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CONTENTS

ΨΥΧΙΑΤΡΙΚΗ

Τριμηνιαία έκδοση της Ελληνικής Ψυχιατρικής Εταιρείας

ΠΕΡΙΕΧΟΜΕΝΑ

Editorial
Άρθρο σύνταξης

Living with covid-19

Psychiatriki 2020, 31:197–198

From the beginning of 2020, the alarming news from Italy and the first known cases arrived in Greece, along with travelers from the Holy Land. Spain, France and all other countries followed. From the first week of March, restrictive measures began in Greece and then confinement in order to limit the spread of the pandemic and not drown the National Health System by serious cases. The policy of restrictive measures to stop the pandemic was the internationally accepted response[1] and the generalized adherence proved effective, despite the shock and the various reactions from the unprecedented, generalized state of restriction, different scale from epidemics of other times.[2–4] In other countries, the loose restrictive measures have cost thousands of deaths. The general restrictive measures, however, have serious consequences for people's mental equilibrium, economy and employment, and for this reason they can only be of limited duration.[5] The gradual return to normal life rhythms began gradually from May. But the test of the holiday time and the gradual opening of the tourist season, that is, the open communication of moving populations with limited, random checks for the virus and only local restrictions of the gathering of citizens. We are experiencing now the gradual and severe increase in cases, with an uncertain spreading, with asymptomatic and younger in age likely playing a central role in the spread of the virus, while the fear of a potential large increase in serious cases remains. At the time of this writing, the only means of coping is to maintain and locally strengthen the protective measures, while we gradually realize that these measures came to stay for many more months.[6,7] A major problem is that the initial small number of cases favored the underestimation of risk by part of the population, and the serious consequences on people's jobs and lives, along with the deregulation of employment and social security relations legislated in recent months, have provided substantial material to conspiracy theories.

We carefully monitor the research on the epidemiological behavior of covid-19 and the clinical data, the discussion on the drugs that make the symptoms milder, the effect of the virus on the CNS and the expected vaccine or vaccines. Our role from the beginning concerned the enormous psychological burden of a global health crisis, with serious consequences on people's working and social lives and equally avoiding the deregulation of the management of our patients and of the units that provide it. At the time of confinement, the telephone contact, familiar to all generations, offered valuable information and support, the lines 10306 and 1110, as well as many local or voluntary help-lines. Telepsychiatry was used more widely – being also an initiative of the Hellenic Psychiatric Association – and seems to have entered impetuously in our work, as well as in education. Its central or complementary role and its safe use are issues that are widely discussed at the moment.[8]

Protection measures against the virus seriously affect the normal functioning of health and mental health services. The solution should be sought in the urgent operational upgrade, the very necessary reinforcement of the staff and its effective protection from the virus and stress from exposure to danger, which has emerged as important factors for the normal operation of the mental health units.[9] The use of telepsychiatry has solved a number of operational problems, but in many cases, it remains complementary, as it cannot replace physical presence in more specific care operations. The need not only to normalize, but to improve the follow up of our patients, the need to strengthen the units that provide basic, community mental health services, is shown by the increase in cases of involuntary hospitalization in the psychiatric hospitals of Athens and Thessaloniki during the last two months.

A health crisis that affects almost the entire planet and the working and social life of most is a major social and political problem that concerns all of us,[10] while mental health professionals are called to offer their scientific tools for people to face a multifaceted threat and in particular to claim and ensure the continuation of the treatment of our patients and the normal operation of our units.

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Άρθρο σύνταξης
Editorial

Ο κορονοϊός στη ζωή μας

Ψυχιατρική 2020, 31:199–200

Από την αρχή του 2020 έφτασαν στην Ελλάδα τα ανησυχητικά νέα από την Ιταλία αλλά και τα πρώτα γνωστά κρούσματα, μαζί με τους ταξιδιώτες από τους Άγιους Τόπους. Ακολούθησε η Ισπανία, η Γαλλία και όλες οι άλλες χώρες. Από την πρώτη εβδομάδα του Μαρτίου ξεκίνησαν στην Ελλάδα τα περιοριστικά μέτρα και στη συνέχεια η καραντίνα (confinement) με σκοπό να περιοριστεί η εξάπλωση της πανδημίας και να μην πνιγεί το ΕΣΥ από βαριά περιστατικά. Η πολιτική των περιοριστικών μέτρων για την ανακοπή της πανδημίας υπήρξε η διεθνώς αποδεκτή μέθοδος αντιμετώπισης[1] και η γενικευμένη τήρησή τους αποδείχτηκε αποτελεσματική, παρά το σοκ και τις ποικίλες αντιδράσεις από την πρωτόγνωρη, γενικευμένη κατάσταση περιορισμού, διαφορετικής κλίμακας από επιδημίες άλλων εποχών.[2–4] Σε άλλες χώρες τα χαλαρά περιοριστικά μέτρα στοίχισαν χιλιάδες νεκρούς. Τα γενικευμένα περιοριστικά μέτρα έχουν όμως σοβαρές συνέπειες στην ψυχική ισορροπία, την οικονομία και την εργασία και για τον λόγο αυτόν δεν μπορούν να έχουν παρά περιορισμένη διάρκεια.[5] Η σταδιακή επάνοδος σε κανονικότερους ρυθμούς ζωής ξεκίνησε ομαλά από τον Μάιο. Ήρθε όμως η δοκιμασία των διακοπών και το σταδιακό άνοιγμα της τουριστικής περιόδου, δηλαδή η ανοιχτή επικοινωνία μετακινούμενων πληθυσμών με περιορισμένους, δειγματοληπτικούς ελέγχους για τον ιό και μόνο κατά τόπους περιορισμούς της συνάθροισης πολιτών. Ζούμε τη σταδιακή και σοβαρή αύξηση των κρουσμάτων, με αβέβαιη τη διασπορά τους, με τους ασυμπτωματικούς και νεότερους στην ηλικία πιθανότατα να παίζουν κεντρικό ρόλο στη διάδοση του ιού, ενώ παραμένει ο φόβος της μεγάλης αύξησης των σοβαρών περιστατικών. Τη στιγμή που γράφονται αυτές οι γραμμές, το μόνο μέσο αντιμετώπισης είναι η διατήρηση και κατά τόπους ισχυροποίηση των μέτρων προστασίας, που σταδιακά αντιλαμβανόμαστε ότι ήλθαν για να μείνουν για πολλούς ακόμα μήνες.[6,7] Ένα σημαντικό πρόβλημα είναι ότι ο αρχικός μικρός αριθμός κρουσμάτων ευνόησε την υποτίμηση του κινδύνου από μέρος του πληθυσμού και οι σοβαρές συνέπειες στην εργασία και τη ζωή των ανθρώπων, μαζί με την απορρύθμιση των σχέσεων εργασίας και κοινωνικής ασφάλισης που νομοθετήθηκε τους τελευταίους μήνες, προσέφεραν ουσιαστικό υλικό στις θεωρίες συνωμοσίας.

Παρακολουθούμε με προσοχή τα καθαρά ερευνητικά δεδομένα για την επιδημιολογική συμπεριφορά του κορονοϊού, καθώς και τα κλινικά δεδομένα, τη συζήτηση για τα φάρμακα που κάνουν ηπιότερα τα συμπτώματα, την επίδραση του ιού στο ΚΝΣ και το αναμενόμενο εμβόλιο ή εμβόλια. Ο δικός μας ρόλος από την αρχή αφορούσε το τεράστιο ψυχολογικό βάρος από μια παγκόσμια κρίση υγείας, με σοβαρότατες συνέπειες στην εργασιακή και κοινωνική ζωή των ανθρώπων και εξίσου την αποφυγή της απορρύθμισης της παρακολούθησης των ασθενών μας και των μονάδων που την εξασφαλίζουν. Κατά τον χρόνο της καραντίνας η τηλεφωνική επαφή, οικεία σε όλες τις γενεές, πρόσφερε πολύτιμη πληροφόρηση και υποστήριξη, οι γραμμές 10306 και 1101 του ΙΣΑ, καθώς και πολλές τοπικές ή εθελοντικές. Αναδείχτηκε και χρησιμοποιήθηκε –και με πρωτοβουλία της ΕΨΕ– η τηλεψυχιατρική, που φαίνεται ότι μπήκε ορμητικά στη δουλειά μας καθώς και στην εκπαίδευση. Ο κεντρικός ή συμπληρωματικός της ρόλος και η ασφαλής χρήση της είναι ζητήματα που συζητιούνται ευρύτατα αυτή τη στιγμή.[8]

Τα μέτρα προστασίας από τον ιό επηρεάζουν σοβαρά την ομαλή λειτουργία των υπηρεσιών υγείας και ψυχικής υγείας. Η λύση θα πρέπει να αναζητηθεί στην επείγουσα λειτουργική και ασφαλή τους αναβάθμιση, την πολύ απαραίτητη ενίσχυση του προσωπικού και την οργανωμένη προστασία του από τον ιό και το στρες από την έκθεση στον κίνδυνο, που έχει αναδειχτεί σε σημαντικό παράγοντα για την όσο το δυνατόν ομαλή λειτουργία των μονάδων.[9] Η χρήση της τηλεψυχιατρι-

κής έχει λύσει μία σειρά από προβλήματα παρακολούθησης, αλλά σε πολλές περιπτώσεις παραμένει συμπληρωματική, καθώς δεν μπορεί να αντικαταστήσει τη φυσική παρουσία στις θεραπευτικές πράξεις. Η ανάγκη όχι μόνο ομαλοποίησης, αλλά αναβάθμισης της παρακολούθησης των ασθενών μας, η ανάγκη ενίσχυσης των μονάδων που παρέχουν βασικές, κοινοτικές υπηρεσίες υγείας και ψυχικής υγείας, φαίνεται και από την αύξηση των περιστατικών ακούσιας νοσηλείας στα ΨΝΑ και ΨΝΘ τους τελευταίους δύο μήνες.

Μια υγειονομική κρίση που επηρεάζει το σύνολο σχεδόν του πλανήτη και την εργασιακή και κοινωνική ζωή των περισσότερων, είναι μείζον κοινωνικό και πολιτικό πρόβλημα που μας αφορά όλους[10] ενώ οι επαγγελματίες της ψυχικής υγείας καλούμαστε να προσφέρουμε τα εργαλεία της επιστήμης μας για να αντιμετωπίσουν οι άνθρωποι μια πολύπλευρη απειλή και ειδικότερα, για να διεκδικήσουμε και να εξασφαλίσουμε τη συνέχιση της θεραπείας των ασθενών μας και τη λειτουργία των μονάδων μας.

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Research article
Ερευνητική εργασία

Epidemiology of panic disorder and subthreshold panic symptoms in the Greek general population

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Panic disorder (PD) is a common anxiety disorder with severe social and health consequences in the lives of individuals who suffer from it. General population studies that attempt to measure the prevalence of this disorder across the world suggest that a 1.7% to 4.7 % of adults and adolescents suffer from Panic Disorder. In Greece, research analyzing the abovementioned matters is limited, and previous studies were put forward in small samples. The aim of the present study was to describe the prevalence and sociodemographic associations of panic disorder (PD) and related subthreshold panic symptoms in the general population of Greece and to appraise the comorbidity, use of services and impact on quality of life of these syndromes. This was a secondary analysis of the 2009–2010 psychiatric morbidity survey carried out in a representative sample of the Greek general population (4894 participants living in private households, 18–70 years, response rate 54%). Psychiatric disorders were assessed with the computerized version of the revised Clinical Interview Schedule (CIS-R). Quality of life was assessed with the EuroQoL EQ-5D generic instrument. The utilization of health services was examined by making relevant questions. Finally, direct questions were used to assess sociodemographic and socioeconomic factors According to our findings, 1.87% of the participants (95% confidence interval [CI]: 1.50–2.26%) met criteria for PD and 1.61% met criteria for subclinical PD (95% CI: 1.26–1.96%). There was a clear female preponderance for both PD (p=0.001) and Sub-PD (p=0.01). In addition, 3.48% of the participants reported having experienced panic attacks during the past week (95% confidence interval [CI]: 2.98–4.01%). PD or subclinical PD was independently associated with a limited number of sociodemographic and socioeconomic variables especially after the adjusted analysis. Both panic related conditions involved significant reductions in quality of life and elevated utilization of health services for both medical and psychological reasons in

comparison to healthy participants. In conclusion, PD and subclinical panic symptoms were common in the general Greek population with substantial comorbidity and impaired quality of life. The observed use of the general and psychological health services among adults with panic symptoms and its temporal and economic consequences calls for more efficient diagnostic and treatment policies.

Key words: Epidemiology, panic disorder, adults, comorbidity, quality of life, Greece.

Introduction

Panic disorder (PD) is a common anxiety disorder with severe social and health consequences in the lives of individuals who suffer from it.[1] In the most severe cases such consequences can be similar or even greater than the ones linked with major depression.[2,3] PD is related, among others, with poor social functioning,[4] heightened possibility of suicide attempts,[5] and drug and alcohol abuse.[6] PD is rare before the age of fourteen[7] and has a typical age of onset in late adolescence and the early twenties.[8,9]

General population studies that attempt to measure the prevalence of this disorder across the world suggest that a 1.7% to 4.7 % of adults and adolescents suffer from panic disorder.[10–12] In particular, according to most recent studies, the 12-month prevalence estimation for this disorder in the United States is as high as 4.7%[12] whereas in Europe it has been observed to be 1.8% (ranging from 0.7–2.2% across studies).[13] In a cross-national epidemiological study, using data collected in 25 countries between 2001 and 2012, researchers reported a lifetime prevalence for PD of approximately 1.7%.[10] In addition, more recent studies begin to look into subthreshold forms of panic regarding its prevalence and impact[14,15] and some report considerable disability associated even with subthreshold panic symptoms.[16]

Sociodemographic and socioeconomic associations have also been examined in community studies. Contemporary research findings show considerable gender differences (i.e. stronger associations with female gender), in the prevalence of PD and subthreshold panic.[10,11,15] Age is another sociodemographic variable positively associated with panic syndromes and its course in many community studies.[10,13,15] Regarding other socioeconomic variables, such as urbanicity, marital status and education, no significant associations have been observed in the majority of previous studies.[13,17] However, some researchers have suggested that variables such as unemployment, being divorced, widowed or separated, lower education and low household income were associated with PD and subthreshold panic symptoms.[6,13]

Individuals suffering from PD as well as subthreshold panic symptoms often struggle with comorbid psychiatric conditions.[10,15–18] PD is often comorbid with anxiety, mood and other psychiatric disorders[10,17,19,20] as well as with a number of medical conditions such as migraine,[21] and cardiovascular illness.[22] Similar comorbidities, although in a milder form, have been also observed for subthreshold panic.[15,18] PD is also associated with suicidal ideation and suicidal behaviour[5,23] and drug and alcohol abuse.[6] It is also noteworthy that individuals with panic syndromes display increased utilization of health care services and hospital emergency divisions[15,24] leading to financial strain, elevated stress and increased number of days absent from work.[1,25]

In Greece, research analyzing the abovementioned matters is limited, and previous studies were put forward in small samples.[26–28] To our knowledge there is no other epidemiological research in this country assessing exclusively the abovementioned disorder and its subthreshold forms in large samples of the community. This makes apparent the need for further research in this topic using a representative sample of the Greek general population. Thus, the assessment of PD and of subthreshold forms of panic in relation to its epidemiology, comorbidity, quality of life, as well as its association with several socioeconomic and sociodemographic characteristics were the main aim of this study.

Material method

Description of the data set

The data analyzed in this study were obtained within the framework of the "Greek Psychiatric Morbidity Survey" arranged by the Department of Psychiatry

– University of Ioannina School of Medicine in 2009–2010. The main report of the study[3] offers a thorough description of the survey. In brief, the prevalence and associations of common mental disorders in the Greek general population have been examined. For this a nationally representative sample of the Greek adult general population (18–70 years) has been employed and a cross-sectional survey was carried out. The total rate of response was 54%, consequently 4,902 adults participated, living in private residences encompassing small insular and rural/semirural Greek areas. The study was ethically confirmed by the Greek Ministry of Health and inclusion in it required verbal informed consent by all the participants.[3]

Assessment of psychiatric disorders

We examined psychiatric disorders and symptoms by employing the computerized version of the revised Clinical Interview Schedule (CIS-R).[29] The CIS-R is a systematic psychiatric interview used in a large scale of epidemiological studies in many countries[30–32] as well as in Greece.[3,26] This structured psychiatric interview assesses the presence, seriousness and course of 14 psychiatric symptoms over the previous month period. A general psychiatric morbidity dimension emerges with the calculation of the total score on the CIS-R, by summing up all the symptom sections. The aforementioned dimension has been employed previously by a number of researchers.[3,29] A number of further question items in the interview permit the appliance of the ICD-10 research diagnostic criteria[33] to make a diagnosis for specific psychiatric disorders with the use of specially developed algorithms.[3,17] Specifications on the formulation of the Greek version of the interview are presented elsewhere.[3,26] Reliability was very good with an overall Cronbach's alpha for the whole CIS-R of 0.86 and CIS-R test-retest reliability at 0.84.[3]

Assessment of panic symptoms and PD

For the definition of panic related symptoms, we used the anxiety and panic sections of the CIS-R. We asked the participants two questions concerning whether anxiety was present during the past month. Furthermore the participants who responded positively in the aforementioned question were asked a screening question for panic attack i.e. "Thinking about the past month, did your anxiety or tension ever get so bad that you got in a panic, for instance make you feel that you might collapse or lose control unless you did something about it?" Subsequently the participants who experienced panic attacks in the previous month were presented with an additional question about experiencing panic attacks during the past week. Finally the participants who gave positive answers (i.e. experienced at least one panic attack during that week's period) were required to answer a number of further questions regarding the characteristics, the severity, the duration and the frequency of the panic attacks, in order to obtain the criteria of panic disorder as described in the ICD-10. On that basis we defined two mutually exclusive definitions of panic:

1. *Panic disorder*: Defined as having a score of two or more on the panic scale and impairment ≥1 where the experience of panic symptoms described in the ICD-10 caused clinically significant distress and disability regarding the individuals social, interpersonal and occupational aspects of life.
2. *Subclinical panic disorder* (Sub-PD): Subjects had a score of two or more on the panic scale but did not meet distress/impairment criteria.

Comorbidity and use of health services

We assessed the comorbidity of PD and subclinical PD with depressive episode, obsessive compulsive disorder, generalized anxiety disorder and all phobias combined. In order to define the aforementioned mental disorders according to the ICD-10 criteria we employed the standard diagnostic algorithms as elaborated previously.[3] Suicidal ideation was assumed to be present when the respondents answered positively in questions involving current death wishes, or had reported continuous and intense ideas that life was not worth living, or reported a history of any suicide attempts during the past month. Current smoking status and current cannabis use (past month) was attained through self-reports [see Skapinakis et al (2013) for details].[3] Harmful alcohol use was assessed using AUDIT and adopting the method detailed in Aalto et al (2009)[34] and our original report.[3]

We assessed Quality of life using the EuroQoL EQ-5D generic instrument which was validated in Greece.[35] Both, the EQ-5D utility index and the EQ-5D Visual Analog Scale (VAS),[3] have been employed.

The utilization of health services was examined by making questions about whether the participants had visited a general practitioner (including internists or other specialist doctors who practice family medicine in Greece in the private sector) or a mental health professional (either a psychiatrist or clinical psychologist) during the past 12 months for any reason concerning their general health or mental health correspondingly.

Other variables

We used direct questions to assess all remaining sociodemographic and socio-economic factors. The following variables have been examined: age, gender, marital status, educational qualifications and employment status, presence of subjective financial difficulties and type of locality. Participants were also asked to report the presence of any chronic physical diseases (from a list of common chronic diseases). Details on the methodology we have used to assess these variables are given elsewhere.[3]

Statistical analysis

All analyses were performed using STATA/SE Version 12.0 (StataCorp, College Station, Texas) and the "svy" family of commands to consider the complex sampling design. Descriptive statistics were elicited for the examined variables, whereas chi-square tests were employed for the prevalence proportions' comparisons. The association between the PD syndromes and the sociodemographic variables were reviewed through the calculations of crude and adjusted odds ratios using logistic regression models. Regarding comorbidity analyses, the dependent variable was the comorbid condition (e.g. depression) and the panic-related condition (e.g. subthreshold panic) was entered as an independent binary variable. The use of health services was also assessed with the employment of similar models. Common doctor visits was the dependent variable and was defined as having visited a general practitioner (including internists or other specialist doctors who practice family medicine in Greece in the private sector) or a mental health professional (either a psychiatrist or clinical psychologist) during the past 12 months for any reason concerning their general health or mental health correspondingly.

Results

Description of the sample

Four thousand eight hundred and ninety-four (4894) adults took part in this study (54.2% response rate, see method for details). 50.4% of the final sample were women, the participants' mean age were 42 years, 61% were married, 59.6% were employed and 54.8% were living in an urban environment. Table 1 gives full details of the characteristics of the participants.

Prevalence and associations with gender

Prevalence rates of PD and subclinical PD (Sub-PD) by gender and clinical type of PD are shown in table 2. In total, 1.87% of the participants (95% confidence interval [CI]: 1.50–2.26%) met criteria for PD and 1.61% met criteria for Sub-PD (95% CI: 1.26–1.96%). There was a clear female preponderance for both PD (p=0.001) and Sub-PD (p=0.01). In addition, 3.48% of the participants reported having experienced panic attacks during the past week (95% confidence interval [CI]: 2.98–4.01%).

Additionally, in figure 1 we present the complete psychopathological profile that the participants with PD and Sub-PD experience in comparison to the general population, as measured by the CIS-R. It can be seen that such symptoms are quite prevalent, as high percentages of the participants with PD experience fatigue (80%), irritability (77%), worry (78%), depressive ideas (73%) and depressive mood (68%). Moreover, similar symptoms of psychopathology are also present in participants with Sub-PD, but their observed prevalence rates are quite lower (i.e. fatigue 52%, irritability 52%, and worry 42%).

Sociodemographic and socioeconomic associations

The associations of PD and Sub-PD with sociodemographic and socioeconomic characteristics are shown in table 3. We present two series of odds ra-

Table 1. Characteristics of the Sample.

	(%)
Sex	
Male	2425 (49.6%)
Female	2469 (50.4%)
Age group	
18–29	1226 (25.1%)
30–39	1032 (21.1%)
40–49	934 (19.1%)
50–59	802 (16.4%)
60–70	900 (18.4%)
Marital status	
Married	2995 (61.2%)
Never-married	1446 (29.6%)
Divorced	240 (4.9%)
Widowed	213 (4.3%)
Education	
None/primary	926 (18.9%)
Lower secondary	797 (16.3%)
Upper secondary	2348 (48.0%)
Technical	439 (9%)
University	384 (7.8%)
Employment status	
Fully employed	2917 (59.6%)
Looks after home	691 (14.1%)
Unemployed	184 (3.8%)
Retired	577 (11.8%)
Other	525 (10.7%)
Urbanicity	
Urban	2682 (54.8%)
Semi-urban	607 (12.4%)
Rural	1605 (32.8%)
Presence of financial difficulties	
No	3283 (67.1%)
Yes	1611 (32.9%)
Chronic diseases	
No	4234 (86.5%)
Yes	659 (13.5%)
Smoking	
No	2955 (60.4%)
Yes	1937 (39.6%)
Mental health disorders	
Depression	142 (2.9%)
GAD	201 (4.1)
Panic disorder	92 (1.9%)
OCD	83 (1.7%)
Phobic disorders	137 (2.8%)
Mixed anxiety depressive disorder	131 (2.7%)
CIS-R score	
0–5	3484 (71.1%)
6–11	722 (14.7%)
12–17	332 (6.7%)
≥18	356 (7.2%)

Continues

tios, the first adjusted for all other sociodemographic and socioeconomic variables of the table (Model 1) and the second (Model 2) additionally adjusted for the presence of psychiatric comorbidity (as measured by the total CIS-R score excluding the panic related sections).

As seen in the table, statistically significant associations were very few. For PD a robust association was found for female gender, i.e. female participants were more likely to meet criteria for PD independently of general psychiatric morbidity. In addition, the presence of chronic physical diseases and the presence of financial difficulties were also significantly associated with PD independently of general psychiatric morbidity. Finally, significant associations that were noted between PD and age (age groups of 30–39, 40–49 and 60–70), upper secondary educational qualifications and having two or more children were not specific to PD as they became non-significant after adjustment for general psychiatric morbidity (CIS-R scores).

Additionally, significant associations were observed between subclinical panic symptoms (Sub-PD) and unemployment, the presence of chronic physical diseases and the presence of financial difficulties. Significant associations with female gender, being single, having two or more children, lower or upper secondary educational qualifications and

Table 2. Prevalence of panic attacks, panic disorder and subclinical panic disorder in a representative sample of the general population of Greece 18–70 (N=4894).

	Male		Female		Total
	Prevalence % (95% CI*)		Prevalence % (95% CI*)		
Panic Disorder	1.19% (0.76–1.62%)		2.55% (1.93–3.17%)		1.87% (1.50–2.26%)
		$p^2<0.001$			
Subclinical Panic Disorder	1.15% (0.73–1.58)		2.06% (1.50–2.62%)		1.61% (1.26–1.96%)
		$p^2=0.01$			
Panic Attacks (Past week)	2.35% (1.75–2.95%)		4.62% (3.79–5.44%)		3.48% (2.98–4.01%)
		$p^2<0.001$			

*CI: Confidence Interval; 2 p-values for the comparison between male – female;

looking after the house were not specific to Sub-PD as they became non-significant after adjustment for psychiatric comorbidity.

Comorbidity, quality of life and use of health services

In table 4 we present the comorbidity patterns of the two PD syndromes. It can be seen that participants with PD or Sub-PD were more likely to report other common mental disorders compared to healthy controls and that this association was more common and higher in those with the full-blown syndrome. Regarding PD, we noted significant comorbidity with all psychiatric conditions (i.e. depressive episode was present in 33.70% of participants with PD, generalised anxiety disorder in 58.70%, OCD in 29.35% and phobias in 63.04%), current suicidal ideation (15.22%) and current cigarette smoking (48.91%). For Sub-PD there was milder but significant associations only with the psychiatric conditions of generalized anxiety disorder (it was present in 15.19% of participants with subclinical PD symptoms) and phobias (11.39%), as well as with the variable current suicidal ideation (11.39%). Moreover, dissimilarly to the clinical condition, the Sub-PD significantly comorbid with frequent alcohol consumption and current cannabis use.

Quality of life is shown in figure 2, where PD and Sub-PD are presented according to their comorbidity with depression. PD is associated with a significant reduction in quality of life compared to controls (and that comorbidity with depression is associated with further reductions ($p<0.001$ in comparison with the controls). Overall, both PD and sub-PD had significant reductions in quality of life compared to controls: for PD, the mean score on the EQ-5D utility index was 0.52 versus 0.89 ($p<0.001$), while for sub-PD was 0.64 versus 0.89 ($p<0.001$). The difference between PD and sub-PD was also significant (0.52 versus 0.64, $p=0.03$), as it was the difference between depression and the two syndromes (0.47 versus 0.52 and 0.64 respectively). Finally, the most significant impact in the quality of life involved the comorbidity of PD with Depression (0.43, $p<0.001$ compared to controls).

The use of health services is shown in table 5 Compared to healthy participants, either PD or Sub-

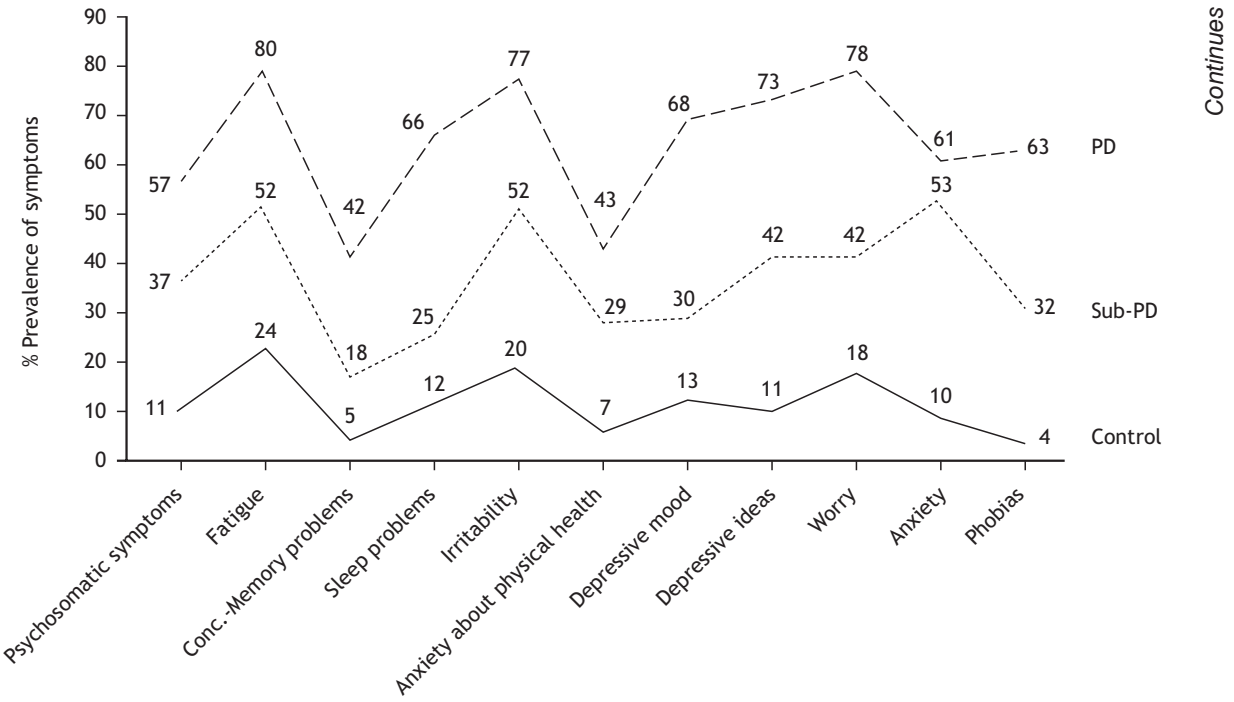

Figure 1. Presence (%) of symptoms of psychopathology in participants with Panic Disorder (PD) and subclinical PD (Sub-PD) compared to the general population (control).

PD are both significantly associated with increased visits to GPs for medical reasons, or to mental health professionals for psychological reasons. More specifically, 53.26% of adults with PD visited a GP for medical reasons during the past 12 months, as did 37.97% of adults with sub clinical PD symptoms versus 15.56% of the control group. In addition, 44.57% of the participants suffering from PD and 18.99% of participants with sub clinical PD symptoms visited a mental health professional for psychological reasons during the past 12 months, versus 5.35% of healthy adults.

It is noted that the pattern of visits to GP ("medical reason") as well as the pattern of visits to a mental health professional ("psychological reason") is more likely in PD compared to subclinical symptoms.

Discussion

Main findings

In the current cross-sectional study we looked for associations between panic related syndromes and several sociodemographic and socioeconomic characteristics, their comorbidity patterns with other common mental disorders, suicidal ideation, cigarette smoking, alcohol consumption and cannabis, as well as for associations of these disorders with the frequency of the use of health services among a nationally representative sample of the Greek adult general population. We found that panic syndromes are relatively common conditions and comorbid with other psychiatric disorders, such as depression, general anxiety disorder and phobias, although PD was more severe in terms of psychiatric comorbidity and suicidal ideation in comparison to Sub-PD.

In addition, there was evidence that having PD or Sub-PD was independently associated with a number of sociodemographic and socioeconomic variables such as female gender, the presence of chronic physical diseases and having financial difficulties for the first condition, and with unemployment, financial difficulties and suffering from chronic physical diseases, for the latter. Both panic related conditions involved elevated utilization of health services for both medical and psychological reasons in comparison to healthy participants.

Table 3. Sociodemographic associations of panic disorder (PD) and subclinical panic disorder (Sub-PD) in a representative sample of the general population of Greece 18–70 (N=4894).

	PD[1]				Sub-PD[2]			
	Odds Ratios–Model 1[3]		Odds Ratios–Model 2		Odds Ratios[3]		Odds Ratios[4]	
	OR[5]	95% CI[6]	OR[5]	95% CI[6]	OR[5]	95% CI[6]	OR[5]	95% CI[6]
Gender								
Men	1.00	Ref	1.00	Ref	1.00	Ref	1.00	Ref
Women	2.16	1.39–3.37	1.98	1.21–3.23	1.81	1.13–2.87	1.52	0.89–2.58
Age								
18–29	1.00	Ref	1.00	Ref	1.00	Ref	1.00	Ref
30–39	2.03	1.02–4.06	1.44	0.64–3.26	1.62	0.81–3.26	1.18	0.52–2.70
40–49	2.25	1.13–4.50	1.20	0.50–2.87	1.32	0.62–2.78	0.78	0.31–1.98
50–59	1.66	0.77–3.54	0.65	0.25–1.73	1.65	0.79–3.44	0.77	0.29–2.03
60–70	2.23	1.11–4.49	0.57	0.19–1.69	1.67	0.82–3.41	0.58	0.19–1.77
Marital status								
Married	1.00	Ref	1.00	Ref	1.00	Ref	1.00	Ref
Single	0.42	0.23–0.77	0.57	0.25–1.31	0.45	0.25–0.82	0.51	0.21–1.20
Divorced/Separated	1.60	0.76–3.39	1.32	0.60–2.93	0.63	0.19–2.02	0.51	0.15–1.72
Widowed	1.82	0.86–3.84	1.30	0.55–3.09	0.95	0.34–2.65	0.69	0.23–2.12
Number of children								
None/One	1.00	Ref	1.00	Ref	1.00	Ref	1.00	Ref
Two or more	1.81	1.18–2.79	1.26	0.73–2.19	1.65	1.04–2.61	1.08	0.59–1.98
Educational Qualifications								
None/Primary education	1.00	Ref	1.00	Ref	1.00	Ref	1.00	Ref
Lower secondary	0.80	0.43–1.47	0.93	0.48–1.81	1.05	0.57–1.95	1.17	0.59–2.29
Upper secondary	0.55	0.33–0.92	0.77	0.40–1.48	0.49	0.28–0.87	0.66	0.32–1.33
Technical vocational	0.48	0.19–1.17	0.68	0.25–1.86	0.19	0.04–0.80	0.27	0.06–1.27
Tertiary education	0.46	0.17–1.20	0.66	0.22–1.92	0.76	0.32–1.80	1.27	0.47–3.44
Employment status								
Full-time/part-time	1.00	Ref	1.00	Ref	1.00	Ref	1.00	Ref
Looking after house	1.63	0.94–2.83	0.84	0.44–1.62	2.33	1.32–4.09	1.25	0.63–2.47
Unemployed	1.70	0.67–4.34	1.31	0.49–3.47	3.26	1.43–7.43	2.79	1.15–6.74
Retired	1.41	0.76–2.62	0.84	0.36–1.97	1.45	0.71–2.95	1.03	0.41–2.61
Other/Economically Inactive	1.07	0.52–2.19	1.14	0.53–2.48	1.28	0.59–2.77	1.53	0.66–3.53
Presence of chronic physical diseases								
No	1.00	Ref	1.00	Ref	1.00	Ref	1.00	Ref
Yes	3.38	2.17–5.24	3.58	2.14–5.98	2.37	1.43–3.93	2.21	1.23–3.96

Table 3. Sociodemographic associations of panic disorder (PD) and subclinical panic disorder (Sub-PD) in a representative sample of the general population of Greece 18–70 (N=4894) (*Continued*).

	PD[1]				Sub-PD[2]			
	Odds Ratios–Model 1[3]		Odds Ratios–Model 2		Odds Ratios[3]		Odds Ratios[4]	
	OR[5]	95% CI[6]	OR[5]	95% CI[6]	OR[5]	95% CI[6]	OR[5]	95% CI[6]
Type of locality								
Urban	1.00	Ref	1.00	Ref	1.00	Ref	1.00	Ref
Semi-rural	0.95	0.49–1.83	0.91	0.47–1.78	1.56	0.82–2.96	1.48	0.77–2.83
Rural	0.98	0.62–1.55	0.91	0.57–1.46	1.31	0.81–2.15	1.15	0.69–1.91
Financial difficulties								
No	1.00	Ref	1.00	Ref	1.00	Ref	1.00	Ref
Yes	2.74	1.65–4.54	1.89	1.09–3.26	2.69	1.56–4.64	2.05	1.14–3.68

[1]PD: Panic Disorder according to ICD-10 criteria, [2]Sub-PD: Subclinical panic symptoms; experiencing panic attacks but not meeting full criteria for ICD-10 obsessive compulsive disorder. The two conditions are mutually exclusive (see methods), [3]Odds ratios adjusted for all other variables of the table, [4]Odds ratios adjusted for all other variables of the table and psychiatric morbidity (total score on the CIS-R excluding Panic related sections), [5]OR: Odds Ratios, [6]CI: Confidence Interval, [7]Ref: Reference category. Values in bold indicate statistical significance at the 0.05 level.

Table 4. Comorbidity of panic disorder (PD) and subclinical panic disorder (Sub-PD) with other psychiatric disorders/use of substances in a representative sample of the general population of Greece 18–70 (N=4894).

Comorbid condition	(%) In total sample	(%) in participants with PD[1]	Odds Ratio[3] (95% CI[3])	(%) in participants with Sub-PD[2]	Odds Ratio[3] (95% CI[3])
Depressive episode	2.90%	33.70%	20.35 (12.47–33.22)	3.80%	1.15 (0.36–3.73)
GAD[4]	4.10%	58.70%	43.20 (27.28–68.42)	15.19%	3.93 (2.07–7.45)
OCD	1.69%	29.35%	33.47 (19.61–57.12)	3.80%	2.09 (0.64–6.82)
Phobias	2.79%	63.04%	97.49 (59.97–158.50)	11.39%	4.26 (2.07–8.75)
Current Suicidal ideation	1.68%	15.22%	11.18 (5.94–21.04)	11.39%	7.47 (3.55–15.72)
Frequent Alcohol Consumption	12.69%	15.22%	1.51 (0.84–2.71)	27.85%	3.26 (1.95–5.44)
Current Cigarette Smoking	39.60%	48.91%	1.83 (1.19–2.81)	45.57%	1.52 (0.96–2.43)
Current Cannabis use	2.06%	3.26%	2.68 (0.80–8.93)	2.53 %	1.76 (0.41–7.46)

[1]PD: Panic Disorder according to ICD-10 criteria, [2]Sub-PD: Subclinical panic symptoms; experiencing panic attacks but not meeting full criteria for ICD-10 panic disorder. The two conditions are mutually exclusive (see methods), [3]Odds ratios adjusted for age and sex and calculated from logistic regression models with the comorbid condition as the dependent variable and PD or Sub-PD as the independent variable. The reference group for the reported odds ratios is "participants without PD or Sub-PD respectively", [4]GAD: Generalized anxiety disorder

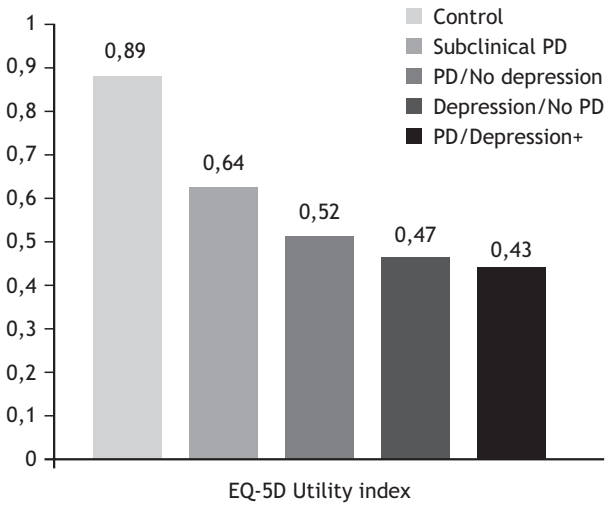

Figure 2. Quality of life (scores on the EQ-5D index) in in participants with Panic Disorder (PD) and subclinical PD (Sub-PD) according to comorbidity with depression

Prevalence

The prevalence of panic disorder (PD) among the participants of this study was 1.87% (95% CI: 1.50–2.26). Our findings lay within the range of other general population studies that estimated the prevalence of PD across the world between 1.7% to 4.7%.[10–12] Reports on the prevalence of subclinical panic symptoms in epidemiological studies are rare,[17] in our study the prevalence rates of such symptoms (1.61%, 95% CI: 1.26–1.96) although lower, are also consistent with similar studies available, whose results ranged from 1.90% to 2.73%.[17,15] Discrepancies in the estimation rates of these studies concerning the prevalence of PD and Sub-PD could be explained due to methodological variations in the screening and diagnostic tools, differences in the diagnostic criteria applied, whether or not there was involvement of clinicians in the administration of the interviews[12,36] as well as in differences in characteristics of the samples.[37,38]

Sociodemographic and socioeconomic associations

In our study a broad number of sociodemographic variables have been also examined for possible associations with PD and Sub – PD. We observed significant associations for both conditions with financial difficulties and the presence of chronic physical diseases. Significant associations have

Table 5. Use of health services use in participants with panic disorder (PD) and subclinical panic disorder (Sub-PD) in a representative sample of the general population in Greece (N=4894).

	Use of health services			
	Visited GP[1] for medical reasons (past 12 months)		Visited Mental Health professional for psychological reasons (past 12 months)	
	(%)	OR2 (95% CI[3])	(%)	OR2 (95% CI[3])
No PD	15.56%	1.00 (Reference)	5.35%	1.00 (Reference)
Sub-PD	37.97%	2.92	18.99%	3.26 (1.82 – 5.84)
PD	53.26%	5.63	44.57%	12.21 (7.88 – 18.92)

[1]GP: Any doctor in general practice (including internal medicine specialists practicing mainly general medicine in Greece), [2]Odds ratios adjusted for age and sex and calculated from logistic regression models with frequent doctor visits as the dependent variable and PD or Sub-PD as the independent variables (e.g., the odds of frequent doctor visits for a medical reason was 1.70 times higher for participants with Sub-PD compared to participants without Sub-PD). Bold values indicate statistical significance at the 0.05 level, [3]CI: Confidence Interval

been also found for female gender and PD and for unemployment and sub – PD. Our findings are in line with a number of contemporary epidemiological studies whose observations also describe associations between PD and factors such as female gender, the presence of chronic physical diseases and experiencing financial difficulties,[10,11,15] They are also in agreement regarding associations between Sub-PD and factors such as unemployment, the presence of chronic physical diseases and having financial difficulties.[10,15,17]

On the other hand, the abovementioned epidemiological studies had also identified significant associations with other sociodemographic factors not observed in our analysis. For instance, De Jonge et al (2016)[10] in his epidemiology study of PD using data from the World Mental Health Surveys[38,39] reported associations for both conditions with age, lower education and being divorced or widowed. Batelaan et al (2006)[15] also described additional SES associations with PD (i.e. lower education, urbanicity, living alone, low household income, low self-esteem) and sub PD (i.e. age, lower education, living alone, low household income). In our study, significant associations were also noted for PD and age, upper secondary educational qualifications and having two or more children, but their statistical power diminished after adjustment for general psychiatric morbidity (CIS-R scores). Similarly, whereas several factors such as female gender, being single, having two or more children, and looking after the house displayed significant associations with Sub-PD in the first analysis section, they became non-significant after adjustment for CIS-R scores.

Considering the abovementioned observations some factors (i.e. gender, age, financial difficulties) appear to be associated with PD and/or subthreshold PD across most epidemiological studies. Most epidemiological studies, despite their inconsistencies,[15] postulate that at least some environmental factors seem to hold an important role in the course and development of PD. Nevertheless, many suggest a process of complex interactions between genetic,[40–42] environmental[43–45] and psychological factors[46] in the development of PD.

Moreover the robust associations of PD and Sub-PD with financial difficulties observed in our analysis, even after adjustment for general psychiatric morbidity (CIS-R scores), and the associations of Sub-PD with unemployment, are of particular interest in the context of the current economic situation in Greece. Further research should shed light on the impact that austerity has in the emergence and prevalence of psychiatric morbidity in Greece examining the role of unemployment and financial strain in the transition from health to subclinical forms of disease and the emergence of full blown psychiatric syndromes.

Comorbidity, quality of life and use of services

PD is highly comorbid thus people suffering from it often struggle with additional psychiatric disorders,[10,16] and this is noticeable yet in the subthreshold forms of the condition.[15,18] PD involves considerable decline in the quality of patients' lives[1] and comorbidity is associated with further deterioration. For instance, comorbidity of PD and depression involves considerably more incidents of suicide attempts than PD or major depression alone.[47] In our analysis the propositions made above are evident and our results suggest that PD and Sub-PD seriously challenge the health status of the adult general population in Greece. According to our estimations, a little less than two in three of our samples with PD also met criteria for generalized anxiety disorder and phobias, one third of them also suffered from depressive episode and a little less than one in seven also suffered from suicidal ideation. In addition, comorbidity with generalized anxiety disorder and phobias was considerably high (though milder) even in the subthreshold condition. Interestingly suicidal ideation comorbidity with Sub – Pd nearly matched the clinical condition's estimation. Our findings are in agreement with previous studies showing heightened comorbidity between PD and other psychiatric conditions as well as suicidal ideation[5,10,17,19,20,23] and considerable but milder comorbidity associations with Sub-PD.[15–18] PD comorbidity is associated with further deterioration in the quality of patients' lives[48] but more research is necessary to illuminate the impact of such comorbidities in the already depleted quality of life of individuals suffering from it.[1]

The burden of PD described above in combination with its persistent and relapsing course,[17,48] and the impairments in the quality of life,[1] often results to an augmented utilization of health services. This is well observed in many studies,[1,24,49] as well as in ours, where participants suffering from PD or Sub-PD displayed considerably elevated visits to GPs for medical reasons or to mental health professionals for psychological reasons, in comparison with healthy ones. Such visits are fuelled by sudden and intense somatic symptoms associated with PD that mimic medical conditions such as asthma and cardiovascular illness and require further diagnostic, time consuming and expensive processes.[1,25] Considering the complexity of the symptoms and the high comorbidity with other mental disorders, the diagnosis of PD can be a daunting task.[50] According to Vermani et al (2011)[51] misdiagnosis rates for PD among 840 primary care patients were as high as 85.8%, and this indicates an important barrier for the individuals suffering from PD until they receive a correct diagnosis and an optimal treatment.

Limitations of the study

A few limitations characterize our study. Since there was no clinical validation in the structured diagnostic interview, we employed the possibility that there was an overestimation in the prevalence of common psychiatric disorders in the general population[52] cannot be ruled out. What is more the cross-sectional design of our study does not allow us to reject the likelihood of reversed causality in the observed associations therefore we cannot suggest any causal relations. Finally, our data has been derived from a general Greek population survey and there was a rather low response rate (54%), which is typical of surveys of this type in Greece and elsewhere.[3] Hence selection bias cannot be ruled out although it is unlikely since our sample has been representative of the Greek adult population and the sex distribution and age of the participants was comparable to the national data.

Implications and conclusions

This study was the first epidemiological study of a nationally representative sample in Greece exploring the prevalence, comorbidity use of health services and several SES associations for panic related conditions. According to our observations panic disorder and subthreshold panic are quite common in the general adult Greek population with substantial comorbidity rates for the clinical type and milder but also important comorbidity rates for the subthreshold type. It has been proposed that the emergence of PD, as it happens with other psychiatric disorders, is characterized by continuity,[53] and the severity of the symptoms progress with the passage from benign to more poignant versions of panic,[17] where subthreshold panic holds a transitional space amidst health (or no panic) and PD.[15] We observed milder associations for subthreshold symptoms indicating a moderate impact in the lives of the participants in comparison to PD. These observations could generate questions in relation to the onset and course of this disorder as described above and further research to illuminate the pathway of PD. For instance, new research should investigate if there is an in-between position occupied by subthreshold forms of panic and a transitional process from such forms to the full-blown panic disorder.

Finally, the observed overuse of the general and psychological health services among adults with panic symptoms and its temporal and economic consequences could be controlled with the development of more efficient diagnostic and treatment plans where the patients will be entitled to timely and to the point care. Such specialized health structures, offering high quality management and treatment of PD and other anxiety disorders are sporadic in the Greek primary health care system. Despite the availability of efficient treatments for the above-mentioned disorders,[50] in many cases in Greece, psychological and psychiatric treatments are very brief and limited in offering common encouragement the first and some standardized psychotropic medication prescription the latter. For that reason emphasis must been given in the promotion and establishment of specialized services and protocols where the patients will receive an optimal treatment, they will have the opportunity to understand the nature of the disorder, to become informed about their treatment options and educated in relation to the personal management of this debilitating syndrome.

Η επιδημιολογία της διαταραχής πανικού και των υποκλινικών συμπτωμάτων πανικού στον ελληνικό γενικό πληθυσμό

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Η Διαταραχή Πανικού (ΔΠ) είναι μια κοινή ψυχιατρική νόσος που ανήκει στην κατηγορία των διαταραχών άγχους και επιφέρει σοβαρή επιβάρυνση στην υγεία και την καθημερινότητα των ατόμων που υποφέρουν από αυτήν. Μελέτες στον γενικό πληθυσμό που επιχειρούν να μετρήσουν τον επιπολασμό αυτής της διαταραχής ανά τον κόσμο υποστηρίζουν ότι περίπου 1,7% με 4,7% του ενηλίκου και εφηβικού πληθυσμού έχουν ΔΠ. Στην Ελλάδα, η σχετική έρευνα, είναι περιορισμένη καθώς προηγούμενες μελέτες έχουν χρησιμοποιήσει μικρά δείγματα πληθυσμού. Σκοπός της μελέτης μας ήταν η περιγραφή του επιπολασμού και των κοινωνικο-δημογραφικών συσχετίσεων της διαταραχής πανικού (ΔΠ) και των σχετιζόμενων υποκλινικών συνδρόμων στον γενικό ενήλικο πληθυσμό της Ελλάδας, καθώς και η εκτίμηση της συννοσηρότητας, της χρήσης των υπηρεσιών υγείας και των επιπτώσεων των παραπάνω συνδρόμων στην ποιότητα ζωής των ατόμων. Η παρούσα μελέτη αποτελεί δευτερογενή ανάλυση της μελέτης ψυχιατρικής νοσηρότητας του γενικού ενηλίκου Ελληνικού πληθυσμού που διενεργήθηκε το διάστημα 2009–2010 σε αντιπροσωπευτικό δείγμα της χώρας (4.894 συμμετέχοντες που ζούσαν σε ιδιωτικά νοικοκυριά, ποσοστό συμμετοχής 54%). Για την εκτίμηση της ψυχιατρικής νοσηρότητας χρησιμοποιήθηκε η αναθεωρημένη Κλινική Διαγνωστική Συνέντευξη (CIS-R). Η εξέταση της ποιότητας ζωής έγινε με τη χρήση του εργαλείου EuroQoL EQ-5D και η χρήση των υπηρεσιών υγείας αξιολογήθηκε χρησιμοποιώντας σχετικές ερωτήσεις. Όλοι οι κοινωνικο-δημογραφικοί και κοινωνικο-οικονομικοί δείκτες εξετάστηκαν κάνοντας ευθείες ερωτήσεις στους συμμετέχοντες. Σύμφωνα με τα αποτελέσματά μας το 1,87% των συμμετεχόντων (95% διάστημα εμπιστοσύνης [CI]: 1,50–2,26%) πληρούσαν τα κριτήρια για ΔΠ και 1,61% πληρούσαν τα κριτήρια για τα υποκλινικά συμπτώματα πανικού (95% CI: 1,26–1,96%) και υπήρξε μια ξεκάθαρη υπεροχή του θηλυκού φύλου στη συσχέτιση με τη ΔΠ (p=0.001) και με την υποκλινική ΔΠ (p=0.01). Η ΔΠ ή τα υποκλινικά συμπτώματα πανικού συσχετίστηκαν μόνο με έναν περιορισμένο αριθμό κοινωνικο-δημογραφικών και κοινωνικο-οικονομικών μεταβλητών, ειδικότερα μετά τη σταθμισμένη ανάλυση. Επίσης και τα δύο αυτά σύνδρομα πανικού σχετίζονται με σημαντικές εκπτώσεις στην ποιότητα ζωής των ασθενών και αυξημένη χρήση των υπηρεσιών υγείας για ψυχολογικά ή παθολογικά αίτια σε σύγκριση με υγιή άτομα. Συμπερασματικά, τόσο η διαταραχή πανικού (ΔΠ) όσο και τα υποκλινικά συμπτώματα πανικού είναι κοινά στο γενικό ενήλικο ελληνικό πληθυσμό με σημαντική συννοσηρότητα και έκπτωση στην ποιότητα ζωής. Η παρατηρηθείσα χρήση των υπηρεσιών υγείας από άτομα που υποφέρουν από συμπτώματα πανικού καλεί για τη σχεδίαση πιο αποτελεσματικών πολιτικών αντιμετώπισης.

Λέξεις ευρετηρίου: Επιδημιολογία, διαταραχή πανικού, ενήλικοι, συννοσηρότητα, ποιότητα ζωής, Ελλάδα.

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Research article
Ερευνητική εργασία

Psychometric properties and factor structure of the Greek version of the Reflective Functioning Questionnaire

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The ability to mentalize, namely to understand, interpret and effectively communicate the mental state of self and others is considered important in self-organisation and affect regulation. The aim of the present study was to provide data on the validation process of Reflective Functioning Questionnaire (RFQ), a recently developed measure of mentalizing, in order to evaluate its use in research and in clinical practice for Greek populations. A total of 219 participants (102 people with type 1 diabetes and 117 healthy individuals) completed the RFQ. A principal component analysis supported the 2-factor model (RF certainty for mental states and RF uncertainty for mental states) in both samples. Internal consistencies of both subscales were satisfactory (α=0.80 for RF certainty and α=0.79 for RF uncertainty). Relationships with validity measures of psychological distress, empathy and emotional intelligence provided further support for the psychometric properties of the scale. As expected, there were positive associations between the degree of certainty concerning mental states and emotional intelligence (r=0.390, p<0.01), as well as empathy (r=0.292, p<0.01) in general population. Conversely, negative associations were found between the degree of certainty about mental states and psychological distress in the diabetes group (r=−0.470, p<0.01) and in general population (r=0.320, p<0.01). A reverse pattern of associations was observed between the degree of uncertainty about mental states and emotional intelligence (r=−0.265, p<0.01) in general population, as well as psychological distress in both the diabetes group (r=0.590, p<0.01) and in general population (r=0.330, p<0.01). Also, as expected, there were differences across age groups, with older participants reporting a more balanced reflective functioning - with higher certainty levels in the diabetes group (t=−2.133, p>0.05) and the healthy participants (t=−2.738, p>0.05) and lower uncertainty levels in the diabetes group (t=−2.480, p>0.05) and the healthy participants (t=−2.779, p>0.05). The data collected so far support the reliability and validity of the measure that can be used in research to address mentalizing impairments. However, further research is needed to evaluate its consistency thought time with a

test-retest analysis, and to evidence its factorial structure with a confirmatory factor analysis. In addition, it is of primary importance to extend the validity testing of RFQ in clinical populations to further support its use in clinical practice.

Key words: Reflective functioning questionnaire, factor structure, psychometric properties, validity, reliability.

Introduction

Mentalizing refers to a person's capacity to express and consciously communicate one's mind, to infer the minds of others based on their thoughts and their emotions, to reflect on one's self in relation to other people, and to engage in empathetic relationships.[1] The ability to mentalize is vital for affect regulation and self-organization. It contributes in developing a sense of identity, a sense of a stable self. By acquiring a deep awareness of oneself and others, one also acquires the ability to easily adapt to different situations, fulfilling one's goals with greater flexibility and engaging in close, lasting relationships with others.[2] People with satisfactory levels of reflective function generally have considerable resistance to stress and adversity.[3,4] Deficits in the reflective function have been linked to a series of mental disorders, such as borderline and antisocial personality disorder,[5] eating disorders,[6] and depression.[7] Research have led to developing mentalized-based interventions, the effectiveness of which has been documented in randomized controlled studies and naturalistic observational studies.[8–11]

An instrument specifically designed to evaluate a person's ability to mentalize has been developed by Fonagy et al (2016).[12] The Reflective Functioning Questionnaire (RFQ) is a self-administered questionnaire, consisting of two subscales that assess Certainty (RFQc) and Uncertainty (RFQu) about the mental states of self and others. Impairments in reflective functioning are expressed through extreme scores on each subscale, i.e., hypermentalizing and hypomentalizing respectively. Hypermentalizing involves making assumptions about the mental states of others that are not justified on the basis of observable data. Hypomentalizing, by contrast, is characterized by an absence or unwillingness to develop more complex models of the mind of others and/or the self and reflects concrete thinking. The psychometric properties of the RFQ, including factor structure, have been evaluated by its developers with findings that support convergent, predictive, and discriminant validity.[12] The two-factor structure of the RFQ has been assessed in the original study[12] and in the French version.[13] Evidence suggests that the RFQ constitutes a useful means of understanding the way a person mentalizes and functions accordingly.

The present study is part of a larger study on reflective functioning (RF) in diverse populations. The aim of the study was to examine the factorial structure and psychometric properties of the Greek version of RFQ in a sample of people with a chronic health condition, such as diabetes, and in healthy individuals. More specifically, we sought to replicate the two-factor structure of the RFQ in both groups and to assess the internal consistency of both scales. In addition, we examined the convergent validity of the RFQ through correlations with clinical variables such as psychological distress and variables of psychological capacities such as empathy and emotional intelligence, as these concepts have been linked with RF both theoretically and empirically in the past. Based on previous studies, validity of the RFQ was further assessed on the basis of known-group comparisons, such as expected differences in RF across age groups, but not across gender.[12,13]

Material and method

Participants and procedure

Participants were 102 adults with type 1 diabetes [age: (mean±SD) 38.85 ±10.08 years, females 63%] attending the diabetes clinic of a general hospital and 117 healthy individuals (age: 36.1±10.7 years, 59% females) recruited from a sample of undergraduate and post-graduate student population. Participants were informed in written of the purpose of the study, their ensured anonymity and data protection, the possibility of non-participation without any health implications for the care they will receive, and the

ability to communicate with the researchers. After obtaining authorization by its developers, the RFQ was translated from English into Greek by independent Greek and English native speakers, following a forward-backward-forward procedure. In addition, the instrument was split translated using a committee based approach.[14] Any discrepancies that emerged from the comparison of the two approaches were discussed and a few minor adjustments were applied.

Measures

Reflective Functioning Questionnaire is a recently developed instrument to measure mentalizing in lieu of Reflective Functioning of the Adult Attachment Interview. Based on previous studies that validated the RFQ,[12,13] clinical measures such as general symptoms of psychopathology, and measures of psychological capacities such as empathy and emotional intelligence were used to examine validity of RFQ, as these concepts have been linked with RF both theoretically and empirically in the past. Moreover, because the present study is part of a larger study examining reflective functioning in diverse populations, the diabetes group did not complete the measures of emotional intelligence and empathy for reasons of avoiding respondent fatigue in this specific group due to a large assessment battery.

The Reflective Functioning Questionnaire (RFQ)

The RFQ is a 8-item measure that assess reflective functioning (RF), the capacity of thinking about mental states of the one's self and others.[12] It consists of two subscales, the Certainty about mental states and the Uncertainty about mental states with statements such as "Sometimes I do things without really know why" or "Strong feelings often cloud my thinking" and has demonstrated good psychometric properties within different samples.[12,13] High scores on the Certainty subscale suggest a rigid stance of one's own mental states and those of others, whereas lower scores suggest more adaptive levels of reflective functioning. High scores on the Uncertainty subscale suggest an almost complete lack of knowledge about mental states, and lower scores reflect acknowledgment of the opaqueness of one's own mental states and those of others.

Symptom Checklist for psychological distress (SCL-10R)

The Symptom Checklist Short (SCL-10R) is a 10-item revised version[15] of the widely used SCL-90R measure for psychological distress.[16] It assess a number of symptoms that involve depression, anxiety, obsessive-compulsive, interpersonal sensitivity, hostility, phobic anxiety, psychoticism, paranoid ideation and somatisation (e.g., "How often did you feel like you were worrying too much?") on a 5-point Likert scale ("not at all" to "very often"). Internal consistency in the present sample was 0.89.

Wong and Law Emotional Intelligence Scale (WLEIS)

The WLEIS was used to investigate the convergent validity of the RFQ. It is a measure of emotional intelligence[17] that contains 16 items measuring self-emotion appraisal (e.g., "I really understand what I feel"), emotion appraisal of others (e.g., "I am a good observer of others' emotions"), use of emotion (e.g., "I am a self-motivated person"), and regulation of emotion (e.g., "I have a good control of my own emotions") measured on a 7-point scale ("completely agree" to "completely disagree"). Internal consistency for the total score in the present sample was 0.89.

The Toronto Empathy Questionnaire (TEQ)

The TEQ was used to investigate the convergent validity of the RFQ. It is a uni-dimensional measure that consists of 16 items (e.g.,"When someone else is feeling excited, I tend to get excited too") each rated on a 5-point scale ("never" to "often") developed to assess the empathy levels of individuals.[18] Internal consistency in the present sample was 0.79.

Statistical analyses

Principal components analysis (PCA) with promax rotation was conducted to evaluate construct validity of the scales. The adequacy of the sample was valued with the Kaiser-Meyer-Olkin test (KMO) (values between 0.80 and 1.00 are considered good, 0.70–0.79 acceptable, 0.60–0.69 fair, and lower than 0.60 inadequate) and a Bartlett's test of sphericity ($p<0.05$ is considered adequate). The internal consistency of the subscales were analysed with Cronbach's alpha. Reliability equal to or greater

than 0.70 was considered acceptable. Convergent validity was assessed through correlations of the subscales with psychological distress, emotional intelligence and empathy. Validity was further assessed on the basis of known-group comparisons that involved expected differences among age groups, and were analyzed with independent t-tests, applying Levene's test for equality of variances. Statistically significant level was set at 0.05 level and analyses were conducted using SPSS Statistical Software version 23.

Results

Factor structure

The PCA results showed that all items loaded on their intended factors in both groups (Table 1). Item #c2 had a high negative loading on RF uncertainty (-0.582 for the diabetes group and –0.560 for the healthy group) instead of a higher one on its predicted RF certainty factor (0.345 for the diabetes group and 0.350 for the healthy group). Because its loading was above the cut-off value of 0.32 suggested by Tabachnick and Fidell (1996)[19] in absolute values, this item was assigned to its predicted factor (table 1).

Internal consistency and scale descriptives

Descriptive statistics for RFQ subscales for both groups are presented in table 2. Diabetes group: Internal consistency was good for RF certainty (Cronbach's alpha=0.861, mean inter-item correlation=0.509) and similarly good for RF uncertainty (Cronbach's alpha=0.810, mean inter-item correlation=0.414). Healthy group: Internal consistency was good for RF certainty (Cronbach's alpha=0.806, mean inter-item correlation=0.405) and satisfactory for RF uncertainty (Cronbach's alpha=0.791, mean inter-item correlation=0.389).

The data of the RF uncertainty subscale for both the diabetes and the healthy group did not meet the assumptions of normality for Skewness and Kurtosis (–2.00 to 2.00; Field, 2009)[20] and data transformation using a square root function was performed. The RF uncertainty subscale indicated normal distribution after transformation for both groups (table 2).

Convergent and known-groups validity of RFQ

Diabetes group: Psychological distress was negatively correlated with RF certainty ($r=-0.470$, $p<0.01$) and positively with RF uncertainty ($r=0.590$, $p<0.01$). All the SCL-10R subscales were significantly correlat-

Table 1. Factor loadings for the RF certainty and RF uncertainty for the diabetes and the healthy group.

RFQitems	Type 1 diabetes		Healthy group	
	Factor 1	Factor 2	Factor 1	Factor 2
c4	0.868	–0.132	0.803	–0.085
c3	0.839	–0.187	0.829	–0.149
c5	0.740	–0.222	0.492	–0.399
c6	0.603	–0.469	0.523	–0.473
c1	0.400	–0.264	0.247	–0.301
c2	0.345	–0.582	0.350	–0.560
u4	–0.544	0.459	–0.494	0.380
u2	–0.035	0.797	–0.100	0.787
u6	–0.285	0.723	–0.212	0.731
u5	–0.500	0.500	–0.252	0.534
u8	–0.375	0.518	–0.284	0.468
u7	–0.103	0.320	–0.068	0.466

All factor loadings ≥0.32. KMO coefficient equal to 0.81 and Barlett x^2 value equal to 646.9 ($p<0.001$) for the diabetes group. KMO coefficient equal to 0.79 and Barlett x^2 value equal to 552.0 ($p<0.001$) for the healthy group

Table 2. Descriptive statistics for and internal consistencies of the RF certainty and the RF uncertainty for diabetes and healthy groups.

	Type 1 diabetes		Healthy group	
	RF certainty	RF uncertainty	RF certainty	RF uncertainty
Mean (SD)	1.24 (0.95)	0.60 (0.73)	0.97 (0.79)	0.49 (0.57)
Median	1.08	0.33	0.83	0.57
Skewness (SE)	0.35 (0.23)	0.36 (0.23)	0.56 (0.22)	0.28 (0.22)
Kurtosis (SE)	–1.10 (0.47)	–0.77 (0.47)	–0.51 (0.44)	–0.47 (0.44)

ed with the RF subscales with the exception of anxiety that was not related to the RF certainty subscale (table 3). Healthy group: Psychological distress was negatively correlated with RF certainty (r=–0.320, p<0.01) and positively with RF uncertainty (r=0.330, p<0.01). Emotional intelligence was positively correlated with RF certainty (r=0.390, p<0.01) and negatively with RF uncertainty (r=–0.265, p<0.01) as expected. Empathy was positively correlated with RF certainty (r=0.292, p<0.01) as expected, but there was no relationship between empathy and RF uncertainty (r=0.079).

Regarding known-groups validity, comparisons based on gender revealed that there were no gender differences for either RF certainty or RF certainty in neither group [diabetes group (t=0.492, p>0.05), healthy group (t=0.965, p>0.05); diabetes group (t=0.220, p>0.05), healthy group (t=0.058, p>0.05)]. However, there were age differences (median split < 38 years) in both groups, as younger participants reported significantly lower certainty in the diabetes group (t=–2.133, p >0.05) and the healthy group (t=–2.738, p>0.05) and higher uncertainty in the diabetes group (t=–2.480, p>0.05) and the healthy group (t=–2.779, p> 0.05) than older participants.

Discussion

The aim of the present study was to provide preliminary data on the validation of the RFQ for screening purposes and to examine its factorial structure and psychometric properties in a sample of people with a chronic health condition, such as diabetes, and in healthy group.

With respect to the dimensionality of the measure, our results did replicate the two-factor structure of the original scale. The internal consistency ranged from good to excellent for both RF certainty and RF uncertainty in both groups. The mean scores were not uniform across the subscales, with people scoring higher in RF certainty than RF uncertainty in both groups. In the original study by Fonagy et al (2016) and other studies that used samples with severe psychopathology, such as borderline personality disorder, the reported mean uncertainty scores were higher.[12,13] Significant associations were observed between RFQ subscales and empathy, emotional intelligence and psychological distress as expected. Positive associations were observed between RF certainty and the psychological capacities of empathy and emotional intelligence, and negative correlations between RF certainty and psychological distress. These finding are congruent with previous research with RFQ.[12,13] A reverse pattern of associations between psychological distress, emotional intelligence and the RF uncertainty scale was observed as expected. Empathy was not associated with RF uncertainty subscale, a finding that also in line with previous research[12,13] and may suggest that the inability to develop complex models of the mind of others and the self is not related to the ability to manifest empathetic concern towards others.

With regard to psychological distress, the results for the two samples were broadly similar with a few exceptions. Depression was not related to neither of the RFQ subscales in the healthy group in contrast with the diabetic group, in which a negative relationship was found with RF certainty and a positive one with RF uncertainty. These findings suggest that the degree of certainty or uncertainty about the mental state of others and/or the self is not related to de-

Table 3. Relationships of RF certainty and RF uncertainty with psychological distress (SCL–10R) for both groups.

	Type 1 diabetes		Healthy group	
	RF certainty	RF uncertainty	RF certainty	RF uncertainty
Depression	–0.365**	0.486**	–0.041	0.150
Psychoticism	–0.415**	0.463**	–0.356**	0.422**
Interpersonal sensitivity	–0.406**	0.441**	–0.286**	0.250**
Anxiety	–0.177	0.365**	–0.017	0.196*
Obsessive-compulsiveness	–0.359**	0.454**	–0.260**	0.319**
Somatization	–0.206*	0.227*	–0.270**	0.073
Phobic anxiety	–0.273**	0.347**	–0.213*	0.095
Hostility	–0.399**	0.495**	–0.339**	0.239**
Paranoia	–0.342**	0.426**	–0.259**	0.208*

*p<0.05, **p<0.01

pression in people who do not face a somatic condition. In addition, somatization and phobic anxiety were not associated with the RF uncertainty subscale in the healthy group, in contrast with the diabetic group, in which positive relationships were observed between these variables. Thus, being uncertain about the mental state of one's self, or of others' is not related to somatization, neither phobic anxiety, in people who do not face a somatic condition. Moreover, anxiety was not related to RF uncertainty in neither group suggesting that the degree of certainty about the mental states of others and/the self is not linked to experiencing anxiety. However, anxiety in SCL-10R is defined as feeling "tense or keyed up". This may be inferred to account for an inability to feel relaxed, and thus, different measures of anxiety need to be used in order to further clarify this relationship. Regarding participant demographics both RFQ subscales were unrelated to gender. However, a more balanced reflective functioning - reflected in significant higher certainty and lower uncertainty levels - was observed in older participants in both groups, suggesting that as time goes by people tend to feel more certain in the ability to understand their own and other people's mental world, and to regulate their emotions more effectively. Both of these findings were congruent with findings from the original validation study.[12]

The present study has some limitations. A test-retest analysis, to further evaluate the reliability of the instrument, was not included. Another limitation is that a confirmatory analysis was not performed. The reliability and validity of the RFQ need to be tested with test-retest analysis and confirmatory analysis respectively in future research. Moreover, the measures of emotional intelligence and empathy were only completed by the healthy group. Further research is necessary to replicate the findings across diverge populations.

In conclusion, although these preliminary findings support the reliability and validity of the measure that can be used in research to address problems of mentalizing, it is of primary importance to extend the validity testing of RFQ in clinical populations to further support its use in clinical practice.

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APPENDIX
Reflective Functioning Questionnaire
Ερωτηματολόγιο Αναστοχαστικής Λειτουργικότητας

Για κάθε μια από τις επόμενες 8 ερωτήσεις επιλέξτε έναν αριθμό μεταξύ 1 (διαφωνώ απόλυτα) και 7 (συμφωνώ απόλυτα) ανάλογα με το πόσο διαφωνείτε ή συμφωνείτε με τη δήλωση και γράψτε τον αριθμό δίπλα στη δήλωση. Μην το σκεφτείτε πάρα πολύ – οι αρχικές σας απαντήσεις είναι συνήθως οι καλύτερες.

1. Το πώς σκέφτονται οι άλλοι είναι για μένα ένα μυστήριο
2. Δεν ξέρω πάντα γιατί κάνω ό,τι κάνω
3. Όταν είμαι θυμωμένος, λέω πράγματα χωρίς να ξέρω πραγματικά γιατί τα λέω
4. Όταν είμαι θυμωμένος λέω πράγματα που μετά μετανιώνω
5. Αν νιώσω ανασφάλεια μπορεί να συμπεριφερθώ με τρόπο που εκνευρίζει τους άλλους
6. Μερικές φορές κάνω πράγματα χωρίς να ξέρω πραγματικά γιατί
7. Ξέρω πάντα τι νιώθω
8. Τα έντονα συναισθήματα συχνά θολώνουν τη σκέψη μου

Ψυχομετρικές ιδιότητες και παραγοντική δομή της ελληνικής εκδοχής του Ερωτηματολογίου Αναστοχαστικής Λειτουργικότητας

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Η αναστοχαστική λειτουργικότητα αναφέρεται στην ικανότητα του ατόμου, να συμπεραίνει την ψυχική κατάσταση του εαυτού και των άλλων, να αναστοχάζεται για τον εαυτό του σε σχέση με τους άλλους, και να εμπλέκεται μαζί τους σε έναν βαθμό συναισθαντικής επικοινωνίας. Σκοπός της παρούσας μελέτης είναι η παρουσίαση δεδομένων σχετικά με τη διαδικασία στάθμισης του ερωτηματολογίου αναστοχαστικής λειτουργικότητας (Reflective Functioning Questionnaire, RFQ), προκειμένου να αξιολογηθεί η χρήση του στην έρευνα και στην κλινική πρακτική για τον ελληνικό πληθυσμό. Συνολικά 219 συμμετέχοντες (102 άτομα με διαβήτη τύπου 1 και 117 άτομα γενικού πληθυσμού) ολοκλήρωσαν το RFQ. Για την παραγοντική δομή της κλίμακας χρησιμοποιήθηκε

διερευνητική παραγοντική ανάλυση που υποστήριξε το αρχικό μοντέλο των δύο παραγόντων (Βεβαιότητα και Αβεβαιότητα για την ψυχική κατάσταση εαυτού και άλλων) και στα δύο δείγματα. Η αξιοπιστία αξιολογήθηκε με τον δείκτη εσωτερικής συνοχής και ήταν ικανοποιητική και για τις δύο υποκλίμακες (α=0,80 για τη βεβαιότητα και α=0,79 για την αβεβαιότητα). Η εγκυρότητα αξιολογήθηκε μέσω συσχέτισης με την ψυχολογική δυσφορία, τη συναισθηματική νοημοσύνη και την ενσυναίσθηση καθώς και με βάση τις αναμενόμενες από τη βιβλιογραφία διαφορές μεταξύ ηλικιακών ομάδων. Όπως ήταν αναμενόμενο, υπήρχαν θετικές συσχετίσεις μεταξύ του βαθμού βεβαιότητας σχετικά με τις ψυχικές καταστάσεις και της συναισθηματικής νοημοσύνης (r=0,390, p<0,01), καθώς και της ενσυναίσθησης (r=0,292, p<0,01) στον γενικό πληθυσμό. Αντίθετα, βρέθηκαν αρνητικές συσχετίσεις μεταξύ του βαθμού βεβαιότητας για τις ψυχικές καταστάσεις και της ψυχολογικής δυσφορίας (r=−0,470, p<0,01) για τους συμμετέχοντες με διαβήτη αλλά και για τον γενικό πληθυσμό (r=0,320, p<0,01). Παρατηρήθηκε ένα αντίστροφο μοτίβο συσχετίσεων του βαθμού αβεβαιότητας σχετικά με τις ψυχικές καταστάσεις και της συναισθηματικής νοημοσύνης (r=−0,265, p<0,01) στον γενικό πληθυσμό, καθώς και της ψυχολογικής δυσφορίας για τους συμμετέχοντες με διαβήτη (r=0,590, p<0,01) και για τον γενικό πληθυσμό (r=0,330, p<0,01). Επίσης, όπως αναμενόταν, υπήρχαν διαφορές μεταξύ των ηλικιακών ομάδων, με τους μεγαλύτερους σε ηλικία συμμετέχοντες και στις δύο ομάδες να παρουσιάζουν μια πιο ισορροπημένη αναστοχαστική λειτουργία – με υψηλότερα σκορ βεβαιότητας για την ομάδα του διαβήτη (t=−2,133, p>0,05) και τον γενικό πληθυσμό (t=−2.738, p>0,05) και χαμηλότερο σκορ αβεβαιότητας για την ομάδα διαβήτη (t=−2.480, p>0,05) και τον γενικό πληθυσμό (t=−2,779, p>0.05). Τα δεδομένα που συλλέχθηκαν ως τώρα υποστηρίζουν την αξιοπιστία και την εγκυρότητα της κλίμακας, ωστόσο είναι πρωταρχικής σημασίας η επέκταση της στάθμισης του RFQ σε κλινικούς πληθυσμούς για περαιτέρω υποστήριξη της χρήσης του στην κλινική πρακτική.

Λέξεις ευρετηρίου: Ερωτηματολόγιο αναστοχαστικής λειτουργικότητας, παραγοντική δομή, ψυχομετρικές ιδιότητες, εγκυρότητα, αξιοπιστία.

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Research article
Ερευνητική εργασία

The relationship between metacognitive beliefs and symptoms in eating disorders

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The present study aimed to explore the role of dysfunctional metacognitive beliefs in Eating Disorders (EDs) and their potential associations with core and comorbid symptoms. The Metacognition Questionnaire-30 (MCQ-30), the Eating Disorder Examination Questionnaire 6.0 (EDE-Q), the Hospital Anxiety and Depression Scale (HADS) and the Maudsley Obsessive–Compulsive Inventory (MOCI) were used to evaluate 44 Anorexia Nervosa (AN), 50 Bulimia Nervosa (BN) patients and 37 controls. Patients featured more dysfunctional metacognitive beliefs which positively correlated with ED and comorbid symptoms. Both AN and BN patients had higher scores than healthy controls on MCQ-30 total score, Positive Beliefs about Worry, Negative Beliefs about Thoughts Uncontrollability and Danger and Need to Control Thoughts. AN patients also featured higher scores than healthy controls on Cognitive Self-Consciousness. No statistically significant difference was found between the two clinical groups in MCQ-30 total and subscale scores. Among metacognitive beliefs, Negative Beliefs about thoughts Uncontrollability and Danger showed the stronger correlations with core EDs symptoms, (coefficients ranging from 0.24 to 0.40), followed by Need to Control Thoughts (coefficients ranging from 0.22 to 0.38). Dysfunctional metacognitive beliefs were also significantly positively correlated with HADS-Anxiety, HADS-Depression and MOCI Total, in a similar manner. Dysfunctional metacognitive beliefs also predicted 19%, 35%, 20%, and 21% of the variance in Global EDE-Q, HADS-Anxiety, HADS-Depression and MOCI Total scores respectively, in regression analyses. Nevertheless, mediation analysis indicated that the relationship between Negative Beliefs about thoughts Uncontrollability and Danger and core EDs symptomatology as measured by EDE-Q, was not mediated by comorbid anxiety, depression and obsessionality. As a result, dysfunctions in metacognitive beliefs may reflect a common, trans-diagnostic path in AN and BN patients, towards a wide range of symptoms, both core and commorbid.

Key words: Anorexia nervosa, bulimia nervosa, cognitive attentional syndrome, metacognition, worry.

Introduction

Eating disorders (EDs) are debilitating, complex mental disorders characterized by pathological eating behaviours, extreme concerns with body weight and shape, and body image distortions.[1,2] Patients suffer from severe psychosocial and physical consequences, experiencing a highly diminished quality of life.[3,4] The outcome of treatment based on the existing therapeutic models is often poor, especially in anorexia nervosa (AN).[5] As new perspectives in the treatment of EDs are necessary, a better understanding of cognitive processes, rather than solely cognitive content itself, seems promising.[6,7] Such modulating processes fall within the concept of metacognition, failures in which lead to inflexible and maladaptive cognitive patterns.[8]

Metacognition or "cognition about cognition", simplistically as described in the areas of education and developmental psychology, is considered a fundamental component of a well-developed cognitive function and a prerequisite for behavioural change.[9,10] According to Wells, metacognition refers to the structures, content, and processes involved in the monitoring, appraisal, and control of cognition.[11] Dysfunctional metacognitive beliefs refer to assumptions that outline the perceived importance or consequences of specific thoughts.[8] Such beliefs have been found to play an important role across a wide spectrum of disorders. The Self-Regulatory Executive Function (S-REF) model links metacognition to psychopathology as distorted metacognitions (i.e. metacognitive beliefs) lead to a maladaptive cognitive fashion termed Cognitive Attentional Syndrome (CAS) featuring attentional bias, focusing attention on perceived threat and heightened self-focused attention, activation of self-beliefs and self-appraisal, reduced efficiency of cognitive functioning and unhelpful coping strategies.[8,12,13] The S-REF model thus points to a problematic self-processing as major component of the CAS which depletes resources for processing information incompatible with dysfunctional beliefs impeding modification of negative self-beliefs and blocking access to self-knowledge. The CAS has been proven to be strongly positively correlated to psychological inflexibility and metacognitive strategies fundamental to the CAS, such as rumination and worry, have been conceptualized as specific types of psychological inflexibility.[12]

The last decade, few studies have examined metacognitive functioning in EDs, most of them focusing on AN, offer corroborative evidence revealing dysfunctional metacognitive beliefs that lead to a perseverative style of thinking and interfere with control of thoughts and emotional regulation. The metacognitions questionnaire 30 (MCQ-30)[14] is often utilized to assess these maladaptive beliefs and tendencies. Three of these studies found higher scores in AN patients than control groups on at least three of the MCQ-30's subscales, with Negative Beliefs about thoughts Uncontrollability and Danger as well as Need to Control Thoughts being among them in all three studies.[15–17] Similar results were yielded by a more recent study in which dysfunctional metacognitions were positively correlated with EDs symptomatology, explaining 51% of the variance in EDs symptoms, with Need to Control Thoughts being the strongest factor.[18] Both typical and atypical AN patients have been shown to feature similar dysfunctional metacognitive profiles, predicting drive for thinness.[19] Similar results were yielded by studies with a qualitative methodology, indicating the presence of dysfunctional metacognitions, thought control strategies like worry and rumination, in a transdiagnostic manner.[20,21]

The present study aimed to examine the profile of dysfunctional metacognitive beliefs in both AN and BN patients. Based on the previous research, our hypothesis was that dysfunctional metacognitions, especially negative beliefs about thoughts uncontrollability and danger as well as need to control thoughts would be present in both AN and BN patients.

Another aim of the study was to examine the potential associations of dysfunctional metacognitive beliefs with clinical characteristics, core EDs clinical symptoms, and comorbid symptoms i.e. depression, anxiety and obsessionality. To the best of our knowledge, there are no such research concerning comorbid sysmptomatology in EDs, but dysfunctional metacognitive beliefs were found to be associated with EDs symptoms in previous research. As results from previously conducted research[22–25] clearly sup-

port the contribution of dysfunctional metacognitions to depression, anxiety and obsessionality, we hypothesized that dysfunctional metacognitive beliefs will be associated with such comorbid symptoms of EDs patients as well.

Finally, we aimed to further expand previous research examining whether the relationship between dysfunctional metacognitions and EDs symptoms were mediated by comorbid symptoms.

Material and method

Participants and procedures

Female patients with EDs (n=94) were consecutively recruited following admission to the Eating Disorders Unit of the Eginition University Hospital, prior to consequent outpatient treatment. Patients group consisted of 44 patients with AN (restricting type, AN-R: n=21 and binge-purge type, AN-BP: n=23) and 50 patients with BN. All patients were native Greek speakers, aged 18–45, and were diagnosed with either AN or BN according to DSM-5 criteria by a psychiatrist specializing in EDs. Exclusion criteria for participation in the study were: mental retardation, concurrent comorbidity with substance abuse-related disorders, chronic obsessive-compulsive disorder, body dysmorphic disorder, current major depressive episode and a history of psychosis. A total of 111 patients were invited to participate in the study, but 9 refused participation, while 8 were not eligible for participation due to the exclusion criteria.

The healthy control group consisted of women (n=37) recruited through local advertising among hospital and university personnel, and students of the University of Athens. Exclusion criteria for healthy participants were any history of psychiatric illness, being under psychotropic medications, a Body Mass Index (BMI)<18,5 or >25 and a family history of ED. Initially 46 responded in order to participate, but 9 were dismissed due to exclusion criteria. Basic demographic data were obtained, and participants' weight and height were measured on the day of testing. Prior to enrollment, all participants provided written informed consent. The study was approved by the Eginition University Hospital Ethics Committee.

Measures

Descriptive self-report data included age, education, duration of disease and lowest adult lifetime BMI as calculated from adult height and lowest adult lifetime weight. BMI was calculated by the height and weight measured at the time of recruitment.

The Metacognition Questionnaire-30, MCQ-30, assesses individual differences in monitoring tendencies and metacognitive beliefs. It consists of five subscales assessed by 30-items in total, rated on a 4-point Likert scale, where higher scores indicate greater dysfunctional metacognitive activity.[14] MCQ-30 subscales are: (1) Positive Beliefs about Worry (extent to which a person believes that worrying is useful), (2) Negative Beliefs about thoughts Uncontrollability and Danger (extent to which a person thinks that worrying is uncontrollable and dangerous), (3) Lack of Cognitive Confidence (lack of confidence in attention and memory), (4) Need to Control Thoughts, and (5) Cognitive Self-Consciousness (tendency to monitor one's own thoughts and focus attention inwards). The Greek version of the MCQ-30 has been proven to be a comprehensible, psychometrically adequate, reliable tool for assessing worry-related metacognitions in the Greek population.[26]

The Eating Disorder Examination Questionnaire 6.0, EDE-Q 6.0, measures the severity of EDs symptomatology.[27] The EDE-Q consists of four subscales, with 28 items in total, which assess Restraint of food intake, Concern about Eating, Concern about Shape and Concern about Weight. Items are scored in a range from 0 to 6, where higher scores imply higher severity of eating disorder symptoms. Each subscale's score is presented as a mean score, and Global EDE-Q score is calculated as the mean score of all the four subscales. The Greek version of EDE-Q 6.0 is a reliable tool with good psychometric properties.[28]

The Hospital Anxiety and Depression Scale, HADS, is a self-report scale consisting of two seven-item subscales that measure current Anxiety and Depression.[29] The Greek version of HADS has been shown with good psychometric properties.[30] The Maudsley Obsessive–Compulsive Inventory, MOCI,

was used to measure obsessionality.[31] It is a self-report 30-item instrument, including four subscales: Checking, Cleaning, Doubting and Slowness. The scale has been adjusted and validated in Greek by research groups at the University of Athens.[32]

Statistical analysis

All data were preliminary assessed for normality. Since the great majority of the examined variables did not follow a normal distribution (as indicated by the Kolmogorov–Smirnov test, kurtosis values and relevant plots) non-parametric tests were used for all variables, for reasons of uniformity. A series of Kruskal–Wallis H non-parametric tests were conducted in order to evaluate differences among the different sample groups (AN, BN and HC) in age, BMI, years of education, EDE-Q, HADS, MOCI and MCQ-30 total and subscale scores. Post-hoc Mann-Whitney U tests were performed for pairwise comparisons. Bonferroni correction for multiple comparisons was performed as appropriate. The relationship between metacognition and EDs symptoms as well as depression, anxiety and obsessionality was examined by calculating Spearman's rho correlation coefficient. Multiple linear regressions were performed to explore the effects of metacognitive factors in predicting EDs symptoms, anxiety, depression and obsessionality. The SPSS PROCESS macro version 3.333 for multiple mediation analyses using bootstrapping was used to examine whether the relationship between metacognitive beliefs and Global EDE-Q was mediated by HADS-Anxiety, HADS-Depression and MOCI Total. Unstandardized indirect effects were computed for each of 5,000 bootstrapped samples, and the 95% confidence interval was computed by determining the indirect effects at the 2.5th and 97.5th percentiles. For all statistical analyses, IBM SPSS Statistics Version 25.0 for Windows was used.

Results

Difference between groups in demographic and clinical variables

No statistically significant difference was found between the three groups with respect to age and years of education. Additionally, no statistically significant difference was found between AN and BN patients in disease duration. As expected, there was a statistically significant difference in BMI between the two clinical groups (AN and BN). The current and the lowest lifetime BMI was significantly lower in AN than BN patients ($U=377.50$, $p<0.001$ and $U=38.50$, $p<0.001$ respectively). There were statistically significant differences between the three groups in HADS-Anxiety, HADS-Depression and MOCI Total as well as in Global EDE-Q and its subscales as shown in table 1.

Difference between groups in metacognitive variables

Pairwise comparisons showed that both AN and BN patients had higher scores than HC on MCQ-30 total score, Positive Beliefs about Worry, Negative Beliefs about Thoughts Uncontrollability and Danger and Need to Control Thoughts. AN patients also featured higher scores than HC on Cognitive Self-Consciousness. No statistically significant difference was found between the two clinical groups in MCQ-30 total and subscale scores (table 2).

Associations between metacognitive and clinical variables

Since there was no statistically significant difference between AN and BN patients in MCQ-30 and their subscales, these two groups were collapsed into one EDs group onwards in the correlation and mediation analyses.

In the unified clinical sample, no statistically significant correlations were found between metacognitive beliefs (MCQ-30 subscales and total score) and BMI, lowest lifetime BMI, and duration of disease. Among the MCQ-30 subscales, Negative Beliefs about thoughts Uncontrollability and Danger showed the stronger correlations with Global EDE-Q and its subscales (coefficients ranging from 0.24 to 0.40), followed by Need to Control Thoughts (coefficients ranging from 0.22 to 0.38). Dysfunctional metacognitive beliefs were also significantly positively correlated with HADS-Anxiety, HADS-Depression and MOCI Total. Negative Beliefs about thoughts Uncontrollability and Danger showed the strongest correlations, similarly to what was found in the correlations with EDs core symptoms (table 3).

Table 1. Demographic and clinical characteristics of Anorexia Nervosa (AN), Bulimia Nervosa (BN) and Healthy Controls (HC).

	AN (n=44)	BN (n=50)	HC (n=37)	H	p
	Median (IQR)				
Age (years)	26.00 (10.75)	24.00 (6.00)	25.00 (7.00)		ns
Education (years)	16.00 (3.00)	16.00 (2.00)	16.00 (3.00)		ns
BMI (kg/m2)	16.58 (2.37)	21.77 (4.45)	20.94 (2.50)	84.04	<0.001
Lowest lifetime BMI (kg/m^2)	15.49 (2.22)	18.66 (3.50)	–	38,50*	<0.001
Duration of disease (years)	5.00 (8.00)	6.00 (9.00)	–	–	ns
HADS-Anxiety	13.00 (5.00)	10.50 (7.00)	3.00 (2.00)	68.16	<0.001
HADS-Depression	9.00 (5.00)	9.00 (5.00)	2.00 (2.00)	62.33	<0.001
MOCI Total	13.50 (7.75)	12.00 (8.00)	5.00 (4.50)	61.25	<0.001
EDE-Q Restraint	4.80 (1.20)	4.00 (1.85)	0.60 (0.80)	73.53	<0.001
EDE-Q Eating Concern	3.50 (1.90)	4.00 (1.45)	0.20 (0.60)	78.62	<0.001
EDE-Q Shape Concern	4.50 (2.06)	4.94 (1.75)	0.75 (1.25)	70.10	<0.001
EDE-Q Weight Concern	3.60 (2.00)	4.60 (1.65)	0.40 (1.10)	74.64	<0.001
Global EDE-Q	4.15 (1.34)	4.45 (1.08)	0.47 (0.99)	77.71	<0.001

IQR: Inter-quartile range, HADS: Hospital Anxiety and Depression Scale, MOCI: Maudsley Obsessive Compulsive Inventory, ns: Non statistically significant, p-values are estimated from Kruskal–Wallis H non-parametric tests
* Mann-Whitney U between AN and BN groups

Linear regression analyses were performed in which Global EDE-Q, HADS-Anxiety, HADS-Depression and MOCI Total scores were successively used as dependent variables. BMI and Duration of disease were examined as possible predictors in Model 1 and the five MCQ-30 factors were entered as predictors in Model 2 (table 4). Collinearity and residual statistics were within the acceptable range in all models. BMI, Lowest adult lifetime BMI, Duration of disease, Age and Years of Education were not significant predictors in any of the analyses. Metacognitive factors explained 19% of the variance in the Global EDE-Q, 35% of the variance in HADS-Anxiety, 20% of the variance in HADS-Depression and 21% of the variance in MOCI Total. Negative Beliefs about thoughts Uncontrollability and Danger was the predominant and common factor in all but HADS-Depression analyses where Lack of Cognitive Confidence was a significant predictor. In the analysis predicting MOCI Total variance, apart from Negative Beliefs about thoughts Uncontrollability and Danger, Cognitive Self-Consciousness was also a significant predictor.

Mediation analysis indicated that the relationship between Negative Beliefs about thoughts Uncontrollability and Danger and Global EDE-Q was not mediated by HADS-Anxiety, HADS-Depression and MOCI Total. The direct effect of Negative Beliefs about thoughts Uncontrollability and Danger on Global EDE-Q was 0.07 (p=0.012). Neither the total indirect effect through the three mediators (HADS-Anxiety, HADS-Depression and MOCI Total), nor each of them separately was statistically significant, as determined by the bias corrected and accelerated confidence intervals (95% BCaCI). (Total Indirect effect 95% BCaCI: -0.004-0.067, indirect effect 95% BCaCI: for HADS-Anxiety -0.039-0.035, for HADS-Depression –0.011–0.038, for MOCI Total –0.002–0.047).

Discussion

This study is the first to investigate the role of dysfunctional metacognitive beliefs in relation to a variety of symptoms in AN and BN patients, extending the so far existing research. The results of the present study are consistent with the S-REF

Table 2. Metacognitive beliefs in Anorexia Nervosa (AN), Bulimia Nervosa (BN) and Healthy Controls (HC)

	AN (n=44)	BN (n=50)	HC (n=37)	H	p		U	p
	Median (IQR)							
MCQ-30	79.00 (22.00)	77.00 (19.50)	54.00 (20.00)	45.06	<0.001	AN-HC	159.50	<0.001
						BN-HC	270.00	<0.001
						AN-BN	966.00	ns
Lack of Cognitive Confidence	12.00 (9.00)	11.00 (8.00)	9.00 (5.00)	7.02	0.030	AN-HC	531.00	ns
						BN-HC	696.00	ns
						AN-BN	985.00	ns
Positive Beliefs about Worry	14.00 (6.00)	11.00 (6.00)	8.00 (6.00)	17.83	<0.001	AN-HC	375.50	< 0.001
						BN-HC	570.50	0.036
						AN-BN	898.00	ns
Negative Beliefs about Thoughts Uncontrollability and Danger	18.00 (7.00)	18.00 (6.50)	10.00 (7.00)	46.41	<0.001	AN-HC	160.50	<0.001
						BN-HC	243.00	<0.001
						AN-BN	1,065.50	ns
Need to Control Thoughts	15.00 (7.00)	16.00 (4.50)	9.00 (5.00)	41.68	<0.001	AN-HC	184.50	<0.001
						BN-HC	288.00	<0.001
						AN-BN	1,016.00	ns
Cognitive Self-Consciousness	18.00 (3.00)	16.00 (5.50)	15.00 (4.00)	9.71	0.008	AN-HC	485.00	0.041
						BN-HC	669.00	ns
						AN-BN	936.00	ns

IQR: Inter-quartile range, ns: Non statistically significant
Note: p in Mann-Whitney U tests was corrected for multiple comparisons using the Bonferroni approach.

Table 3. Spearman's Correlation Coefficients (rho) of metacognitive beliefs with EDs core and comorbid symptoms (n=94).

	MCQ-30 Total score	Need to control thoughts	Negative beliefs about thoughts uncontrollability and danger	Positive beliefs about worry	Cognitive self-consciousness	Lack of cognitive confidence
Global EDE-Q	0.24*	0.35**	0.32*	0.07	–0.03	0.13
Restraint	0.04	0.17	0.06	0.04	0.06	–0.02
Eating Concern	0.26*	0.27*	0.38**	0.05	–0.15	0.31*
Weight Concern	0.14	0.22*	0.24*	–0.02	–0.15	0.06
Shape Concern	0.34**	0.38**	0.40**	0.09	0.08	0.17
HADS-Anxiety	0.49**	0.31*	0.57**	0.18	0.14	0.35**
HADS-Depression	0.35**	0.27*	0.36**	0.00	0.08	0.36**
MOCI Total	0.33**	0.31*	0.44**	0.16	–0.10	0.24*

Note: Values refer to EDs group correlations, ns: Non statistically significant, *p<0.05, **p<0.001

Table 4. Multiple regression analyses predicting *Global EDE-Q*, *HADS-Anxiety*, *HADS-Depression*, *MOCI Total* (*n*=94).

	Global EDE-Q			***HADS-Anxiety***			***HADS-Depression***			***MOCI Total***		
	β	SE	R^2 change	*β*	SE	R^2 change	*β*	SE	R^2 change	*β*	SE	R^2 change
Model 1			0.09			0.08			0.08			0.15
BMI	0.07	0.04		–0.21	0.16		0,01	0.13		–0.35	0.18	
Lowest lifetime BMI	–0.02	0.04		0.47	0.18		–0.16	0.15		0.11	0.20	
Duration of disease	–0.02	0.03		0.14	0.13		0.06	0.11		0.21	0.15	
Age	–0.14	0.07		–0.04	0.14		0.04	0.12		–0.13	0.16	
Education				–0.62	0.32		–0.58	0.28		–0.86	0.36	
Model 2			0.19*			0.35*			0.20*			0.21*
NBUD	0.06*	0.03		0.53*	0.12		0.13	0.12		0.45*	0.15	
NCT	0.06	0.04		–0.10	0.13		0.19	0.13		0.15	0.17	
CSC	0.00	0.03		0.04	0.13		0.04	0.12		–0.37*	0.16	
PBW	–0.02	0.03		0.07	0.10		–0.14	0.09		0.03	0.12	
LCC	0.00	0.02		0.22	0.08		0.21*	0.08		0.09	0.10	

*p<0.05, SE: standard error, NBUD: *Negative Beliefs about thoughts Uncontrollability and Danger*, NCT: *Need to Control Thoughts*, CSC: *Cognitive Self-Consciousness*, PBW: *Positive Beliefs about Worry*, LCC: *Lack of Cognitive Confidence*

model linking metacognition to psychopathology. They also confirm the results of previous research studies regarding the presence of dysfunctional metacognitions in AN and BN, and well replicates previous findings that Negative Beliefs about thoughts Uncontrollability and Danger, Need to Control Thoughts, Positive Beliefs about Worry and Cognitive Self-Consciousness are higher in AN than controls.[15–19] It also suggests that the same findings also apply in BN patients, with the exception of Cognitive Self-Consciousness. Previous findings, suggested that participants with AN were more likely to endorse positive beliefs about worry and were more likely to state that they could not trust their cognitive abilities than BN patients.[21] Results from our study indicate that with the exception of Cognitive Self-Consciousness the degree of the dysfunction was found to be almost equal in AN and BN, a finding that in consistent with the present transdiagnostic conceptualization of EDs. This is probably more accurate than previous findings since the present study used larger sample and stricter statistical methodology. Overall, our findings support the transdiagnostic role of dysfunctional metacognitions in AN and BN.

As found in previous research, several dysfunctional metacognitive beliefs correlated with EDs symptomatology in the clinical sample, in our study specifically the following: Negative Beliefs about thoughts Uncontrollability and Danger, Need to Control Thoughts and Lack of Cognitive Confidence. Among those, Negative Beliefs about thoughts Uncontrollability and Danger and Need to Control Thoughts showed the strongest correlations with EDs symptoms. These findings are in line with a meta-analysis of 45 studies that showed elevated dysfunctional metacognitions across patients, with large and robust effects for beliefs concerning the uncontrollability and danger of worry and for beliefs about the need to control thoughts.[33] The EDs

symptoms which significantly correlated with dysfunctional metacognitions in our study were: Eating Concern, Weight Concern, and Shape Concern, which –among symptoms represented by EDE-Q subscales– are those most closely related to the construct of worry, as they are of psychological nature, whereas Restriction reflects a behaviour. These findings are in line with previous research.[18] According to Wells metacognitive beliefs trigger a counterproductive cognitive style where threat-focused attention and ineffective coping strategies such as rumination and worry strain-limited cognitive resources, leading to maladaptive means of coping with problems and threats.[8] Worry and rumination have been found to be significant predictors of EDs symptomatology in previous studies, over and above the effects of anxiety and depression.[35,36]

A similar pattern of correlations was also found between dysfunctional metacognitive beliefs and comorbid anxiety, depression and obsessionality. Thus, these correlation results indicate that dysfunctional metacognitions might reflect a common path towards a wide range of symptoms, such as EDs core symptoms, anxiety, depression and obsessionality in EDs patients. This was further supported by the linear regression analyses, in which metacognitive beliefs predicted 19%, 35%, 20%, and 21% of the variance in the Global EDE-Q, HADS-Anxiety, HADS-Depression, and MOCI Total scores, respectively. In a previous study,[18] dysfunctional metacognitions, especially Need to Control Thoughts, was found to explain 51% of variance of the Global EDE-Q score, a finding that should be attributed to the fact that regression analysis was conducted in the total sample, including the control groups.

Dysfunctional metacognitive beliefs are well demonstrated to be associated with depression, anxiety and obsessionality.[22,25] In order to examine the probable role of comorbidity symptoms in the path from dysfunctional metacognitions to eating, weight and shape symptoms in EDs we conducted mediation analyses. The mediation results suggest that anxiety, depression and obsessionality symptoms do not mediate this relationship. These results provide further support to the notion that the CAS and especially metacognitive dysfunctions are directly implicated in the psychopathology of eating disorders, contributing directly to the development and maintenance of eating disorder symptoms.

The findings of this study must be interpreted in the context of several limitations. Our data are based on self-report instruments, even though the questionnaires used in this study are considered valid and reliable. Patients group consisted of individuals that were probably acknowledging their condition and might have been less reluctant to seek treatment, as they were recruited through the initial assessment of an Eating Disorders Unit. The representativeness of the control group can be questioned as it was a non-random sample. Last but not least, the cross-sectional design of the study is a limitation by itself.

Dysfunctional metacognitions seem to be present in EDs in a trans-diagnostic pattern, being associated both with core EDs psychopathology as well as concurrent symptoms such as anxiety, depression and obsessionality. This seems to be related to the severity of symptomatology, but additional research is required. Taken together, our findings provide further support that targeting such beliefs could prove to be an effective strategy to reduce core and comorbid symptoms in EDs. As ED patients present with such maladaptive coping strategies, our findings suggest that future research could include further exploration of the CAS in EDs. As the S-REF model emphasizes on common processes in psychological disorders, predicting universal, or transdiagnostic abnormalities in attention (e.g. threat monitoring), metacognition and perseveration, several dysfunctions in patients with EDs, namely body image distortions,[37] alexithymia[38] and self-knowledge deficits in general,[39] mentalizing deficits,[40] and impaired awareness of illness and symptoms[41] might prove to be associated with maladaptive self-reflectivity processes and self-centered worries relevant to CAS.

In addition, longitudinal studies need to address the temporal relationship of metacognitive functioning with EDs pathology. This would provide evidence as to whether the current therapeutic models are able to assess and eventually alter dysfunctions in metacognitions, or interventions directly targeting these processes need to be integrated.

Η σχέση μεταξύ μεταγνωσιακών πεποιθήσεων και συμπτωμάτων στις διαταραχές πρόσληψης τροφής

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Η παρούσα μελέτη αποσκοπούσε στη διερεύνηση του ρόλου των δυσλειτουργικών μεταγνωστικών πεποιθήσεων στις Διαταραχές Πρόσληψης Τροφής (ΔΠΤ) και στις πιθανές συσχετίσεις τους τόσο με ειδικά όσο και συνοδά συμπτώματα των ασθενών αυτών. Το Ερωτηματολόγιο για τις Μεταγνωσίες (Metacognitive Questionnaire-30, MCQ-30), το Ερωτηματολόγιο για την Εξέταση των Διατροφικών Διαταραχών (Eating Disorder Examination Questionnaire, EDE-Q), η Νοσοκομειακή Κλίμακας Άγχους και Κατάθλιψης (Hospital Anxiety and Depression Scale, HADS) και η Κλίμακα Ιδεοψυχαναγκαστικών Συμπτωμάτων (Maudsley Obsessive-Compulsive Inventory - MOCI) χρησιμοποιήθηκαν για την αξιολόγηση 44 ασθενών με Ψυχογενή Ανορεξία (ΨΑ), 50 ασθενών με Ψυχογενή Βουλιμία (ΨΒ) και 37 υγιών μαρτύρων. Οι ασθενείς με ΨΑ και ΨΒ παρουσίασαν υψηλότερες βαθμολογίες δυσλειτουργικών μεταγνωσιακών πεποιθήσεων, οι οποίες συσχετίζονταν θετικά τόσο με τα ειδικά συμπτώματα των διατροφικών διαταραχών όσο και τα συνοδά συμπτώματα άγχους, κατάθλιψης και ψυχαναγκαστικότητας. Τόσο οι ασθενείς με ΨΑ όσο και εκείνοι με ΨΒ παρουσίασαν υψηλότερες βαθμολογίες από τους υγιείς μάρτυρες στη συνολική βαθμολογία της κλίμακας MCQ-30, και στις υποκλίμακες «θετικές πεποιθήσεις σχετικές με την ανησυχία», «αρνητικές πεποιθήσεις σχετικά με την απώλεια ελέγχου και τον κίνδυνο που η ανησυχία συνεπάγεται» και «ανάγκη για έλεγχο της σκέψης». Οι ασθενείς με ΨΑ επιπλέον εμφάνισαν υψηλότερη βαθμολογία από τους υγιείς μάρτυρες στη βαθμολογία της υποκλίμακας «νοητική αυτοσυνείδηση». Δεν παρατηρήθηκαν στατιστικά σημαντικές διαφορές μεταξύ των δύο ομάδων ασθενών στη συνολική βαθμολογία της κλίμακας MCQ-30 και τις υποκλίμακές της. Η υποκλίμακα «αρνητικές πεποιθήσεις σχετικά με την απώλεια ελέγχου και τον κίνδυνο που η ανησυχία συνεπάγεται» εμφάνισε τις ισχυρότερες θετικές συσχετίσεις με τα ειδικά συμπτώματα των διατροφικών διαταραχών (συντελεστές που κυμαίνονταν από 0,24 έως 0,40), ακολουθούμενη από την «ανάγκη για έλεγχο της σκέψης» (συντελεστές που κυμαίνονταν από 0,22 έως 0,38). Αντίστοιχα, οι δυσλειτουργικές μεταγνωσιακές πεποιθήσεις εμφάνισαν στατιστικά σημαντικές θετικές συσχετίσεις και με τη συνοδό συμπτωματολογία άγχους, κατάθλιψης και ψυχαναγκαστικότητας, με παρόμοιο τρόπο. Σε αναλύσεις παλινδρόμησης οι δυσλειτουργικές μεταγνωσιακές πεποιθήσεις προέβλεπαν το 19%, 35%, 20% και 21% της διακύμανσης στις συνολικές βαθμολογίες των EDE-Q, HADS-Anxiety, HADS-Depression και MOCI, αντίστοιχα. Οι αναλύσεις διαμεσολάβησης ανέδειξαν πως η συνοδός συμπτωματολογία δεν διαμεσολαβεί τη σχέση μεταξύ δυσλειτουργικών μεταγνωσιακών πεποιθήσεων και ειδικών συμπτωμάτων των ΔΠΤ. Κατά συνέπεια, οι δυσλειτουργίες στις μεταγνωσιακές πεποιθήσεις μπορεί να αντικατοπτρίζουν ένα κοινό, δια-διαγνωστικό μονοπάτι στην ΨΑ και ΨΒ προς ένα ευρύ φάσμα συμπτωμάτων σε ασθενείς με ΔΠΤ.

Λέξεις ευρετηρίου: Ψυχογενής ανορεξία, ψυχογενής βουλιμία, σύνδρομο γνωσιακής προσοχής, μεταγνωσία, ανησυχία.

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Research article
Ερευνητική εργασία

Similarities and differences in psycho-educational assessments of adolescents with specific language impairments and specific learning disabilities: A challenging differential diagnosis

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Specific Language Impairment (SLI) and Specific Learning Disabilities (SLD) have been the subject of extensive research especially with respect to the connection between them. However, the manifestation of these disorders in adolescence has not been thoroughly investigated. The objective of the present study was to compare the intelligence scores and the reading, oral and written language skills of Greek adolescents with SLI and Greek adolescents with SLD, as assessed during their psycho-educational evaluation, in order to clear the path for diagnosis and intervention. 124 Greek adolescents diagnosed with Specific Learning Disabilities and 76 Greek adolescents diagnosed with Specific Language Impairment aged from 11 to 16 years took part in the study. All participants were assessed in reading, oral language and written language skills and took part in IQ testing. Independent samples t-test, chi-square test, odds ratios and their 95 percent confidence intervals were implemented to determine statistically significant differences. Analyses revealed differences in IQ scores and some differences in the skills assessed, thus indicating that SLI adolescents exhibited more difficulties across most of the basic academic skills, whereas SLD adolescents' difficulties confined to the affected written language skills. Specifically, the observed difference was statistically significant for the total and verbal IQ score, and WISC-III scores also disclosed a significant difference for the similarities and information

sub-tests. Regarding reading skills, SLI adolescents were 4.9 times more likely to exhibit line skipping, 5.8 times more likely to exhibit hesitations, 3.2 times more likely to exhibit repetitions of syllables/words/phrases, and 8.5 times more likely to exhibit non-acknowledgement of punctuation. Regarding reading comprehension, adolescents with SLI were more likely to have difficulty in retrieving simple information questions, making inferences, and giving titles. Adolescents with SLI were also more likely to have difficulties in story reproduction, giving synonyms/opposites, oral sentence reproduction and auditory oral word reproduction. In the area of written language skills, SLI adolescents were more likely to have poor handwriting, poor content, poor structure, and poor use of punctuation. In adolescence, Specific Language Impairment can be a different manifestation of an ongoing language disorder, which finally appears as a different type of Specific Learning Disability, but with a more generalized nature of learning difficulties. This finding should be interpreted in terms of the importance of differential diagnosis, especially during the challenging period of adolescence.

Key words: Specific learning disorder, specific language impairment, adolescence, diagnosis, educational assessment.

Introduction

Specific Language Impairment (SLI) and Specific Learning Disorder (SLD) are common developmental disorders which are considered distinct. The term "Specific Language Impairment"(SLI) is used to describe children whose language development is substantially below age-level, for no apparent cause and despite normal non-verbal intelligence.[1] These children display a significant limitation in language ability, without any evident neurological or sensory damage, such as hearing impairment.[2] According to the definition by the American Speech-Language-Hearing Association[3] as well as the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5),[4] a language disorder includes difficulties either in spoken or written language.[5] SLI prevalence ranges from 0.5% to 7%.[6,7]

According to the Individuals with Disability Education Improvement Act (IDEA), SLD is an "umbrella term" incorporating deficits affecting general academic skills, and more specifically persistent difficulties in reading, writing and arithmetic[7] not being attributed to developmental, neurological, sensory or motor disorders, intellectual disability, or lack of age-appropriate teaching.[7–12] SLD prevalence is reported to be 5–15%[13] and it is the main type of learning difficulties in which students are provided with special educational and assessment accommodations.[13] Dyslexia is the most extensively investigated learning disorder in the national and international studies regarding, features, characteristics and similarities with other disorders, diagnosis and intervention.[9]

Researchers and clinicians have gradually grown aware of the considerable overlap between language and learning disorders. Research has focused mainly in the relation between SLI and dyslexia, indicating significant overlap between dyslexia and SLI.[6,9,14–17] According to Spanoudis et al, SLI and SLD elementary school children display poor reading comprehension, spelling, orthographic processing and semantic skills, albeit with a different manifestation, i.e. as distinct disorders.[14] McArthur et al found that an average of 55% of dyslexic children in their studies met the criteria for SLI and 51% of children with SLI had a reading disability, concluding that a large percentage of children could be identified as either SLI or dyslexic.[17] Findings have also indicated that children with SLI are very likely to experience difficulties in literacy[18–22] and reading comprehension.[23–26] On the contrary, children with reading difficulties, such as dyslexic children, are likely to experience language difficulties,[17,27–29] while it seems that good language skills are used to compensate for word-level reading difficulties.[30,31] It has even been suggested that dyslexia is a form of language impairment[5,28,32–34] or that SLI is a more severe form of dyslexia.[18]

However, research focusing on whether there are underlying phonological deficits in SLI– the main cause of difficulties in dyslexia[9,35–36]– is inconclusive with most researchers arguing in favor,[9,16,34,35,37,38] but others placing less importance on these defi-

cits.[38,39] In general, most of the above studies agree, to a certain extent, that SLD and SLI share common characteristics. However, the two conditions are manifested with different symptoms.

The connection between learning and language disorders has been highly researched for pre-school and school children, especially in the case of reading disorders,[5] but when it comes to adolescence, there are still many questions concerning these two disorders. Adolescents with SLD often have persistent receptive and expressive oral language deficits as curriculum demands increase in academic areas that involve vocabulary, content specific knowledge, organization and retrieval of semantic information, basic and complex syntax, and higher-order semantic processing.[8] Children with SLI continue to experience language difficulties as adolescents[40] and are underachieving in domains such as spelling, reading comprehension, word identification, word attack and calculation.[41] Young et al even found that language-impaired children were approximately five times as likely to have academic difficulties severe enough to be classified as learning disabilities in adolescence.[41] These difficulties can take the form of deficits in reading and writing[42] and/or deficits in higher levels of oral language comprehension and expression.[42,43] Patchell and Hand acknowledged how easy it could be to misinterpret language disorders in high school students for a learning disorder, at a time when the language level of written and oral material begins to get more complex.[44] Consequently, children, adolescents and young adults facing language and learning difficulties may be identified with different diagnostic labels across their lifespan and struggle with inappropriate interventions.[5]

The acknowledgement of the above consideration is strongly reflected in DSM-5[4] where it is specified that the valid diagnostic procedure for SLI and SLD disorders does not lie only to the three basic specifiers (ex. in the domains of reading, written expression and mathematics in SLD), neither on the level of the condition's severity (mild, moderate, severe). A number of issues and parameters should be taken into account, such as obtaining both quantitative and qualitative information from a number of different sources, considering the important changes in manifestation of symptoms that occur from preschool years to adulthood.

Stated in both the DSM-5 manual as well as in a number of studies,[45,46] the enormous overall clinical profile changes that occur during adolescence and adulthood should also be considered. This is due to the fact that new areas of reduced functionality (social, professional, personal, etc.) often interfere with the "purely academic" difficulties of "grown-up" children with SLD and/or SLI.[47] Furthermore, patterns of strengths and weaknesses change with developmental time and with the influence of other important factors such as instruction.[48] In that age, with at least six year of formal schooling, many of the primary and basic difficulties of a developmental disorder may be less distinct and less sharp, some may be resolved while others may have arisen.[12,34,49,50]

A limited number of studies has compared adolescents with SLD and adolescents with SLI. Goulandris et al compared, among others, adolescents with dyslexia, and adolescents with persistent language impairment through the use of oral and written language skills testing.[34] Oral language tasks disclosed significantly lower performance for SLI adolescents than dyslexics. On tests of written language, dyslexics performed in the same level as SLI adolescents, except for reading comprehension task in which SLI showed more deficits.

In Greece official diagnosis for all developmental disorders is provided only by Diagnostic Centers supervised by the Ministry of Education (KESY) and by Child Psychiatric Units operating in major state hospitals. However, most referrals aim at the identification and diagnosis of dyslexia, due to the facilitative legislative measures regarding academic examinations. According to the Greek legislation students with dyslexia have the right to be examined orally in all academic examinations through Secondary Education and Higher Education and even in the very competitive National Exams for entrance to Higher Education. These accommodations suggest that a large number of adolescents arrive at the diagnostic centers, and many are diagnosed for the first time during adolescence, in order to benefit. Children with SLI are either misdiagnosed as dyslexics in order to benefit or are diagnosed as SLI without, though, further provision for intervention,[51]

given the fact that, generally, not only in Greece, the provision of services in adolescents with SLI seems to be less prevalent.[52]

The objective of this study was to compare the psycho-educational profiles of Greek adolescents with SLI and Greek adolescents with SLD in order to clear the path for diagnosis and intervention.

Material and method

Participants

124 Greek adolescents diagnosed with SLD and 76 Greek adolescents diagnosed with SLI aged 11 to 16 years participated in the study. All participants had been referred, assessed and diagnosed at a University Psychiatry Clinic within a period from 2009 to 2014. Both participants with SLD and SLI had received the diagnosis after completion of the diagnostic procedure conducted by a psychologist, an educational specialist, and a psychiatrist, according to the DSM-IV-TR diagnostic criteria.[53] In Greece, the identification process of SLD[51] is based on the criterion of a severe discrepancy between intellectual ability, as measured by the Greek WISC-III, and academic performance as assessed by non-standardized tools. "Thus, estimation of the discrepancy is based on clinical judgments on the part of the multidisciplinary teams, particularly with respect to the child's reading, spelling, and mathematical performance. It is not confirmed by results of standardized tests measuring academic achievement, partly due to the scarcity of such tests in Greece".[51]

The mean age of both SLD and SLI groups was 13 years and seven months (SD=1.25 and SD=1.23 retrospectively). 91 (73.4%) of the SLD group and 49 (64.5%) of the SLI group were boys. 74 (59.7%) of the SLD group and 46 (60.5) of the SLI group were referred for assessment by the parents, while the rest were referred after suggestion of the teacher or other school staff. All participants were native Greek speakers and were attending mainstream secondary education in Northern Greece. The majority of both groups (82.3% of the SLD group and 86.8% of the SLI group) attended Grades 1, 2 or 3 of the Greek Gymnasium, which is part of the compulsory education, while the rest attended Grades, 1, 2 or 3 of General Lyceum.

IQ measurement

The Greek version of WISC-III[54] verbal and performance scales were used to assess adolescents' general intelligence as well as verbal and non-verbal intelligence.

For the present study the assessment tools used have been constructed for the assessment of children and adolescents referred for educational and learning problems.[55–58] This assessment battery consists of a number of tasks evaluating basic –not curriculum based– skills in the areas of literacy and language. Each task assesses the existence or not of a difficulty in the several skills. The examiner scores one (1) if difficulties were detected or zero (0) if not.

Reading skills

(a) *Decoding skills*: The participants were given a three-paragraph simple literary story to read aloud in order to assess their reading behavior in terms of syllabic or word by word reading, substitutions (omissions, inversions, insertions etc.), line skipping, finger pointing, hesitations, repetition of syllables-words-phrases, acknowledgement of punctuation and pseudowords. The assessment of the participants' decoding skills was based on the "Miscue Analysis"[59] method of reading modified by Bonti.[58]

(b) *Comprehension skills*: The participants' performance was assessed by their ability to answer questions concerning retrieving simple information, making inferences and providing a general title and subtitles for each paragraph from a three-paragraph simple literary story.

(c) *Phonological awareness*: The assessment was based on the phonological awareness subtest of Athena Test[60] along with several other phonemic awareness tasks.[58] Participants were given several oral tasks constructed (e.g. manipulating phonemes, awareness of phoneme – grapheme relationships, discriminating between the concepts "letter," "word," "syllable," "sentence" analysis, synthesis/segmentation of letters– syllables and other phonological tasks such as adding or omitting a letter in order to produce a new word)

(d) *Oral language skills*: Participants were given a number of tasks to assess their oral language skills such as provide synonyms/opposites, story con-

struction, oral word and oral sentence repetition. The tasks were based on Detroit Test of Learning Aptitude[61] modified by Bonti.[58]

Written language skills

In order to assess written language skills participants were asked to write a composition with a given subject. The participants' handwriting, spelling, use of punctuation, structure and content were assessed based on TOWL-4[62] modified by Bonti.[58]

Results

Table 1 summarizes the results for the IQ scores using mean and standard deviation. An independent samples t-test was used to compare scores of the two groups, adolescents with SLI and adolescents with SLD. The observed difference was statistically significant for the total IQ score and for the verbal IQ score, while there was not a statistically significant difference for the practical IQ score. Adolescents with SLD had higher total and verbal IQ scores.

Furthermore, the results of these analyses demonstrated a significant difference between the two groups for the "similarities: and "information" subtests. In these categories adolescents with SLD had greater scores compared to the adolescents diagnosed with SLI (table 1).

The chi-square test, odds ratios and their 95 percent confidence intervals were used to determine statistical significant differences between adolescents with SLI and adolescents with SLD in reading, oral and written language skills.

Regarding reading skills, the two groups were assessed in terms of their decoding, reading comprehension and phonological awareness. In table 2 the results of the relation between decoding and phonological difficulties and group are presented. SLI adolescents were found approximately 4.9 times more likely to exhibit line skipping, 5.9 times more likely to exhibit hesitations, 3.2 times more likely to exhibit repetitions of syllables, words or phrases, and 8.5 times more likely to exhibit non-acknowledgement of punctuation. It was also noted that there were not any statistical differences between the two groups in finger pointing, syllabic reading and decoding pseudowords. Finally, there was no statistically significant relation between difficulties in phonological awareness and group. Almost half adolescents of both groups displayed difficulties with the numbers being higher for adolescents with SLI (table 2).

Similarly, statistical analyses revealed a relation between diagnosis and reading comprehension difficulties. Adolescents with SLI were more likely to have difficulties retrieving simple information questions, making inferences, and giving titles (table 3).

Regarding the relation between the diagnosis and oral language difficulties, statistical differences also emerged (table 4). More specifically, adolescents with SLI were more likely to have difficulties in story reproduction, synonyms/opposites, oral sentence reproduction, and auditory oral word reproduction. It was observed that a very high percentage of SLI adolescents, almost 9/10, encountered difficulties in all tasks assessing oral language skills, except audi-

Table 1. Comparisons between SLI and SLD adolescents in WISC-III scores.

WISC-III scores	SLD		SLI		p
	Mean	SD	Mean	SD	
Total IQ	100.85	11.41	87.71	11.17	0.00
Verbal IQ	103.94	11.40	84.88	11.09	0.00
Practical IQ	96.52	11.81	93.60	14.17	0.12
Information	9.98	2.71	7.39	2.71	0.00
Similarities	11.52	2.62	8.35	2.37	0.00
Vocabulary	7.67	2.73	8.00	2.96	0.43
Filling Images	9.27	2.88	9.01	2.94	0.55
Cubes	10.02	2.77	9.20	2.83	0.05
Object Assembly	10.08	2.78	9.50	2.89	0.16

Table 2. Chi-square test and odds ratio for decoding difficulties and phonological difficulties with respect to group.

Task		f(SLD)	f(SLI)	p	OR* (95% CI**)
Substitutions	No	56.5%	42.1%	0.05	1.78 (1.00–3.18)
	Yes	43.5%	57.9%		
Syllabic reading	No	80.6%	71.1%	0.12	1.70 (0.88–3.31)
	Yes	19.4%	28.9%		
Line skipping	No	92.7%	72.4%	0.00	4.88 (2.10–11.35)
	Yes	7.3%	27.6%		
Finger pointing	No	79.8%	69.7%	0.10	1.72 (0.89–3.32)
	Yes	20.2%	30.3%		
Hesitations	No	29%	6.6%	0.00	5.81 (2.17–15.58)
	Yes	71%	93.4%		
Repetitions of syllables, words & phrases	No	68.5%	40.8%	0.00	3.16 (1.75–5.73)
	Yes	31.5%	59.2%		
Non acknowledgement of punctuation	No	67.7%	19.7%	0.00	8.54 (4.33–16.84)
	Yes	32.3%	80.3%		
Difficulties in decoding pseudowords	No	57.3%	47.4%	0.17	1.49 (0.84–2.64)
	Yes	42.7%	52.6%		
Difficulties in phonological awareness	No	49.2%	35.5%	0.07	1.76 (0.98–3.16)
	Yes	50.8%	64.5%		

*OR=Odds Ratio, **CI=Confidence Interval

Table 3. Chi-square test and odds ratio for reading comprehension difficulties with respect to group.

Task		f(SLD)	f(SLI)	p	OR* (95% CI**)
Difficulties in retrieving simple information questions	No	91.9%	47.4%	0.00	12.67 (5.76–27.85)
	Yes	8.1%	52.6%		
Differences in inferences	No	89.5%	17.9%	0.00	41.38 (18.07–94.76)
	Yes	10.5%	82.9%		
Difficulties in giving titles	No	55.6%	5.3%	0.00	22.58 (7.77–65.67)
	Yes	44.4%	94.7%		

*OR=Odds Ratio, **CI=Confidence Interval

tory word reproduction where there was a difference between the two groups but still only 38.2% of SLI exhibited difficulties (table 4).

In the area of written language skills, statistical analyses disclosed an association between the diagnosis and some of the skills assessed. In particular, it was more likely for SLI adolescents to have poor handwriting, poor content, poor structure and poor use of punctuation in their writing. It was notable that almost all SLI adolescents who participated in the study exhibited the above difficulties, while difficulties in spelling appeared to be a common problem both for SLD and SLI adolescents (table 5).

Discussion

The findings of the present study stress the complex relationship between language disorders (SLI in particular) –undiagnosed or misdiagnosed at an early stage in most cases– and later learning difficulties, as expressed during adolescence. The exceptional-

Table 4. Chi-square test and odds ratio for oral language difficulties with respect to group.

Task		f(SLD)	f(SLI)	p	OR* (95% CI**)
Difficulties in story reproduction	No	96%	10.5%	0.00	202.3 (63.47–643.0)
	Yes	4%	89.5%		
Difficulties in synonyms/opposites	No	79%	9.2%	0.00	37.15 (15.26–90.44)
	Yes	21%	90.8%		
Difficulties in oral sentence reproduction	No	98.4%	3.9%	0.00	1484.33 (242.3–9093)
	Yes	1.6%	96.1%		
Difficulties in auditory oral word reproduction	No	100%	61.8%	0.00	–***
	Yes	0%	38.2%		

*OR=Odds Ratio, **CI=Confidence Interval, ***Cannot be calculated because the relative frequency for SLD adolescents in category No is 0

Table 5. Chi-square test and odds ratio for written language difficulties with respect to group.

Task		f(SLD)	f(SLI)	p	OR* (95% CI**)
Poor handwriting	No	11.3%	0%	0.00	–***
	Yes	88.7%	100%		
Difficulties in spelling	No	80.6%	71.1%	0.12	1.70 (0.87–3.31)
	Yes	19.4%	28.9%		
Poor content	No	45.2%	1.3%	0.00	61.77 (8.32–458.41)
	Yes	54.8%	98.7%		
Poor Structure	No	8.9%	1.3%	0.03	7.30 (5.92–57.73)
	Yes	91.1%	98.7%		
Poor use of punctuation	No	25.8%	13.2%	0.03	2.30 (1.06–4.99)
	Yes	74.2%	86.8%		

*OR=Odds Ratio, **CI=Confidence Interval, ***Cannot be calculated because the relative frequency for SLD adolescents in category No is 0

ity of the study is that the participants were adolescents, compared to the majority of the relevant literature where the focus is on younger children mostly in their first years of typical education.

The results of the present study disclosed that the "centrality of the language factor" in adolescence, also stressed by several researchers,[5,44,63] may strike out in terms of its enormous interference with almost every academic area. This also became apparent in the present findings, as SLI adolescents presented an overall lower –but within normal levels– IQ score (total and verbal) compared to the SLD group, which was a prospective finding, as it came to an agreement with the actual diagnostic criteria of the SLI population according to which SLI children present a below-age level of language development along with a normal non-verbal intelligence score on the WISC-III.[1,64] However, a challenging thought rising from this finding was that the "ostensibly low" total IQ score witnessed in most of the SLI adolescents could be a possible "plasmatic" reflection of the SLI child's ongoing – throughout the school years- struggle with the various academic tasks, due to their "problematic" language skills, rather than vice versa.

With respect to the comparison of the two groups in the reading skills assessed, decoding and phonological awareness skills, the findings revealed that both SLD and SLI adolescents seemed to have overcome their difficulties at a satisfactory level, since none of the two adolescent groups presented significant defects in those areas. This was probably due to

the different manifestation SLD and SLI seem to take through the years.[14,16,17,27,36,37,65]

On the other hand, the particular reading skills in which the SLI group performed lower probably reflected their lack of familiarity with the morphological, grammatical and syntactical structures of written language and possibly poor vocabulary. Once again, this finding revealed the enormous effect of the underpinning of oral language development required for developing adequate literacy skills, "especially by the time of high school, when the language level of written and read material begins to equal and then exceed the spoken system in complexity."[44]

Reviewing the above findings concerning the overall reading skills of the two groups, the following are to be considered: The adequate performance of both groups in phonological skills assessment and in some of the decoding skills assessment also raise questions about the "validity" of the diagnostic terms used both in the research literature as well as in non-school clinical settings to describe types or variations of SLD and SLI diagnoses. For example, the terms "SLD" and "Dyslexia," by definition, presuppose reading disorder, impaired decoding – word attack and phonological skills, as well as poor reading fluency8. Based on our findings, though, it seemed that those characteristics, broadly used to identifying SLD and SLI populations during the early school years, are not 'valid' anymore when it comes to adolescence.

In addition, the fact that the SLD group did not exhibit difficulties in the oral language tasks only partially agrees with the argument that a spoken and/or written language disorder consists a learning disorder and vice versa,[5] since it seems that this might be the case only during the early school years but not at the age of adolescence. The present findings are in accordance with research arguing that SLD adolescents are more likely to have overcome basic skills deficits at that age, albeit they exhibit higher level deficits.[12,50] SLI group performed at a significantly lower level in almost all skills, thus revealing the severity and continuum of their difficulties in the late school years, which is also consistent with other studies.[14,40,41]

The only area in which both SLD and SLI students seemed to encounter similar difficulties is that of written language skills, especially when it came to handwriting, content, structure and use of punctuation. This finding probably reveals that during adolescence, written language skills are still seriously affecting both the SLD and the SLI academic performance. It should also be mentioned that written language skills are the only area in which the SLD group exhibits difficulties at a higher percentage. Of course, even though many of the SLD presented difficulties with the overall content and expressive skills of their written text, the majority of them presented good ideas and sufficient vocabulary, compared to the SLI group who, as already mentioned above, still struggle with most of the written language tasks. This is in agreement with researchers stating that adolescents seem to "outgrow: some of their language and/or learning difficulties through the years.[49,50]

Therefore, our findings are only partially in line with the researchers who have concluded that a large percentage of the SLD and SLI population could be identified as either one or the other or that their difficulties could be a different manifestation of the same developmental language disorder.[17,28,29] The present study offers support to the idea that instead of using the dichotomy of SLI and SLD in diagnosis,– especially in Greece where the former do not receive the appropriate services and assessment and facilitations are not provided – professionals should acknowledge the significant overlap of language impairment and learning difficulties, not only in "language and/or literacy related" academic areas.

Conclusion and future directions

By this study the authors hope they will stimulate researchers on investigating further relationships of language and learning disorders across the life span and efforts on the part of clinicians to support adolescents in receiving the right diagnosis and a meaningful intervention which addresses their needs. Finally, since we have a major scientific interest, as well as a number of studied around the learning profiles and other life areas of adults with SLD, future research could be expanded in the investigation of the language aspects and difficulties this population may encounter.

Ομοιότητες και διαφορές στην ψυχο-εκπαιδευτική αξιολόγηση των εφήβων με ειδικές γλωσσικές διαταραχές και ειδικές μαθησιακές δυσκολίες: Μια απαιτητική διαφοροδιάγνωση

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Η Ειδική Γλωσσική Διαταραχή (SLI) και οι Ειδικές Μαθησιακές Δυσκολίες (SLD) αποτέλεσαν αντικείμενο εκτεταμένης έρευνας, ιδίως όσον αφορά τη μεταξύ τους σχέση. Η εκδήλωση αυτών των διαταραχών στην εφηβεία, ωστόσο, δεν έχει διερευνηθεί διεξοδικά. Στόχος της παρούσας μελέτης ήταν η σύγκριση των δεικτών νοημοσύνης και των γλωσσικών δεξιοτήτων ανάγνωσης, καθώς και προφορικού και γραπτού λόγου των Ελλήνων εφήβων με Ειδική Γλωσσική Διαταραχή και Ελλήνων εφήβων με Ειδικές Μαθησιακές Δυσκολίες, όπως αξιολογήθηκαν κατά τη διάρκεια της ψυχο-εκπαιδευτικής αξιολόγησής τους, προκειμένου να ανοίξει το δρόμο για διάγνωση και θεραπευτική παρέμβαση. 124 Έλληνες έφηβοι διαγνωσμένοι με Ειδικές Μαθησιακές Δυσκολίες και 76 Έλληνες έφηβοι με διάγνωση Ειδικής Γλωσσικής Διαταραχής ηλικίας 11 έως 16 ετών συμμετείχαν στη μελέτη. Όλοι οι συμμετέχοντες αξιολογήθηκαν στην ανάγνωση, τις προφορικές και γραπτές γλωσσικές δεξιότητες και συμμετείχαν σε δοκιμασία νοημοσύνης. Για τον προσδιορισμό στατιστικών σημαντικών διαφορών εφαρμόστηκαν οι δοκιμασίες t-test για ανεξάρτητα δείγματα, x^2-test, λόγος σχετικών πιθανοτήτων και διαστήματα εμπιστοσύνης 95%. Οι αναλύσεις ανέδειξαν διαφορές στις βαθμολογίες δείκτη νοημοσύνης και κάποιες διαφορές στις δεξιότητες που αξιολογήθηκαν, υποδεικνύοντας έτσι, ότι οι έφηβοι με Ειδική Γλωσσική Διαταραχή εμφάνιζαν περισσότερες δυσκολίες στις περισσότερες από τις βασικές ακαδημαϊκές δεξιότητες, ενώ οι δυσκολίες των εφήβων με Ειδικές Μαθησιακές Δυσκολίες περιορίζονταν στις διαταραγμένες δεξιότητες γραπτού λόγου. Συγκεκριμένα, η παρατηρούμενη διαφορά ήταν στατιστικά σημαντική για τη συνολική και λεκτική βαθμολογία του δείκτη νοημοσύνης, καθώς και τις επιμέρους υπο-δοκιμασίες (WISC-III) ομοιοτήτων και πληροφοριών. Ως προς τις δεξιότητες ανάγνωσης, οι έφηβοι με SLI είχαν 4,9 φορές περισσότερες πιθανότητες να παρουσιάσουν παράλειψη γραμμής, 5,8 φορές δισταγμό, 3,2 φορές επαναλήψεις συλλαβών/λέξεων/φράσεων και 8,5 φορές μη-αναγνώριση της στίξης. Όσον αφορά την κατανόηση της ανάγνωσης, είχαν περισσότερες πιθανότητες να δυσκολευτούν να απαντήσουν σε απλές ερωτήσεις ανάκτησης πληροφοριών, να εξάγουν συμπεράσματα και να δώσουν τίτλους. Οι έφηβοι με SLI είχαν επίσης περισσότερες πιθανότητες να αντιμετωπίσουν δυσκολίες σε αναπαραγωγή ιστοριών, συνώνυμα/αντίθετα, αναπαραγωγή

προφορικής πρότασης και ακουστική αναπαραγωγή προφορικής λέξης. Στις γραπτές γλωσσικές δεξιότητες, είχαν περισσότερες πιθανότητες να έχουν κακό γραφικό χαρακτήρα, και ένδεια σε περιεχόμενο, δομή και χρήση σημείων στίξης. Κατά την εφηβεία, η Ειδική Γλωσσική Διαταραχή μπορεί να είναι μια διαφορετική εκδήλωση μίας διαρκούς γλωσσικής διαταραχής, η οποία τελικά εμφανίζεται ως ένας διαφορετικός τύπος Ειδικής Μαθησιακής Δυσκολίας, αλλά με μια πιο γενικευμένη φύση των μαθησιακών δυσκολιών. Αυτό το εύρημα θα πρέπει να ερμηνεύεται με βάση τη διαφοροδιαγνωστική του αξία, ειδικά κατά τη διάρκεια της απαιτητικής περιόδου της εφηβείας.

Λέξεις ευρετηρίου: Ειδικές μαθησιακές δυσκολίες, ειδική γλωσσική διαταραχή, εφηβεία, διάγνωση, εκπαιδευτική αξιολόγηση.

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Review
Ανασκόπηση

Dietary interventions and cognition: A systematic review of clinical trials

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Prevalence of Alzheimer's Disease and other forms of dementia is increasing in accordance with the increase of life expectancy and the resulting world population aging, while an effective pharmaceutical treatment is pending. These facts underline the need for development of targeted interventions that could decrease the incidence of dementia. Dietary supplementation, especially sources of ω-3 fatty acids and polyphenols such as fish oil and blueberries respectively, have been reported to have a beneficial effect on cognitive functioning. The aim of this review is to summarize the most recent findings of clinical studies investigating the effect of dietary supplementation on cognitive performance and identify potential effective interventions. For this purpose, PubMed, Scopus and Google Scholar research was conducted and a total of ten studies met the selection criteria. Four of these studies investigated the effect of ω-3 fatty acid supplementation. Two of these presented significant benefits in certain domains of cognitive functions (such as working memory, space imagery efficiency perceptual speed), in full scale IQ as well as prevention of hippocampal atrophy while the remaining two did not report any improvements. Two more studies investigated the effect of polyphenol supplementation and reported minor benefits in spatial memory as well as enhanced stimulation of certain brain regions. One study compared the effect of fish oil and blueberry supplementation as well as their combination and presented cognitive benefits for both fish oil and blueberries but not for their simultaneous administration. Finally, three more studies investigated the effect of DW 2009 soybean, ashwagandha and a nutraceutical formulation and reported cognitive benefits in attention, memory and global cognition respectively for their intervention groups. In total, eight studies investigated interventions on people with Mild Cognitive Impairment or Subjective Cognitive Impairment and all of them reported significant cognitive benefits in some cognitive domains. On the contrary, the remaining two studies included individuals with diagnosed dementia reported minimal to hardly any benefits. Conclusively, the interventions of the studies reviewed seem promising for individuals at risk of dementia, but not for those who are already diagnosed with dementia. However, further research is required to validate their effect as well as determine recommended doses.

Key words: Diet, nutrition, dietary supplements, cognition, Alzheimer disease, dementia.

Introduction

Cognitive impairment in the form of Alzheimer's Disease (AD) and other types of dementia, is the main contributor to disability in elderly creating a great burden for both patients and their caregivers.[1,2] Mild Cognitive Impairment (MCI) is defined as a condition between dementia and the expected cognitive decline of normal aging.[3] Subjective Cognitive Impairment (SCI) is defined as the state of self-experience of deterioration in cognitive performance which cannot be detected by objective neuropsychological tests.[4] Both these conditions (MCI and SCI) are associated with elevated risk of progressing to dementia later in life. As there is currently no effective pharmaceutical treatment, there is an imperative need for targeted interventions that could decrease the burden of dementia, especially in the stages preceding it, such as MCI and SCI, as once it is clinically diagnosed there is little prospect for improvement in AD.[5]

Dietary interventions have been studied as a means of preserving cognitive performance in high-risk individuals. Particularly, ω3-fatty acids and polyphenols are associated in many studies with improvement of cognitive function, however they are not the only dietary interventions that are reported to benefit cognitive performance. Docosahexaenoic acid (DHA) and Eicosipentaenoic acid (EPA) are ω-3 fatty acids contained in fish oil. DHA is the main component of the neuronal cell membranes. As a result, it takes part in the cell's ionic exchange and interacts directly with membrane proteins, thus, regulates cells' communication. In addition, DHA and EPA, have been shown in animal models to decrease levels of Aβ amyloid, a molecule that plays a key role in AD.[6,7] What is more, DHA and EPA have been shown to promote anti-inflammatory molecules (leukotrienes, resolvins, neuroprotection D1)[8] as well as reduce brain oxidative stress in animal models.[9] As a result, they are believed to have a major role in regulating inflammation, another key aspect of the pathogenesis of AD. All the mechanisms mentioned above, as well as their proved beneficial effect on cardiovascular system[10] make DHA and EPA a promising intervention for the protection of cognitive function.

Polyphenols, particularly anthocyanins, contained mostly in blueberries, are also believed to have neuroprotective properties.[11] Animal models have shown that blueberry intake may improve age-related cognitive decline in various aspects of cognition. Blueberry supplementation is reported to reduce markers of inflammation and oxidative stress as well as upregulate neurogenesis, neuroplasticity and brain-derived neurotrophic factor.[12] Furthermore, they are reported to benefit cardiovascular health via their anti-inflammatory properties, thus further benefiting brain tissues by improving their blood perfusion.[13,14] As a conclusion, blueberry supplementation can also be considered a promising dietary intervention for the protection of cognitive functioning.

The aim of this systematic review was to summarize and synthesize data from the latest randomized trials investigating the effect of dietary interventions on cognitive functions and the population that is expected to have the most benefit from these interventions.

Material and method

Literature selection criteria

The inclusion criteria for this review were the following: The studies had to be randomized placebo controlled clinical trials, published in English but with no limitation regarding the country where they were conducted, published in the past five years.

Outcome measures

The outcomes of interest were all the different domains of cognitive functioning measured by various neuropsychological tests.

Search strategy

A literature search on PubMed, Scopus and Google Scholar, was conducted. The search query included the following terms: ″diet″, "dietary supplementation" ″cognitive function″, "cognition", "cognitive impairment". Additional methodological filters were also used: publication in the past 5 years, studies in humans only, and clinical trial design. Figure 1 summarizes the search strategy that was followed.

Data extraction

At first, papers were manually checked based on the Title and Abstract screening and then full text reading for the final selection decision.

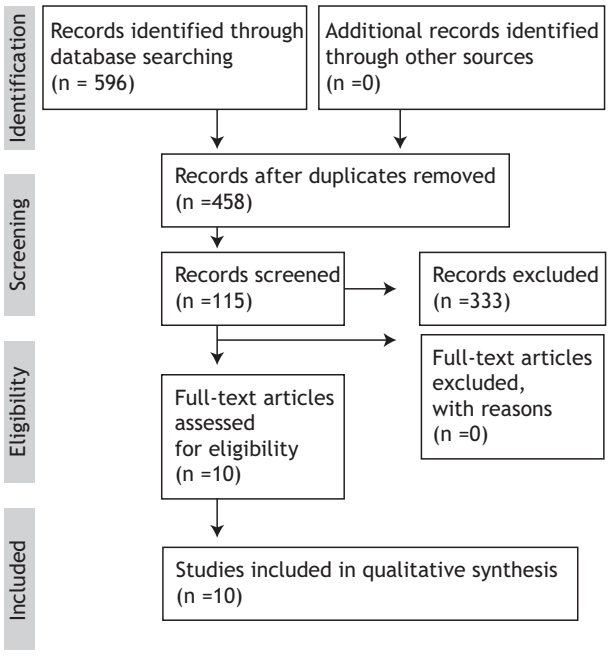

Figure 1. PRISMA Diagram of search strategy for the review of intervention trials of dietary supplementation on cognitive performance.

Quality assessment

Risk of bias for each study was estimated using the Cochrane Rob 2 tool (table 1).

Findings of the studies

The search query provided 596 results. After Title and Abstract screening and then full text reading a total of ten studies met all the criteria mentioned above. Table 2 summarizes the characteristics of the studies that were selected

Based on the literature review of the ten studies that met the inclusion criteria, it seems that certain nutrients from fish and berries have significant effects on cognitive function. In particular, Zhang et al[15] conducted a double blind RCT in order to investigate the effect of DHA supplementation on cognitive function and hippocampal volume in 240 community-living individuals, aged over 65, with MCI. The participants were randomized into two groups and were administered either a daily dose of 2 mg of an algal-derived DHA or identical placebo. Cognitive outcomes included the Chinese version of Wechsler Adult Intelligence Scale Revised (WAIS-RC) and hippocampal volume measured via MRI. Age-appropriate norms from the Chinese standardization were used for the calculation of the Intelligence Quotient (IQ) and index scores. The results showed significant benefits for the intervention group (IG) compared to the control group (CG) in Full Scale IQ as well as in some subcategories of WAIS-RC. Furthermore, total volume of hippocampus increased for IG while it decreased for CG.

Table 1. Risk of bias estimated with Cochrane Rob 2 tool.

Year	Study	Estimated risk of bias
2017	Boespflug EL	High Risk
2016	Hashimoto M	High Risk
2016	Zhang YP	Low Risk
2016	Lamport DJ	Low Risk
2017	Choudhary D	Low Risk
2017	Bo Y	Low Risk
2019	Hwang YH	Low Risk
2015	Remington R	Low Risk
2017	Mcnamara RK	Some Concerns
2015	Eriksdotter M	Some Concerns

In another double-blind randomized trial, Bo et al[16] investigated the effect of n-3 polysaturated fatty acids (PUFAs) supplementation on cognitive function in 86 Chinese elders with MCI. The participants were randomized into two groups and received either a daily dose of 480 mg DHA and 720 mg of EPA in a capsule form or isocaloric capsules of placebo (olive oil) respectively. Cognitive functioning was assessed with Basic Cognitive Aptitude Tests (BCATs). The results showed that the intervention group had significant improvement in their BCATs' scores ($p<0.001$). In particular, perceptual speed, space imagery efficiency and working memory were significantly improved ($p<0.05$).

Eriksdotter et al[17] investigated the effect of a 6-month administration of ω-3 fatty acid supplementation on the cognitive function of 174 patients with AD in relation to their lipidaemic profiler. Participants were randomized to receive four capsules daily each containing either 430 mg of DHA and 150 mg of EPA or placebo). Cognitive outcomes included Mini

Table 2. Characteristics of studies included in the systematic review

Year	Study	Type of study	Sample	Intervention	Cognitive Outcomes	Significant benefit for intervention
2016	Zhang YP et al[15]	RCT	N=240, Over 65 with MCI	DHA vs Placebo	WAIS RC Hippocampal Volume	Yes
2017	Bo Y[16]	RCT	N=86 Chinese elderly with MCI	n-3PUFAs vs placebo	BCATs	Yes
2015	Eriksdotter M[17]	RCT	N=174, over 75 with Alzheimer's Disease	DHA vs Placebo	MMSE and ADAS-cog	No
2016	Hashimoto M[18]	RCT	N=75, individuals over 88 in nursing homes with Dementia	DHA vs Placebo	MMSE and HDS-R	No
2017	Mcnamara RK[19]	RCT	N=76, individuals over 62 with SCI	Fish oil vs blueberries vs Both vs Placebo	Various neuropsychological tests***	Yes
2016	Lamport DJ[20]	Randomized crossover trial	n=24 healthy mothers aged (40–50)	CGJ vs placebo2017	Battery of cognitive tests, Driving Performance. BP	Yes
2017	Boespflug EL[21]	RCT	N=16, individuals over 68 with MCI	Blueberry vs placebo	WM task and BOLD signal in fMRI	Yes
2019	Hwang YH[22]	RCT	N=100, individuals with MCI	DW 2009 vs placebo	Various neuropsychological tests**	Yes
2017	Choudhary D[23]	RCT	N=50, adults with MCI	Ashwagandha vs Placebo	Battery of cognitive Tests	Yes
2015	Remington R[24]	RCT	N=34, individuals with MCI	NF vs placebo	DRS and CLOX1	Yes

*Population included in the analysis, **Verbal Learning Test (VLT), Auditory Continuous Performance Test (ACPT) and Digit Span Test (DST), ***Dysexecutive Questionnaire (DEX), Trail Making Test part A and B, Controlled Oral Word Production procedures, an alternate form of Hopkins Verbal Learning Test

List of abbreviations: RCT: Randomized Controlled Trial, MCI: Mild Cognitive Impairment, BCATs: Basic Cognitive Aptitude Tests, WM: Working Memory, DHA: Docosahexaenoic acid, NF: nutraceutical formulation, DW: Lactobacillus plantarum C29-fermented soybean, CGJ: Concord Grape Juice, BP: Blood Pressure

Mental State Examination (MMSE) and Alzheimer's Disease Assessment Scale (ADAS-cog). The results showed a significant positive association between changes in plasma DHA levels and ADAS-cog total scores (p=0.016) No association was found between changes in plasma fatty acid profile and MMSE score. In addition, there was no association at baseline between gender and fatty acid profile or severity of dementia and fatty acid profile.

In a single blind randomized interventional study Hashimoto et al[18] investigated the effect of DHA intervention on cognitive functioning and mental health of 75 Japanese elderly individuals (aged over 88) living in care facilities and nursing homes. Participants were randomized in two groups and received 1720 mg dose of DHA or placebo. Cognitive outcomes included MMSE score and Dementia Scale-Revised (HDS-R). The results showed no significant difference in the total scores of the tests. However, when test subitems were analyzed the mean changes in subitem "Registration" of MMSE at six and twelve months was significantly higher in the intervention group (p=0.01). Moreover, total MMSE score was positively correlated with DHA levels (r=0.247, p=0.031).

Conducting a 24-week randomized, double-blind, placebo-controlled trial Mcnamara et al[19] investigated the effect of fish oil, blueberry and combined supplementation on cognitive functioning of 94 adults with SCI, aged 62–80. Participants were randomized into four groups: FO (fish oil+placebo powder, n=21), BB (blueberry powder+placebo oil, n=24), FO+BB (fish oil+ blueberry powder, n=26) and PL (placebo oil+ placebo powder, n=23). Cognitive outcomes included the Dysexecutive Questionnaire (DEX), Trail Making Test part A and B, Controlled Oral Word Production procedures to evaluate lexical access under constraint, as well as alternate form of Hopkins Verbal Learning Test. The results showed that FO groups (p=0.03) and BB groups (0.05) reported significantly fewer cognitive symptoms. In addition, the BB groups showed improved memory discrimination (p=0.04).

In a randomized crossover trial that was conducted by Lamport et al[20] the effect of Concord grape juice (CGJ), a rich source of polyphenols, was investigated for its effect on cognitive functioning and driving performance of 25 British mothers of preteens, aged 40–50. They were randomized into one of two crossovers (CGJ then placebo or placebo then CGJ) and consumed daily 355 mL of CGJ or placebo. The cognitive outcomes included a 45-min cognitive test battery which comprised 7 subtests. The results showed a significant improvement in immediate spatial memory and in driving performance, following the CGJ intervention.

In another double-blind, randomized, placebo-controlled trial Boespflug et al[21] investigated the effect of blueberry supplementation on neural activation and working memory in 16 individuals with MCI aged over 68. Participants were randomized into two groups of eight and received twice daily either 12.5 g of blueberry powder or identical placebo. The outcome of this study was a working memory task with a simultaneous record of Blood Oxygen Level-Dependent (BOLD) signal in fMRI while the participants performed this test. The results showed no difference in the performance of the two groups. However, BOLD signal indicated increased activation in certain regions during the working memory task in the blueberry treated group (p<0.01).

In a double-blind, mutli-centre, placebo-controlled clinical trial, Hwang et al[22] investigated the effect of Lactobacillus plantarum C29-fermented soybean (DW2009), a source of isoflavones, on the cognitive function of 100 individuals with MCI, aged 55–85. Participants were randomized to receive either a daily dose of 800 mg of DW2009 in the form of a capsule or indistinguishable placebo. Cognitive outcomes Verbal Learning Test (VLT), Auditory Continuous Performance Test (ACPT) and Digit Span Test (DST). The results showed significantly greater improvement in the combined cognitive function for the intervention group compared to placebo, especially in the attention domain composite score.

Conducting a prospective, randomized, double blind, placebo-controlled trial, Choudhary et al[23] investigated the effect of ashwagandha, a herb used in the Indian Ayurvedic system, on cognitive function of 50 adults with MCI. The participants were randomized into two groups and were administered twice daily either a dose of 300 mg of ashwagandha root extract or identical placebo. Cognitive outcomes included tests assessing memory (immediate

memory, general memory, working memory), visuospatial processing and response, executive function, and attention capabilities. The results showed significant improvements for the ashwagandha treatment compared to placebo in immediate and general memory, executive function as well as in attention and information processing speed, while they were inconclusive for the working memory index.

In a randomized clinical trial Remington et al[24] investigated the effect of a nutraceutical formulation (NF) containing folate, alpha-tocopherol, vitamin B12, S-adenosyl methionine, N-acetyl cysteine and acetyl-L-carnitine on the cognitive functioning of 34 people with MCI. Participants were randomized to receive either NF in the form of a tablet or indistinguishable placebo. Cognitive function was assessed with Dementia Rating Scale (DRS) and CLOX-1. The results showed that participants who received NF had a significant increase in their DRS results in three months and maintained this level of improvement for the duration of the study. After the intervention period there was and open label extension during which placebo group switched to NF. In this period the placebo group presented significant improvement (Cohen's Effect Size=0.35).

Discussion

Ω-3 fatty acids

Four studies investigated the effect of ω-3 fatty acid supplementation on the cognitive functioning compared to a placebo. The results of these studies seemed to vary depending on their population. Specifically, the two studies that included patients with dementia did not report a substantial improvement of cognitive function compared to their control groups. On the contrary, the studies that included patients with MCI reported significant improvements for their intervention groups compared to their control groups in their primary outcomes, WAIS-RC and BCATs respectively. These findings may indicate that once dementia and especially AD have been diagnosed little can be done to reverse their progress.

Polyphenol supplementation

Two studies investigated the effect of polyphenol supplementation, in the form of concord grape juice and blueberries, on the cognitive function of healthy mothers and patients with MCI respectively. Lamport et al with a crossover trial, reported significant benefits in certain categories of the battery tests that were used as primary outcome, as well as in the additional driving task, between the intervention and the control group. Although this study is limited by its small size (n=24), it makes an interesting implication that healthy individuals may also benefit by its intervention. On the other hand, Boespflug et al did not report any benefit in the performance of the WM task, however the intervention altered significantly BOLD signal in fMRI. Although these findings do not show a beneficial effect on cognitive function, they suggest that the intervention may increase stimulation of certain brain regions providing some interesting insights in mechanisms that may be further researched.

Blueberry versus fish oil

One trial investigated the effect of blueberry and fish oil supplementation as well as their combination. This study included participants over 62 years old with SCI. This study reported cognitive benefits for both the fish oil and the blueberry. Furthermore, the blueberry group also reported improved memory discrimination at the end of the intervention period. Surprisingly, the combined group, that received both fish oil and blueberry supplementation, not only did it not present a higher accumulative effect, but it actually showed no cognitive benefit. A potential explanation provided by the researchers, suggests that the reason for this surprising finding lies in the common molecular path that both ω-3 fatty acids and flavonoids follow. Specifically, both interventions' effects are suggested to be mediated by the transcription factor NF-E-2 related factor 2 (Nrf2). Although acute activation of Nrf2 is believed to have an anti-inflammatory effect, prolonged and excessive upregulation may have the opposite effect.

Ashwagandha, DW and NF

Three more studies reported the effect of interventions that do not belong in the categories of ω-3 fatty acids or polyphenols. All these studies included participants with MCI and based their hypothesis on previous studies. Ashwagandha is a herb that has long been used in the Ayurvedic system to improve cognition. DW2009 is a soybean fermented with C29

lactobacillus plantarum that has been shown to have cognitive enhancing and anti-inflammatory properties in animal models. NF is a nutraceutical formulation containing folate, alpha tocopherol, B12, S-adenosyl methionine, N-acetylcysteine and acetyl-L-carnitine, that has been shown to improve cognition in patients with AD. All these interventions showed significant cognitive benefits for their intervention groups. Although their mechanisms are not clarified, an anti-inflammatory action is common is ground for them. Moreover, DW2009 is reported to alter gut microbiota, which could be another potential mechanism given the rising number of studies that report a link between gut microbiota and various neurodegenerative diseases. Their findings may seem promising, however there is still need for further research and validation as the data supporting their effect in published literature is far less compared to ω-3 fatty acids and flavonoids.

Conclusions

Ω-3 fatty acids and flavonoid rich foods such as blueberries are consistently reported to have a significant protective role in cognitive functioning, when administered to people at risk but not with a clinical diagnosis of dementia. In addition, more interventions, such as ashwagandha, DW2009 and NF, look promising, but there is still need for further research and validation.

Διατροφικές παρεμβάσεις και νοητική λειτουργία: Συστηματική ανασκόπηση κλινικών μελετών

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Η επίπτωση της νόσου Alzheimer και άλλων μορφών άνοιας αυξάνεται ως αποτέλεσμα της αύξησης του προσδόκιμου επιβίωσης και της επακόλουθης γήρανσης του παγκόσμιου πληθυσμού, ενώ δεν υφίσταται ακόμα κάποια αποτελεσματική φαρμακευτική αγωγή. Τα παραπάνω αναδεικνύουν την ανάγκη για εύρεση στοχευμένων παρεμβάσεων που θα μπορούσαν να μειώσουν την επίπτωση της άνοιας. Διάφορα διατροφικά συμπληρώματα, και ειδικά πηγές ω-3 λιπαρών και πολυφαινολών όπως το ιχθυέλαιο και τα blueberries αντιστοίχως καταγράφεται πως εμφανίζουν ευεργετική επίδραση στη νοητική λειτουργία. Ο σκοπός αυτής της ανασκόπησης είναι να συνοψίσει τα πιο πρόσφατα ευρήματα από κλινικές μελέτες που μελέτησαν το αποτέλεσμα διατροφικών συμπληρωμάτων στη γνωστική λειτουργία και να αναδείξει πιθανές αποτελεσματικές παρεμβάσεις. Για τον σκοπό αυτόν, πραγματοποιήθηκε αναζήτηση στις βάσεις δεδομένων PubMed, Scopus, Google Scholar και επιλέχθηκαν συνολικά δέκα άρθρα που πληρούσαν τα κριτήρια για να συμπεριληφθούν. Τέσσερεις μελέτες ερεύνησαν την επίδραση της χορήγησης ω-3 λιπαρών οξέων. Δύο από αυτές τις μελέτες παρουσίασαν σημαντικά οφέλη σε συγκεκριμένους τομείς της νοητικής λειτουργίας (όπως η λειτουργική μνήμη, η χωρική αντίληψη και η ταχύτητα αντίληψης), στο νοητικό πηλίκο καθώς και στην πρόληψη της ατροφίας του ιπποκάμπου, ενώ οι υπόλοιπες δύο δεν κατέγραψαν καθόλου οφέλη. Δύο ακόμα μελέτες διερεύνησαν την επίδραση της χορήγησης πολυφαινολών και παρουσίασαν ελάσσονα οφέλη στη χωρική μνήμη καθώς και αυξημένη διέγερση συγκεκριμένων εγκεφαλικών περιοχών. Μία μελέτη συνέκρινε την επίδραση της χορή-

γησης ιχθυελαίων και blueberries καθώς και του συνδυασμού τους και παρουσίασε οφέλη και για τις δύο κατηγορίες όχι όμως και για τη συνδυασμένη χορήγησή τους. Τέλος, τρεις ακόμα μελέτες διερεύνησαν την επίδραση της χορήγησης ashwagandha, 2009 DW σόγιας καθώς και μιας διατροφικής φόρμουλας και ανέφεραν οφέλη σε προσοχή, μνήμη και συνολική νοητική λειτουργία αντιστοίχως. Συνολικά, οκτώ μελέτες διερεύνησαν παρεμβάσεις σε πληθυσμούς με Ήπια Νοητική Διαταραχή ή Υποκειμενική Νοητική Διαταραχή και όλες παρουσίασαν σημαντικά νοητικά οφέλη συγκριτικά με την εικονική θεραπεία. Αντιθέτως, οι δύο εναπομείνασες μελέτες που συμπεριέλαβαν πληθυσμούς με διαγνωσμένη άνοια δεν παρουσίασαν σημαντικά οφέλη. Συμπερασματικά, οι παρεμβάσεις των μελετών που ανασκοπήθηκαν, φαίνονται ελπιδοφόρες, για πληθυσμούς όμως με αυξημένο κίνδυνο εμφάνισης άνοιας και όχι γι' αυτούς που είναι ήδη διαγνωσμένοι με αυτή. Παρόλ' αυτά, χρειάζεται περαιτέρω έρευνα προκειμένου να επικυρώσει την αποτελεσματικότητά τους καθώς και να καθορίσει τις συνιστώμενες δοσολογίες.

Λέξεις ευρετηρίου: Διατροφή, δίαιτα, διατροφικά συμπληρώματα, νοητική λειτουργία, νόσος Alzheimer, άνοια.

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Review
Ανασκόπηση

Pregnancy and the perinatal period: The impact of attachment theory

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In this study we aim to examine and integrate current literature and research on attachment theory and its expression on the specific field of obstetrics, the perinatal period. In medical settings in general, and in the field of obstetrics in specific, which is the clinical domain of the perinatal period, obstetricians, psychiatrists and psychologists frequently come across antenatal and postnatal concerns, psychological issues as well as psychiatric symptomatology stemming from closer observation of the women's difficulties or reported by women themselves. To our theoretical understanding, in order to better comprehend these psychosocial concerns and deliver timely and more effective personalized interventions to women in need, it is of paramount importance to thoroughly examine the perspective proposed by attachment theory, as it was first developed by child psychiatrist-psychoanalyst John Bowlby and the newest theoretical developments on the field that followed. Subtypes of attachment style are examined regarding their imprint on the benefits, as well as the difficulties and risks they place on women during each perinatal stage. "Insecurity" in attachment and significant relationships appears to render women more vulnerable in relation to psychopathology, according to the literature reviewed. As far as the psychopathological symptoms and disorders related to the perinatal period and their connection to attachment are concerned, the main disorders and symptomatology discussed in the literature appear to be perinatal depression, postpartum depression, perinatal anxiety and posttraumatic stress symptoms related to pregnancy and labor. At the same time, "security" attachment-wise, tangibly observed in couples with strong intramarital support, appears to offer a protective barrier against adversities by enabling securely attached women to remain calmer and make better use of their emotional and social resources throughout the challenging perinatal phase. Consequently, mothers-to-be become more eligible to overcome perinatal difficulties by the use of patterns of behavior that promote their well-being. Through the in-depth review of the current literature on attachment theory available and the tools of knowledge it equips us with, we attempted to assemble the real challenges and needs deriv-

ing from the demands that pregnancy, labor and the postpartum place on new mothers, as well as the way close relationships become affected by or, correspondingly, can be positively used in order to protect and shield women and their families from acknowledged stressful perinatal phases.

Key words: Attachment theory, perinatal period, pregnancy, psychological adjustment.

Introduction

The perinatal period, including in its realm the timeline around the beginning of pregnancy and reaching the postpartum period, can be effectively conceptualized as the main pathway to the transition to parenthood. The World Health Organization connects closely the maternal health with the perinatal health, pointing to their combined effects to the coveted outcome, the birth of a healthy neonate.[1]

Maternal perinatal psychological health constitutes a domain where psychologists, psychiatrists and obstetricians cooperatively combine their theoretical as well as clinical practical knowledge and the deriving preventive guidelines, in order to screen, support, treat and follow-up populations at risk for psychiatric symptoms and disorders or burdened with psychological vulnerabilities, which could affect pregnancy and maternal health and well-being.

The theory of attachment, as first conceptualized by the renowned child psychiatrist John Bowlby,[2–4] stemming from the fields of developmental psychology and psychoanalysis, proposes a theoretical scaffolding in order to support the aforementioned needs of both patients and clinicians. The perspective it offers allows a thorough understanding of how initial childhood experiences may explain and are responsible for the structuring of relating to other individuals. During pregnancy and early parenthood, the new mother's attachment patterns become of great importance in order to understand how the quality of her own relating to her mother and her partner proclaim the process of adaptation to her pregnancy and the evolving future attachment to her baby.

In the current project we aspire to re-examine the way in which attachment theory and its evolution has contributed in the comprehension of the difficulties and challenges a number of expectant women appear to undergo during pregnancy and postnatally, while aiming to appraise the existing literature in order to examine closely the effects of attachment in each perinatal stage: pregnancy, childbirth and the postpartum period.

Attachment theory, an overview

Attachment theory, as initially developed by child psychiatrist and psychoanalyst John Bowlby, describes how and why children form bonds with their parents and caregivers, in a quest for closeness, stability, emotional health and security.[2–4] Following a Darwinian paradigm, Bowlby theorized attachment behavior as an evolutionary function, a "biological predisposition to form relationships",[5] facilitating adaptation and survival.[6,7]

In conditions of distress, infants elicit comfort and security from their caregivers through signals –like crying and crawling towards the caregiver– that inform the adults concerning their needs.[8] When caregivers provide prompt and appropriate relief, while being steadily and continuously responsive to care and attention - seeking behaviors stemming from the child, they gradually develop and ensure a secure proximity baseline and style of attachment for the child. This mode of relating provides the socio-emotional supplies the infant will use later in life in order to navigate the social world.[9,10]

These primal interactions between the child and the caregiver are internalized early in life and guide the infant's expectations and evaluations of relationship experiences through the individual's lifespan. They provide the scaffolding for the emergence of relationship patterns even across generations.[11] This is mediated by the development of "internal working models"[12–14] –or "relational prototypes" according to Bowlby– mental constructs of the self and of significant others which depict the way attachment and proximity have been experienced and perceived by each individual since infancy. These internal working models can be further expanded to the formation of adult romantic attachment styles, guided by the attachment scaffolding developed during infancy,

childhood and adolescence. Attachment dynamics tend to remain stable throughout adulthood.[15]

Additionally, the attachment theory paradigm[16] assumes that disruption of these early relationships may bear a far-reaching adverse effect on the individual's future important relationships, mental and physical health, health – related behaviors, overall well-being and personality development; it appears that even minor interruptions and separation experiences, jeopardize the development of a healthy and secure bond.

Given the sociocultural markers of his era, to provide examples while raising awareness concerning the lifelong effect of attachment theory, Bowlby identified specific stress-prone situations which yield in activation of the attachment mechanism. Hence, he acknowledged marriage, childbearing and parenting as milestones of life events that induce the arousal of affectionate attachments and relationships, exposing women to greater risk for emotional stress and depression, if the fulfillment of their emotional needs rest unmet.

The main styles of attachment, secure and insecure, primarily describe the mode of parental responsiveness and stability of caregiving. Following Bowlby's innovative framework, Ainsworth and her colleagues developed an experiment, namely the "Strange Situation" procedure, based on observing children's interaction patterns and immediate responses upon separation from their main caregiver, their mother. Given the observational remarks and results of the experimental work of the "Strange Situation", Ainsworth suggested an inclusive and extended proposal regarding the attachment style categorization. Grounded on the caregiver's past responsiveness to the infant's signals for comfort and attention, infants' behaviors, as observed during the experimental procedure, reflect the degree and quality of proximity and caregiving received and established so far.[7,17,18]

Based on Ainsworth's work therefore, styles of attachment can be further subcategorized in three consequent categories: "secure, insecure ambivalent and insecure avoidant". More explicitly, infants showing distress when separated from their caregiver, allowing being comforted when being reunited with them and actively exploring surroundings and environment in the presence of the attachment figure are identified as having a "secure" attachment style. Infants appearing anxious upon separation from their caregiver and ambivalent when the attachment figure returns, while having difficulty exploring their surroundings due to preoccupation with the caregiver, are identified as belonging to the "insecure ambivalent" category. Finally, infants appearing neither distressed or anxious when the caregiver leaves the room, avoiding contact with them upon their return and directing all attention to the surroundings not including the attachment figure, were identified as "insecure avoidant".

Researchers further expanding on the theory of attachment and drawing on the hypothesis that the internal working models regarding attachment tend to remain stable throughout adulthood, used the same line of thought to understand and observe the development and maintenance of romantic relationships. Hazan and Shaver, first proposed how secure, anxious and avoidant adults possibly felt in romantic relationships portraying their past personal experiences in attachment.[19]

Bartholomew & Horowitz,[20] developing on the theory of adult attachment proposed the addition of a fourth style named "fearful avoidant", describing adults appearing dismissive of being romantically involved while actually being fearful of relationships. The same theorists, further exploring attachment theory research, focused in the observation of attachment and relating in the adult romantic relationships. They suggested that the individual's attachment style reflects positive or negative thoughts regarding the self and others. The four-category classification deriving from the aforementioned postulation describes a "secure, preoccupied, dismissive and fearful/disorganized" attachment style, based on whether or not individuals consider themselves to be worthy of receiving support from their partner in a romantic relationship and positive or negative representations of the partner's accessibility and responsiveness upon their quests for intimacy and support.

Thus a securely attached individual scores positively in both reflections of self and other, a preoccupied person thinks low of their self-worthiness while high concerning their positive regard of the other, the dismissive individual bears a positive image of the self and a negative or distrustful view of the other and

finally the fearful/disorganized individual thinks in negative terms regarding both the self and the other in terms of self-worthiness in receiving comfort and support, as well as accessibility and responsiveness from the part of the other.[20,21]

The neurobiology of attachment

The psychological description of the attachment processes so far described is ostensibly founded on the neurobiological depiction of the formation of attachment and early development. All interactions the infant experiences, given the starting point when the maternal-infant relationship begins in utero and continues through preschool age, involve neurobiological events that form mental and medical health later in life.[22]

It has been demonstrated that higher quality parenting in the first three months can amend the risk of disorganised attachment due to maternal postpartum depression. A firmer understanding of the neurobiological changes attachment variability is eligible to provoke to the evolving infant brain, may prove crucial for child and developmental psychologists' educational needs in order for them to aptly identify the possible ways to intervene in cases where the mother-infant relationship is at risk.[23]

The hypothalamic-pituitary-adrenal (HPA) axis and the reward neurocircuitry have been shown to play significant roles in the attachment formation process and in psychiatric illness morbidity later in adulthood.[22]

The developing fetal hypothalamus is affected by the maternal HPA axis, and at the time of birth, it is fully developed.[24] It functions through the HPA axis to produce cortisol, the body's main stress hormone, by the adreanl glands. In high doses, cortisol may have a neurotoxic effect on the rest of the developing brain by inhibiting neuronal connections, while at low levels it promotes neuronal development and growth through neuroplasticity.[25] It becomes evident that modulation of cortisol during the crucial period of neural development is of great importance. What has been shown to decrease cortisol levels is oxytocin and social interaction, making maternal physical and emotional connection very important regarding their effect on the developing brain and neuroplasticity.[26,27] To further support the cruciality of the effect of the HPA axis hyperactivity, Quirin, Pruessner & Kuhl, demonstrated that adults with insecure attachment exhibit a hyperactive HPA axis and cortisol response to acute stress, highlighting the long lasting parameter of these effects.[28]

During those first critical three months of the infant's life and development, the hippocampus, which is part of the limbic system and involved in spatial and emotional memory, fully develops. As the hippocampus further matures it enables the baby to remember and recognize his/her mother, emotionally engage with her and safeguard their bond.[29] According to Chambers, the hippocampus has a large number of glucocorticoid receptors causing significant sensitivity to stress and cortisol production through the HPA axis. When the baby becomes stressed, higher doses of cortisol produced may cause neurotoxicity to the hippocampus.[22] Experiments performed on rat pups regarding early separation of the neonates from their mothers, as a parallel of human circumstances of neglect, showed these pups developed smaller hippocampi compared to non-separated pups.[30,31]

In the case of the amygdala, it seems that influences on its development begin even before birth, as it has been shown that both maternal depression and cortisol imbalances in the mother during pregnancy negatively affect the size of the child's amygdala later in life.[32]

Further expanding on the neurobiological imprints that follow attachment interactions each individual develops with their caregivers very early in life, oxytocin hormone proves important regarding attachment and synchronocity between mother and her child. According to Levine et al,[33] there is scientific evidence that in pregnant mothers, an increase in maternal oxytocin levels during the first and second trimester of gestation may predict mothering behaviour after labor. More specifically, in securely attached individuals, oxytocin levels are generally higher and tend to increase during stressful circumstances, during play and they also tend to synchronize during interaction with one's infant.[34] However, in the case of women with a history of child abuse, they appear to show lower levels of oxytocin in general and during pregnancy and the postpartum period.[35]

Summarizing the above, synchronicity of oxytocin between parents and their children affects the child's oxytocin regulation; when child and parent interact, oxytocin levels normally increase in both parents and child. In the case of securely attached mothers, oxytocin levels rise during play with their children, while, interestingly, in the case of insecurely attached mothers, their oxytocin levels decrease with play.[36]

Secure attachment has also been correlated with higher oxytocin levels and decreased subjective stress during an acutely stressful situation, further highlighting the soothing effect of ocytocin and security in attachment regarding stress regulation.[34]

Attachment during adulthood; a protective shield or risk factor during adversities

Ongoing research indicates that during adulthood, symbolic threats reactivate the attachment style system of the individual experiencing stressful personal incidents. In such instances, the individual tends to seek security through proximity to others, in order to reproduce security – related representations that will induce and reestablish calmness and balance.[37]

A rich body of literature and research indicate that adult attachment orientations play a significant role in relation to the coping strategies individuals will use in these cases of intense stress and hardships.[8,9]

Drawing on the continuum of attachment, securely attached individuals are expected to appraise stressful events with optimism, while seeking practical and emotional help, relief and support from trusted significant others.[38,39] By doing so, they achieve to remain relatively stable and comforted through adversities, to regulate stress, to minimize distress but also to enhance bonds and the depth and quality of relating with those they feel connected and attached to.

Along similar lines, individuals under the anxious category of attachment tend to feel uncertain about whether they will be loved and emotionally supported and protected; they may overemphasize threats and become emotional, intrusive or persistent in their attempts to gain protection and attention from others.[8]

Finally, individuals with an avoidant type of attachment and relating will have a tendency to lean on their own capacities to support themselves (what Bowlby called "compulsive self-reliance")[16] and not openly seek help from significant others, even though this could be valuable regarding their survival and wellbeing. They may also be prone to alleviate stress by cognitively suppressing hazard related thoughts and thus avoid expressing distress and despair.[9,39–41]

From all the above it becomes evident that every individual's history of attachment as well as current styles of relating with significant others and family members may prove either promoting to a more resilient and "healthy" self – with openly expressing emotional and practical support needs, i.e. willingly discussing somatic symptoms and thus searching for health care solutions promptly – or maladaptive, with denying distress and vulnerability to self, hiding needs from others and thus reaching a point when one may end up losing the opportunity to receive timely help from professionals.

Attachment and its application in medical settings: the field of Obstetrics

In medical settings, and more specifically in the field of obstetrics being the focus field for the current approach, attachment theory has long been studied by psychologists, psychiatrists and health care providers in relation to women's experiences, seek of care, use of resources provided and compliance to therapeutic advice.[42]

Under the perspective of attachment theory, clinicians in the fields of psychology and obstetrics aim to understand in a better way how to respond to presenting symptomatology and needs of their patients, through bearing into consideration the possible patterns and manners through which patients interact with significant and important others, including their health care providers. The main intention, therefore, is to intensify patient satisfaction, treatment adherence and more balanced patient-doctor relationships.

Narrowing our interest in the field of obstetrics and the perinatal period, another long-term goal equally important is how to make good use of the benefits of attachment theory as described, while at the same time highlighting the possible risk factors it entails.

Perinatal period and attachment correlates

In confirmation to the position that attachment tends to become intergenerationally transmitted, (16) simply put, repeated throughout generations, we understand the cruciality of its protective role in the future psychological health of the newborn babies whose mothers experienced responsive and sensitive relationships with their own mothers. Therefore, we consider the onset of pregnancy as the beginning of a new attachment relationship.

A large body of literature[43–51] helps us understand that a securely attached to her own mother expectant mother, and thus subsequently securely attached to her husband/partner woman, bears very good chances to develop positive attitudes regarding pregnancy and her unborn baby.

Those positive attitudes include self-confidence regarding motherhood and caregiving, warm, caring and positive stance towards her unborn baby, better pregnancy health practices (i.e. compliance and adherence to medical counseling and guidelines) and thus better neonatal outcomes, quality of early mother-child interactions after birth and safeguarding of her psychological well-being during the demanding phase of pregnancy and the post-natal period.

Contrary to the benefits of attachment security, attachment insecurity is largely considered a risk factor towards the development of negative feelings, difficulties in adherence to the maternal role and impediments regarding the prenatal attachment process with the baby, especially for the age groups of teenage mothers (under 18 years of age) and women older than 35 years of age.[52,53]

Apart from maternal age, more factors influencing the development of mother-baby prenatal attachment during the perinatal period, according to data gathered through the Maternal-Fetal Attachment Scale (MFAS) and the Maternal Antenatal Emotional Attachment Scale (MAEAS)[45] are: surrogacy (surrogate mothers avoid attaching themselves to the fetus as a means of self-protection), psychological factors such as the presence of depression or anxiety or both and, of course, social support. The latter parameter coincides well with the aforementioned element of the cruciality of marital/relationship satisfaction and the quality of the perceived relationship with the baby's father, in relation to the maternal capacity to establish spontaneous attachment to her unborn child/neonate. According to Laxton-Kane & Slade, other factors such as parity, cultural differences, in vitro fertilization (IVF), perinatal loss and high risk of pregnancy, did not appear to result in differences regarding prenatal attachment.[45]

Embracing deeper into the issue of how prenatal attachment may be negatively influenced, and thus enable better prevention measures for high-risk mother-child incidents, previous studies have additionally indicated the presence of poor fetal health, poor maternal physical health and prenatal distress as potential risk factors.[54,55]

In relation to maternal physical condition in specific, it seems that a cyclical mechanism of poor maternal attachment history, pregnancy health problems and psychological distress, all of which possibly related to antenatal depression, place an alarmingly adverse environment for the developing fetus and its chances for receiving a healthy attachment to the mother, pre and postnatally.[56]

Attachment styles and coping strategies during pregnancy

Mikulincer & Florian,[50] provided us with a robust description of how secure, anxious and avoidant expectant mothers tend to behave in attachment style terms, as juxtaposed in the first chapters of this review, regarding the characteristics of reactions each style entails- in relation to their forming relationship with their unborn child.

Considering the fetus as the "other" with whom the new mother is about to come closely related to and the actual state of pregnancy as a stressful period and life change that energizes attachment patterns, the authors[50] observed the following:

- Securely attached women/new mothers showed positive bonding to their fetus from the start (first trimester) and remained stably positively attached to their unborn baby throughout the whole gestational period, scaffolding positive postnatal attachment foundations.
- Anxiously attached women were characterized with compromised mental health during pregnancy. However, their bonding to their fetus improved as pregnancy progressed, so that they finally

reached similar levels of attachment disposition as securely attached women did, and finally,

- Avoidant women tended to deal with pregnancy related issues and distress by using by default distancing as a coping mechanism, while they reported better mental health and bonding sentiments towards their child solely during the second trimester of pregnancy.

Maternal mental health during pregnancy and its impact on mother-infant attachment

It has so far become clear that the attachment patterns each individual develops and most probably stably exerts throughout his/her life emanate from past or primal experiences with their own caregivers. Sometimes these patterns are "intergenerationally transmitted"[16] from traumatized adults who in their turn proved incapable to become sentimentally available for their own infant when time was due. Thus, trauma and attachment proliferate across generations in the case of some families, as parents with a trauma history (abuse, neglect, abandonment, parental death) tend to pass on their behavioral symptomatology to their children, either by direct exposure due to their lack of capacity to healthily relate to their child, or by repeating their own painful past.[57,58]

It is very common for children of trauma survivors to develop mental health and behavioral issues such as depressive symptomatology, anxiety, psychosomatic problems, sentiments of guilt and aggressive tendencies.[59,60]

Such difficult family histories, along with issues in attachment frequently provide an unfortunate baseline for psychopathology. In cases when the protective role of attachment and care is impinged, the trauma that lays across the generations becomes a risk factor regarding future and new attachment relationships to-be-formed, such as the one expectant mothers will form with their child, rendering prenatal attachment a task difficult to fulfill, contrary to expectant mothers who reported no interpersonal traumatic history.[58]

Pregnant women with insecure attachment styles appear to be at greater risk for postpartum depression, as numerous studies indicate.[61–65]

It seems that when insecure schemas of thought and correspondent behavioral patterns become activated, this contributes to pregnant women under the insecure classification feeling more anxious or depressed throughout the whole perinatal period. Especially those belonging to the "fearful" category, reportedly experienced greater distress during the perinatal period.

Under the insecurely attached woman's perspective, even events like a healthy pregnancy may be presumed as stressful and anxiety provoking, as cognitions about relationships including interpersonal dissatisfaction, low self-esteem and negative mood become dominant, rendering them susceptible to feeling alone, isolated and depressed.[61,65]

Conversely, under the umbrella of secure attachment, everyday hassles and challenges of pregnancy become easily tackled by women falling under this category, as they are shielded by cognitions and behaviors that enable them to protect themselves from mood imbalance and disturbance.

Childbirth, partner support and pain management in terms of attachment

Childbirth can be a rather stressful event and experience for the mother-to-be, especially in the case of first-time mothers. Apart from the physical stress the body naturally goes through, a biological procedure that promotes labor as such, the new mother experiences a relative loss of control in relation to her body, as clinicians and professionals take medical charge of the procedure, in cooperation with the mother. Main sources of anxiety related to childbirth include fear of labor as well as the pregnant woman's sense of self-efficacy, namely, her ability and readiness to control labor pain.[66,67]

In some cases, as it has been reported, severe childbirth anxiety has been associated with obstetric complications that include prolonged labor, instrumental vaginal deliveries or the choice of caesarian sections.[68,69]

Partner influence and presence in terms of quality support and not of physical presence solely, becomes especially significant as research shows, with respect to pain management during and after delivery.[70] Given the fact that partners today are increasingly likely to be present and available during and after labor as such, their role and contribution be-

comes paramount, as main providers of support and security for the new mother.[71,72]

It becomes noteworthy that especially the securely attached individuals appear to benefit the most from the fact that their partners support them and alleviate a stressful labor, by contributing to a less painful experience. Security in attachment, therefore, not only promotes a healthier and stronger ability of coping with stressful situations, as indicated by leading researchers in the field of attachment theory,[37,50] but also bears a positive physical impact on the individual, a biological expression of its effect. At the other end of the spectrum, it is notable, as literature indicates,[73] that individuals under the insecure attachment patterns appear to report more pain and catastrophizing thoughts centered around pain, thus feeling less in control of it than securely attached people do.

The postpartum period, transition to parenthood and attachment derivatives

According to Hawkins, Cowan & Cowan,[74] the transition to parenthood tends to enhance personal as well as marital well-being, in a percentage of couples.

At the same time, however, this transitional phase can sometimes bring turmoil and prove rather challenging.[75] It could be assessed as a major indicator of how the newly formed family will cope from this moment forward, with the family's foundations basically structured around the resources it has been psychologically equipped with, as well as the attachment parameters each member represents and belongs to.

In many cases,[76–78] as reported in Simpson's et al[63] research work, it has been postulated that sometimes new parents experience declines and ruptures in marital satisfaction and companionate activities, as well as an increase in personal difficulties and intramarital conflict during the first months postpartum, a case especially true for new mothers having dealt with the perinatal exigencies of pregnancy, childbirth and the rigorous childcare of the newborn.

Results on the specific domain of attachment expressions postpartum,[79] indicated that in the case of insecure ambivalent women, where support from their partner was perceived as low antenatally, larger declines in the spousal support and marital satisfaction were reported during the postnatal transition to parenthood period. Conversely, given the same attachment subcategory, women with insecure ambivalent attachment style reporting higher levels of perceived antenatal spousal support, consequently reported higher levels of marital satisfaction and postnatal support from their husband.

In the case of dismissive individuals on the other hand, where a tendency to elude connectedness and intimacy is often associated with the specific attachment style, literature[79] highlights a "less close and less supportive orientation" towards children in childrearing in general, a default psychological mechanism characterizing the difficulties insecure-avoidant individuals unfortunately face, as Bowlby first postulated.[16] Along similar lines, Priel & Besser,[80] suggested that it seems plausible that mothers tend to structure their perinatal attachment orientations towards their newborn-child based on the templates of attachment they have already formed in relation to the baby's father, their partner. This indicates that representations and, therefore, the beginning of attachment with their unborn baby bears strong similarities to maternal descriptions of the baby's father.[80,81]

Psychopathology during the postpartum period

In addition, the postpartum period and the stressors of the adjustment to parenthood often proves a difficult period for women running greater risk for psychopathological expressions.

Post-partum depression (PPD), posttraumatic stress symptoms, perinatal anxiety and depressive symptoms in general, seem to be rather prominent among pregnant women.[82] Risk factors for postpartum depression usually include recent stressful events, lack of social and interpersonal support and low self-esteem.[83] Another risk factor for the development of PPD includes women under the insecure attachment category, who appear to be more vulnerable regarding the stressors of the new life transition that activates the insecure attachment worldview, schemas and associated behaviors.[61,63,65,73,84,85]

In the case of posttraumatic stress symptoms, their main starting point usually includes a baseline of prior psychiatric problems, stressful or frightening labor experiences, difficulties in delivery, painful or traumatic

incidents around childbirth and medical implications regarding the mother or the baby's health.[86,87]

Further studies also indicate a comorbidity of depressive symptoms as well as concordance of symptomatology within couples, with paternal symptomatology following his attendance at his partner's labor.[88,89]

Once again, it seems that social and emotional intramarital support within the couple's dynamics help alleviate the difficulties and restore well-being and feelings of stability, for both partners, whereas insecurity in attachment augments dissatisfaction concerning spousal support and understanding, thus enabling psychopathology to be maintained to unaltered states.[87,90–92]

Conclusion

Throughout the current paper we attempted a juxtaposition of the literature regarding the major issue of the expression of the attachment theory, during the crucial and demanding life-altering phase of the perinatal period. Viewed through the lens of symbolizing a significant period including stressful personal milestones as far as the mother-to-be is concerned, it is believed and has been observed reactivating her attachment style system, thus reproducing thought representations and behaviors indicative and representative of her own personal attachment style patterns.

Overall, attachment security and stability within the mother and father-to-be couple appeared to provide a promising baseline regarding the formation of positive attitudes towards the unborn baby and pregnancy, namely self-confidence regarding caregiving and motherhood, a caring positive stance towards the fetus/newborn baby and better adherence to medical counseling.

Contrary to these benefits, insecurity in attachment seemed to contribute to a risky emotional environment for the emergence of difficulties in adjustment to pregnancy and the maternal role, negatively affecting the developing mother-child bond.[11,43,45–50]

Regarding childbirth, the main stress - provoking issues are centered around pain management and the woman's self-efficacy in relation to overcoming the distress labor sometimes invokes.[93] Once again, under the condition of security in attachment partner support through physical and emotional presence seems to positively influence the alleviation of labor pain,[70] whereas insecurity in partnership and attachment appears to adversely impact on the pain variable, as well as the catastrophizing thoughts the mother-to-be reproduces around it.[73]

In the postpartum period, where many couples seem to experience marital conflict and dissatisfaction due to the overall difficulties of the demanding perinatal phase,[76–78] the attachment subcategory of insecure-ambivalent women receiving poor spousal support were faced with the larger declines in marital satisfaction postnatally.

As far as the psychopathological facets related to the perinatal period and their connection to attachment are concerned the main disorders and symptomatology discussed in the literature appear to be depression, depressive symptoms, postpartum depression, perinatal anxiety, and posttraumatic stress symptoms related to pregnancy and labor.[61–65,84–87] Insecurity in attachment and significant relationships brought women in a more vulnerable position which created a baseline for psychopathology to emerge or set it in.

At the same time, security in attachment tangibly observed in couples with strong intramarital support, as bibliography sturdily forecasts, places a protective shield against disturbances, by enabling securely attached women to remain calmer and make better use of their emotional and social resources in order to navigate themselves through the perinatal challenging phase and consequently overcome possible difficulties by the use of patterns of behavior that promote their well-being.[90–92]

The future of research but also of ostensible clinical work in the rich and profound field of attachment theory is essentially centered around how to make better use of the risk indicators it provides by highlighting the special needs and vulnerabilities individuals face, given their categorical correspondence to each type of attachment style.

Apart from appreciating and further enhancing the benefits of its impact on the stability and well-being of the securely attached individuals, it becomes crucial for psychologists, psychiatrists and obstetricians to develop techniques or clinical protocols aimed at enabling the less fortunate individuals belonging to the insecure attachment category to be equally sup-

ported and alleviated during times of distress, by preventing stress-augmenting parameters that activate alarms and by proposing targeted therapeutic interventions.

Everyone ostensibly benefits from efforts aligned with the protective role, or, on the other side, addressing the demands of the difficulties in attachment, as future psychological health of the individuals (new mothers in this case, their neonates and families, as well as the relationships and cooperation with the medical staff) bears better chances to elicit more adaptive-to-needs responses from close others thus hopefully ameliorate the challenges experienced so far.

In a more positive and hopeful tone, interventions that enable the transmission of security in attachment intergenerationally,[16,94] protecting the psychological well-being of the newborn babies and their relationships with their parents is of paramount importance and could fuel future research aspirations via applicable attachment-oriented therapeutic actions and psychoeducation.

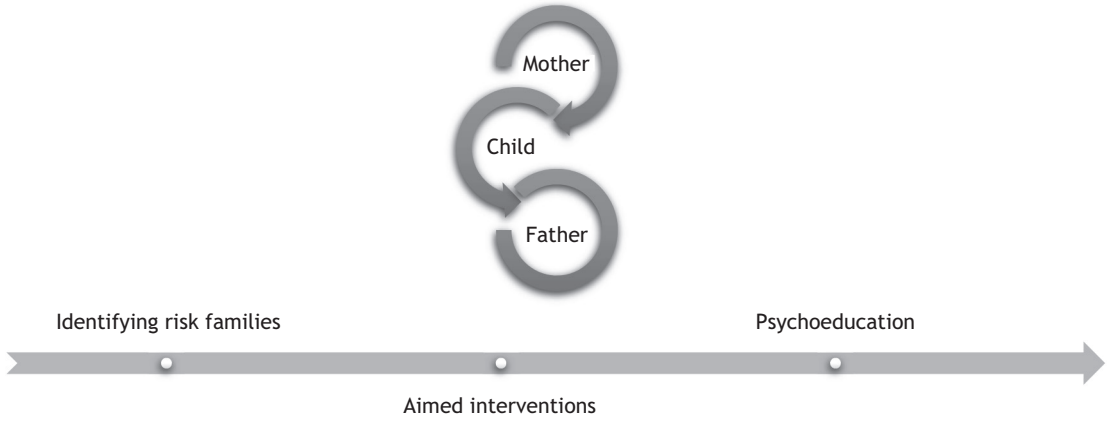

Figure 1. Helping families through integrated use of attachment theory.

Εγκυμοσύνη και περιγεννητική περίοδος: Η επίδραση της θεωρίας δεσμού

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Η παρούσα εργασία έχει ως στόχο να εξετάσει σε βάθος την τρέχουσα βιβλιογραφία κι έρευνα αναφορικά με την παρουσία και επίδραση της θεωρίας δεσμού (attachment theory) στον τομέα της περιγεννητικής περιόδου και της σύγχρονης βιοψυχοκοινωνικής προσέγγισης της επιτόκου. Κατά

την κλινική πράξη και στον τομέα της μαιευτικής-γυναικολογίας εν προκειμένω ως το βασικό πλαίσιο παρατήρησης των περιγεννητικών ζητημάτων, μαιευτήρες, ψυχίατροι και ψυχολόγοι συχνά έρχονται αντιμέτωποι με περιστατικά γυναικών που αναφέρουν δυσκολίες ψυχολογικής προσαρμογής ή την παρουσία ψυχιατρικής συμπτωματολογίας λόγω των προβλημάτων που προκύπτουν κατά τη διάρκεια της εγκυμοσύνης και της λοχείας. Βασιζόμενοι στην επιστημονική βάση και εφαρμογή της θεωρίας του δεσμού, όπως αυτή αρχικά αναπτύχθηκε από τον παιδοψυχίατρο-ψυχαναλυτή John Bowlby και κατόπιν εξελίχθηκε από τους συνεχιστές του, προτείνουμε ως εργαλεία καλύτερης κατανόησης των ψυχολογικών παραμέτρων που παρατηρούνται κατά την περιγεννητική περίοδο, τις προδιαγραφές, τα οφέλη και τις πιθανές δυσκολίες που προσδιορίζονται και προβλέπονται ανά τύπο δεσμού (attachment style). Η εκτενής βιβλιογραφική ανασκόπηση έδειξε πως η παρουσία «ανασφαλούς τύπου δεσμού» ενδέχεται να συμβάλει στην ανάδυση συμπτωμάτων ψυχοπαθολογίας σε γυναίκες που διανύουν την περίοδο της εγκυμοσύνης αλλά και κατά τη μεταγεννητική περίοδο. Ψυχιατρικές διαταραχές που παρατηρούνται και καταγράφονται κατά την περιγεννητική περίοδο και φαίνεται να σχετίζονται με τις υποκατηγορίες ανασφαλούς δεσμού, είναι η περιγεννητική κατάθλιψη, η επιλόχεια κατάθλιψη, η διαταραχή άγχους και η διαταραχή μετατραυματικού στρες, με συμπτώματα σχετιζόμενα με την εγκυμοσύνη και τον τοκετό. Παράλληλα, η παρουσία «ασφαλούς τύπου δεσμού» που παρατηρείται σε ζευγάρια με δυνατό ποιοτικά δεσμό μεταξύ των δύο συντρόφων, φαίνεται να δρα προστατευτικά απέναντι σε ενδεχόμενες αντιξοότητες, βοηθώντας τις γυναίκες που ανήκουν στην κατηγορία του ασφαλούς δεσμού, να αντλήσουν από το απόθεμα των συναισθηματικών τους πόρων και του ευρύτερου καλώς έχειν της ψυχικής τους κατάστασης. Συνεπώς είναι αρτιότερα εξοπλισμένες να προετοιμαστούν με αποτελεσματικότερο τρόπο απέναντι στις πιθανές δυσκολίες που η περιγεννητική περίοδος συχνά συνεπάγεται. Σκοπός μας είναι η ενίσχυση των παρεχόμενων υπηρεσιών υγείας από τους επαγγελματίες που εστιάζουν στην περιγεννητική περίοδο (ψυχολόγοι, ψυχίατροι, μαιευτήρες-γυναικολόγοι) μέσω της συμβολής του θεωρητικού αυτού πλαισίου ώστε να εμπλουτιστούν περαιτέρω οι θεραπευτικές και ψυχοθεραπευτικές παρεμβάσεις σε πληθυσμούς των εγκύων, των νέων μητέρων αλλά και των οικογενειών τους.

Λέξεις ευρετηρίου: Θεωρία δεσμού, περιγεννητική περίοδος, εγκυμοσύνη, ψυχολογική προσαρμογή.

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Letter to the Editor
Επιστολή προς τη Σύνταξη

Conceptual controversies regarding the terms Gender and Sex

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I have been following lately the debate that has emerged in the Greek and International literature regarding the terms "sex" and "gender". Traditionally, the term sex refers to the assignment of gender at birth by the obstetrician or the midwife, based on the external genitalia. They declared the sex of the newly born baby as male or female, without any other graduation. Therefore, the term sex is a non-flexible categorical concept. It is quite difficult to comprehend the sense of "a little bit male" or "a little bit female", as it is not possible to comprehend the sense of "a little bit pregnant".

At the preface of the DSM-5, the American Psychiatric Association presents its intention to propose the new dimensional classification of psychiatric symptoms, based on the rationale that the present categorical system does not apply to clinical and research needs.[1] In that case, it would be difficult (if not impossible), to achieve the graduation of the term "sex", which refers to the biological definition.

Therefore, in my opinion, there is a trend to bring back the term "gender", where a graduation is feasible, and dimensions can be applied. The term gender contains the social definition of reproductive behavior, which can be detached from the reproductive role per se.

The term "gender" was recalled in 1955 by the well-known author J. Money, in order to indicate the social effect on the development of the behavior of "sex", and therefore he used at the beginning the term G-I/R, which refers to Gender Identity Role.[2]

The short term "gender", that derived from the abovementioned term, came up the recent years and was widely used, putting aside the clearly biologic, non-flexible term "sex".[3] The term "gender" spread in the literature, especially when it was adopted by the women rights' movement (feminism), in order to highlight the "socially constructed" differences between the two sexes.

The term "gender" has given ground to the proposal of several graduations of sexual behavior. Zucker et al at in a recent article report ten different gender behaviors such as agender, gender nonconforming, gender neutral, gender variant, gender queer, gender dysphoria, gender fluid, bigender, nonbinary, transgender.[4] Several of these identities overlap considerably.

In the Greek language, the use of the terms gender and sex (male, female) may lead to confusion, since they are attributed by the same term «φύλο».

Additionally, the use of the term “gender” in Greek as «γένος» may also lead to misunderstandings and misconceptions, as it happened lately with the law regarding the name change in the identification card (ID) of people with gender dysphoria. Actually, the latter term refers to masculinity or femininity, as these are configured by the social background.

In my opinion, in the Greek language it would be better to use the term “gender” referring to its social delineation, meaning “social sex”, social sex identity. The term “gender dysphoria” could be attributed as «δυσφορία γένους», in order to distance itself from the dysphoria caused by dysplasias of genitalia which are refered to in the literature as “intersexual disorders“ and could be referred to as “disorders of the development of genitalia“.

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Εννοιολογικές αντιπαραθέσεις σχετικά με τους όρους Gender και Sex

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Παρακολουθώ αρκετό καιρό τη διαμάχη που έχει ξεσπάσει στη διεθνή και ελληνική βιβλιογραφία ανάμεσα στους όρους "sex" και "gender". Παραδοσιακά ο όρος sex προσδιορίζει το φύλο που καθοριζόταν από την εμφάνιση των γεννητικών οργάνων και συνήθως το δήλωνε ο μαιευτήρας, η μαία, ή παλαιότερα η μαμή. Όλοι αυτοί δήλωναν το φύλο του νεογέννητου ως άρρεν ή θήλυ. Δεν υπήρχε άλλη διαβάθμιση. Ο όρος φύλο (sex) είναι επομένως μια ανελαστική κατηγορική έννοια. Δεν νοείται εύκολα, το «ολίγον άρρεν» ή «ολίγον θήλυ» όπως δεν νοείται το «ολίγον έγκυος».

Στον πρόλογο του DSM-5 αναφέρεται ότι η πρόθεση της Αμερικανικής Ψυχιατρικής Εταιρείας είναι να προτείνει τη νέα διαστασιακή ταξινόμηση των ψυχικών συμπτωμάτων με το σκεπτικό ότι το ήδη υπάρχον κατηγορικό σύστημα δεν ανταποκρίνεται στις κλινικές και ερευνητικές ανάγκες.[1] Σε αυτή την περίπτωση θα είναι δύσκολο (αν όχι αδύνατον) να διαβαθμιστεί ο όρος "sex" που παραπέμπει στον βιολογικό προσδιορισμό του φύλου.

Έχω, λοιπόν, την εντύπωση ότι ανασύρεται από το παρελθόν ο όρος "gender" (γένος) που μπορεί να διαβαθμιστεί, δηλαδή να έχει διαστάσεις γιατί εξ ορισμού περιέχει τον κοινωνικό προσδιορισμό της αναπαραγωγικής συμπεριφοράς, που όμως έχει αποδεσμευτεί από τον καθαυτό αναπαραγωγικό ρόλο.

Ο όρος "gender" ανακλήθηκε από τη γραμματική το 1955 από τον γνωστό στη βιβλιογραφία, J. Money για να δηλώσει ακριβώς την κοινωνική επίδραση στη διαμόρφωση της συμπεριφοράς του "sex" γι' αυτό αρχικά τον χρησιμοποίησε ως G-I/R που σημαίνει Gender Identity Role.[2]

Από αυτόν τον όρο τα τελευταία χρόνια απομονώθηκε ο όρος "gender" και έχει αρχίσει να χρησιμοποιείται παντού υποβαθμίζοντας τον σαφώς βιολογικό, ανελαστικό όρο "sex".[3] Ο όρος εξαπλώθηκε πάρα πολύ όταν υιοθετήθηκε από το φεμινιστικό κίνημα για να τονίσει τις «κοινωνικά κατασκευασμένες» διαφορές μεταξύ των δύο φύλων.

Με τη χρήση του όρου "gender" έχουν προταθεί πολλές διαβαθμίσεις της σεξουαλικής συμπεριφοράς. Σε πρόσφατο άρθρο των Zucker et al αναφέρονται δέκα ξεχωριστές gender συμπεριφορές όπως agender, gender nonconforming, gender neutral, gender variant, gender queer, gender dysphoria, gender fluid, bigender, nonbinary, transgender.[4] Πολλές από αυτές τις ταυτότητες αλληλοεπικαλύπτονται.

Στην ελληνική γλώσσα η απόδοση του όρου gender ως φύλο είναι προφανές ότι θα οδηγήσει σε σύγχυση με τον όρο sex (άρρεν, θήλυ) που επίσης αποδίδεται ως φύλο. Η απόδοση του gender με τον όρο γένος επίσης οδηγεί σε δυσνοήσεις ή παρανοήσεις, όπως έγινε πρόσφατα με τον νόμο για αλλαγή του δελτίου ταυτότητας στα άτομα με δυσφορία ταυτότητας φύλου. Στην ουσία του ο όρος καθορίζει την αρρενωπότητα/θηλυκότητα όπως διαμορφώνεται από το κοινωνικό πλαίσιο.

Κατά τη γνώμη μας, στην ελληνική γλώσσα θα διευκόλυνε η απόδοση του gender με τον κοινωνικό του προσδιορισμό, δηλαδή κοινωνικό φύλο και κατ' επέκταση κοινωνική ταυτότητα φύλου. Ως προς τον όρο gender dysphoria θα μπορούσε να αποδοθεί ως δυσφορία γένους για να πάρει αποστάσεις από τη δυσφορία που γεννούν οι δυσπλασίες των γεννητικών οργάνων που αναφέρονται στη βιβλιογραφία ως intersexual desorders και στα Ελληνικά θα μπορούσε να γίνει «διαταραχές διάπλασης γεννητικών οργάνων».

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