly included in any diagnostic system, but we argue that this short-

coming does not have an impact in clinical practice. Schizotypal personality disorder is not listed as a personality disorder in the ICD-10 and is considered psychosis, so it is not evaluated along with personality disorders. The main problem is the inability to calculate the validity of narcissistic personality disorder because this disorder is not included in the Greek version of the IPDE. It is possible that the use of another test, such as the MMPI, can be used in the future to assess the validity of this diagnosis.

Conclusions

Testing the psychometric properties of the SCID-II for DSM-III-R in the Greek population complements a procedure that was initiated long ago with its translation and adaptation to the Greek language. This interview presents very good interrater reliability in all diagnoses except the diagnosis of not otherwise specified personality disorder. It requires minimal training in its use and can be adopted by a variety of mental health professionals. We conclude that the SCID-II is a flexible, valid and reliable instrument that can be used for research and clinical purposes in the Greek population.

Acknowledgements

Authors want to thank Dr Konstantino Christoudi, psychiatrist, for his contribution to this study.

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Ερευνητική εργασία

Η εγκυρότητα και η αξιοπιστία της ελληνικής εκδοχής της ημιδομημένης συνέντευξης Schedule Clinical Interview για το DSM III-R που αφορά τις διαταραχές προσωπικότητας (SCID-II)

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ΙΣΤΟΡΙΚΟ ΑΡΘΡΟΥ: Παραλήφθηκε 24 Οκτωβρίου 2020/Αναθεωρήθηκε 30 Μαρτίου 2021/Δημοσιεύθηκε Διαδικτυακά 5 Αυγούστου 2021

ΠΕΡΙΛΗΨΗ

Η ημιδομημένη κλινική συνέντευξη για διαταραχές προσωπικότητας (SCID-II) είναι ένα χρήσιμο εργαλείο για τη αξιολόγηση διαταραχών προσωπικότητας σύμφωνα με τα κριτήρια του αμερικανικού ταξινομικού συστήματος DSM. Τα χαρακτηριστικά προσωπικότητας και η αξιολόγηση τους είναι πολιτισμικά ευαίσθητα. Λόγω αυτό του χαρακτηριστικού είναι σημαντικό τόσο οι κλινικοί ιατροί όσο και οι ερευνητές να έχουν μια πιο καθαρή εικόνα για τις επιδόσεις τέτοιων εργαλείων στη δική τους πολιτισμική πραγματικότητα. Παρά το γεγονός ότι αυτή η συνέντευξη έχει μεταφραστεί στα Ελληνικά δεν έχει ελεγχθεί για τις ψυχομετρικές της ιδιότητες στην ελληνική της έκδοση. Προκειμένου να καλύψουμε αυτή την ανάγκη πραγματοποιήσαμε αυτή την έρευνα ώστε να ελέγξουμε την εγκυρότητα και την αξιοπιστία του συγκεκριμένου εργαλείου στην έκδοση του για το DSM-III-R στον ελληνικό πληθυσμό. 32 ασθενείς, 13 άνδρες και 19 γυναίκες πήραν μέρος σε αυτή τη μελέτη. 16 από αυτούς εξετάσθηκαν από τρεις εξεταστές. Δύο φορές με τη δομημένη συνέντευξη SCID-II και μία φορά με τη Διεθνή Εξέταση για τις Διαταραχές Προσωπικότητας (IPDE), που αποτέλεσε και τον χρυσό κανόνα και 14 από δύο εξεταστές με τη δομημένη συνέντευξη SCID-II. Δύο δεν μπόρεσαν να συνεργαστούν επαρκώς και δεν συμμετείχαν στη μελέτη. Συνολικά πραγματοποιήθηκαν 69 συνεντεύξεις. Η εσωτερική συνοχή του οργάνου ήταν αποδεκτή με τιμή Cronbach α 0,623. Τα αποτελέσματα δείχνουν ότι η αξιοπιστία του οργάνου είναι καλή. Η βαθμολόγια Cohen's Kappa κυμαίνεται μεταξύ 0,375 για την ιστριονική και 1,000 για την ηττοπαθή και αντικοινωνική διαταραχή προσωπικότητας. Πολύ υψηλή είναι και η συσχέτιση τόσο μεταξύ των διαγνώσεων όσο και μεταξύ των κριτηρίων ανάμεσα στους εξεταστές. Εξαίρεση αποτελεί η διαταραχή προσωπικότητας μη προσδιοριζόμενη αλλιώς, στην οποία δεν υπάρχει συμφωνία σε κανένα από τα μέτρα αξιοπιστίας που χρησιμοποιήθηκαν. Η εγκυρότητα αξιολογήθηκε σε σύγκριση με τον χρυσό κανόνα. Η ειδικότητα ήταν εξαιρετικά υψηλή από 79–100% με εξαίρεση τη διαταραχή προσωπικότητας μη προσδιοριζόμενη αλλιώς, στην οποία ήταν 66%. Η ευαισθησία ήταν κακή και κυμαινόταν από 0–50%. Η SCID-II είναι ένα αξιόπιστο, έγκυρο και εύκολο στην εξοικείωση με αυτό το όργανο το οποίο μπορεί να χρησιμοποιηθεί από διάφορους επαγγελματίες της ψυχικής υγείας στην Ελλάδα τόσο στην έρευνα όσο και στην κλινική πράξη.

ΛΕΞΕΙΣ ΕΥΡΕΤΗΡΙΟΥ: Προσωπικότητα, ημιδομημένη συνέντευξη, εγκυρότητα, αξιοπιστία, SCID-II, Ελλάδα.

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https://doi.org/10.22365/jpsych.2021.032 / Psychiatriki 2021, 32:317–327

Special article

Adaptive immersive Virtual Environments as a treatment for depersonalization disorder

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ARTICLE HISTORY: Received 1 July 2020/Revised 26 November 2020/Published Online 5 August 2021

ABSTRACT

Depersonalization is a dissociative disorder associated to a profound disruption of self-awareness in the form of emotional numbing and feelings of disembodiment. The salient feature of depersonalization is a breakdown in the familiarity of one's psychological and somatic self (and surroundings when derealization is also present), in spite of being aware of the unreality of the change. At an early stage of research it was realized that people inclined to dissociation find it harder to tolerate discontinuity in perceptual environments, possibly due to a rigid perceptual attitude. Consequently, perceptual discontinuity experienced during momentary immersion into a virtual environment would be expected to increase symptoms of dissociation among individuals prone to develop them. It has been put forward that a tendency toward immersion or absorption, linking to imaginative processes underlying the dissociative experience, significantly relates to the level of change in virtual reality-induced dissociative symptoms. Consequently, it has been implied that increased tolerability of perceptual discontinuities and a more flexible perceptual attitude in people suffering depersonalization/derealization disorder may be of help. We propose the use of adaptive immersive virtual environments to the treatment of depersonalization. In particular, we propose that implementation of biofeedback electrical stimulation to detect somato-sensory processing bias may contribute to selectively targeting deranged neurocognitive processing components, and as an indirect consequence promote, to some extent, the diagnostic process. Psychophysiological approaches may be of help in the treatment of depersonalization via additional series of afferent inputs – virtual reality stimuli – to alter the receptive fields of the affected proprioceptive systems and reorganize them. The aim of this paper is to stimulate future research towards the development of potential virtual rehabilitation programs based on biofeedback, electrical stimulation and concurrent measurement of galvanic skin response and EEG targeting selective somatosensory stimulation in patients with depersonalization. Our research hypotheses might constitute a starting point for the development of new treatment tools for depersonalization in particular and depersonalization/derealization disorder in general.

KEYWORDS: Neuropsychology, dissociation, virtual reality, biofeedback, depersonalization/derealization disorder.

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Introduction

During the last two decades, virtual reality (VR) has been applied to the field of medicine exhibiting potential benefits for the diagnosis, treatment, counseling and rehabilitation of various physical, neurological and psychiatric disorders. VR technology has recently matured with VR-software and -hardware becoming more robust and affordable; VR quality has been significantly improved, thus making it feasible for VR systems to reach households for everyday use. Whereas once VR was an expensive technology, nowadays Head-Mounted Displays are much more accessible, and their hardware price set at 1300 USD in 2014, compared to 2006 cost was set at 45,000 USD.[1] Immersive virtual environments (VEs) may be seen as highly controllable spaces that facilitate experimental research, given that nearly every aspect of virtual space can be manipulated at will. Additionally, virtual space is amenable to transformations and adjustments as a result of a process of adaptation to the user's particular cognitive, emotional and neurophysiological characteristics. Thus, when used for medical applications, adaptation and personalization of VEs may enable us to tailor certain interventions and treatments to the requirements of specific patients. More specifically, in the fields of clinical psychology and psychiatry, VR has been used for the treatment of addictions and several types of phobia, subclinical fears, and anxiety disorders.[2–6] VR provide real time interaction with software-generated 3D environments, simulating real-life experiences and triggering physiological symptoms of anxiety, including sweating or nausea, thus emphasizing the likelihood of replacing behavioral approaches (i.e., exposure therapy).[7] As such, it is now possible to utilize VR as a research, diagnostic assessment, and treatment tool for a wide variety of mental disorders while keeping the associated costs at a manageable level.

Hypothesis and rationale

Early evidence shows that people inclined to symptoms of dissociation find it harder to tolerate discontinuity in perceptual environments, possibly due to a rigid perceptual attitude.[8,9] Thus, perceptual discontinuity as induced by momentary immersion into a VE would be expected to increase dissociative symptoms among individuals prone to develop them. Aardema and colleagues[10] put forward that a tendency toward immersion or absorption as measured by several different scales, significantly relates to the level of change in VR-induced dissociative symptoms. Authors discussed their findings in the light of the imaginative processes underlying the dissociative experience. Consequently, it has been proposed that by increasing the ability to tolerate perceptual discontinuities and adopting a more flexible perceptual attitude people suffering depersonalization/derealization disorder (DPDR) may ameliorate.[8]

In this paper we propose a VR approach, i.e., the use of adaptive immersive environments, in conjunction with early psychophysiological notions from the domain of motor neurorehabilitation (Perel'man in 1947 as reported by Luria),[11] for the treatment of depersonalization. In particular, we propose that implementation of biofeedback electrical stimulation to detect somato-sensory processing bias along with evidence-based patterns of neuropsychological dysfunction (steaming from the relevant literature), may selectively target deranged processing components serving both DPDR's differential diagnosis and treatment. VR in conjunction to auxiliary psychophysiological equipment may be of help in the treatment of depersonalization. Stimulated by early evidence[11] showing that additional series of afferent inputs (sensory stimuli) may alter the receptive fields of the affected proprioceptive systems and reorganize them, we propose a transfer of such theoretical notion, steaming from soviet psychophysiological and neuropsychological research, to the context of depersonalization treatment.

More specifically, we herewith aim to stimulate future research towards the development of virtual rehabilitation programs for depersonalization based on biofeedback, concurrent measurement of galvanic skin response - since electrodermal activity is a well-documented marker of bodily arousal expression of emotion-, EEG and electrical stimulation targeting selective somatosensory stimulation of the posterior cortical association areas (see below) to establish new afferent links (inputs) to the deranged proprioceptive functional systems.

Depersonalization/derealization disorder – related issues

Depersonalization is a dissociative disorder with a profound disruption of self-awareness in the form of emotional numbing and feelings of disembodiment.[12] Traditionally, it has been viewed either as a vestigial form of behavior subserving evolutionary meaningful purposes or as a temporal lobe seizure manifestation.[13] The salient feature of depersonalization is a breakdown in the familiarity of one's psychological and somatic self (and surroundings when derealization is also present), in spite of being aware of the unreality of the change.[14]

Diagnostic issues

According to DSM-5[15] individuals with DPDR persistently experience feelings of detachment, either bodily or mentally, from themselves or from their surroundings. DPDR falls within the wider diagnostic category of dis-

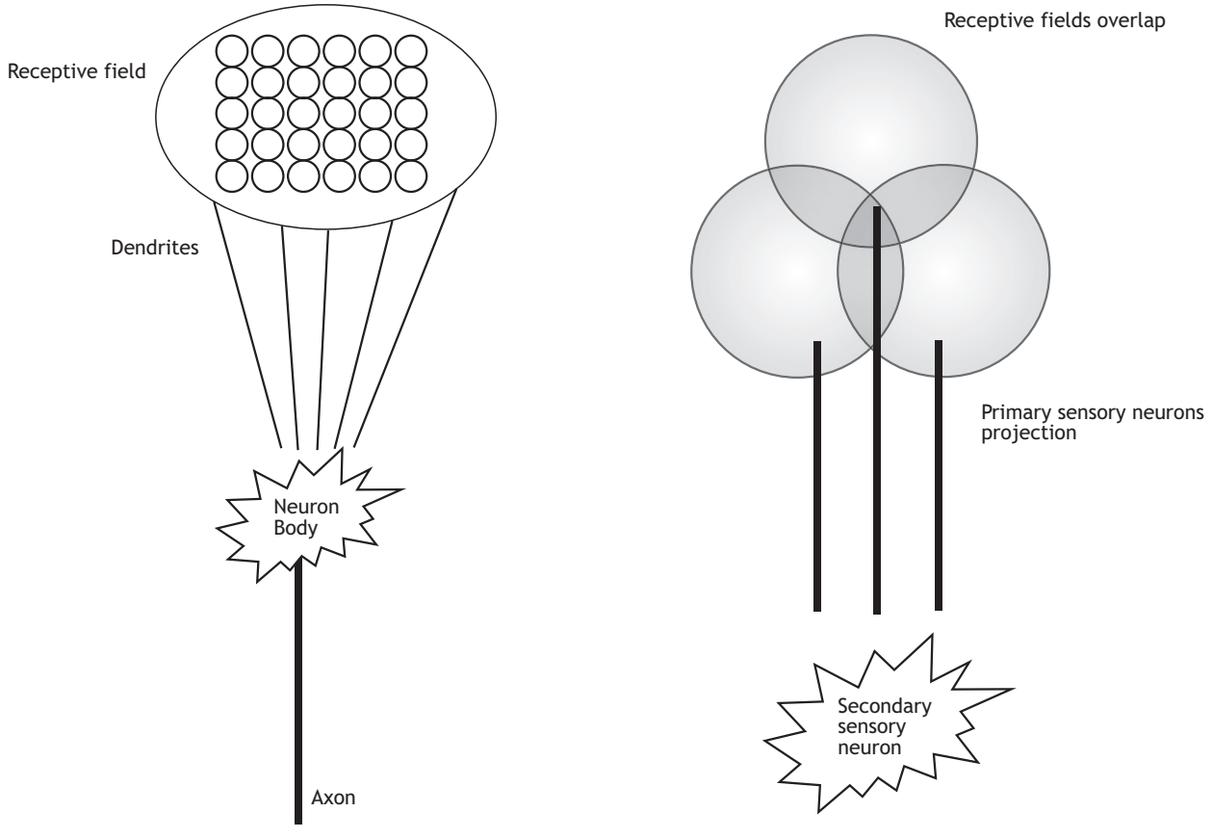

Figure 1. Primary neurons' receptors can gather inputs from specific areas namely their receptive fields-RF, while the latter may assume irregular shape and overlap with other neurons' RFs. Whether primary neurons' RFs converge onto a secondary neuron (A), a sum of the formers features takes place giving rise to a single and complex RF (B), rendering possible for subthreshold incoming information to be summed up and thus processed by the secondary neuron. By appropriately stimulating specific neuronal populations suffering in depersonalization, we speculate that their receptive fields would undergo reorganization.

sociative disorders, which are characterized by feelings of disconnection from reality. DPDR has only one type, although sufferers may experience depersonalization symptoms only, derealization symptoms only, or an equal mixture of both.

DPDR phenomena are difficult to understand and interpret because of the complex interwoven of sensory-motor experiences resulting from aberrant integration of perception, identity, memory and also other faculties of consciousness.[16] Moreover, dissociative disorders may become hard to diagnose for a number of reasons, namely, comorbidity issues or differential diagnoses, lack of information about any early childhood trauma, patient's difficulty in recalling unpleasant life-events.

In recent past DPDR as an isolated syndrome has been reported very rarely. Neglecting comorbid DPDR coding and patients' difficulty to find the appropriate terms to describe their symptoms are among the likely reasons accounting for this inconvenience. Provided the scarce literature on DPDR as a primary diagnosis, future research should address the actual prevalence and coding of DPDR.[17]

DPDR symptoms may occur in a great variety of neuropsychiatric conditions such as during epileptic auras, pharmacological intoxication, acute and transient psychosis, manic ecstatic states, as well as acute stress disorder, generalized anxiety disorder, obsessive-compulsive disorder, schizophrenia, and bipolar disorder).[18–20] DPDR symptoms may also represent additional specifiers in the diagnosis of posttraumatic stress disorder, panic disorder and borderline personality disorder.[21] It is possible that due to the severity of many psychopathologies, DPDR symptoms may seldom be overlooked.

Neuropsychological and psychophysiological evidence for dissociation

The study of the neuropsychological backgrounds of various psychiatric syndromes, as a methodological vehicle to shedding light to otherwise inaccessible disease-related components is well-known in psychopa-

thology. In major depressive disorder (MDD) patients, greater severity of derealization was seen in those performing worse in measures of delayed visuospatial recall and verbal recognition memory. Moreover, an association was found between depersonalization and a severe slowing in processing speed, but not depressive symptoms, as well as a higher vigilance performance in a less active environment.[22] The same study found a pathological association between dissociative symptoms and neuropsychological performance in depressed persons, with a frontotemporal anatomic distribution mediating memory and attention in particular. Of note, Aarderma and colleauges[10] showed that exposure to VR may induce an increase in dissociative experience (depersonalization and derealization), including a lessened sense of presence in objective reality. Dissociative symptoms resulting from VR immersion are related to higher idiosyncratic propensity to dissociation and virtual immersion or absorption. Thus, markers of dissociation and derealization could be used to achieve better adjustments of VE to patients' individual characteristics and needs.

Interestingly, it has been put forward that dissociative states strongly associate with creativity and "splinter" skills,[23] since creativity requires the ability to fluently retrieve and recombine remote associative elements.[24] This latter may have important implication for the neurorehabilitative treatment of DPDR in view of the fact that dissociative ability reflects the ability to dissociate from salient concepts and ideas to facilitate the concurrent access to mutually remote concepts, as well as to avoid getting stuck with initial ideas.[25,26] Accordingly, VR adaptations to the above theoretical requirements may aid to target cognitive processes central to DPDR (e.g., decrease mental flexibility and enhance inhibitory control over semantic networks "enabling" patients to access mutually remote concepts).

It has been proposed that the processing of emotional experience can be partly measured through the use of autonomic indices, and in particular, electrodermal activity (EDA).[27] A recent systematic review on emotional response in depersonalization suggest that depersonalization is marked by a high skin conductance level and attenuated skin conductance responses to negative stimuli.[28] EDA studies put forward that depersonalization is associated with hypervigilance and emotional detachment during threatening situations, but EDA in people suffering depersonalization should be also investigated in positive situations.

Treatment approaches to DPDR

The majority of published works on psychological therapies of depersonalization have been anecdotal or confined to small case series.[29] Unfortunately, the lack of quantified, systematic research makes it difficult to assess the effectiveness of these approaches. Psychodynamic treatments focus on triggering and sustaining mechanisms concerning the lack of control feelings and perceived threat to self. Abreactive techniques provide strategies to deal with the more dissociative aspects of depersonalization, while cognitive-behavioural therapy focuses on more cognitive, anxiety-generating mechanisms, which may play important role in the vicious-cycle of the condition and constitute a major source of distress and incapacity.

Psychanalytic psychotherapy can be beneficial in selected cases.[30] "Fear of losing control" has been emphasized as a central therapeutic target. Indeed, an extreme sensitivity to "control" threats is at the heart of psychopathological processes triggering and maintaining depersonalization. Early developmental difficulties to establish a healthy 'narcissism' and a trusting relationship with significant others can be seen as laying the ground for such a vulnerability.[31] Psychoanalytic therapists mainly aim at assisting the patient to realize that depersonalization and associated feelings of worthlessness and helplessness originate from parents' unrealistic expectations, while such relational needs later become internalized into a tyrannical idealized self-structure, imposing impossible demands (representing an indirect reflection of perceived impositions by significant others). Accordingly, the person begins to privilege a sense of self as a performing object ("third person viewpoint"), rather than as a source of subjective experiencing ("first person viewpoint").[32]

Similarly, there are no recent systematic studies on the use of abreactive techniques on patients with depersonalization. However, there are few indications that imagery-driven techniques may be helpful in depersonalization patients with a history of emotional abuse.[33,34] Although cognitive-behavioral therapy interventions seem promising,[29] the relevant studies also suffer from methodological limitations such as small size of the samples and lack of control groups.

Little is known about effective pharmacological treatment of depersonalization, and the condition has been generally considered refractory to most medications. A prominent background of anxiety or obsessions may respond better to SSRIs or to clonazepam, while unpublished anecdotal observations suggest that patients whose main complaints are attentional symptoms, underarousal and hypersomnia may respond to stimulants such as modafinil.[35] As to the research on new pharmacological agents two new drug categories loom on the horizon: cannabis receptor antagonists

and selective kappa opioid receptor antagonists.[36] Given the fact that cannabis can induced depersonalization in a dose-dependent manner, the cannabinoid CB1 receptor antagonist rimonabant is an intriguing research candidate with potential anti-depersonalization effects.[37] Integration of elements stemming from cognitive-behavioral theory, psychophysiology, and computer science, is expected to enhance our understanding of the condition and our treatment-planning acumen.

Neurobiological evidence

A neurobiological model of depersonalization proposed by Sierra and Berrios[13] suggests a bilateral corticolimbic disconnection with prefrontal activation and limbic inhibition resulting in hypoemotionality and attentional difficulties. However, Sierra, parallels depersonalization to neurological cortico-limbic disconnection syndromes such as pain asymbolia and asomatognosia, referring to depersonalization as a "functional cortico-limbic disconnection".[38]

Increased alertness observed in depersonalization results from activation of the right dorsolateral prefrontal cortex (prefrontal attentional systems) and reciprocal inhibition of the anterior cingulate, producing symptoms of "mind emptiness" and "indifference to pain" often seen in depersonalization. Additionally, left prefrontal inhibitory influences are likely to inhibit the amygdala resulting in dampened autonomic output, hypoemotionality, and lack of emotional coloring leading to feelings of "unreality or detachment."

Interestingly, there is evidence of clinical similarities between the experiential narratives produced by patients with depersonalization and those with corticolimbic disconnections. Early psychophysiological studies reporting a blunting in skin conductance recordings of patients during depersonalization episodes.[39] In line with this, it was recently found that healthy controls undergoing aversive experimental stimulation and manifesting among other experiences of depersonalization, demonstrated fast attenuation of skin conductance responses, i.e., habituation.[40] It was also found that in anxiety disorders the presence of depersonalization accounted for much of the variance of electrodermal habituation rate.[41]

Patients with depersonalization present selectively reduced autonomic responses and prolonged autonomic response latency to unpleasant stimuli but not to emotionally neutral ones. This finding indicates a specific disruption in emotional information processing rather than a non-specific dampening effect on autonomic reactivity.[42] Moreover, the findings suggest that the presence of depersonalization in otherwise anxious patients has a blunting and selective effect on autonomic reactivity.[42,43] An abnormally low tone in the sympathetic autonomic nervous system has been found in patients with depersonalization in comparison to patients with other anxiety, depressive, or psychotic disorders, by using forearm blood flow as a measurement of sympathetic autonomic function while interestedly their anxiety ratings were higher;[42] this indicates a fundamental discrepancy between objective and subjective signs of anxiety encountered among these patients.

Functional neuroimaging studies showed the putative role of abnormal functioning of the posterior cortical section (i.e., temporo-parietal junction, inferior parietal cortex, insula) in the generation of embodiment and agency, which are relevant to the experience of depersonalization. It is currently assumed that the right angular gyrus is responsible for comparing intended actions to subsequently experienced motor acts.[44,45] People with depersonalization exhibit different relative glucose metabolic rate from healthy controls especially concerning BA 22 (a right temporal lobe association area), and 7B (a somatosensory association area), BA 39 (a multimodal parietal; association area), BA 19 (occipital association area). Depersonalization patients were characterized by greater activity than comparison subjects in all these areas, with the exception of the BA 22, where activity was lower.[46] These findings indicate the role of extensive associational brain networks, mainly localized within the occipito-parietal domain, particularly with respect to embodiment. Although, healthy controls as well as OCD patients showed activation in the anterior insula in response to unpleasant and disgusting pictures, such activation was not seen in the patients with depersonalization.[42] Other brain areas related the response to expressions of fear and disgust, such as the occipito-temporal cortex, were also found to be underactive in patients with depersonalization as compared with the two control groups.[47]

fMRI studies of depersonalization showed reduced activity in emotion-related areas, such as the amygdala and the insula, and by attenuated autonomic responses to arousing emotional stimuli. They also propose that such neural unresponsiveness seems functionally coupled with abnormally increased activity in prefrontal regions linked to emotional control.[48,49]

In case of brain injury, depersonalization has been assumed to represent a manifestation of 'subtle', no localized brain damage leading to 'problems with the integration of perceptual, affective and attentional information.[50] From a physiological point of view, there is

evidence suggesting that vestibular dysfunction can frequently trigger depersonalization symptoms.[51] However, vertigo and depersonalization did not coexist in the majority of cases.[50]

Finally, it has been showed in healthy controls that experimentally induced sensory mismatch between disordered vestibular inputs and other sensory signals impair the process whereby an ongoing representation of the body within the surrounding space is achieved.[52] Consistently, it has been hypothesized that vestibular and multisensory information becomes integrated in a cortical region known as the temporoparietal junction,[53] the latter thought as relevant in the generation of the experience of being localized within one's body, i.e., embodiment

Virtual Reality in psychiatry

VR has been a significant tool in the hands of medical experts during the last two decades for diagnosis, treatment, counseling and rehabilitation of various physical and psychiatric disorders. Its main use in healthcare can be summed up as (a) a simulation tool and (b) an interaction tool.

In psychiatry, VR in interventions of counseling and cognitive-behavioral therapy has been used for the treatment of addictions and several types of phobia, subclinical fears and anxiety and stress disorders.[54,55] Furthermore, VR rehabilitation allows for adaptive environments, adjusting to the needs and progress of the individual patient using input data from the Head-Mounted Display (HMD) and certain sensors, creating the illusion of realistic interaction with the VE.[55] These types of sensory feedback allow specific targeting of symptoms unique for each group of patients.

From a technical point of view, in-game performance and ability parameters are monitored to ensure appropriate levels of challenge. Game difficulty adaptation in VR rehabilitation platforms is achieved by either simple parameterization,[56] naive adaptive algorithms[57,58] or by using an adaptation strategy by which patient's speed and control are computed to adjust for game difficulty level, through a Markov decision process (MDP) providing a therapist-guided reinforcement learning algorithm. A MDP refers to the process of the agent observing the environment output consisting of a reward and the next state, and then acting upon that. It is a sort of straightforward definition of the learning problem from interaction to achieve a goal. The agent and the environment interact continually, with the former selecting actions and the latter providing him with feedback and presenting new situations. Formally, an MDP is used to describe an environment for reinforcement learning, where the environment is fully observable.

Since, none of the above approaches offers on-line therapist's feedback, recently there has been an attempt to produce a novel algorithm for game difficulty adaptation, by coupling patient's performance and therapist feedback information to efficiently balances adaptation.[59]

VR has been demonstrated to influence higher order cognitive functions and cortical plasticity, with implications for the treatment of phobias (e.g., fear of spiders, heights, public speaking), schizophrenia and pharmacological addictions,[2,3] stroke rehabilitation,[4] and post-traumatic stress disorders.[5] Of crucial importance for successful VR implementation is a high sense of presence – a feeling of "being there" in the virtual scenario. The cognitive and perceptual underpinnings inducing feelings of presence in VR scenarios, to our knowledge, remain as yet largely unknown. Positive effects in patient treatment have been demonstrated[4-6] suggesting that VR is capable of successfully influencing behavior on a subconscious level.

VR disposes an inherent diagnostic potential as a means inducing increases of dissociative experience (depersonalization and derealization), and a lessened sense of presence in objective reality.[10] The use of VR enables the neurorehabilitation team to take overall control over the selected stimuli in order to meet the needs of the patient, overcoming the limitations of physical world. A number of companies worldwide develop and provide customized VR solutions solely targeting to psychiatric healthcare, including CleVR, psious, VirtualRET and Mimerse (https://techcrunch.com/2016/01/06/virtual-reality-therapy-treating-the-global-mental- health-crisis/), each one focusing on different span of disorders.

Moreover, objective bio-signal data measurements of changes in the heart rate and galvanic skin reflex, can be obtained using wearable devices during VR sessions.[60] In particular, anxiety-related bio-signals can be monitored in real time, and exposure to stressful stimulus can be gradually increased in a more reasonable fashion.[61]

Finally, there are many methodological issues to be addressed to verify how effective, harmful, or safe VR interventions are, compared to conventional treatment options. Current VR-related clinical trials limitations are the small size of the samples, lack of adequate controls, and lack of double-blind studies. These important issues should be addressed to design methodologically robust studies. In addition, the problem of ecological validity in terms of similarity between human behaviors in VR to those in real life, still remains an open issue.

Embodiment and identity in Virtual Environments

There has been a growing scientific interest in the representation of the physical body in VEs and the way embodied experience is connected with the physical, social and self-presence of the users within the virtual space.[61] In immersive VR the interface defines both the boundaries and shape of the body, thus research that has been conducted concerning the (avatar or first person) representation of body image and the distortions of it that occur in the VE.[62] The affordances of the virtual body may lead to different social meanings compared to the user's physical body alluding to the notion that virtual embodiment can alter personal identity and perception.[6] It has been suggested that embodiment in VEs exhibits the potential for increased intelligence levels, through the progress of sensory fidelity virtual worlds. The progressive perfection of the way VEs respond to user actions, by linking physical movement to sensory feedback, lead to a heightened stimulation of human action in a natural environment. Confidence in the cognitive potency of VEs research[62] is due partly to the experience of the high-level reaction via the immersion in high-end VR systems. However, this assumption requires further investigation of the occurring psychological effects and the concept of presence,[63] as a basic state of consciousness.[64] The subject of presence, which is also referred as "phenomenal body" and "self" respectively, does not always correspond with the physical body.[65,66] Thus, the concept of self-presence is defined as "the users' mental model of themselves inside the virtual world and the short term or long-term effect of virtual environment on the perception of one's body (i.e., body schema or body image), physiological states, emotional states, perceived traits, and identity".[66] Furthermore, wearable technology, due to its proximity to the body, becomes a major factor in affecting human identity and transforming the relationship with the physical body. In particular, wearable devices enable the users, while present in the virtual space, to define and present their digital identities, which augment their real ones rather than replacing those.[67] As prosthetic mechanisms, wearables improve the performance of the users, enabling them to cope with the demands imposed on them by the environment, since the capability of the human body is limited within the requirements of the digital environment.[68] Thus, ubiquitous and pervasive computing includes, through the use of wearable devices, the physical body of the user and transforms his/her personal space into a "bodynet", enhancing it with additional capabilities.[69]

A fresh view

The representation of the physical body in VEs and the way embodied experience is connected with the physical, social and self-presence of the trainees within virtual space has recently become a subject of growing scientific interest.[70] Embodiment in VEs exhibits the potential to promote users' mental potential (in terms of cognitive reserve enrichment). However, this concept along with the concept of presence as a basic state of consciousness warrant further investigation. The terms "phenomenal body" and "self" are used to describe the immersion of the user into the VE and are not always identical to the "sense of the physical body". "… *Self-presence is defined as users' mental model of themselves inside the virtual world, but especially differences in self-presence due to the short term or long-term effect of virtual environment on the perception of one's body (i.e., body schema or body image), physiological states, emotional states, perceived traits, and identity*…".[71] As with other forms of presence, VR experts share the assumption that increases in self-presence go alike to higher levels of cognitive performance, and, possibly, emotional development. Furthermore, wearable technology that enhances presence within the virtual space, due to its proximity to the body, may become a major factor in enhancing human identity and transforming the relationship with the physical body. In particular, wearable devices enable users, while present in the virtual space, to define and present their digital identities, by enriching their real ones instead of replacing them. Accordingly, in the following lines we suggest that the impact of new afferent stimulation and feedback may offer a short of corrective proprioceptive experience - leading to reorganization of deranged brain functional systems - mainly based upon patient's behavioral outcome during interaction with VEs to achieve therapeutic gains (enhanced sense of presence), with the latter hopefully transferred to ecological-everyday life situations. For instance, stimulation of mechanoceptors along the heel of the foot or those distributed along the chest surface, may be of help for the patient suffering depersonalization enhance his/her sense of presence in terms of contact with the ground and his/her weight dynamics, and the required body position adjustment imposed by external sources of stimulation (e.g., a strong wind) to achieve better balance. Changes induced by auxiliary mechanoceptive stimulation (e.g., through peripheral sensors) may in turn produce changes at a cortical level, thus meeting depersonalization patient's cognitive neurorehabilitation needs.

A similar approach using wearable technology in the area of motor rehabilitation is the early work of

Perel'man in 1947, as reported by Luria,[11] who had showed that patients with paresis and dystonia resulting from deep penetrating injuries of the white matter of the posterior cortices and subcortical centers, may benefit from the implementation of additional series of afferent impulses (e.g., proprioceptive: plaster splint inducing hand's hyperextension may abolish spasm; nociceptive: squeezing the terminal phalanx of the finger may make spastic contraction disappear) leading their afferent filed to change and normalize deranged movements. For instance, these additional afferent inputs may either take place at a subconscious level (low cortical and subcortical level) or even in a conscious level (high cortical levels). Consequently, compensation of a motor defect may occur by modifying the patient's afferent field of interest.

We hypothesize that manipulation of the somatosensory aspects (i.e., pain, temperature, touch, and proprioception: articular and/or baroceptive components) during VEs immersion in DPD patients, may simulate real-life situations entailing stressful-aversive scenarios as potential triggers of depersonalization to assess self-awareness, in both its somatic and emotional components. Implementation of biofeedback electrical stimulation to the posterior cortical association areas –presenting aberrant processing in these patients–, concurrent measurement of galvanic skin response and EEG, as well as individualized neuropsychological assessment, may help in the detection of somato-sensory processing bias (i.e., baroceptive control bias). Consequently, this may assist clinicians in making necessary therapeutic adjustments. Since a set of wearables and sensors is implemented during interaction with the VE, self-presentation and self-perception of the participants could also be investigated, with the aim of detecting differences and variations between the physical and the virtual environment.

Considering the proposed treatment methodology, a neurobehavioural rehabilitation approach to the treatment of depersonalization should be adopted. To this aim the VEs would be enriched by somatosensory stimulation along with visual, and auditory stimulation offering the trainee multimodal sensory cuing to facilitate integrative processing, the latter being compromised in dissociative disorders.

Additionally, behavioral and psychoeducational treatment components must be included in a virtual rehabilitation tool. Thus, integration of elements stemming from behavioral psychology and cognitive therapy, psychophysiology and computer science, is expected to enhance our understanding of the condition and our treatment-planning.

What is expected?

Our research hypotheses steaming from early psychophysiological and neuropsychological theoretical notions and empirical evidence might constitute a starting point for the development of new theory-based restorative cognitive neurorehabilitation approach to depersonalization. We believe that by introducing new afferent links - to provide fresh additional sensory inputs – one may alter the receptive fields of the affected proprioceptive functional systems and reorganize them. Future research may benefit of the neurorehabilitation principles developed by Alexander R. Luria on the basis of his clinical experience with thousands of people suffering brain injuries during the second world-war. Lurian neuropsychological approach to diagnosis and rehabilitation heavily relies upon solid evidence from physiological and experimental psychological research.

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Ειδικό άρθρο

Προσαρμοστικά εμβυθιστικά Εικονικά Περιβάλλοντα ως θεραπεία για τη διαταραχή αποπροσωποποίησης

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ΙΣΤΟΡΙΚΟ ΑΡΘΡΟΥ: Παραλήφθηκε 1 Ιουλίου 2020/Αναθεωρήθηκε 26 Νοεμβρίου 2020/Δημοσιεύθηκε Διαδικτυακά 5 Αυγούστου 2021

ΠΕΡΙΛΗΨΗ

Η διαταραχή αποπροσωποποίησης είναι σχετική μιας εκ βαθέων προσβολής της αυτο-ενημερότητας υπό τη μορφή συναισθηματικής ψυχρότητας και αίσθημα αποσωματοποίησης. Προεξάρχον χαρακτηριστικό γνώρισμα της αποπροσωποποίησης συνιστά η απώλεια του αισθήματος οικειότητας για το ψυχικό και σωματικό εγώ (καθώς και του περιβάλλοντος όπου συνυπάρχει και αποπραγματοποίηση), μολονότι το άτομο είναι ενήμερο της σφαλερότητας της εν λόγω αλλαγής. Υφίστανται πρώιμες ερευνητικές ενδείξεις ότι τα άτομα τα οποία ρέπουν προς τη διάσχιση παρουσιάζουν μικρότερη ανοχή σε αντιληπτικά ασυνεχή περιβάλλοντα, πιθανόν λόγω της υιοθέτησης μιας δύσκαμπτης αντιληπτικής στάσης. Συνεπώς, το βίωμα αντιληπτικής ασυνέχειας κατά τη χρήση εμβυθισμένης εικονικής πραγματικότητας (ΕΠ), αναμένεται να επιδεινώσει τη διασχιστική συμπτωματολογία σε ευεπίφορα άτομα. Ορισμένοι προτάσσουν το γεγονός ότι μια τάση του ατόμου να εμθυθίζεται ή να απορροφάται, η οποία αφορά σε διαδικασίες φαντασίας που υπόκεινται των διασχιστικών βιωμάτων, σχετίζεται σημαντικά με τον βαθμό ευκολίας επαγωγής διασχιστικής συμπτωματολογίας από την ΕΠ. Εν κατακλείδι, έχει επισημανθεί το γεγονός ότι η αύξηση του ουδού ανοχής έναντι της αντιληπτικής ασυνέχειας, καθώς επίσης μια περισσότερο ευέλικτη αντιληπτική στάση σε ασθενείς με διαταραχή αποπροσωποποίησης/αποπραγματοποίησης, δυνατόν να αποβούν ωφέλιμες για τους εν λόγω ασθενείς. Στην παρούσα μελέτη προτείνουμε τη χρήση προσαρμοστικής και εμβυθισμένης εικονικής πραγματικότητας για τη θεραπεία της αποπροσωποποίησης. Συγκεκριμένα, φρονούμε πως η εφαρμογή ηλεκτρικής διέγερσης βιοανάδρασης για την ανίχνευση διεργασιακών παρελκύσεων της επεξεργασίας των σωματοαισθητηριακών πληροφοριών είναι δυνατόν να συμβάλει στην επιλεκτική στόχευση συγκεκριμένων νευρογνωστικών συντελεστών που έχουν υποστεί βλάβη και κατά συνέπεια να προάγει σε κάποιον βαθμό και τη διαγνωστική προσπέλαση της αποπροσωποποίησης. Οι ψυχοφυσιολογικές προσεγγίσεις είναι δυνατόν να βοηθήσουν στη θεραπεία της αποπροσωποποίησης μέσω επικουρικών σειρών προσαγωγών εισιόντων με απώτερο σκοπό την τροποποίηση των υποδεκτικών πεδίων των προσβεβλημένων ιδιοδεκτικών συστημάτων και τη λειτουργική τους αναδιοργάνωση. Η παρούσα ερευνητική εργασία διατείνεται πρωτίστως να ενθαρρύνει μελλοντικές έρευνες ανάπτυξης προγραμμάτων εικονικής νευροαποκατάστασης που θα βασίζονται στη βιοανάδραση, την ηλεκτρική διέγερση και την ταυτόχρονη μέτρηση της γαλβανικής απόκρισης του δέρματος και της ΗΕΓ δραστηριότητας, στοχεύοντας στην επιλεκτική σωματοαισθητηριακή διέγερση σε ασθενείς με αποπροσωποποίηση, μία παρέμβαση που φαίνεται να απουσιάζει από τη φαρέτρα των κλινικών. Οι ερευνητικές μας υποθέσεις δυνατόν να αποτελέσουν ένα σημείο εκκίνησης για την ανάπτυξη νέων εργαλείων νευροαποκαταστασιακών παρεμβάσεων για την αποπροσωποποίηση ειδικότερα και τη διαταραχή αποπροσωποποίησης/αποπραγματοποίησης εν γένει.

ΛΕΞΕΙΣ ΕΥΡΕΤΗΡΙΟΥ: Νευροψυχολογία, διάσχιση, εικονική πραγματικότητα, βιοανάδραση, διαταραχή αποπροσωποποίησης/αποπραγματοποίησης.

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https://doi.org/10.22365/jpsych.2021.042 / Psychiatriki 2021, 32:328–332

Brief communication

The emotional burden of the SARS-CoV-2 pandemic on medical students in Greece

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ARTICLE HISTORY: Received 22 July 2021/Revised 7 October 2021/Published Online 26 November 2021

ABSTRACT

Everyday human life has recently been affected worldwide by the SARS-CoV-2 pandemic. Medical students were found to be a vulnerable population, facing many challenges with the temporary suspension of clinical activities, as well as their confrontation with violent changes in their chosen profession. The purpose of the present study is to record and detect possible signs of emotional burden on the psychological profile of northern Greek medical students in the second wave of the European pandemic at the hitherto culmination point. 342 medical students completed a questionnaire investigating some very rough and easily self-reported affective psychiatric symptoms and their responses were statistically evaluated. The results disclosed experienced emotional burden among medical students with a general exacerbation of various non-specific affective symptoms, but a decrease in suicidal ideation and auto-destructiveness was nevertheless observed. On the contrary, a moderate increase in wishes for illness was noted among medical students. Findings of emotional burden were disclosed among medical students with a general worsening of various non-specific affective symptoms in turn connoting feelings of discomfort in adapting to the multiple constraints and fear of insecurity for the newly-formed reality created by the outbreak of the new coronavirus pandemic.

KEYWORDS: SARS-CoV-2, students; occupational psychology, medicine, pandemic.

Introduction

Everyday human life has recently been affected worldwide by the SARS-CoV-2 pandemic as well as measures proposed by expertise and implemented by governments.[1] In Greece, the new coronavirus pandemic broke out and expanded from February 26, 2020 onwards, but began to escalate uncontrollably in northern Greece from November, 2020, and remained so until May 2021, with emergency measures taken by the Greek government, including suspension of operation of all educational structures at all levels, compulsory relocation of medical staff and patients, suspension of all leaves for healthcare workers as well as compulsory requisition of private health structures.[2] Many healthcare professionals and some of their close relatives were infected. This resulted in a violent change of employment status for

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many workers, especially those in the healthcare sector. The reality in everyday medical practice has been differentiated by far. Medical students being the future of the scientific medical community have been confronted with multiple challenges including the temporary disruption of university studies and educational activities as well as the eminent confrontation with a violently changed profession in both academic and practical environments. Initial reports suggest that students constitute a vulnerable population but have been conducted in a much milder phase of the SARS-CoV-2 pandemic and most included students from various faculties, but the present study focuses only on students of medicine and to the authors' knowledge is the first one carried out in the second wave of the European pandemic at the hitherto culmination point with all that this time parameter entails.[3,4]

The purpose of the present study is to record and detect possible signs of emotional burden among northern Greek medical students to the period of implementation of restrictive measures and the occupational impact of the pandemic.

Material and Method

The authors of the present article are a team of mental health professionals working in both reference hospitals for the novel coronavirus incidents in northern Greece. On November 21, 2020, 342 medical students of northern Greece (Democritus University of Thrace and Aristotle University of Thessaloniki) voluntarily completed an online questionnaire exploring self-reported psychiatric symptoms and changing habits among before and after February, 2020, referring to the month just before the onset of the pandemic in Greece. The study was approved by the ethics committee affiliated to Democritus University of Thrace, Department of Medicine and a written (electronic) informed consent was obtained from all participants.

The aim of the study was to assess the psychological burden of the SARS-CoV-2 pandemic on Greek medical students in a clinical interview. Therefore, phrases from questionnaires were used in order to match questions that we commonly ask during the clinical examination. In order to achieve its remote administration in the form of an anonymous and fast digital reply, and for the homogeneity of the results, we used some questions from the questionnaires Mini-International Neuropsychiatric Interview (MINI), Montgomery and Asberg Depression Rating Scale (MADRS), Hamilton Depression Rating Scale (HAMD) and Beck Depression Inventory (BDI). It is highlighted that the primary goal was to quickly retrieve such information as part of a screening routine in an ad hoc questionnaire and not to complete a validated questionnaire that would yield a score or a diagnosis.[5–8]

Specifically, the questions concerned: pessimistic thoughts[6,7] (representing thoughts of guilt, inferiority, self-reproach, sinfulness, remorse and ruin), death wishes6 (representing the feeling that life is not worth living and that a natural death would be welcome), suicidality[5,6] (suicidal thought content, intent to hurt oneself either passively or actively, absence of presence of plan/ preparations for suicide), suicide attempts[5,8] and other self-destructive actions5, irritability,[5,8] inner tension[6,8] (representing feelings of ill-defined discomfort, edginess, inner turmoil, mental tension mounting to either panic, dread or anguish) and sleep disorders[5,6,8] (representing the experience of reduced duration or depth of sleep compared to the subject's own normal pattern). Furthermore, the consumption of alcohol and the use of substances as well as wishes for illness were investigated. Wishes for illness included hypochondriasis[8] as well as various other non-specific minor etiologies, such as a deep need for attention/ to be empathized/nurtured, avoidance of daily responsibilities due to lassitude6 or low self-esteem and self-doubt, expressed desire to get away from the exhausting and stressful reality, etc.

Relationships between self-reported signs of emotional burden and individuals' demographic variables, their history of alcohol consumption or substance abuse, attitudes towards illness and autodestructive behavior were statistically examined. Statistical significance was tested with Mann-Whitney U test and Fisher's exact test. All tests were performed in IBM SPSS software 25.0, were two-tailed, and the significance level was set at $p < 0.05$.

Results

The age of the participants ranged between 18 and 53 years with a mean age of 22.71 (Median=22; Variance=19.37; Standard Deviation=4.40). Females outnumbered males with a M:F ratio; 1:1.6. Results disclosed that subjects experienced a 64.9% self-reported increase in feelings of anxiety and agitation ($p<0.01$), a 51.2% self-reported increase of pessimistic thoughts ($p<0.01$), a 46.5% self-reported increase in confrontational behavior against others and feelings of anger ($p<0.01$), a 42.4% self-reported increase in sleep disturbances ($p<0.01$), as well as a 24.3% self-reported increase in alcohol consumption ($p<0.01$), and an 11.4% increase in substance consumption ($p<0.05$) compared to the situation prior to February, 2020. Furthermore, 1.52 times higher wishes for illness were noted among subjects compared to the same variable prior to February, 2020, which was moderately significant ($p=0.05$). 25.7% of medical students admitted having expressed death wishes at least

once in lifetime, while self-reported death wishes decreased almost in half (1.9:1) after the outburst of the pandemic (p<0.01). In addition, 10.2% of medical students had committed a suicide attempt and 11.1% had engaged in physical self-destructive actions in their lifetime, while self-destructive actions self-reportedly fell to 1.7–fold lower compared to the same variable prior to February, 2020 (p<0.05). Self-destructive thoughts also fell to 1.52 times lower compared to the same variable prior to February, 2020 (p<0.05).

Regarding gender differences, females seemed to experience more perceived psychological burden compared to males, in self-reported increase of pessimistic thoughts, feelings of anxiety and agitation, and sleep disturbances (p<0.05) (table 1).

Discussion

Data extracted from international literature as well as different national health and educational systems have indicated that medical students stand for a population of increased vulnerability to burnout and suicidality.[9,10] Specifically, a study by Zis et al on a sample of Cypriot medical students concluded significantly higher levels of exhaustion among students of the sixth year of medical education during the Covid-19 pandemic (in contrast to the pre-pandemic era; p<0.01), significantly deteriorating general mental health among students of the first, third and sixth year of medical education during the pandemic (in contrast to pre-pandemic era; p<0.01) as well as higher levels of cyniscism across all years of education (p<0.01).[11] Furthermore, an earlier study by Kaparounaki et al. on a sample of Greek medical students had detected a "horizontal" increase in anxiety levels (73.0%), depression (60.9%), overall suicidality (20.2%), quantity of sleep (66.3%) as well as a deterioration in sleep quality (43.0%), sexual life (38.6%), and overall quality of life (57.0%) in a sample of Greek medical students.[12] A similar study conducted by Torun et al on a sample of Turkish medical students found the perceived stress level in females higher compared to males, and concluded that the status of having personal medical history of a chronic disorder, low family income, and close relationship with a person infected with COVID-19 were aggravating factors for anxiety among medical students. In addition, the same research study detected increase in sleep (29.5%) and appetite disturbances (36.4%), while found the status of being married or living with family to be protective factors for anxiety dur-

Table 1. Questionnaire results from medical students (n=342)

	Total	Fisher's	x^2	p	Males	Females	x^2	p
Overall participants	342 (100%)				130 (38%)	212 (62%)	6.270	0.002
Increase of pessimistic thoughts	175 (51.2%)	<0.001	13.909	<0.001	55 (42.3%)	120 (56.6%)	2.567	0.010
Increase in alcohol consumption	83 (24.3%)	<0.001	6.640	<0.001	33 (25.4%)	50 (23.6%)	0.377	0.704
Increase in substance consumption	39 (11.4%)	0.046	3.074	0.003	12 (9.2%)	27 (12.7%)	0.990	0.322
Present self-destructive thoughts	33 (9.7%)				13 (10%)	20 (9.4%)	0.172	0.865
Lifetime self-destructive thoughts	50 (14.6%)				18 (13.9%)	32 (15.1%)	0.317	0.749
Decline in self-destructive thoughts	17 (5%)	0.082	-1.991	0.047	5 (395%)	12 (5.7%)	0.749	0.453
Present wishes for illness	47 (13.7%)				16 (12.3%)	31 (14.6%)	0.604	0.549
Lifetime wishes for illness	31 (9.1%)				11 (8.5%)	20 (9.4%)	0.304	0.764
Increase in wishes for illness	16 (4.7%)	0.095	1.925	0.054	5 (3.8%)	11 (5.2%)	0.571	0.569
Present death wishes	44 (12.9%)				13 (10.0%)	31 (14.6%)	1.239	0.215
Lifetime death wishes	88 (25.7%)				30 (23.1%)	58 (27.4%)	0.879	0.379
Decrease in death wishes	44 (12.9%)	0.0006	-4.263	<0.001	17 (13.1%)	27 (12.7%)	0.091	0.928
Lifetime suicide attempts	35 (10.2%)				12 (9.2%)	23 (10.9%)	0.479	0.631
Present self-harm	22 (6.4%)				7 (5.4%)	15 (7.1%)	0.619	0.535
Lifetime self-harm	38 (11.1%)				12 (9.2%)	26 (12.3%)	0.867	0.384
Decrease inself-harm	16 (4.7%)	0.059	-2.163	0.031	5 (3.9%)	11 (5.2%)	0.571	0.569
Increase in confrontations with others	159 (46.5%)	<0.001	12.534	<0.001	55 (42.3%)	104 (49.1%)	1.215	0.226
Increase in feelings of anxiety and agitation	222 (64.9%)	<0.001	17.006	<0.001	71 (54.6%)	151 (71.2%)	3.125	0.002
Increase in sleep disturbances	145 (42.4%)	<0.001	11.089	<0.001	46 (35.4%)	99 (46.7%)	2.055	0.039

ing the pandemic. No significant difference was found in terms of tobacco smoking habits and patterns by the specific study.[13] In addition, research by Cao et al on a sample of Chinese medical students indicated that 0.9% of the respondents were experiencing severe anxiety, 2.7% moderate anxiety, and 21.3% mild anxiety during the pandemic. The demographic status of living in urban areas, co-habiting with parents, and family income stability were identified as protective factors against anxiety. On the contrary, living in rural areas, living alone, family income instability, and having a relative or an acquaintance infected with COVID-19 were correlated with more severe levels of anxiety. Furthermore, in the specific study, gender was found to have no significant effect on anxiety.[14]

The results of the present study disclosed experienced emotional burden among medical students with a general exacerbation of various non-specific affective symptoms; anxiety (64.9%), anger (46.5%), sleep disturbances (42.4%), pessimistic thoughts (51.2%), alcohol consumption (24.3%) – thus, being generally in line with aforementioned literature results, but for a decrease in suicidal ideation and autodestructiveness nevertheless observed.[3,4] Death wishes without actively causing self-harm in the context of passive death ideation remained stable and unaffected. Alcohol consumption and substance abuse increased, in contrast to a previous study on alcohol abuse in the general population during the pandemic and lockdown era in Greece.[15] On the contrary, a moderate increase in wishes for illness was noted among medical students, while a possible interpretation for this finding may be the perceived sense of security provided by immunity, which may be in turn associated with the fear of insecurity and feelings of discomfort in adapting to the multiple constraints and the new reality formed by the novel coronavirus pandemic, while at the same time reflecting qualitative variables related to the appraisal and judgment of the specific situation on behalf of medical students.

More research needs to be invested over the impact of the violent outbreak of the pandemic on matters of occupational and social psychology.

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Σύντομο άρθρο

Η ψυχολογική επιβάρυνση από την πανδημία SARS-CoV-2 στους Έλληνες φοιτητές Ιατρικής

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ΙΣΤΟΡΙΚΟ ΑΡΘΡΟΥ: Παραλήφθηκε 22 Ιουλίου 2021/Αναθεωρήθηκε 7 Οκτωβρίου 2021/Δημοσιεύθηκε Διαδικτυακά 26 Νοεμβρίου 2021

ΠΕΡΙΛΗΨΗ

Λίαν προσφάτως, η ανθρώπινη καθημερινότητα επηρεάστηκε σε παγκόσμια κλίμακα από την πανδημία SARS-CoV-2. Οι φοιτητές Ιατρικής είναι ένας ευάλωτος πληθυσμός, που βρέθηκε να αντιμετωπίζει πολυάριθμες προκλήσεις με την προσωρινή αναστολή κλινικών δραστηριοτήτων στα πλαίσια της εκπαιδευτικής διαδικασίας, καθώς και την αντιμετώπιση ριζικών και βίαιων μεταβολών σε σχέση με το επάγγελμα αυτό σε πολλά επίπεδα (συνθηκών, αντικειμένου, κλινικής πρακτικής). Ο σκοπός της παρούσας μελέτης είναι να καταγράψει και να εντοπίσει στοιχεία συναισθηματικής επιβάρυνσης στο ψυχολογικό προφίλ των φοιτητών Ιατρικής της Βόρειας Ελλάδας κατά το δεύτερο κύμα της ευρωπαϊκής πανδημίας στο χρονικό σημείο μέχρι την «κορύφωση» της πανδημίας. 342 φοιτητές Ιατρικής συμπλήρωσαν ένα ερωτηματολόγιο σε διερεύνηση κάποιων πολύ βασικών και εύκολα αυτο-αναφερόμενων συμπτωμάτων συναισθηματικών διαταραχών και οι απαντήσεις τους αξιολογήθηκαν στατιστικά. Τα αποτελέσματα της παρούσας μελέτης αποκάλυψαν ενδείξεις συναισθηματικής επιβάρυνσης μεταξύ των φοιτητών ιατρικής με γενική επιδείνωση διαφόρων μη ειδικών συναισθηματικών συμπτωμάτων, αλλά παρατηρήθηκε μείωση του αυτοκτονικού ιδεασμού και της αυτοκαταστροφικής διάθεσης. Αντιθέτως, παρατηρήθηκε μια μέτρια αύξηση των ευχών για νόσηση μεταξύ των φοιτητών Ιατρικής. Ευρήματα συναισθηματικής επιβάρυνσης αποκαλύφθηκαν στον μελετώμενο πληθυσμό φοιτητών Ιατρικής με γενική επιδείνωση διαφόρων μη ειδικών συναισθηματικών συμπτωμάτων, υποδηλώνοντας, με τη σειρά τους, συναισθήματα δυσφορίας για την προσαρμογή στους πολλαπλούς περιορισμούς και φόβο -ανασφάλεια για τη νεοσυσταθείσα πραγματικότητα που δημιουργήθηκε από το ξέσπασμα της πανδημίας του νέου κορωνοϊού.

ΛΕΞΕΙΣ ΕΥΡΕΤΗΡΙΟΥ: SARS-CoV-2, φοιτητές, επαγγελματική ψυχολογία, ιατρική, Πανδημία.

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PSYCHIATRIKI

Published Quarterly by the Hellenic Psychiatric Association

VOLUME 32
JANUARY–DECEMBER 2021

Acknowledgment to Reviewers

The Editorial Board of the Psychiatriki would like to thank everyone who has contributed to the 32nd volume and especially the following expert clinicians and researchers who have served as peer reviewers of the journal

Agorastos, Agorastos
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We cordially thank you for your invaluable help!
George Konstantakopoulos
Editor-in-Chief

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Τριμηνιαία έκδοση της Ελληνικής Ψυχιατρικής Εταιρείας

ΤΟΜΟΣ 32

ΙΑΝΟΥΑΡΙΟΣ–ΔΕΚΕΜΒΡΙΟΣ 2021

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Η Συντακτική Επιτροπή της Ψυχιατρικής θα ήθελε να ευχαριστήσει όλους όσοι συνέβαλαν στον 32ο τόμο και ειδικά τους παρακάτω ειδικούς κλινικούς και ερευνητές, που εργάστηκαν ως κριτές εργασιών του περιοδικού μας:

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Φουντουλάκης Κωνσταντίνος
Φρανσίς Κώστας
Χατζούλης Μιχάλης
Χριστοδούλου Νίκος
Χριστοδούλου Χρήστος

Σας ευχαριστούμε από καρδιάς για την ανεκτίμητη βοήθειά σας!
Γιώργος Κωνσταντακόπουλος
Πρόεδρος της Συντακτικής Επιτροπής