OFFICIAL JOURNAL OF THE ITALIAN SOCIETY OF PSYCHOPATHOLOGY

Journal of PSYCHOPATHOLOGY

Editor-in-chief: Alessandro Rossi

VOL. 23 - 2017

NUMBER 1

Cited in: EMBASE - Excerpta Medica Database ▪ Index Copernicus ▪ PsycINFO ▪ SCOPUS ▪ Google Scholar

Periodico trimestrale POSTE ITALIANE SpA - Spedizione in Abbonamento Postale - D.L. 353/2003 conv.in L.27/02/2004 n°46 art.1, comma 1, DCB PISA - Aut. Trib. di Pisa n. 9 del 03/06/95 - February - ISSN 2284-0249 (Print) ISSN 2499-6904 (Online)

www.jpsychopathol.it

PACINI EDITORE MEDICINA

OFFICIAL JOURNAL OF THE ITALIAN SOCIETY OF PSYCHOPATHOLOGY

Journal of PSYCHOPATHOLOGY

VOLUME 23
MARCH 2017
NUMBER 1

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Cited in:
EMBASE - Excerpta Medica Database ▪ Index Copernicus
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JOURNAL OF PSYCHOPATHOLOGY
2017;23:1-3

Loneliness: a new psychopathological dimension?

The concept of loneliness has raised the interest of cultural and scientific community. For instance the existentialist thought considered loneliness as one of the main features of human existence: every single human being "alone", abandoned in the world and forced to experience the consciousness of finitude and the awareness of nothingness. Jean-Paul Sartre, Simone de Beauvoir, Gabriel Marcel, Albert Camus, in their literary production, faced this fundamental theme identifying the core of the concept in the controversial relationship with other subjects undermined by the presumed impossibility of an authentic communication.

With Fromm-Reichmann and Melanie Klein, the concept of loneliness was brought into consideration in the field of psychology and psychoanalysis since it began to be conceptualized as a factor playing a determinant role in psychic dynamics.

The first studies about loneliness mainly focused on its phenomenology and correlates [1,2]. Later on, a consistent number of attempts directed to the drawing of a precise definition of the concept has been produced. In this direction, some important aspects need to be highlighted [3].

Three different concepts may be derived from this complex scenario: social isolation, loneliness and solitude (Fig. 1). Social isolation may be defined as the objective lack of contact between an individual and the society, this may include a concrete detachment from family or friends, and the willful avoidance of any contact with other people despite the arising of such opportunities. Social isolation is related to anxiety, stress and depression [4]. Loneliness has been defined in several ways, firstly as an unpleasant feeling of separateness [5], alienation [6] and social disconnectedness following the dissatisfaction of the human need for intimacy [7]. Secondly, Peplau and Perlman (1981) [8] hypothesized loneliness as the result of the subjective discrepancy between desired and achieved levels of social relations; this attributional approach explained how a person could feel lonely even when among other people. Although related to factors such as marital status, frequency of contact with friends and family, and participation in voluntary organizations, loneliness is not reducible to these social factors or to simply being alone [9]. In some cases, a subject may enjoy being alone experiencing that pleasant state defined by Tillich in 1959 as solitude. A state of solitude is thought to favor the reaching of solitary meditations and experiences of personal growth. Sometimes it may be moreover helpful for a temporary pause from the incessant demands of modern society. According to Tillich solitude expresses the glory of being alone, whereas loneliness expresses the pain of feeling alone [10].

A huge contradiction of our time is the coexistence of a spreading feeling of loneliness and the "hyperconnected condition" in western societies. Even if internet and social networks offer many more possibilities of contacts among people, the feeling of loneliness seems to be higher and higher in our countries. To this regard, the existence of an internet paradox has been suggested: research on this field has shown that internet addiction may cause negative effect on psychological wellbeing such as depression and loneliness. On the contrary it has been argued that loneli-

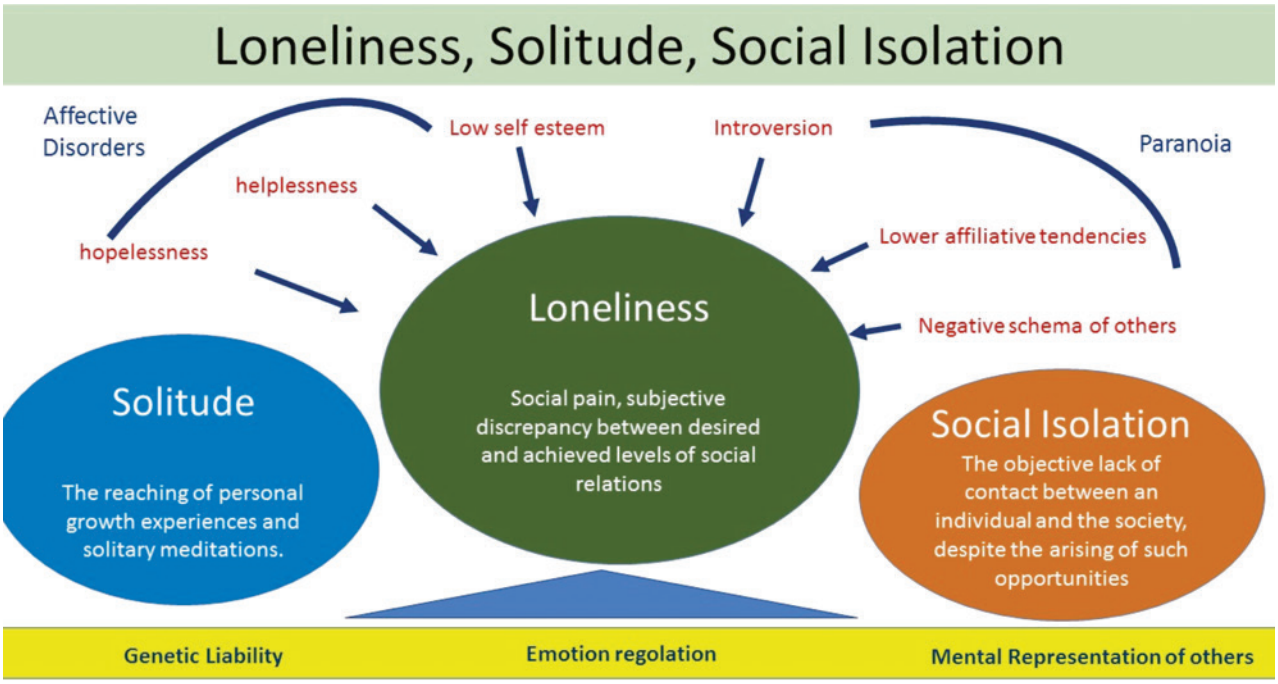

FIGURE 1.

ness and depression may be themselves causal factors of addictive or problematic use of internet [11]. Lonely and depressed individuals, in facts, may prefer online interaction, perceiving online communication as less risky and easier than face-to-face communication because of its greater anonymity. To this regard, we could hypothesize a bidirectional relationship between internet use and mental health.

There is some agreement on considering loneliness as a risk factor for physical and mental health. Loneliness has been recognized as a risk factor for stroke, obesity, increased vascular resistance, hypertension, premature mortality, sleep disturbances [12].

In addition, loneliness contributes to various mental disorders such as depressive symptomatology, aggressive behaviors, social anxiety, and impulsivity.

In particular, several studies have investigated the relationship between depression and loneliness (Fig. 1). It has been suggested that loneliness and depression are correlated but clearly different constructs, although both probably share some common origins [13]. Similarly, Cacioppo & Patrick [14] hypothesized a fundamental difference between loneliness and depressive dimension. The first being associated to a social pain, following the lack of desired close relationships, and represented by a real, concrete motivational drive, similar to hunger or sleepiness. On the contrary, depression is a pervasive feeling of sadness, hopelessness and helplessness, or dejection. To sum up, as Cacioppo & Patrick (2008) pointed out: "loneliness reflects how you feel about your relationships. Depression reflects how you feel, period" [15]. Obviously, there are some data on the reciprocal interplay between loneliness and depression, with the consequences of each increasing the other. Also loneliness and paranoia are related, even if their relationship is still not clear (Fig. 1). Recently, a review has hypothesized a social-cognitive model in which loneliness contributes to the lack of interpersonal trust. In particular, according to the authors, the association between loneliness and paranoia is mediated by negative schema of others and a low perceived social support [16].

In conclusion, we propose the idea that loneliness represents an often underestimated new psychopathological dimension whose clinical core and boundaries need further investigations. However, although still inconclusive, literature has shown that clinicians should pay attention to this aspect in order to improve the clinical evaluation of the patients and eventually to set up prevention strategies.

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Original article

JOURNAL OF PSYCHOPATHOLOGY
2017;23:4-11

Distress tolerance, psychosocial burden and its relationship with self-management of health in women with mental illness

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Summary

Objectives

This study was conducted to explore the relationship of caregiving burden, distress tolerance with self-health care among mentally ill women.

Materials and Methods

One hundred women with mental illness in remission were recruited and assessed with socio-demographic and clinical proforma, Distress tolerance Scale (DTS), Zarit Caregiver Burden Interview (ZBI) and Effective Consumer Scale (EC-17).

Results

The mean score of ZBI was 28.34 (SD ± 19.83) and the mean score of DTS scale was 26.80 (SD ± 12.07). The score of DTS was higher in the group without a family history of substance (MU = 532.50, Z = -2.711, p =.007), in those who remained untreated before the on-going treatment (χ^2 = 4.811, df = 1, p = .028), and in the group with less awareness of treatment options (χ^2 = 4.072, df = 1, p = .044). Linear multiple regression analysis (R^2 = .215, df = 4, F = 6.443, Sig. = .000), showed that the score on burden was negatively associated with tolerance (β = -.416, t =-2.368, p =.020), and positively associated with regulation (β = .596, t = 3.742, p =.000) sub-scale of ZBI. The level burden was negatively associated (β = .280, t = 2.795, p =.006) with the score of EC-17, and the score on tolerance subscale of ZBI was positively associated (β = -.548, t = -3.239, p =.002) with the score of EC-17.

Conclusions

The finding of this study indicates that mentally ill caregiving women had significant caregiving burden, and tolerated high distress. Caregiving burden was inversely associated with ability to tolerate distress and positively associated with emotional dysregulation. Self-management of health was negatively associated with severe level of burden and positively associated with ability to tolerate distress.

Key words

Distress tolerance • Psychosocial Burden • Women's mental health

Introduction

Stress is any stimulus (e.g. environmental or life events, etc.) that impinge on individual's reactions to stressful events, or a mismatch between the demands placed on the individual and the ability to cope with the demands[1 2]. The stress becomes distress when it is unwanted, unexpected and ongoing, due to life changing events or situations. Distress tolerance (DT) is perceived as/or actual capability to tolerate aversive emotional and physical experience [3]. DT is an individual's evaluation and expectations about experiencing distress and associated with a tendency to alleviate or escape negative emotional experience [4]. DT is considered as a trans-diagnostic risk, maintenance or preventive factor of psychological disorders [3]. Relationship of distress tolerance and self-management of health

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is not yet explored. A report reveals that the level of DT may mediate medication adherence and health seeking behaviour [5 6]. Assessment of DT is challenging due to lack of consensus regarding the conceptualization. In this study, we have used Distress Tolerance Scale (DTS) to measure the Tolerance (individual's perception of ability to tolerate stress), Absorption (the degree to which an individual is consumed by negative emotions), Appraisal (the individual's assessment of the tolerability of the stress), and Regulation (the individual's feeling of urgency to do something to alleviate the negative emotion) after translating it to a local language (Kannada) [4]. This tool is considered appropriate to measure distress tolerance in comparison to other methods (e.g. persistence in arithmetic tasks, breath holding, and CO2 inhalation and holding hand in cold water etc.) , particularly in population suffering from mental illness, and has been used in Indian population [7].

The burden is the appraisal of the balance between the level of care demands, the level of resources available, and quality of caregiver-care recipient relationship [8].The burden of care is the discomfort experienced during caregiving by the caregivers in the domains of physical health, psychological well-being, finances, and social life that affect the life of the care giver [9]. The burden was initially conceptualised as unidimensional, and later understood to be a multidimensional construct [10]. Burden of caregiving is known to affect physical and mental health of caregiver [11 12]. Researchers have focussed more on ill effect of caregiving burden on caregiver health, and the relationship of caregiving burden and self-management of health is unexplored. Reports indicates that self-management of health is poor among caregivers [13]. There are challenges in the assessment of burden due to cultural, ethical, religious and other personal values. No unified approach is devised for its measurement, and there is little agreement on its definition [14]. To assess the burden of care, we have used Zarit Caregiver Burden Interview (ZBI) in this study (after translating to a local language, Kannada), a tool that is used in the Indian population [15].

Self-management of health is "engaging in activities that protect and promote health, monitoring and managing the symptoms and signs of illness, managing the impact of illness on functioning, emotions and interpersonal relationships and adhering to treatment regimes" [16]. It is performed by patients to manage their own illness (not what the clinician does) such as making a choice, to practice new health behaviours, and to maintain or regain emotional stability [17]. Self-management of health depends upon multiple factors such as the necessary knowledge and skills, and the confidence to manage effectively their condition [18]. A report from India reveals that among general population, more than half people with physical illness do not practice self-care [19]. To empower the health care recipient with health care skill for better outcome of illness is the need of the hour [20]. In developed countries attempt have been made to develop specific self-management interventions to reduce or prevent recurrence of mental ill health and to help challenge existing perceptions and enhance the reputation of people with a psychiatric diagnosis as being capable citizens [21 22]. Though attempt has been made to reduce the burden of caregivers, to optimise their overall health, but so far, the self-management of health among caregivers is unexplored in India.

The relationship of distress tolerance and caregiving burden with self-management of health in women is unknown, particularly if they also have a mental illness. Several studies reported a higher level of psychosocial distress among Indian women [23-25]; who are the major informal caregiver, facing role overload, poor health literacy, poor health care facility leading to poor psychological and physical health [11 12 26-29]. Thus, this exploratory study was carried out to explore the level of distress tolerance & burden, and its relationship with self-management of health among mentally ill women caregivers with mental illness in full remission for at least two months. We hypothesised that level of DT and burden are negatively associated with the self-management of health.

Materials and Methods

This hospital based cross sectional study was conducted in a tertiary care centre over a period of 6 months (November 2014 - April 2015). A total of 100 consecutive female patients, who were living in the community after an episode of illness, and coming for follow-up, were consecutively recruited as per selection criteria; all the participants subscribed informed consent. The inclusion criteria were females between the age of 18-65, an ICD 10 diagnosis of a mental disorder currently in remission for at least 2 or more months (as per treating psychiatrist), and currently living in the community with their family members and involved in caregiving of any family members. A patient with chronic physical illness or physical disability, intellectual disabilities and dementia were excluded from this study, as these conditions are known to interfere in caregiving due to the inherent nature of illness. The study was started after approval from the institute's ethical committee. Participants who met the selection criteria were evaluated with assessment tools in following order:

1. Sociodemographic & clinical proforma: This proforma included demographic and clinical details such as education, employment, socioeconomic status, religion, marital status, residence, family type, housing, diagnosis, currently living with, substance

use in the family, number of family members living together, treatment sought before, and knowledge about available treatment;

2. Distress Tolerance Scale (DTS): The DTS is a 15-item self-report measure of one's ability to tolerate psychological distress [4]. The measure contains four subscales: (1) Tolerance - perceived ability to tolerate emotional distress, (2) Absorption - attention being absorbed by negative emotions, (3) Appraisal - subjective appraisal of distress, and (4) Regulation - regulation efforts to alleviate distress. The scores of the scale range from 15 to 75, and found to be of good internal consistency (α = .92 in the present sample), test-retest reliability, and discriminant validity. This instrument has been used in the Indian population [15];
3. Zarit Caregiver Burden Interview (ZBI): This tool has been used to assess the psychosocial burden of caregiving [9]. The ZBI measures subjective burden, in terms of the degree to which the caregivers experience physical, psychological, emotional, social and financial problems because of their care-giving role. It is a multicultural validated tool, and available in different language. It contains 22 self-reported items that assess the frequency and impact of care burden. Score ranges from 0 to 88, and studies showed Chronbach's alpha ranging from 0.88 to 0.92 and test-retest reliability to be .71. A score between 0 – 20 indicates no burden, 21- 40 is mild to moderate, 41-60 is moderate to severe, and score between 61- 88 indicate severe burden. It assesses both personal and role strain [15];
4. Effective Consumer Scale (EC-17): The EC-17 measures knowledge, attitude, and behaviour about self-management skills using 17 items with 5-point Likert-type scales (''never'' to ''always''). Item scores are summed and converted to range from 0 to 100, where 100 is the best possible score [30]. Cronbach's Alpha and test-retest correlations found to be over 0.90 [18].

Data analysis was done with SPSS version 16. Demographic and clinical characteristics were expressed with descriptive statistics. Since analysis of data distribution revealed skewedness, Kruskal-Wallis H test was used to know the group difference between three or more variables, while Mann Whitney U test was used for comparison between two groups. After normalising the data, score on subscales of distress tolerance & different severity of burden were analysed using multiple linear regression analysis, to find out if they can predict the value measure on self-management of health. The level of statistical significance was kept at $p < 0.05$ for all tests.

Results

Demographic characteristics

More number of participants were married (91%), Hindu (88%), belonging to nuclear family (86%), having a diagnosis of mood disorder (62%), did not receive any treatment earlier (90%), and were aware only about medication as the treatment option (64%). The mean score of age was 37.35 and duration of illness was 4.89 years (Table I).

Levels of distress tolerance and burden

We obseved a mean score of 26.80 (± 12.07) on DTS and 28.34 (± 19.83) on ZBI. Mean scores on subscales of DTS were - Tolerance 5.65 (±2.57), Absorption 5.29 (± 2.68), Appraisal 10.62 (± 5.08), and Regulation 5.24 (± 2.83) (Table I).

The sociodemographic variables that had a statistically significant group difference on score of DTS were - substance use in the family (present *vs* absent; U = 532.50, Z = - 2.711, p = .007), treatment received (no treatment *vs* allopathic treatment; χ^2 = 4.811, df = 1, p = .028),

TABLE I. *Demographic and clinical feature.*

	Minimum	Maximum	Mean	Std. Deviation
Age	20.00	61.00	37.35	8.91
Duration of illness	1.00	25.00	4.89	5.09
Number of family members	1.00	13.00	4.070	1.73
Score on Burden Interview	0.00	79.00	28.34	19.83
Score on Distress Tolerance Scale	4.00	51.00	26.80	12.07
– Tolerance subscale	0.00	13.00	5.65	2.57
– Absorption subscale	0.00	11.00	5.29	2.68
– Appraisal subscale	1.00	22.00	10.62	5.08
– Regulation subscale	0.00	14.00	5.24	2.83

and knowledge of treatment option (medication only *vs* medication and psychotherapy; χ^2 = 4.072, df = 1, p = .044) (Table IIA-B).

Relationships of burden and distress tolerance

On linear multiple regression analysis (R^2 = .215, df = 4, F = 6.443, Sig. = .000) the score on ZBI had significantly predicted the value of score on Tolerance (beta = -.416, t = -2.368, p = .020) and Regulation (beta =.596, t = 3.742, p = .000) subscale of DTS (Table III).

Relationships of self-management of health with distress tolerance and burden

On linear multiple regression analysis (R^2 = .200, df = 7, F = 3.287, Sig. = .004), the severe level of burden had significantly positively predicted the value on score of EC-17 (beta =.280, t = 2.795, p = .006), while score on tolerance subscale of DTS had significantly but negatively predicted the value of score on EC-17 (beta =-.548, t = -3.239, p = .002) (Table IV).

Discussion

Demographic characteristics of this study were similar to the observation made in another study conducted in this centre [31]. In this study, mean duration of illness was nearly five years, and the number of family members living together was four. Longer duration of illness and more number of family members to be taken care, may have bearing on the level of burden experience [32].

Levels of distress tolerance and burden

In this study, we found a significant level of distress tolerance and burden. Among socio-demographic variables history of substance use in the family, history of any past treatment for on-going illness and knowledge about treatment option had a statistically significant association with distress tolerance.

Among women, Indian culture and tradition favours a higher tolerance of burden. Indian women experience a higher level of psychosocial distress as observed in this study [23-25]. They are the major informal unpaid family caregivers, particularly when they have a role of daughter-in-law, spouse and daughter (Role overload) [27 29]. Supportive care demands, emotional toll, the adverse impact of caregiving on their health are the main stressors related to the caregiver role [33]. The burden increases further after the occurrences of a mental illness due to associated psychosocial and human rights issues, stigma, etc. [31]. We Hypothesize that significant level of distress tolerance observed in this study can be due to mastery, habituation or other method of coping to overcome the persistent burden [34]. In this study,

TABLE IIA. *Relationships of distress tolerance and demographic characteristics.*

Relationship between variables		N (%)	Mean Rank	Sum of Ranks	Mann-Whitney U	Z	Asymp. Sig. (2-tailed)
DTS score* Education	Uneducated	41	45.67	1872.50	1.012	-1.389	.165
	Educated	59	53.86	3177.50			
DTS score* Employment	Unemployed	38	46.86	1780.50	1.040	-.984	.325
	Employed	62	52.73	3269.50			
DTS score* Socioeconomic status	Low	63	50.16	3160.00	1.144	-.154	.878
	Middle	37	51.08	1890.00			
DTS score* Religion	Hindu	88	50.81	4471.00	501.00	-.287	.774
	Muslim	12	48.25	579.00			
DTS score* Marital status	Single	9	60.33	543.00	321.00	-1.067	.286
	Married	91	49.53	4507.00			
DTS score* Residence	Rural	68	52.26	3553.50	968.50	-.884	.377
	Urban	32	46.77	1496.50			
DTS score* Family type	Nuclear	86	51.37	4418.00	527.00	-.746	.456
	Joint	14	45.14	632.00			
DTS score* Housing	Kaccha	18	46.83	843.00	672.00	-.593	.553
	Pakka	82	51.30	4207.00			
DTS score* Substance use in family	Yes	22	65.30	1436.50	532.50	-2.711	.007
	No	78	46.33	3613.50			

TABLE IIB. *Relationships of distress tolerance and clinical characteristics.*

Relationship between variables			n (%)	Mean Rank	χ^2	h^2	df	Asymp. Sig. (2-tailed)
Diagnosis		F 10	3	32.83	2.299	.02	3	.513
		F 20	7	62.00				
		F 30	81	50.47				
		F 40 & Other	9	47.72				
Living with		Parent	17	47.00	0.811	.00	2	.667
		In- law	7	43.71				
		Husband	76	51.91				
Treatment received	1	No treatment	90	47.90	0.669	.00	1	.413
		Magicoreligious	6	57.50				
	2	Magicoreligious	6	4.92	0.574	.00	1	.449
		Allopaththic	4	6.38				
	3	No treatment	90	46.20	4.811	.04	1	.028
		Allopaththic	4	76.75				
Knowledge about treatment	1	Medication	64	36.17	3.023	.03	1	.082
		Psychotherapy	5	20.00				
	2	Psychotherapy	5	15.70	0.411	.00	1	.521
		Medication+ therapy	31	18.95				
	3	Medication	64	51.97	4.072	.04	1	.044
		Medication+ therapy	31	39.81				

TABLE III. *Relationships of distress tolerance and burden.*

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	1.153	.182		6.323	.000
	Appraisal	.106	.319	.061	.331	.741
	Tolerance	-.775	.327	-.416	-2.368	.020
	Absorption	-.070	.432	-.042	-.162	.872
	Regulation	.966	.258	.596	3.742	.000

Dependent Variable: Burden Score. R^2 = .215,df = 4,F = 6.443, Sig .= .000.

participants employed multiple strategies (tolerance, absorption, appraisal and regulation) to buffer the burden. Indian women use multiple coping strategies such as relaxation, exercise, yoga, writing dairy, prayer, recreation with family, spending time with friends, reading books, travelling or outing, listening to music, etc. [35 36]. However, even if we reported high level of DT, the high score of burden may suggest that the tolerance was inadequate to neutralise the burden effect.

We observed that, those who did not have a family history of substance use disorder (78%) were significantly more tolerant to distress. This finding can be explained with the biopsychosocial model of health and disorder [37].

Substance use disorder in one family member is often associated with syndromal and subsyndromal mental health problem in other first-degree relatives that may determine the distress tolerance [38]. There is indirect evidence, that distress tolerance is less amongst the relatives of a patient with substance use disorder [39].

Those who did not receive any prior treatment (except ongoing treatment) were more tolerant to distress, than

TABLE IV. *Relationships of health seeking behaviour with distress tolerance and burden.*

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	34.707	3.045		11.397	.000
	Mild burden	-3.238	2.940	-.124	-1.101	.274
	Moderate burden	-3.556	3.354	-.111	-1.060	.292
	Severe burden	13.241	4.737	.280	2.795	.006
	Tolerance subscale	-2.579	.796	-.548	-3.239	.002
	Absorption subscale	1.835	1.093	.406	1.679	.097
	Appraisal subscale	-.036	.470	-.015	-.077	.939
	Regulation subscale	.489	.769	.114	.636	.527

Dependent Variable: ECS Score. R^2 *= .200, df = 7, F = 3.287, Sig. = .004.*

those who received allopathic methods of treatment earlier. In this study, 90% of the participant did not receive any prior treatment; ongoing treatment was the initial treatment for their mental illness, and interestingly distress tolerance did not vary significantly with the diagnosis of depression. It is possible that the reported distress tolerance was related to other stressors than mental illness such as psychosocial, financial, occupational ones .

One interesting finding of this study was less distress tolerance among those having awareness of both medication and psychotherapy as treatment option (31% of participants) compared to those who were aware of medication as the only treatment option (64% of participant). This is contrary to the other reports, which suggest that tolerance is enhanced with more knowledge about illness [40]. Those with less distress tolerance might have explored the possible treatment option (pharmacotherapy and psychotherapy) in order to get rid of distress, or had more mental health literacy. A report from India revealed that women with low distress tolerance try to gain more information about a psychological problem [41].

Relationships of burden and distress tolerance

We observed that ability to tolerate the distress is significantly but negatively associated with the burden. This finding is consistent with other report [42]. Role related burden in women is reportedly more than male, particularly if they are working out of home (in this study 62% were working women) [27 29]. Role overload, dependent care issues, quality of health, problems in time management and lack of proper social support are the major factors that determine the psychosocial burden among working women in India [29]. Greenhaus and Beutell (1985) categorise these issues in to three work-family conflict: (a) time-based conflict, (b) strain-based conflict, and (c) behavior-based conflict. In this study, a high level of distress tolerance appeared to be a necessity in order to buffer the effect of the burden [43]. Nehushtan (2007) proposed that tolerance has three types of motives that may be operative in Indian scenario also [44]. They are: 1) Tolerance as a right - other has a right to do the wrong thing or because the other has a privilege not to be harmed, in spite of his repulsive features or manners; 2) Pragmatic tolerance- tolerant person thinks that in given circumstances, it is in her or society's best interest to do so. Pragmatic tolerance can be the result of informal as well as formal decisions, and 3) Tolerance out of mercy. The result of this study revealed that, the feeling of urgency to alleviate the negative emotion (Regulation) is positively associated with the burden. Gratao et al. (2012) observed that, the caregiver emotional distress and burden is interrelated [45]. Distress tolerance involves active affect regulation, deployment of attention and cognitive function, appraisals of distress, and modulation of responses to distress [4]. Cognitive variables that mediate avoidance of negative emotional states are negative problem orientation, distorted beliefs about worry, and cognitive avoidance [46]. These cognitive variables together with a low level of distress tolerance may increase the likelihood of engaging in worry as an avoidance strategy [3]. On the other hand, low distress tolerance may increase the appraisal of anxiety symptoms, and helps to perceive anxiety symptoms as aversive, maintain rigid & inflexible view about negative emotions (harmful, impossible to manage or cope with, intolerable) [47 48].

Relationships of self-management of health with distress tolerance and burden

Contrary to our hypothesis, we observe that patients scored better on measure of self- management of health, if they had a severe burden or lower level of

tolerance. This finding may be explained by Common Sense Model (CSM) of self-management that posited that people try to make sense of a threat to their health in order to try to control the threat [49]. Illness perception (the cognitive and emotional representations of symptoms and illnesses) is shaped by burden of the illness, sense of a threat to their health and coping behaviour that in turn determines self-management behaviour. The burden of the illness and the sense of a threat to their health depend upon the person & multiple factors such as the necessary knowledge and skills, and confidence to effectively manage their condition [18]. Thus, level of burden may have indirectly enhanced the self-management of health. More burden with less tolerance observed in this study appears to be consistence with CSM model of explanation.

In conclusion, the result of this study showed that women with mental illness in remission have a high level of distress tolerance and burden. The ability to tolerate stress (Tolerance) was negatively associated with the burden, while the feeling of urgency to alleviate the negative emotion (Regulation), positively associated with burden. Severe level burden was negatively associated, while the ability to tolerate stress was positively associated with self-management of health. Though our hypothesis appeared to be untrue, it should be interpreted in the background of following limitation of this study. Study design was cross sectional, conducted at tertiary care centre. High burden can be viewed as a part of Indian culture and reported only when it is affecting and severe.

Acknowledgements

The authors would like to thank Yahosha, Shamaya, Hagai, Asther, Yasuas, Marias, Ashish, Akash and Mini (Divine Retreat Centre, Chalakudy, Kerla, India) for their moral support.

Conflict of interest

None.

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JOURNAL OF PSYCHOPATHOLOGY
2017;23:12-18

Risk of Post-Traumatic Stress Disorder in 111 survivors the 2009 Viareggio (Italy) Rail Crash: the role of mood spectrum comorbidity

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Summary

Objectives
To explore the presence of PTSD and the potential correlations between the risk of developing PTSD and the lifetime mood spectrum signs and symptoms, as assessed with the Mood Spectrum Questionnaire Lifetime Version (MOODS-SR), in a sample of survivors of a liquid gas train crash in Italy, in 2009.

Methods
One hundred eleven subjects were assessed with the Structured Clinical Interview for Axis I Disorder (SCID-I), the Mood Spectrum Questionnaire (MOODS-SR) Lifetime version, the Impact of Event Scale-Revised (IES-R), and the Trauma and Loss Spectrum Questionnaire (TALS-SR).

Results
Sixty-six subjects, of the 111 who completed the SCID-I (59.5%), met criteria for PTSD. PTSD patients showed higher comorbidity rates for Generalized Anxiety Disorder (GAD) ($p < 0.001$), and lifetime and current Major Depressive Disorder (MDD) ($p < 0.001$) than subjects who did not develop PTSD. Lifetime MOODS-SR 'Sociability/Extraversion' factor and the prevalence of lifetime MDD differentiated subjects with from those without PTSD, when a multiple logistic regression analysis was performed.

Conclusions
Although further research is needed, our results show a significant correlation between the risk of developing PTSD and the mood spectrum comorbidity.

Key words
PTSD • Lifetime comorbidity • Mood spectrum • Mood disorders • Rail crash

Introduction
Disaster survivors may experience a number of responses in the aftermath of the event, such as feelings of sadness, anger, guilt, numbness, and sleep disturbances. These responses can belong to a normal stress reaction to abnormal situations. However, survivors may be more affected than general population by such signs and symptoms and may develop a Post-Traumatic Stress Disorder (PTSD) [1-3]. The DSM-5 [4] has highlighted the increased relevance of this disorder, and included PTSD in a separate session, namely the *'Trauma and Stress Related Disorders'*, that specifically addressed post-traumatic stress reactions. In the DSM-5, the PTSD structure has been shuffled into 4 clusters: re-experiencing, persistent avoidance of stimuli, negative alterations in cognition and mood, and arousal [4].

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Several studies investigated PTSD prevalence rates in general population exposed to different kind of traumatic events. Percentages ranging from 7.5% to 40% have been reported in survivors to terroristic attacks, natural disasters, bomb explosions, fire or accidents [5-8]. These differences have been accounted to inhomogeneity in the studies methodology, such as the recruitment procedure, the assessment methodology, the time from exposure to the traumatic event. Nevertheless, there is agreement across studies in reporting high comorbidity rates between PTSD and mood disorders [9-13].

The link between mood disorders and PTSD is intriguing and increasing literature has pointed out the strong relationship between the two psychopathological areas. Patients with PTSD are at increased risk for the onset of mood disorders, if compared with individuals who experienced the same traumatic event without developing a PTSD [14]. Moreover, there is evidence that patients with mood disorders exposed to a traumatic event tend to develop more frequently PTSD than subjects without [15 16]. The percentages of both cross-sectional and lifetime comorbidity between depressive disorders and PTSD are constantly high in epidemiological and in clinical studies, ranging from 49.6% to 59.6% for current, and from 3.7% to 10.1% for lifetime comorbidity [1 18-20]. Further, the large majority of studies on patients with bipolar disorder documented rates of PTSD double than in general population with a mean prevalence of 16%[21]. When bipolar disorder co-occurs with PTSD, it is associated to an increased morbidity and mortality, a poorer outcome, a more severe course of illness, and a higher risk of self-injuring behaviors [22 23].

Recently, clinical studies have shown the impact of subthreshold mood dysregulations on PTSD onset on its symptoms and complications, including suicide [9 24-26].

Aim of this study was to explore mood spectrum features potentially related to the occurrence of PTSD in a civil population exposed 7 to 8 months before a railway explosion in Italy, in 2009.

On 29 June 2009, at 11.48 p.m., in the railway station of Viareggio, Italy, a freight train carrying Liquefied Petroleum gas, derailed with a subsequent fire. The wagon hit the platform of the station and the derailed wagons overturned to the ground, with two of them exploding and coughing a fire. A whole street alongside the railway was destroyed in the explosion. Thirty-two people died (8 immediately at the time of explosion; 24 after being hospitalized for physical trauma and burns); 26 people were severely injured. A large area of the town was damaged in the subsequent fires caused by the wagons exploding. Local authorities declared the state of emergency: around 1,000 residents of Viareggio were evacuated from their homes; the accident left around 100 people homeless.

Methods

Study Participants

The study sample consisted of 111 subjects exposed 7 to 8 months before to the explosion of a train containing liquid gas near to the Central Station of Viareggio (Italy) [27]. Subjects referred to a psychiatric service dedicated to the survivors of the traumatic event. Eligible subjects provided written informed consent after receiving a complete description of the assessment procedures approved by the Ethical Committee of the Azienda USL 12 of Viareggio (Italy).

Instruments

Axis I disorders were assessed with the Semi-structured Clinical Interview from the DSM-IV (SCID-I) [28]. Participants completed the following self-report measures: the Impact of Event Scale-Revised (IES-R) [29]; the Trauma and Loss Spectrum-Self Report (TALS-SR) [30]; the Lifetime Mood Spectrum Self-Report (MOODS-SR-LT) [31- 33].

The Impact of Event Scale-Revised version (IES-R) [29] is a 22 items scale measuring subjective stress following a traumatic event. It represents the revised version of IES, a 15-item scale measuring intrusive, avoidant, and hyper-arousal symptoms [34]. Participants were asked to rate the different statements on a scale ranging from '0' (not at all) to '4' (completely true). Psychometric properties of the IES, its reliability and validity are described in detail elsewhere [35].

The TALS-SR includes 116 items exploring a range of loss and/or traumatic events that the subjects may have experienced and the symptoms, behaviors and personal characteristics that might represent manifestations and/or risk factors for the development of a stress response syndrome. The instrument is organized into 9 domains (loss events, grief reactions, potentially traumatic events, reaction to losses or upsetting events, re-experiencing, avoidance and numbing, maladaptive coping, arousal, personal characteristics/risk factors). Each item response is coded in a dichotomous way (yes/no) and domain scores are obtained by counting the number of positive answers.

The MOODS-SR explores the overall spectrum of lifetime mood signs and symptoms, including manic and depressive features, rhythmicity and vegetative functions [36]. In the present study we utilized the factors structure of mood spectrum, identified by an exploratory factor analysis approach as described by Cassano et al. [32 33]. This includes 6 factors for the lifetime depressive side, namely: *'Depressive Mood', 'Psychomotor Retardation', 'Suicidality', 'Drug/Illness related depression', 'Psychotic Features' and 'Neurovegetative Symptoms'*. The manic side accounts 9 factors: *'Psychomotor activation', 'Creativity', ' Mixed instability ', 'Sociability/ extraversion', 'Spirituality/mysticism', Mixed irritability',*

'Inflated self-esteem', 'Euphoria', 'Wastefulness/recklessness'.

Statistical Methods

Mann-Whitney U-test and Chi-square test were used to test differences between patients with or without PTSD. A multiple logistic analysis was performed to investigate potential significant associations between the presence/absence of PTSD as dependent variable, and the mood spectrum features (including lifetime Axis I mood comorbidity and MOODS-SR factor scores) as independent variables. All statistical analyses were carried out with SPSS, version 15.0 [37].

Results

A total sample of 111 subjects was recruited, 60 females (54.0%) and 51 males (46.0%). The mean age of the overall sample was 52.9 ± 15.8 years. Sixty-six subjects (59.5%) met Axis I criteria for PTSD. Demographic characteristics of the sample are summarized in Table I. Subjects who developed PTSD reported statistically significant lower (p = .04) educational levels, when compared to subjects who did not develop PTSD.

Among survivors with PTSD, 49 (74.2%) fulfilled SCID-I criteria for at least one Axis I disorder comorbidity in their lifetime, with respect to 20 of survivors without PTSD (44.4%) (chi-square = 10.10, p = 0.001). The lifetime prevalence of major depressive disorder (MDD) was significantly higher in patients with PTSD than in patients without PTSD (65.2% *vs* 28.9%, respectively; chi-square = 14.07, p < 0.001).

Subjects with PTSD had a higher percentage of comorbidity for multiple Axis I disorders, than subjects without (81.0% *vs* 27.6%, respectively, chi-square = 20.22, p < 0.001). Subjects with PTSD scored significantly higher percentages of current Major Depression (53.0% *vs* 15.6%, respectively, chi-square=15.98, p < 0.001), and Generalized Anxiety Disorder (GAD) (57.6% *vs* 24.4%, respectively, chi-square=11.91, p = 0.001) than subjects without PTSD. Only one patient with PTSD met diagnostic criteria for Bipolar Disorder (Table II).

As expected, the IES total scores and the TALS-SR scores were significantly higher in subjects with PTSD than in those without (Table III). The only exception was the TALS-SR domain regarding the '*lifetime exposure to traumatic events*', infrequent in the overall sample.

Survivors with PTSD reported statistically significant higher scores in all the factors of the lifetime MOODS-SR depressive component (*Depressive Mood, Psychomotor Retardation, Suicidality, Drug-Illness Related Depression, Psychotic Features, Neurovegetative Symptoms*) as well as in the following factors of the manic component: *Psychomotor Activation, Creativity, sociability/extraversion, Mixed Irritability, Inflated Self-Esteem, and Wastefulness/Recklessness* (see Table IV for details). A multiple logistic regression, including lifetime MOODS-SR factors and lifetime Major Depression prevalence as independent variables, was performed. The '*sociability/extraversion*' factor (OR = 1.89, 95% CI 1.25-2.86), and the prevalence of lifetime Major Depression (OR = 5.21, 95% CI 1.61-16.91) differentiated subjects with and without PTSD.

TABLE I. *Demographic characteristics (n = 111).*

	No PTSD (n = 45)	PTSD (n = 66)	p
Age (years)	*Mean/SD* 51.5 (16.6)	*Mean/SD* 53.9 (15.2)	ns
Female gender	*n (%)* 22 (48.9)	*n (%)* 38 (57.6)	ns
	n (%)	*n (%)*	ns
Single	8 (17.8)	9 (13.8)	ns
Married	32 (71.1)	41 (63.1)	ns
Separated/divorced	2 (4.4)	10 (15.4)	ns
Widowed	3 (6.7)	5 (7.7)	ns
	n (%)	*n (%)*	ns
Low Educational Level	21 (46.7)	43 (53.3)	.04
High Educational Level	24 (66.2)	22 (33.8)	ns
Family History for Psychiatric Disorders	*n (%)* 15 (44.1)	*n (%)* 19 (55.9)	ns

Discussion

Our study aimed at exploring mood spectrum features potentially related to the risk of PTSD in a civil population exposed 7 to 8 months before a railway explosion. Our results showed PTSD prevalence rates in almost two thirds of exposed subjects (59.5%), much higher than those reported in other similar studies. Galea et al. [5], in fact, reported PTSD rates of 7.5 % in a sample of adults living south of 110th Street in Manhattan after the terroristic attack of September 11, 2001. Farhood et al. [6], reported prevalence rates of PTSD of 17.2 % in a sample of Lebanese civilians exposed to a church explosion, and in their comparison groups (33 victims, 30 family members, and 30 neighbors), 1 year after exposure. Methodological differences across these studies, particularly the subjects' recruitment, could account for the discrepancies in results. In our study, the sample was obtained from subjects who spontaneously referred to a psychiatric service dedicated to the rail crash witnesses or survivors.

TABLE II. *Lifetime and Current Axis I Comorbidity* (SCID-I) in the Overall Sample (n = 111).*

	No PTSD (n = 45)	PTSD (n = 66)	Chi-square Or Fisher Exact test	*p value*
Lifetime Comorbidity	n (%)	n (%)		
Major Depressive Episode (MDE)	13 (28.9)	43 (65.2)	14.07	< .001
Panic Disorder	17 (37.7)	9 (13.6)	0.36	.547
Agoraphobia without PD	-	1(1.5)	-	.595
OCD	1 (2.2)	-	-	.405
Social Phobia	1 (2.2)	-	-	.405
Specific Phobia	-	4 (6.0)	-	.120
Anxiety Disorders NOS	2 (4.4)	1 (1.5)	-	.162
At least 1 comorbid Axis I Lifetime Disorder	20 (44.4)	49 (74.2)	10.10	< .001
Current Comorbidity	n (%)	n (%)		
Major Depressive Episode (MDE)	7 (15.6)	35 (53.0)	15.98	< .001
Panic Disorder	5 (11.1)	14(21.2)	3.01	.083
Bipolar I Disorder	-	1 (1.5)	-	.595
Dysthymia	1 (2.2)	-	-	.405
GAD	11 (24.4)	38 (57.5)	11.91	< .001
Social Phobia	1 (2.2)	-	-	.405
Specific Phobia	-	4 (6.0)	-	.120
Anxiety Disorder NOS	1 (2.2)	-	-	.405
At least 1 comorbid Axis I Current Disorder	17 (37.8)	52 (78.8)	19.13	< .001

** Lifetime and Current Axis I Diagnoses are calculated as mutually exclusive*

TABLE III. *IES and TALS-SR Scores in subjects with and without PTSD.*

	No PTSD (n = 29)	PTSD (n = 42)	Mann-Whitney test	*p value*
Trauma and Loss Spectrum-Self Report (TALS-SR)	Mean/SD	Mean /SD		
Loss events	4.0 (2.0)	4.9 (1.9)	2.04	.041
Grief reactions	10.5 (5.8)	14.3 (5.8)	2.59	.009
Potentially traumatic events	3.7 (2.7)	5.0 (3.0)	1.81	.071
Reaction to losses or upsetting events	6.4 (4.9)	11.1 (3.4)	4.27	< .001
Re-experiencing	2.7 (2.2)	6.0 (2.9)	5.43	< .001
Avoidance and numbing	3.7 (3.7)	6.3 (2.9)	3.22	.001
Maladaptive coping	0.8 (1.0)	1.8 (1.4)	3.58	< .001
Arousal	2.0 (1.7)	3.7 (1.2)	4.26	< .001
Personal characteristics/risk factors	0.9 (1.4)	1.7 (1.1)	3.64	< .001
Impact of Event Scale (IES)	Mean/SD	Mean/SD		
Total score	18.4 (18.5)	43.5 (18.7)	4.62	< .001
Intrusion	8.4 (9.5)	23.9 (10.0)	5.09	< .001
Avoidance	10.0 (10.6)	19.6 (10.6)	3.51	< .001

TABLE IV. *Lifetime MOODS-SR factors' scores in subjects with and without PTSD, according to TALS-SR Criteria.*

	No PTSD (n = 35)	PTSD (n = 36)	*p value*
MOODS-SR Lifetime version Factors	**Mean/SD**	**Mean/SD**	
Depressive mood	3.5 (4.2)	9.6 (6.3)	.0001
Psychomotor retardation	1.4 (2.5)	5.4 (4.6)	.0001
Suicidality	0.1 (0.4)	0.8 (1.2)	.004
Drug-illness related depression	0.2 (0.6)	0.6 (0.8)	.016
Psychotic features	0.6 (1.3)	2.1 (1.9)	.001
Neurovegetative symptoms	2.4 (2.4)	4.5 (3.1)	.003
Psychomotor activation	2.2 (2.1)	4.4 (2.8)	.001
Creativity	2.4 (2.3)	3.7 (2.8)	.03
Mixed instability	0.4 (1.1)	0.8 (1.0)	.222
Sociability/extraversion	1.5 (1.3)	2.3 (1.9)	.06
Spirituality/mysticism	0.3 (0.6)	0.5 (0.9)	.330
Mixed irritability	0.8 (1.0)	1.9 (1.5)	.001
Inflated self-esteem	0.4 (1.0)	1.0 (1.1)	.029
Euphoria	2.2 (1.4)	2.7 (1.7)	.199
Wastefulness/recklessness	0.5 (0.8)	1.1 (1.2)	.015

Further, our results showed lower educational level in survivors who developed PTSD compared to those who did not, in line with the available literature [8 38-40]. Despite a slight higher prevalence of women among survivors with PTSD, we found no statistically significant gender difference in the PTSD rates. Most literature on humans' made or natural disaster survivors suggested a higher vulnerability to PTSD in females [41-45]. However non-univocal results are described in literature when the traumatic event is a severe crash, as occurred in our sample [46].

A higher prevalence of lifetime and current comorbidity for major depression (MDD) was found among survivors with PTSD, when compared to those who did not. Interestingly, exploring lifetime mood spectrum symptoms and features in survivors with PTSD, with respect to those without, we found significantly higher scores not only in all the depressive component factors as expected, but also on several factors belonging to the manic/hypomanic component, namely: '*psychomotor activation*', '*mixed irritability*', *lifetime'Spirituality/Mysticism', 'Sociability/Extraversion'*. However, only one PTSD survivor reported Axis I Bipolar Disorder comorbidity. We argued the relevance of sub-threshold manic comorbidity as one of the leading correlates to PTSD development after trauma. Accordingly, the *'Sociability/Extraversion'* MOODS-SR lifetime factor was confirmed as the only predictor of PTSD, except for the Axis I comorbidity for lifetime major depressive episodes, when a multiple logistic regression analysis was performed. The *'Sociability/Extraversion'* MOODS-SR lifetime factor explored the lifetime presence of personality traits, such as proneness to enthusiasm, optimism, and high levels of self-confidence, sociability and extraversion. This finding was consistent with previous studies in which the occurrence of manic/hypomanic or mixed symptoms among subjects with PTSD was described [16 21 47]. Given the variety of genetic and environmental factors influencing brain systems that are crucial for the development of anger, mixed irritability, and mood instability, it is not surprising that traumatic events might potentially modulate the expression of both depressive and mixed/irritable mood. It remains unclear, therefore, whether pre-existing traits, belonging to the manic/hypomanic realm, might have a specific role as risk factors for onset, severity or other clinical parameters of PTSD, beyond a '*general adverse background'* effect.

Our results should be interpreted with caution, keeping in mind some limitations. The most important is related to the fact that subjects spontaneously referred to an outpatient service dedicated to the Viareggio population exposed to the rail crash. This might represent a selection bias for the rates of disorders reported with respect to studies on general population samples. Moreover, the number of subjects was small. Finally, to detect mood spectrum symptoms we adopted a lifetime instru-

ment (the MOODS-SR) that did not allow us determining which symptoms occurred before and which after the trauma exposure [48-51].

Conclusions

Although further research is needed to elucidate if there is a specific link between PTSD and manic/hypomanic lifetime mood spectrum features, we sumit that the systematic detection of such signs and symptoms should be part of the risk assessment and prevention strategies, when a population is exposed to a severe traumatic event. With the above-mentioned limitations, in light of our finding, we could speculate that the presence of sub-threshold manic/hypomanic lifetime features might be one of the predictors for a subsequent PTSD onset.

Acknowledgments
None.

Conflict of Interest
The authors declare that there is no conflict of interest regarding the publication of this paper.

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JOURNAL OF PSYCHOPATHOLOGY
2017;23:19-25

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Depressive syndrome in perimenopausal, menopausal and postmenopausal patients. An Italian multicentre observational study

Summary

Objectives

All women are at risk for developing somatic and psychiatric symptoms during their menopausal transitions, up to the occurrence of major depressive disorder. This study was aimed to evaluate and characterize the presence of a depressive status in a sample of perimenopausal, menopausal and postmenopausal women.

Materials and Methods

156 women with a diagnosis of depressive disorder under the DSM-IV-TR criteria, who spontaneously referred for a psychiatric evaluation during their perimenopausal, menopausal and postmenopausal stages, were enrolled in the study.

Results

Patients (51.9 ± 4.2 years) were diagnosed with unipolar disorder, dysthymia, bipolar disorder and cyclothymia in 67.9, 14.4, 14.1 and 4.5 % of the cases, respectively. Axis I and II co-morbidities were present in 14.1 and 7.7 % of the patients, respectively. No significant differences in the prevalence of disorders and co-morbidities during the different climacteric stages were observed. The HAM-D, HAM-A, and BDI-II rating scale scores were 17.4 ± 7.4, 19.8 ± 9.6, and 26.8 ± 13.2, respectively, with severe or very severe symptoms in 39.7, 28.8 and 35.9% of the patients, respectively. The GCS scale showed depression in 44.2% and anxiety in 38.5% of the patients, with general, somatic, and vasomotor scores of 27.5 ± 11.3, 8.0 ± 4.8, and 2.6 ± 2.2, respectively.

Conclusions

These results describe the psychopathological scenario of women who underwent a psychiatric evaluation during their different menopausal transitions. Although these results did not show any significant differences among those stages, they suggest a major psychiatric impairment, with several patients affected by severe disorders.

Keywords

Depression • Anxiety • Woman • Menopause • Transition

Introduction

Menopause is a normal, and for most women largely uneventful, part of life. For some women, however, the transition to menopause may represent a time of biological vulnerability, together with relevant somatic and psychiatric symptoms, up to the occurrence of a significant depressive disorder [1 2]. Specifically, the highest vulnerability for depressive disorders seems to be related to the periclimacteric period, with an increasing risk from early to late perimenopausal stage, and a subsequent decrease in the postmenopausal stage [2]. The results of recent cohort longitudinal

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studies demonstrate an approximatively 4-fold higher risk for depressive symptoms during this transition to menopause compared with premenopause, and a 2.5-fold higher risk for a major depressive episode [3 4]. Women with a history of previous depressive episodes are up to 5 times more likely to have a major depressive episode in perimenopause [2]. It's well known how the transition between women's menarche and menopause is characterized by monthly fluctuations of gonadal steroids (including estrogen and progesterone), in which neuromodulatory effects at the central nervous system are observed [5 6]. During the perimenopausal stage, these normally cyclic hormonal fluctuations become increasingly erratic followed by progressively longer periods of estrogen withdrawal [7 8]. It has been postulated that changes in these hormonally mediated neuromodulatory effects may heighten the risk for mood disorders in women with sensitivity to normal hormonal fluctuations (during the premenstrual period, puerperium, and perimenopause) [2 9]. The transition to menopause is often associated with somatic symptoms (pain, myalgia, fatigue, vasomotor symptoms, urogenital complaints and sexual disorders), psychological symptoms (irritability, anxiety, low libido) and sleep disturbances, all specific risk factors for developing depressive symptoms and a poorer patient's quality of life [10-12]. Notwithstanding their prevalence, all depressive disorders related to climacterium are often underdiagnosed and therefore not correctly managed, with subsequent psychiatric disorder worsening and chronicity. Several studies showed that general practitioners are unable to diagnose up to 30-50% of major depressive disorders, especially when associated with physical symptoms [13]. The acknowledgment and characterization of specific risk factors related to the occurrence of depressive disorders during climacterium could provide useful elements for both specialist and generic disease updating in order to establish an early treatment. The present observational study was aimed to evaluate the presence of a depressive status in a sample of perimenopausal, menopausal and postmenopausal women (age 45 to 65 years), describe their baseline demographics as well their clinical and psychopathological data and assess any possible differences, together with risk factors and predictors.

Materials and Methods

This observational study was carried out at ten outpatient- and inpatient-based Italian Psychiatric Centres, was approved by the Ethics Committee of each centre and conducted according to the Helsinki declaration. The study enrolled women who spontaneously referred for a psychiatric evaluation at the above-said centres between September 2012 and September 2014 according to the following inclusion criteria: age 45 to 65 years, a diagnosis of major depressive disorder under the DSM-IV TR criteria (Hamilton Depression scale score ≥ 8), a perimenopausal status (defined as almost 6 irregular menstrual cycles and less than one year of amenorrhoea) or a menopausal status (defined as 12 months of amenorrhoea following the last menstrual cycle) or a postmenopausal status (defined as the immediate subsequent period after menopause) not superior to 5 years, and a written informed consent for the observational study participation. Female patients of < 45 and > 65 years with menstrual abnormalities or not physiologically-induced amenorrhoea were excluded. Socio-demographical data, historical data of previous individual and familiar psychiatric disorders, data of current psychiatric and organic disorders and related drug therapies were collected in a single enrolling interview. The psychopathological scenario was evaluated by a psychiatrist after the administration of two clinical rating scales (Hamilton Rating Scale for Depression and Hamilton Anxiety Scale) and two self-administered scale for depressive symptoms (Beck Depression Inventory II) and menopause-related psychic and physical symptoms (Greene Climacteric Scale). During this observational period, 182 women with a diagnosis of depressive disorders referred to the above-said trial centres and were enrolled into this study. Among these patients, 26 were excluded during the first screening for missing data or inclusion criteria violations.

Statistical analysis

The variables were described using mean, standard deviation, median, standard error of the mean, 95% confidence interval and crosstabulation. Chi-square test for categorical data and ANOVA analysis of variance for continuous variables were applied. The differences were analyzed and assessed for significance testing through parametric tests – after checking the normality (Student t for independent data and ANOVA with Bonferroni correction) – and non-parametric tests (Mann Whitney and Kruskal-Wallis). The superiority of the depressive syndrome between phases was verified by dichotomous transformation (presence in the case of Ham-D > 14 and the absence in the event of Ham-D < 14) with chi-square test and relative risk factor estimates (OR). Predictors were tested by logistic regression. Statistical significance was considered for $p < 0.05$. All analyzes were performed with SPSS software (16.0, 2007).

Results

Table I shows the characteristics of the 156 women included in the study. In perimenopausal and postmeno-

TABLE I. *Baseline demographics and psychopathological features in the study population.*

	Total sample N = 156	Perimeno-pause N = 62	Menopause N = 22	Postmeno-pause N = 72	p
Mean age, years ± SD	51.9 ± 4.2	49.1 ± 3.1	50.7 ± 3.0	54.6 ± 3.5	< 0.0001
Age at stage onset, years ± SD	49.9 ± 3.6	48.3 ± 3.3	49.3 ± 2.3	51.4 ± 3.5	< 0.0001
Marital status (%)					NS
unmarried	17.3	19.4	13.6	16.7	
married	64.7	61.3	72.7	65.3	
legally separated/widow	17.9	19.4	13.6	18.1	
Smoking (%)					NS
no	61.5	66.1	72.7	54.1	
yes	34.0	32.3	22.7	38.9	
ex	4.5	1.6	4.5	6.9	
Alcohol abuse (%)	6.3	8.0	4.5	5.5	NS
Organic diseases (%)					NS
0	59.0	56.5	45.4	65.3	
1	24.4	29.0	36.4	16.7	
2	13.5	12.9	9.1	15.3	
≥ 3	3.2	1.6	9.0	2.8	
Unipolar disorder (%)	67.9	72.6	68.2	63.9	NS
Dysthymia (%)	14.4	9.7	13.6	18.1	NS
Bipolar disorder (%)	14.1	14.5	4.5	16.7	NS
Cyclothymia (%)	4.5	4.8	9.1	2.8	NS
Axis I co-morbidities (%)	14.1	11.3	18.2	15.3	NS
Axis II co-morbidities (%)	7.7	8.1	9.1	6.9	NS
Mean length of psychiatric disorder, years ± SD	9.6 ± 4.2	10.5 ± 10.1	3.5 ± 3.1	10.5 ± 9.5	0.042
Mean number of psychiatric episodes ± SD	1.7 ± 2.8	2.2 ± 3.2	1.4 ± 2.0	1.5 ± 2.7	NS
Depression during pregnancy (%)	7.7	8.1	9.1	6.9	NS
Post-partum depression (%)	21.2	22.6	18.2	20.8	NS
Premenstrual syndrome (%)	39.1	53.2	31.8	29.2	0.013
Psychiatric familiar history (%)	43.6	54.8	36.4	36.1	NS
Patients at their first psychiatric visit (%)	27.6	29.0	40.9	22.2	NS
Estrogen Replacement Therapy (%)	5.1	1.6	9.1	6.9	NS
Total number of received drugs (%)					NS
0	12.8	12.9	27.3	8.3	
1	32.1	27.4	36.4	34.7	
2	31.4	30.6	22.7	34.7	
3	14.7	19.4	4.5	13.9	
≥ 4	8.9	9.6	9.0	8.9	
Total number of psychotropic drugs (%)					0.052
0	16.7	16.1	36.4	11.1	
1	35.3	30.6	36.4	38.9	
2	30.1	30.6	13.6	34.7	
≥ 3	17.9	22.6	13.6	15.3	

(continued)

TABLE I (follows). *Baseline demographics and psychopathological features in the study population.*

	Total sample N = 156	Perimeno-pause N = 62	Menopause N = 22	Postmeno-pause N = 72	p
Number of benzodiazepines (%)					0.038
0	66.0	61.3	86.4	63.9	
1	26.9	29.0	9.1	30.6	
2	6.4	9.7	0.0	5.6	
≥3	0.6	0.0	4.5	0.0	
Number of antidepressant drugs (%)					NS
0	28.2	24.2	45.4	26.4	
1	66.0	66.1	54.4	69.4	
2	5.8	9.7	0.0	4.3	
Number of stabilizer drugs (%)					NS
0	85.3	85.5	81.8	86.1	
1	13.5	11.3	18.2	13.9	
2	1.3	3.2	0.0	0.0	
Number of antipsychotic drugs (%)					NS
0	79.5	83.9	81.8	75.0	
1	20.5	16.1	18.2	25.0	

SD: standard deviation; NS: non statistically significant.

pausal stages, the age at onset of women with smoking habit or ex-smokers was lower than the age at onset in women with no current or past smoking habit (47.7 *vs* 48.6 and 50.6 ***vs*** 52.1, respectively). This difference was not observed in the menopausal stage (49.2 ***vs*** 49.3). In this population, the age at onset of women in perimenopausal and postmenopausal stages is affected by alcohol abuse, being anticipated of about 12-15 months compared with no alcohol consumers. This was not observed in the menopausal stage (however, we must consider the limited sample size: in fact, only one case of menopausal woman with alcohol abuse was reported in the study). The most frequent organic diseases were: hypertension (15 cases) followed by endocrinological disorders (3 hyperthyroidism, 8 hypothyroidism), metabolic disorders (6 diabetes, 4 hypercholesterolemia) e gynaecological diseases (10). Multiple psychiatric diagnoses were possible. Psychotropic drugs: 26 women were not treated with a pharmacological therapy, 65% of the women were treated with one or two drugs, 18% with three or more drugs. Although this difference did not reached a significant level ($p = 0.052$), a trend toward an under-treatment of menopausal women compared with peri- and post-menopausal women has been observed. On average, a perimenopausal woman receives 1.9 drugs, of which 1.66 psychotropic drugs and 0.23 drugs for organic diseases; a menopausal woman receives 1.45 drugs, of which 1.14 psychotropic drugs and 0.32 drugs for organic diseases; ultimately, a postmenopausal woman receives 1.86 drugs, of which 1.58 psychotropic drugs and 0.28 drugs for organic diseases.

Table II shows the scores of psychiatric rating scales. The Greene scale scores demonstrate a significant correlation with the Hamilton-Depression scale ($r = 0.508$, $p < 0.001$), the Hamilton Anxiety scale ($r = 0.675$, $p < 0.001$) and the Beck Depression Inventory ($r = 0.609$, $p < 0.001$). The Greene subscale for vasomotor disorders does not show any correlation with the Greene subscale for depression ($r = 0.138$, $p = 0.067$), nor with the Hamilton-Depression scale ($r = 0.49$, $p = 0.547$) and the Beck Depression Inventory ($r = 0.57$, $p = 0.482$). Conversely, the Greene subscales for somatic disorders and for anxiety and depression show a positive correlation with the Hamilton Depression scale, the Hamilton Anxiety scale and the Beck Depression Inventory. The Hamilton Depression scale demonstrates a positive correlation with the Hamilton Anxiety scale ($r = 0.629$, $p = < 0.001$) and the Beck Depression Inventory ($r = 0.464$, $p < 0.001$). Postmenopausal *vs* menopausal stage was associated with a higher risk for severe depression (OR = 1.89 [IC 95%, 1.0-3.7]).

Discussion and Conclusions

We evaluated the psychopathological profiles of a women's sample with a diagnosis of depression, comparatively monitored during their three climacteric stages in order to identify any features and possible differences.

TABLE II. *Depression differentiation in the three climacteric stages.*

	Total sample N = 156	Perimenopause N = 62	Menopause N = 22	Postmenopause N = 72	p
HAM-D					NS
mean score ± SD	17.4 ± 7.4	17.5 ± 7.6	15.9 ± 6.5	17.8 ± 7.4	
mild (%)	35.9	38.7	45.5	30.6	
moderate (%)	24.4	17.7	18.2	31.9	
severe (%)	17.3	21.0	13.6	15.3	
very severe (%)	22.4	-22.6	22.7	22.2	
BDI					NS
mean score ± SD	26.8 ± 13.2	27.2 ± 13.2	27.6 ± 15.0	26.2 ± 12.8	
mild (%)	7.7	8.1	13.6	5.6	
moderate (%)	21.2	21.0	4.5	26.4	
severe (%)	35.3	30.6	45.5	36.1	
very severe (%)	35.9	40.3	36.4	31.9	
HAM-A					NS
mean score ± SD	19.8 ± 9.6	19.6 ± 9.3	18.9 ± 9.9	20.7 ± 9.8	
normal (%)	27.5	29.0	31.8	25.0	
mild (%)	16.0	14.5	13.6	18.1	
moderate (%)	27.6	27.4	31.8	26.4	
severe (%)	28.8	29.0	22.7	30.6	
GCS					NS
Depression, YES	44.2	50.0	27.3	44.4	
Anxiety, YES	38.5	41.9	31.8	37.5	
General score ± SD	27.5 ± 11.3	28.2 ± 10.9	27.5 ± 11.8	26.8 ± 11.5	
Somatic score ± SD	8.0 ± 4.8	8.2 ± 4.6	7.4 ± 4.6	7.9 ± 5.0	
Vasomotor score ± SD	2.6 ± 2.2	2.9 ± 2.0	3.1 ± 2.4	2.6 ± 2.2	

HAM-D: Hamilton rating scale for depression; HAM-A: Hamilton rating scale for anxiety; BDI: Beck depression inventory; GCS: Greene climacteric scale; SD: standard deviation; NS: non statistically significant.

Although data showed no difference of depressive syndrome during these three stages in the analytic sample, some findings must be clinically evaluated and furthermore investigated in order to assess the general validation of these reported data.

The analytic sample was made up by women referring for an outpatient psychiatric evaluation during the experimental period. 72.4% of this sample had been already visited at those Centres before the occurrence of their current depressive disorders.

The tested population showed a mean age at onset of 49.3 years for menopause, lower than the Italian mean age of 50.9 years [14]. The lowest mean age at onset for menopause was reported alcohol abuse and/or smoking habit, consistent with the findings of other studies, even if this gap is higher for the smoking category in the general female population (Parazzini et al. [15] reported a 0,2% anticipation; 3% in our sample).

In our study, the tested group of women experienced a relevant prevalence of premenstrual syndrome (almost 40% of the patients), post-partum depression (21.2%) and depression during pregnancy (7.7%), with significantly higher percentages than those reported in literature for the general female population: 13-26% premenstrual syndrome [16], 10-15% post-partum depression [17], and 2.2% depression during pregnancy [18].

Although not related to their depressive profile, interesting differences in these women's three stages were observed:

1. Three out of four **perimenopausal women** had been already visited at these Research Centres and their history shows 2-fold psychiatric episodes than the other two stages. More than half of perimenopausal women have a psychiatric familiar history and experience a premenstrual syndrome, 22.6% post-partum depression and 8% depression during pregnancy. In particular, these patients mostly complaint somatic disorders during their climacteric transitions.
2. Conversely, **menopausal women** are characterized by a significantly shorter disease than the other two stages, and a higher prevalence of first visits and vasomotor disorders. The latter symptoms are not significantly related with their depressive status (p = 0.547), but represent the rationale for their first

psychiatric visit ($p < 0.001$), apart from their menstrual cycle status. It may be postulated that this central stage of climacterium is associated with a psycho-physical suffering of the patients; therefore, these women are seeking for medical attention but they hardly find it in their primary care setting. Consequently, they ask for a previously not required specialist evaluation. Other differential features of menopausal women compared with the other two stages are represented by lower pharmacological treatment and higher self-reported complaints than those described by psychiatrists. In order to explain this discrepancy it may be suggested that, even if this distress can be objectively more severe in other climacteric stages, as reported by health professionals, it involves women with a history of previous psychiatric diseases who are more accustomed to this psychological distress and less prone to focus on a biunique equivalence between psychological distress and climacterium.

3. Postmenopausal women are the largest group in this study, with a long history of disease and visits at these centres (78% refers to these Centres for their follow-up visits). They exhibit the most severe depressive and anxious symptomatology and the highest risk for depression. They experience climacterium-related somatic disorders but a smaller number of organic diseases compared with other patients.
Individual history (disease length and number of previous psychiatric episodes) seems to explain some of depressive variations observed in postmenopausal women and not in perimenopausal women. Conversely, perimenopausal women's depression episodes seem to be related and partially explained by their own age and their age at onset in the perimenopausal stage through an inverse relationship (the lower patient's age, the higher chance of a depressive response), while age is not randomly related to a depressive syndrome in postmenopausal women.

Conclusions

Our results describe the psychopathological scenario of women who underwent a psychiatric evaluation during their different menopausal transitions, indicating a major psychiatric impairment, with several patients affected by severe disorders. Physicians who most commonly visit women going through the menopause, eg general practitioners and gynecologists medicine, should pay attention to and actively search for possible psychic symptoms.

Acknowledgements

Preclimacteric Depression Italian Group. Claudio Mencacci MD, Roberta Anniverno MD, Erminia Gadler PsyD, Elena Di Nasso MD, Department of Neuroscience, "Fatebenefratelli e Oftalmico" Hospital, Milan, Italy. Silvia Barbieri MD, Pietro Caronna MD, Giuseppe De Paoli MD, Mental Health Department, Azienda Socio-Sanitaria Territoriale, Voghera, Pavia, Italy. Pierluigi Randi MD, Tiziana Omezzolli MD, Mental Health Department, Azienda Sanitaria Locale Verbano Cusio Ossola, Italy. Carlo Fraticelli MD, Olivia Salemi MD, Mental Health Department, Sant'Anna Hospital, Cantù, Como, Italy. Roberta Paleari MD, Farida Ferrato MD, Hospital G. Salvini di Passirana, Rho, Milan, Italy. Domenico Suma MD, Mental Health Department, ASL, Brindisi, Italy. Simonetta Martello MD, Gianfranco Nuvoli MD, Mental Health Department, ASL3, Genova, Italy. Roberto Poli MD, Department of Psychiatry , Istituti Ospitalieri of Cremona, Cremona, Italy. Antonello Bellomo MD, Antonio Ventriglio MD, Department of Medical Sciences, Psychiatry Unit, University of Foggia, Foggia, Italy. Caterina Vecchiato, MD. Anna Maria Pacilli MD, Psychiatry Unit, A.S.L. CN1, Cuneo, Italy. Emi Bondi MD, Psychiatry 1 Unit, Ospedale Papa Giovanni XXIII, Bergamo, Italy.

Conflictis of interest

A. Bellomo has received grant/research and/or has collaborated as consultant and/or speaker in symposia for Janssen Cilag, Angelini e Lundbeck.
E. Bondi has received grant/research and/or has collaborated as consultant and/or speaker in symposia for Janseen Cilag, Angelini e Otzuka.
A. Ventriglio has received grant/research and/or has collaborated as consultant and/or speaker in symposia for Jansenn Cilag e Lundbeck.
C. Mencacci has received grant/research and/or has collaborated as consultant and/or speaker in symposia for Lundbeck, Janssen Cilag, Angelini e Otzuka.
R. Anniverno, E. Gadler, R. Poli, A.M. Pacilli, S. Barbieri, O. Salemi have not receive any grants.
A. Farina is an employee of Italfarmaco SpA.
The study was partially supported by an unrestricted grant by Italfarmaco SpA, Milan, Italy.

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JOURNAL OF PSYCHOPATHOLOGY
2017;23:26-34

Validation of the Arabic version of the Geriatric Anxiety Scale among Lebanese population of older adults

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Summary

Objectives

To translate the Geriatric Anxiety Scale (GAS) to Arabic for use in elderly patients in Lebanon, check its validity, reproducibility and responsiveness to the adapted version of the questionnaires and assess the risk factors associated with anxiety in these Lebanese geriatrics.

Methods

This case-control study was conducted between June and August 2016 on 500 patients.

Results

For the GAS total score, the internal consistency was excellent (alpha = 0.908). The reliabilities of the GAS subscale scores were as follows: Cognitive (alpha = 0.756); Somatic (alpha = 0.810); Affective (alpha = 0.845). The three subscales of the GAS were highly intercorrelated, with r varying from 0.523 to 0.816 (p < 0.001).

Mild and severe stress, as showed by the Beirut Distress Scale (BDS) score, would significantly increase the total GAS score (p < 0.001, Beta = 5.14, CI 3.817-6.464 and p < 0.001, Beta = 6.847 and CI 5.790-7.903 respectively). Mild and severe depression, as showed by the Geriatric Depression Scale (GDS) score, being divorced or widowed as compared to being single, would significantly increase the total GAS score (p < 0.001, Beta = 7.448, CI 4.222-10.675 and p < 0.001, Beta = 11.889, CI 8.172-15.606; p = 0.001, Beta = 6.127, CI 2.647-9.607 and p = 0.026, Beta = 3.027, CI 0.369-5.685 respectively). The complementary, secondary and university levels of education would increase the total GAS score as compared to illiteracy (p = 0.018, Beta = 3.030, CI 0.531-5.528; p < 0.001, Beta = 5.606, CI 2.751-8.460 and p < 0.001, Beta = 12.014, CI 8.922-15.107 respectively). In opposite, age significantly lowered the total GAS score (p = 0.001, Beta = -0.159, CI -0.248-0.070).

Conclusions

These preliminary results suggest that the Arabic version of the GAS has promising psychometric properties. On the basis of these findings, periodic screening for anxiety, depression, nutritional status and stress is required among geriatric people living in Lebanon.

Key words

Anxiety • Nutritional status • Depression • Factors • Elderlies • Lebanon

Introduction

Anxiety is an emerging problem that aspects individuals across their lifespan. Anxiety may range in severity from mild, adaptive anxiety, wherein it enhances one's normal functioning and maintains one's sense of safety, to severe and debilitating symptoms that are characteristic of anxiety disorders [1].

Anxiety disorders are among the most prevalent mental disorders worldwide [2,3] and are more common among older adults [2,4]. The knowledge about anxiety disorders in geriatric patients is less developed, although they are

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more common than depressive disorders in the elderly population [5,6].

Anxiety disorders in older adults are common, with a prevalence that ranges between 3.2% and 14.2% [6]. Moreover, subsyndromal anxiety symptoms in late life are even more prevalent, ranging between 15 to 52.3% in community samples and 15 to 56% in clinical samples [5]. Anxiety was the most common among all disorders with a prevalence of 16.7%, according to the lifetime prevalence of mental disorders in Lebanon conducted on adults aged 18 years and more [7].

Clinically significant anxiety is associated with a variety of adverse outcomes such as poor physical health, sleep problems, or urinary incontinence [8,9]. Excessive anxiety causes considerable subjective distress, and is associated with a loss of physical activity and depressive symptoms such as reduced life satisfaction, poor self-perceptions of health, and increased loneliness [10,11].

Many scales were developed as a tool to screen for anxiety among adults and elderlies, such as the Adult Manifest Anxiety Scale (AMAS) for younger adults and elderlies 12, the Geriatric Anxiety Inventory (GAI) [13] and the Geriatric Anxiety Scale (GAS) [14].

None of these scales are validated among our Lebanese population of elderly patients. We chose the GAS scale because of its promising psychometric properties and for its capability of measuring several components of anxiety: somatic, affective and cognitive symptoms. Thus, the primary objective of this study is to translate the GAS scale to Arabic for use in elderly patients in Lebanon, to check its validity, reproducibility and responsiveness to the adapted version of the questionnaires. The secondary objective is to assess the risk factors associated with anxiety in these Lebanese geriatrics.

Methods

Study design

This case-control study was conducted between June and August 2016. 250 cases were chosen from three nursing homes in 3 districts in Lebanon. After the nursing homes administration's approval, the questionnaire was distributed to the elderlies, after obtaining both verbal and written informed consents. On the other hand, 250 controls were randomly chosen from the general population from public places (malls, pharmacies, shops, etc.). The interviewed persons were not aware of the exact objective of the study.

Questionnaire and variables

The permission to use the original GAS scale was obtained from Professor Daniel Segal. The GAS was translated from English to Arabic through an initial translation and back translation process. The English version was translated into Arabic by a mental health specialist, then this translation was translated again into English by another specialist. Upon completion of this process, the translators compared the English versions of GAS to determine whether the variables had the same meaning. One trained person was responsible for the data collection, via a personal interview with each patient. This person was independent of this study. A pilot test was conducted on 15 patients to check if the questions were well understood. To note that these 15 answers were not entered in the final database.

Geriatric Anxiety Scale

The GAS [14] contains 25 self-report items used for scoring, as well as five additional items, that tap into common topical concerns of anxiety among older adults and help clinicians identify areas of concerns for the patient. To note that these 5 questions do not load on the final GAS score of each participant. The GAS includes three subscales that study the somatic, cognitive and affective symptoms respectively. Each of these domains include 8 to 9 questions.

Participants are asked to rate symptoms of anxiety or stress by indicating how often they have experienced each symptom during the past week on a Likert-type scale that ranges from 0 (not at all) to 3 (all of the time). Possible scores range from 0 to 75, with higher scores indicating higher levels of anxiety.

Sample size calculation

Using the Epi info program for the calculation of the minimal sample size needed for our study, with an acceptable margin of error of 5% and an expected frequency of anxiety of 16.7% [7] for a 4 million inhabitants in Lebanon, the results showed that we need 428 patients to be enrolled in the study [15].

Statistical analysis

Data analysis was performed on SPSS software, version 22. To confirm the GAS questionnaire construct validity in the Lebanese population, a factor analysis was launched for the whole scale and its 3 subscales respectively, using the principal component analysis technique, with a promax rotation since the extracted factors were found to be significantly correlated. The Kaiser-Meyer-Olkin measure of sampling adequacy and Bartlett's test of sphericity were ensured to be adequate. The retained number of factors corresponded to Eigenvalues higher than one. Moreover, Cronbach's alpha was recorded for reliability analysis for the total score and for subscale factors. Moreover, a multivariate linear regression, using a forward stepwise method, was applied taking the GAS total score as dependent variable and several independent variables (BDS stress

score, GDS score, MNA status, level of education, age, gender, marital status, etc.).

Results

Reliability

Internal item consistency for the Arabic version of the GAS was evaluated by Cronbach's alpha coefficient. For the GAS total score, the internal consistency was excellent (alpha = 0.908). The reliabilities of the GAS subscale scores were as follows: Cognitive (alpha = 0.756); Somatic (alpha = 0.810); Affective (alpha = 0.845). The three subscales of the GAS were highly intercorrelated, with r varying from 0.523 to 0.816 ($p < 0.001$) (Table I). Furthermore, the correlation between the GAS 10 items scale and the GAS total scale with the other 3 subscales was high as well as shown in Table I. Furthermore, these data provide evidence of convergent validity of the translated GAS in this Lebanese sample.

Geriatric Anxiety Scale validity checking

Out of all the items asked in the questionnaire, all variables could be extracted from the list, with no items that over-correlated to each other ($r > 0.9$), having a low loading on factors (< 0.3) or because of a low communality (< 0.3).

The factor analysis for the GAS was run over the whole sample (Total = 500). The total GAS scale converged over a solution of 3 factors, explaining a total of 58.08% of the variance. A high Cronbach's alpha was found for the whole scale 0.908. A Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy of 0.605 was found, with a significant Bartlett's test of sphericity ($p < 0.001$). The *GAS somatic subscale* items converged over a solution of 3 factors that had an Eigenvalue over 1, explaining a total of 70.02% of the variance. A KMO measure of sampling adequacy of 0.672 was found, with a significant Bartlett's test of sphericity ($p < 0.001$). Moreover, a high Cronbach's alpha was found for the somatic subscale (0.756). The *GAS cognitive subscale* items converged over a solution of 2 factors that had an Eigenvalue over 1, explaining a total of 65.64% of the variance. A KMO measure of sampling adequacy of 0.726 was found, with a significant Bartlett's test of sphericity ($p < 0.001$). Moreover, a high Cronbach's alpha was found for the somatic subscale (0.810). The *GAS affective subscale* items converged over a solution of 3 factors that had an Eigenvalue over 1, explaining a total of 81.84% of the variance. A KMO measure of sampling adequacy of 0.678 was found, with a significant Bartlett's test of sphericity ($p < 0.001$).

Moreover, a high Cronbach's alpha was found for the affective subscale (0.845).

Gender difference

A series of independent samples t-tests was used to compare gender differences on the GAS total score (10 and 30 items scales) and on the GAS subscale scores (Table III). Since older women typically have higher levels of anxiety symptoms and higher rates of anxiety disorders than older men [6], these analyses were conducted to assess whether gender differences exist in older stages of life in our Lebanese sample. The results showed that there was no significant difference between genders for any of these scales except for the GAS somatic scale ($p = 0.014$).

Factors affecting the total anxiety score

The results of the multivariate analysis taking the total GAS score as dependent variable, showed that mild and severe stress, as showed by the BDS score, would significantly increase the total GAS score by 5.14 and 6.847 points respectively ($p < 0.001$, Beta = 5.14, CI 3.817-6.464 and $p < 0.001$, Beta = 6.847 and CI 5.790-7.903 respectively). In addition, mild and severe depression, as showed by the GDS score, would significantly increase the total GAS score by 7.4 and 11.8 points respectively ($p < 0.001$, Beta = 7.448, CI 4.222-10.675 and $p < 0.001$, Beta = 11.889, CI 8.172-15.606 respectively). Being divorced or widowed would significantly increase the GAS total score, as compared to being single, by

TABLE I. *Correlations between the different GAS subscales.*

	GAS 10 items	GAS total score	GAS somatic subscale	GAS cognitive subscale	GAS affective subscale
GAS 10 items scale	-	0.927	0.703	0.862	0.859
GAS total scale	0.927	-	0.803	0.912	0.902
GAS somatic subscale	0.703	0.803	-	0.584	0.523
GAS cognitive subscale	0.862	0.912	0.584	-	0.816
GAS affective subscale	0.859	0.902	0.523	0.816	-

$p < 0.001$ for all correlations between all subscales.

TABLE II. *Descriptive analysis and factor loading of the Arabic GAS (N = 500 patients).*

Question	Item	Subscale	Min-Max	Loading factor
My heart raced or beat strongly	1	Somatic	0-3	0.936
My breath was short	2	Somatic	0-3	0.842
I had an upset stomach	3	Somatic	0-3	0.814
I had difficulty falling asleep	8	Somatic	0-3	0.908
I had difficulty staying asleep	9	Somatic	0-3	0.908
I had a hard time sitting still	17	Somatic	0-3	0.654
I felt tired	21	Somatic	0-3	0.770
My muscles were tense	22	Somatic	0-3	0.582
I had back pain, neck pain or muscle cramps	23	Somatic	0-3	0.459
I felt like things were not real or like I was outside of myself	4	Cognitive	0-3	0.865
I felt like I was losing control	5	Cognitive	0-3	0.881
I had difficulty concentrating	12	Cognitive	0-3	0.934
I felt like I was in a daze	16	Cognitive	0-3	0.661
I worried too much	18	Cognitive	0-3	0.504
I could not control my worry	19	Cognitive	0-3	0.536
I felt like I had no control over my life	24	Cognitive	0-3	0.891
I felt like something terrible was going to happen to me	25	Cognitive	0-3	0.698
I was afraid of being judged by others	6	Affective	0-3	0.910
I was afraid of being humiliated or embarrassed	7	Affective	0-3	0.943
I was irritable	10	Affective	0-3	0.907
I had outbursts of anger	11	Affective	0-3	0.894
I was easily startled or upset	13	Affective	0-3	0.880
I was less interested in doing something I typically enjoy	14	Affective	0-3	0.516
I felt detached or isolated from others	15	Affective	0-3	0.999
I felt restless, keyed up or on edge	20	Affective	0-3	0.823

Cronbach's alpha for the whole GAS scale alpha = 0.908; for the somatic scale alpha = 0.756; for the cognitive subscale alpha = 0.810; for the affective scale alpha = 0.845.

6.1 and 3 points respectively (p = 0.001, Beta = 6.127, CI 2.647-9.607 and p = 0.026, Beta = 3.027, CI 0.369-5.685 respectively). Furthermore, the complementary, secondary and university levels of education would increase the total GAS score as compared to illiteracy, by 3.03, 5.6 and 12 points respectively (p = 0.018, Beta = 3.030, CI 0.531-5.528; p < 0.001, Beta = 5.606, CI 2.751-8.460 and p < 0.001, Beta = 12.014, CI 8.922-15.107 respectively). In opposite, age significantly lowered the total GAS score by 0.159 points (p = 0.001, Beta = -0.159, CI -0.248- -0.070).

Discussion

Validation of the GAS scale

In the current study, we were able to validate the Arabic version of the GAS questionnaire, intended specifically for use among elderlies in Lebanon. Results provide initial evidence supporting the reliability and validity of the scale as a screening instrument for anxiety in geriatric patients. The findings showed that the two reliability estimates of the new measure used (Cronbach's alpha and inter-item correlations) were all adequate and similar to reliability data for the English version [14 16 17]. The three identified factors of the GAS scale demonstrated good psychometric properties, with excellent internal consistency for this scale. Thus, the scale can be used in the Lebanese population.

Validity

To assess validity, relationships between the GAS total scale and its subscales were done using the correlation coefficients. In fact, strong positive correlations (p < 0.001 for all subscales) were found between the to-

TABLE III. *Gender differences in the GAS scale and subscales scores.*

Factor	N	Mean ± SD	p
GAS total score			**0.208**
Male	226	32.69 ± 14.84	
Female	274	30.99 ± 15.23	
GAS 10 items scale			**0.146**
Male	226	13.53 ± 7.15	
Female	274	12.59 ± 7.23	
GAS somatic score			**0.014**
Male	226	11.83 ± 5.80	
Female	274	10.56 ± 5.63	
GAS cognitive score			**0.648**
Male	226	9.18 ± 5.17	
Female	274	8.96 ± 5.26	
GAS affective score			**0.218**
Male	226	11.68 ± 6.18	
Female	274	11.46 ± 6.44	

tal scale and its subscales (cognitive r = 0.912; somatic r = 0.803; affective r = 0.902) similar to the original GAS scale that showed strong relationships with its subscales as well (cognitive r = 0.91; somatic r = 0.86; affective r = 0.92) [14]. Additionally, each subscale was significantly correlated with the other subscales, ranging between r = 0.523 between somatic and affective subscales to r = 0.816 between affective and cognitive subscales in the Arabic version, as compared to a range between r = 0.61 to r = 0.82 in the original scale.

Another issue to be discussed is construct validity. It consisted in comparing the initial GAS with our version of the questionnaire using Cronbach's alpha reliability coefficient and factor analysis. The internal consistency reliability for the total GAS scale was α = 0.908, whereas the internal consistency estimated for the three subscales was good as well (cognitive α = 0.810, somatic α = 0.756, affective α = 0.845), similar to the original values obtained α = 0.93, α = 0.85, α = 0.80 and α = 0.82 for the same original scales respectively.

Factors affecting the anxiety score

Our results showed a significant correlations between anxiety from one end, and stress and depression for another end. Our results showed that mild and severe depression would increase anxiety. In fact, the co-occurrence of anxiety and depression in elderly patients is strongly associated with symptomatic overlap and frequent progression of anxiety to depression over time [18]. Furthermore, this combination in elderly patients is a true fact with very strong association between them as detected by Brenes et al. [19], Abdel Rahman et al. [20] and Ahmed et al. [21]. Our results are also in line with the findings of van Zelst et al. [23] that showed that stressful life events were significantly associated with increased anxiety.

Age is a common predictor for depression, anxiety, and mixed form. This may be attributed to the fact that with increasing age, people experience a greater loss of physiological, psychological, and social functioning and become increasingly prone to mental disorders [23]. The results of Ahmed et al. revealed that the occurrence of depression and anxiety increases with age Egypt, in opposite to our study where age was shown to

TABLE IV. *Multivariate analysis with total GAS score as dependent variable.*

Factor	Unstandardized Beta	Standardized Beta	p-value	Confidence interval	
BDS severe stress	6.847	.628	< 0.001	5.790	7.903
BDS mild stress	5.140	.328	< 0.001	3.817	6.464
University level of education*	12.014	.308	< 0.001	8.922	15.107
Secondary level of education*	5.606	.148	< 0.001	2.751	8.460
GDS score severe depression	11.889	.380	< 0.001	8.172	15.606
GDS score mild depression	7.448	.246	< 0.001	4.222	10.675
Age	-.159	-.123	.001	-.248	-.070
Divorced**	6.127	.121	.001	2.647	9.607
Complementary level of education*	3.030	.092	.018	.531	5.528
Widowed**	3.027	.078	.026	.369	5.685

BDS = Beirut Distress Scale; GDS = Geriatric Depression Scale.
** Levels of education as compared to illiteracy. ** Marital status as compared to being single.*

decrease anxiety [21]. Our results are however similar to those of Acierno et al. who showed that older adults are more resilient than younger adults with regard to mental health outcomes [24].

With regards to social factors, the marital status and the level of education appeared to be related with an increased level of anxiety. Being divorced or widowed was associated with increased anxiety, in line with the findings of Mohamed EM et al. [25] that demonstrated that a divorced/ separated marital status was associated with geriatric depression and anxiety in both sexes and also in the overall sample [25]. This might also be explained by the feeling of loneliness, a strong predictor of anxiety, which is a subjective, negative feeling related to the person's own experience of deficiency in social relations [26 27] and by the lack of social support [28 29].

In addition, the complementary, secondary and university levels of education were associated with an increased risk of anxiety in our study. Although some studies showed an association between lower education and anxiety [30 31], others showed that higher education and intelligence might be associated with higher levels of anxiety [32 33]. The results we obtained might me due to the fact that elderlies in our sample are more intelligent and more educated people that would have more responsibilities and would think more about the future, leading to an increased anxiety level.

Limitations

Although the preliminary results in this study are promising, further research should explore the psychometrics of the Arabic GAS in future larger studies, including older adults with psychiatric problems. Future studies should also investigate the extent to which self-report administration is comparable to oral administration of the GAS. However, since this scale was studied on nursing home geriatrics and elderlies living in their own houses, our results can be extended to the general population.

Conclusions

These preliminary results suggest that the Arabic version of the GAS has promising psychometric properties. Based on this study, health care professionals and researchers can readily use the GAS total score to estimate the overall severity of anxiety in Lebanon and in all Arabic-speaking populations, including the Gulf and most North African countries, and in all Arab immigrants around the world. Increasing awareness among nursing home personnel and family members, creating recreational activities for these elderlies, encouraging family bonds would definitely help improve the psychological status of these geriatrics, and thus, their quality of life.

Acknowledgment

The authors would like to thank Professor Daniel Segal for giving us the permission to translate and use the original Geriatric Anxiety Scale to Arabic.

Funding

None.

Competing interests

None declared.

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اكمل المسح الأولي بملأ المربعات بالارقام (النقاط) المناسبة. إجمع النقاط للحصول على المجموع النهائي للنقاط المحرزة لهذا المسح.

المسح الأولي

A أ. هل نقص تناول الطعام خلال الثلاثة أشهر الماضية نتيجة لفقدان الشهية أو مشاكل في الهضم أو صعوبات في المضغ أو البلع؟
0= فقدان شديد للشهية
1= فقدان متوسط للشهية
2= لا يوجد فقدان للشهية ☐

B ب. مدى فقدان الوزن خلال الأشهر الثلاثة الأخيرة
0= فقدان الوزن أكثر من 3 كجم
1= غير معروف
2 = فقدان الوزن من 1 إلى 3 كجم
3= لا يوجد فقدان في الوزن ☐

C ج. القدرة على الحركة
0= ملازم الفراش أو الكرسي
1 = قادر على القيام من الفراش / الكرسي ولكنه غير قادر على مغادرة المنزل
2 = يغادر المنزل ☐

D د. أي إصابة بضغط نفسي أو مرض حاد في الأشهر الثلاثة الماضية ☐

E 0= نعم 2= لا.
ه. أي إصابات عصبية ونفسية
0=خرف شيخوخة شديد أو إكتئاب
1= خرف شيخوخة خفيف (معتدل) ☐

F1 2 = غير مصاب بأمراض
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0= معدل كتلة الجسم أقل من 19
1 = معدل كتلة الجسم من 19إلى أقل من 21
2 = معدل كتلة الجسم من 21 إلى أقل من 23 ☐

إذا تعذر حساب معامل كتلة الجسم , إستبدل السؤال و-1 بالسؤال و-2.
لا تجب عن السؤال و-2 إذا تمت الاجابة على السؤال و-1.

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	على الاطلاق	أحيانا	في معظم الأحيان	طو ا ل الوقت
قلبك ينبض بشدة.				
كانت أنفاسك قصيرة.				
كان لديك اضطراب في المعدة				
شعرت أن الأمور لم تكن حقيقية أو كأنك خارج من نفسك.				
شعرت كأنك فاقد السيطرة.				
كنت خائفا من الحكم عليك من قبل الآخرين.				
كنت تخشى المهانة والحرج.				
كان لديك صعوبة في النوم.				
كان لديك صعوبة في البقاء نائما.				
كنت عصبي.				
كان لديك نوبات غضب.				
كان لديك صعوبة في التركيز.				
كنت تذهل أو تستاء بسهولة.				
كنت مهتمّا أقلّ في القيام بشيء كنت تستمتع به عادة.				
شعرت بأنك منفصل أو منعزل عن الآخرين.				
شعرت وكأنك كنت في حالة ذهول.				
كان لديك صعوبة في الجلوس في مكان واحد.				
قلقت أكثر من اللازم.				
لم تستطع أن تتحكم بالامور				
شعرت بأنّك لا تستطيع البقاء مكانك أو متوتّر أو على أعصابك.				
شعرت بالتعب.				
كنت تشعر بتوتر عضلات.				
كان لديك آلام في الظهر، أو في الرقبة، أو تشنجات في العضلات.				
شعرت وكأنك لم يكن لديك السيطرة على حياتك.				
شعرت أن شيئا رهيبا سيحدث لك				
لقد كنت قلقا حيال المسائل الماليّة.				
لقد كنت قلقا على صحتك.				
لقد كنت قلقا على أطفالك.				
كنت تخشى الموت.				
كنت تخشى أن تصبح عبئا على عائلتك أو الأطفال.				

تحت الجواب المطابق لعدد المرات التي شهدت كل الأعراض خلال الأسبوع الماضي، بما في ذلك اليوم.

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The validity and reliability of the Italian version of the Hypomanic Personality Scale (I-HPS)

Summary

Objectives

To validate the Italian version of the Hypomanic Personality Scale (I-HPS) in a non-clinical sample of young adults.

Materials and Methods

Reliability, convergent and divergent validity, and discriminant capacity of the Italian I-HPS were explored in a sample including 456 undergraduate students attending an Italian university (males: n = 210 [46%]). Convergent and divergent validity was tested by association with the Marlowe-Crowne Social Desirability Scale (SDS); the short Temperament Evaluation of Memphis, Pisa, Paris and San Diego – Autoquestionnaire (TEMPS-A); the 12-item General Health Questionnaire (GHQ-12); the Peters et al. Delusions Inventory (PDI); and the extended Launay-Slade Hallucination Scale (E-LSHS). Discriminant capacity of the I-HPS was tested by Latent Class Analysis (LCA).

Results

Reliability of the I-HPS, as measured with the ordinal Cronbach's alpha, was 0.91. There were no differences in the distribution of I-HPS scores by gender, or parental education, our proxy for socio-economic status. Age was negatively related to I-HPS scores (Pearson's r = -0.15, p = 0.002). Scores on I-HPS were negatively related to social desirability (r = -0.23). As expected, the I-HPS was related to TEMPS-A subscales measuring hypomania-proneness more than to TEMPS-A subscales measuring proneness to depression or anxiety (Steigers' z test p < 0.001 or lower). The I-HPS revealed a stronger association with measures of delusion- (PDI) and hallucination-proneness (E-LSHS) than with generalist psychological distress (GHQ-12): Steigers' z test p < 0.0001 in all comparisons. In the sample, 45 (10%) scored ≥ 6 on the GHQ-12 and ≥ 8 on the PDI, our psychometric threshold for higher risk of psychosis. LCA identified three classes in the sample. Compared to the baseline class (42.8% of participants), people at a higher risk of psychosis were more likely to fall in the intermediate class (23.9%), and, with greater odds, in the "high propensity to hypomania" class (33.3%).

Conclusions

The I-HPS reveals good psychometric properties in line with the other studies on the cross-cultural validity of the I-HPS as currently tested in German, Spanish, and French samples. The I-HPS is a suitable measure to identify people with hypomanic personality and a promising tool to assist the identification of individuals at a higher risk of bipolar disorder.

Key words

Bipolar disorder • Hypomanic personality • Temperament • Screening

Introduction

The widespread dissemination of the early intervention paradigm has renewed interest in the stress-vulnerability model of the onset of psychosis [1-3]. According to this model, an underlying genetic vulnerability to psychosis coupled with the impact of environmental stressors, whether psycho-social (social adversities) or biochemical (substance use) in na-

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ture, may trigger the development of psychotic symptoms in at-risk subjects [1 2]. Needless to say, the renewed emphasis on this model has reinvigorated the focus on the premorbid vulnerability traits in both schizophrenia and bipolar disorder spectra [4-9], including at-risk mental states [10 11].

As far as the schizophrenia spectrum is concerned, Meehl's schizotaxia-schizotypy heuristic model remains central for the derivation of measurement tools [12]. Indeed, several instruments are available for the measurement of the risk of psychosis within Meehl's schizotaxia-schizotypy model. This is the case of the Schizotypal Personality Questionnaire (SPQ) [13-15]; the Oxford-Liverpool Inventory of Feelings and Experiences (O-LIFE) [16 17]; and the Wisconsin Schizotypy Scales (WSS) [5]. Similarly, the pragmatic sample-enrichment strategy to identify subjects at presumed ultra high-risk for psychosis, is centered around ad hoc semi-standardized interviews, i.e. the Comprehensive Assessment of At-Risk Mental States (CAARMS) [10 11], and the Structured Interview for Prodromal Syndromes and the Scale of Prodromal Symptoms (SIPS/SOPS) [18 19]. As far as the bipolar spectrum is concerned, current research has mainly focused on screening tools targeting potentially unrecognized cases of already developed affective disorders, e.g. via the Mood Disorder Questionnaire [20 21], or the Hypomania Checklist (HCL-32) [22 23], and on measures of affective temperaments (e.g. Temperament Evaluation of Memphis, Pisa, Paris and San Diego - TEMPS). The TEMPS in particular is a tool specifically designed to measure the affective temperaments that define the bipolar spectrum, that is: depressive (D), cyclothymic (C), hyperthymic (H), irritable (I), and anxious (A) subscales [24-26]. As a matter of fact, there is a relative paucity of tools to detect people at a higher risk of bipolar disorder [27].

So far only the Hypomanic Personality Scale (HPS) [28 29] has proved to be a valid measure of the risk of future psychosis within the bipolar spectrum, with people scoring higher on the HPS being at the highest risk for developing psychosis at follow-up [30 31].

The HPS is a 48-item true-false scale measuring behaviors and feelings that may be related to hypomanic episodes, such as hyperactive, ambitious, or exhibitionistic behaviors, and feelings of euphoria or flights of thoughts. In the original study, involving 1,519 US undergraduates, those scoring in the top 3% were more likely to meet the criteria for bipolar spectrum disorders than were control participants with average scores [28]. At a 13-year follow-up, those scoring higher on the HPS were found to report more depressive episodes, borderline personality disorder symptoms, psychotic-like experiences, substance and alcohol problems, and a trend toward more arrests, than controls with average scores [30]. These findings were corroborated by the results of a longitudinal study of a large adolescent sample [32]. Among the investigated adolescents, higher scores on the HPS predicted increased levels of impairment in a number of areas, including depressive and internalizing symptomatology, during the follow-up [32]. Another independent 3-year follow-up study confirmed that higher scores on the HPS predicted new cases of bipolar spectrum disorders, as well as hyperthymic temperament or history of hypomania, grandiose traits, substance use disorders, and borderline traits [33]. The HPS has also good discriminative properties when applied to patients' samples [29 34], and it was found to predict relapse into a mood episode in patients with bipolar disorder [35].

Thus, the HPS might be a valid tool to screen people potentially at a high risk of developing a condition within the bipolar disorder spectrum. To our knowledge, up to now the cross-cultural validity of the HPS has been proved for the German [29], Spanish [36], and French versions of the scale [37].

Therefore, the aim of this study is to validate the Italian version of the HPS (I-HPS) in a young adult non-clinical sample. Reliability, convergent and divergent validity, and discriminant capacity of the Italian HPS are detailed, with the overarching goal of illustrating the good psychometric properties of the tool in the age range that is at a higher risk of bipolar disorder onset.

Materials and Methods

The institutional review board approved the study protocol in accordance with the guidelines of the 1995 Declaration of Helsinki, as revised in Tokyo in 2004.

Participants were 456 undergraduate students attending the courses of the University of Cagliari (Italy). Participants were enrolled from a wide array of courses: engineering (n = 98), law (n = 58), psychology (n = 57), foreign languages courses (n=33), higher education in art music and dance (music: n=32; painting and sculpture: n=32; dance: n=32; and drama: n=32), classical studies (n = 19), political science (n = 15), education (n = 13), economics (n = 12), architecture (n = 6), biology (n = 5), medicine (n = 4), pharmacy (n = 4), mathematics (n = 2), geology (n = 1), and physics (n = 1).

Participation rate was 87% of the original 520 subjects sample invited to take part in the study: 20 declined after glancing at the booklet; 44 cases were discarded because their questionnaires were left blank in some part.

Participants received a short briefing on the aims and scope of the study ("To collect information on the customary behavior of people, including their psychological and emotional wellness"). Participation was voluntary and no fee or other compensation was given for taking part in the study. All participants provided in-

formed consent. Participants were allowed as much time as they wanted to answer the questionnaires; the time dedicated to answering the questionnaires was not recorded. A short debriefing was given after the completion of the booklet containing the questionnaires, to ensure that the filling in of the questionnaires produced no negative response. Potential ethical issues (discovery of an unknown disorder, awareness of own psychological distress, list of addresses for consultation) were discussed during the debriefing when needed. A card with the contacts of the principal investigator and the staff of the Clinical Psychology Unit was given to those who desired further explanation of the items investigated by the questionnaires.

Measures

Each participant was told the data would remain confidential, and received a booklet containing the questionnaires listed below, which they were asked to complete. The Hypomanic Personality Scale (HPS): This 48-item scale is a dichotomous (True/False) tool that was designed to identify people with hypomanic personality, conceived as an overactive, highly sociable style of behavior in which episodes of hypomanic euphoria are likely to recur [28]. This questionnaire has been used as a measure of affective/hypomanic traits, and discriminates between patients with bipolar disorder and controls and predicts the onset of bipolar disorder in adulthood from the scores in late adolescence [30]. Sample items are: "There are often occasions when I am so restless that I cannot even remain seated", "I often feel excited and happy for no apparent reason", "I have such a wide range of interests that I often wonder what I will do later", "I think I have a special ability to persuade and motivate other people". Standard procedures were used to translate the HPS [38 39]. The original English version of the HPS was translated into Italian by the principal investigator then checked for correctness by an English-speaking translator. A second English-speaking translator checked the back translation into English. This version was finalized with the aid of one of the principal investigators of the HPS (T. R. Kwapil) to assure full compatibility of the translation in terms of meaning and understanding of the items (see Appendix).

For the purpose of the study we also used the following questionnaires and scales: the Marlowe-Crowne Social Desirability Scale (SDS) [40 41]; the short Temperament Evaluation of Memphis, Pisa, Paris and San Diego – Autoquestionnaire (TEMPS-A) [26 42]; the 12-item General Health Questionnaire (GHQ-12) [43 44]; the Peters et al. Delusions Inventory (PDI) [45 46]; the extended Launay-Slade Hallucination Scale (E-LSHS) [47-49].

The SDS is a 33-item self-report questionnaire aimed at measuring socially desirable response [40]. Subjects rate the extent to which they agree (True) or disagree (False) with each item: the 15 items keyed False (denial subscale, D) are likely but socially undesirable and are thought to measure denial and self-deception (e.g. "I am sometimes irritated by people who ask me some favours"); the 18 items keyed True (positive attribution subscale, PA) are improbable but socially desirable and are thought to measure a tendency to positive attribution, or to attributing the self traits that are seen by society positively (e.g. "No matter who I'm talking to, I am always a good listener"). The Italian version of the SDS showed good psychometric functioning when tested in non-clinical populations and, in past studies, it showed a negative correlation with measures of psychopathology, particularly the denial subscale [41]. Reliability of the Italian SDS, measured as Cronbach's alpha, was > 0.80 in both genders [41].

The short TEMPS-A is a 39-item Yes-or-No self-report questionnaire designed to quantify affective temperaments in psychiatric patients and healthy subjects [26 42]. It derives from a longer, 110-item version built-up on the concept of bipolar spectrum, and includes five subscales: cyclothymic, dysthymic, irritable, hyperthymic, and anxious [42]. The validated Italian version was used for this study [26]. The TEMPS-A proved able to readily distinguish patients with bipolar disorder from healthy subjects, and it is considered a good description of the affective temperaments in both clinical and non-clinical samples [26 42]. Reliability of the Italian TEMPS-A, as measured by Cronbach's alpha, was > 0.70 for all subscales [26].

The GHQ-12 is a screening tool aimed at identifying people in need of clinical attention [43]. The validated Italian version was used for this study [44]. Respondents have to rate the presence and frequency of each symptom on a 4-point scale (i.e. "not at all", "less than usual"', "more than usual", "rather more than usual") in the past four weeks [43 44]. For the purpose of this study, a dichotomous scoring system was used attributing a point to each item with a "more than usual" or "rather more than usual" answer. Previous research using this scoring method showed that a score of 4 or more is likely to be associated with a common mental disorder [44]. Reliability of the Italian GHQ-12, measured as Cronbach's alpha, was > 0.80 in past studies [26 44].

The PDI is a dichotomous (Yes/No) questionnaire that was designed to measure unusual beliefs and experiences pertaining to the dimension of delusional ideation in the general population [45]. The 21 original questions were adapted to explore life-time experience (For

example: "Do you ever feel that you are especially close to God?", "Do you ever feel as if someone is deliberately trying to harm you?"). The Italian version of the PDI discriminates patients diagnosed with psychosis from controls with a sensitivity = 0.74 and a specificity = 0.79 (AUC = 0.815) [46],and classified patients into three classes traceable to the three major dimensions of psychosis, i.e. paranoia, grandiosity/hypomania, and the schizophrenia-like profile. Reliability of the Italian PDI, measured as Cronbach's alpha, was > 0.70 in past studies [26].

The E-LSHS is a self-report scale with 16 items investigating hallucinatory experiences in the domain of auditory, visual, olfactory, tactile cognition and sleep-related perception, and including items that tap into the experience of feeling the presence of someone close who isn't there, the so-called "sensed presence" [47 48]. Respondents have to rate each item on a five-point scale: (0) "certainly does not apply to me"; (1) "possibly does not apply to me"; (2) "unsure"; (3) "possibly applies to me"; and (4) "certainly applies to me". The Italian version of the LSHS-R showed good convergent validity with other measures of psychotic-like experiences [49]. Reliability of the Italian E-LSHS, measured as Cronbach's alpha, was > 0.80 in past studies [49].

General socio-demographic information from self-report data was collected for the following variables: age, gender, and socioeconomic status. As a measure of socioeconomic status we used the highest level of parental education [50], which was further classified into three categories: lower than high school diploma, high school diploma, college graduate or higher.

Statistical analyses

Since the 44 incomplete booklets were discarded, no data were missing in the database. Once entered in the database by a researcher, data were rechecked by another researcher. Error rates – improbable values on the basis of expected (i.e. age) or requested (interval on a item) scores – were less than 1% and all were corrected based on the questionnaires. All data were coded and analyzed using the Statistical Package for Social Sciences (SPSS) version 20. Additional analyses were carried out in R using dedicated packages [51].

All tests were two-tailed. Due to multiple testing, significance threshold was set at $p < 0.005$. According to Bayesian interpretations, this threshold has the greatest chance of suggesting evidence against the null [52].

Descriptive and exploratory analysis

Mean with standard deviation was reported for continuous variables. Counts and percentage were reported for categorical variables (Table I).

Scale scores' reliability was measured by Cronbach's alpha or its ordinal version, which has a better fit for dichotomic items or for items showing skewness [53]. For group comparisons, reliability values of 0.70 are considered quite satisfactory, and when dealing with subscales derived from a single questionnaire, values around 0.60 are considered acceptable [54].

Finite mixture models were applied for testing whether the distribution of I-HPS scores in the sample corresponded to a single or a mixture of Gaussian distributions. Analysis was carried out with the "mixtools" package running in R [55].

Continuous variables were tested with Student's t-test or ANOVA. Categorical analyses were carried out with the Chi-square, with Yates correction whenever necessary. Pearson's correlation coefficient was used to test for associations between variables. Correlation coefficients were compared according to the Steigers' z test [56].

Convergent and divergent validity of I-HPS scores

The I-HPS is expected to be positively related to psychological distress (GHQ-12) and to the reporting of posi-

TABLE I. *General characteristics of the sample (n = 456).*

Socio-demographic groups	N (%)	I-HPS Mean (SD)	Statistics
Gender			
Male	210 (46%)	17.5 (7.8)	t = -1.08, df = 454, p = 0.280
Female	246 (54%)	16.7 (7.8)	
Age			
19-22 (%)	166 (36%)	18.3 (7.5)	t = -2.49, df = 454, p = 0.013
23-38 (%)	290 (64%)	16.4 (7.9)	
Highest level of parental education			F(2;453) = 1.96, p = 0.141
Lower than high school diploma	167 (37%)	16.2 (7.7)	
High school diploma	192 (42%)	17.7 (7.9)	
College graduate or higher	97 (21%)	17.6 (7.8)	

HPS: Hypomanic Personality Scale; SD: standard deviation.

tive symptoms of psychosis (PDI and E-LSHS). I-HPS is also expected to be related to affective temperaments within the hypomanic spectrum (cyclothymic, irritable, and hyperthymic subscales of the short TERMS-A) and to be minimally related or unrelated to affective temperaments within the dysthymic spectrum (dysthymic and anxious subscale of the short TEMPS-A). Pearson product-moment correlation analysis was used to test convergent and divergent validity.

Discriminant validity of the I-HPS

Distribution of the scores at the I-HPS is expected to vary continuously across the population. To the purpose of differentiating individuals by their degree of proneness to hypomania, we applied Latent Class Analysis (LCA) to the I-HPS dichotomous scores.

LCA was carried out with the poLCA package running in R.[57] PoLCA estimates the latent class model by maximizing the log-likelihood function [57]. Parsimony criteria are applied to strike a balance between over- and under-fitting the model to the data by penalizing the log-likelihood by a function of the number of parameters being estimated [57]. The preferred models are those that minimize the values of the Bayesian Information Criterion (BIC) [58] and the Akaike Information Criterion (AIC) [59], and of their derivation, the consistent AIC (CAIC) [60], and the sample size adjusted BIC (SSBIC) [61]. The likelihood ratio chi-square test was also used to determine how well a particular model fits the data with reference to the ratio of the observed cell counts versus the predicted cell counts [62]. Standardized entropy measure was used to assess accuracy of participants' classification (0 to 1), with higher values indicating better classification. Entropy values greater than .80 indicate a good separation of the identified groups [63].

Participants were assigned to the latent class to which they had the highest probability of belonging (average probabilities per class ≥ 85%).

Multinomial logistic regression was used to assess the association between class membership and risk of psychosis in the sample by taking into account demographic variables (i.e. gender and age). Subjects were identified as being at risk of psychosis when they scored ≥ 6 on the GHQ-12 and ≥ 8 on the PDI (see Rocchi et al., 2008 for details) [64]. Differences between classes were expressed with odds ratio (95% confidence interval [CI]).

Likelihood ratio test (LRT) was used to assess model fitting, with the null of the LRT specifying lack of fit (so, refutation of the null corresponds to good fit of the model). Goodness of fit of the model was also assessed with Pearson chi-square statistics. In this test, the null assumes that the model has a good fit, so $p < 0.05$ (refutation of the null) indicates misspecification of the model. Variance explained by the model was assessed with pseudo-R^2 measures, such as the McFadden and the Cox-Snell pseudo-R^2. These indicators are on a similar scale, ranging from 0 to 1, with higher values being a reflection of the better fit of the model [65].

Results

The final sample included 210 males (46%) and 246 females (54%). Participants were 24 years old (SD = 3.5) on average (range: 18 to 38 years). In the sample 8 participants declared to be married (2%), and 166 reported to be in a stable relationship (36%). The participants whose parents had a high school diploma were 192 (42%), while the participants whose parents had a university degree or a higher qualification were 97 (21%).

Distribution of I-HPS scores in the sample departed from normality at the very low values. Essentially, the distribution of I-HPS scores can be interpreted as a mixture of two Gaussian distributions, one with mean = 10.6 (SD = 4.1), and the other with mean = 20.5 (SD = 7.1; for details, see Fig. 1).

Mean in the whole sample was 17.1 (SD = 7.8); median = 16 (interquartile range = 12); skewness = 0.37 (standard error of skewness = 0.11); kurtosis = -0.25 (standard error of kurtosis = 0.23).

There were no differences in the distribution of I-HPS total scores by gender, or parental education, our proxy for socio-economic status (details in Table I).

Age was negatively related to I-HPS total scores (Pearson's $r = -0.15$, $p = 0.002$).

Reliability of the questionnaires used in the study

Internal coherence, as measured by ordinal Cronbach's alpha, was good for all scales and acceptable for all subscales (see Table II for details).

Convergent and divergent validity of the Italian HPS

Scores on I-HPS were negatively related to social desirability and positively related to measures of psychological distress and of psychosis-proneness (Table III).

The links of I-HPS scores with delusion (PDI) or hallucinations-proneness (E-LSHS) were stronger than the links with psychological distress (GHQ-12): Steigers'z test $p < 0.0001$ in both comparisons.

As expected, the I-HPS was related to TEMPS-A subscales measuring hypomania-proneness more than to TEMPS-A subscales measuring proneness to depression or anxiety (Steigers' z test $p < 0.0001$ in the comparisons of TEMPS-A Cyclothymic subscale versus the Dysthymic or Anxious subscale; Steigers' z test $p < 0.0001$ in the comparisons of TEMPS-A Hyperthymic or Irritable subscale versus the Dysthymic subscale; the distinction between the TEMPS-A Hyperthymic and Irritable subscales and the Anxious subscale is less evident: Steigers' z test $p > 0.001$ in both comparisons).

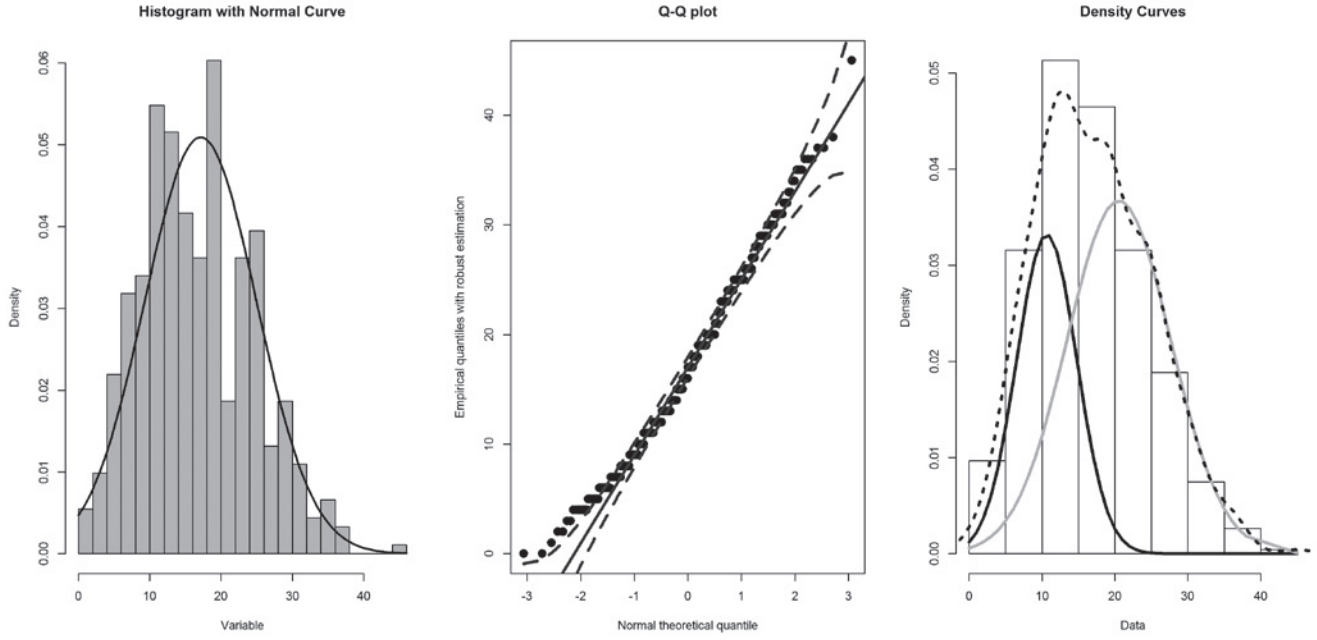

FIGURE 1. *Distribution of I-HPS test scores, 48 items (n = 456); from left to right: histogram of scores with superimposed normal curve; quantile-quantile probability plot (Q-Q plot) of scores with confidence interval; density plot of the scores (dashed line) with two superimposed Gaussian distributions (continuous lines in black and gray).*

TABLE II. *Mean scores and inter-correlation among the measures of psychopathology used in the study and the i-HPS.*

	No. Items	Item's score	Maximum possible score	Cronbach's α*	Mean (SD)	Median (IRQ)	Min - Max
I-HPS	48	0/1	48	0.91	17.1 (7.8)	16 (12)	0-45
SDS	33	0/1	33	0.84	16.1 (4.9)	16 (6)	3-33
GHQ-12	12	0/1	12	0.92	3.5 (3.0)	3 (4)	0-12
PDI	21	0/1	21	0.89	5.9 (3.7)	5 (5)	0-20
E-LSHS	16	0 to 4	64	0.93	16.1 (11.9)	13 (16)	0-57
TEMPS-A							
Cyclothymic	12	0/1	12	0.87	4.3 (2.9)	4 (4)	0-12
Dysthymic	8	0/1	8	0.83	1.9 (1.8)	1 (3)	0-8
Irritable	8	0/1	8	0.79	1.3 (1.5)	1 (2)	0-6
Hyperthymic	8	0/1	8	0.78	3.5 (2.0)	3 (3)	0-8
Anxious	3	0/1	3	0.82	1.2 (1.0)	1 (2)	0-3

** Cronbach's α was calculated on the basis of a polychoric correlation matrix due to the dichotomous or ordinal nature of data*

The correlations between the I-HPS and the measures of psychosis-proneness (PDI and E-LSHS) were of the same order – in term of effect size – as those of the TEMPS-A Cyclothymic subscale with these same scales.

It is worth mentioning that the TEMPS-A Hyperthymic subscale was statistically related to the I-HPS scores but not to the scores on the other scales.

Discriminant validity of the Italian HPS

The three-class solution represented the best compromise on the basis of the statistics used to assess comparative model fit (Fig. 2).

TABLE III. *Inter-correlation (Pearson's r) among the measures of psychopathology used in the study and the I-HPS.*

	I-HPS	SDS	GHQ-12	PDI	E-LSHS	Cycl.	Dysth.	Irr.	Hyper.
SDS	-0.234*								
GHQ-12	0.178*	-0.216*							
PDI	0.491*	-0.289*	0.225*						
E-LSHS	0.508*	-0.272*	0.234*	0.571*					
TEMPS-A									
Cyclothymic (Cycl.)	0.509*	-0.377*	0.386*	0.411*	0.464*				
Dysthymic (Dysth.)	0.069	-0.271*	0.287*	0.215*	0.202*	0.440*			
Irritable (Irr.)	0.352*	-0.357*	0.111	0.252*	0.219*	0.416*	0.256*		
Hyperthymic (Hyper.)	0.419*	0.055	-0.006	0.161*	0.021	0.097	-0.073	0.196*	
Anxious	0.236*	-0.184*	0.155*	0.197*	0.250*	0.336*	0.240*	0.184*	0.086

** Pearson's r p < .005. Pearson's r > 0.30 (medium effect size according to Cohen)75 are marked in bold.*

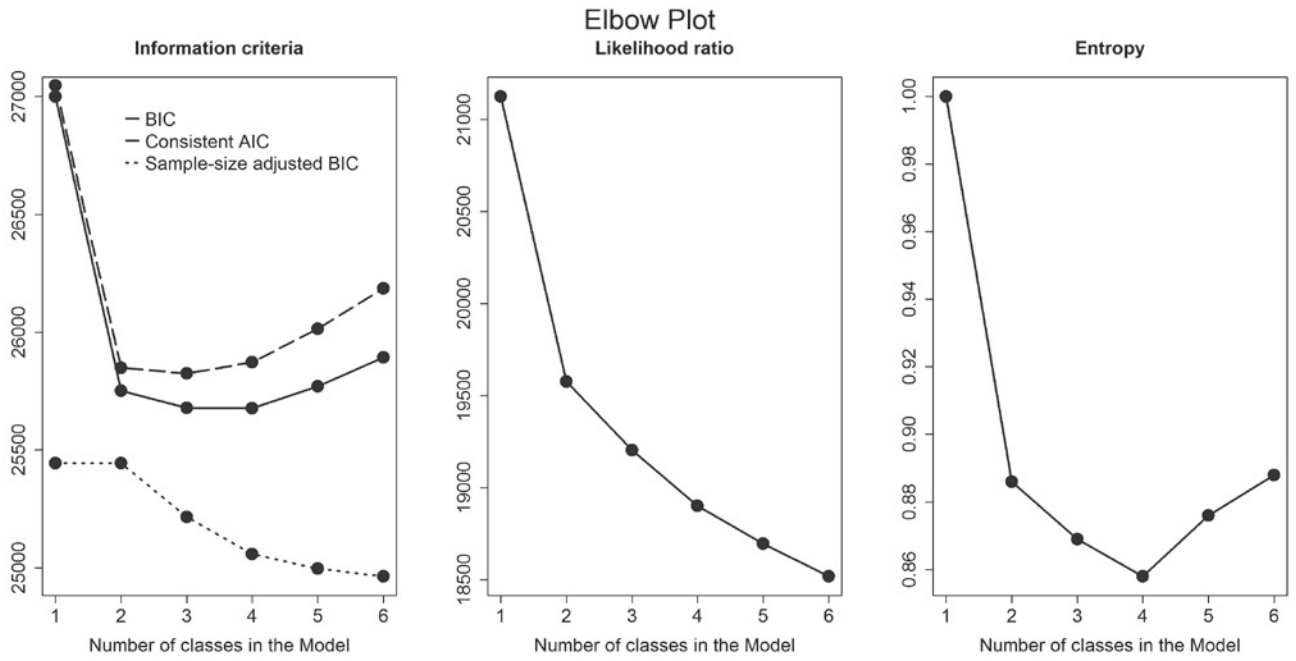

FIGURE 2. *Fit indices for the latent class analysis of the I-HPS.*

The elbow plot indicated a smoothed decrease in the sample-size adjusted BIC and a more marked decrease in the likelihood ratio; however, the BIC and the consistent AIC were congruent with a 3-class solution, advising against further decomposition of the sample. In the 3-class solution entropy was 0.87, which indicated a good classification of participants in the model. Entropy in the subsequent 4-class solution was lower (0.85) than in the 3-class solution, suggesting the preceding model had a better classification of participants.

The 3-class solution generated/produced a baseline class with low endorsement of most I-HPS items, including 195 (42.8%) participants; an intermediate class, including 109 (23.9%) participants; and a third class of "high propensity to hypomania", with high endorsement on most I-HPS items, and including 152 (33.3%) participants (Fig. 3).
Mean scores of I-HPS were 10.8 (SD = 4.3) in the baseline, 16.4 (4.2) in the intermediate, and 25.6 (4.9) in the "high propensity to hypomania" class: $F(2;453) = 466.1$, $p < 0.0001$.

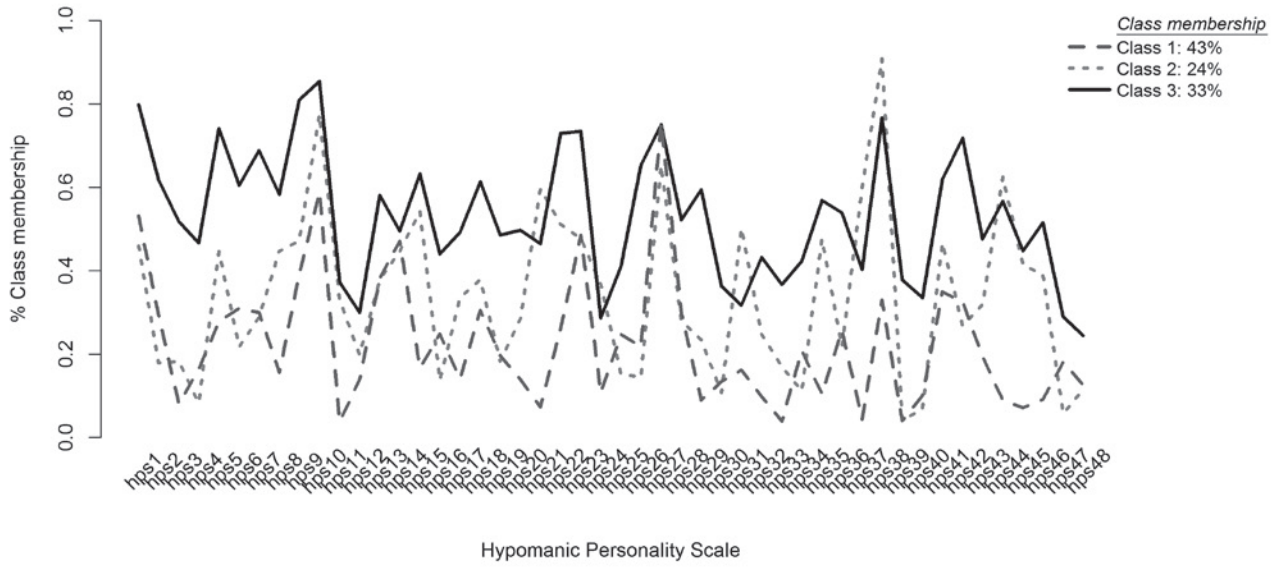

FIGURE 3. *Profile plot for the latent class analysis of the I-HPS (48 items). The Y-axis represents the class-specific mean scores as proportions of the maximum score for the indicator. The X-axis contains the 48-item profile of the I-HPS.*

In the sample, 109 participants (24%) scored ≥ 6 on the GHQ-12, 134 participants (29%) scored ≥ 8 on the PDI, and 45 (10%) scored ≥6 on the GHQ-12 and ≥8 on the PDI. This latest subsample represented our target group at a higher risk of psychosis.

Gender was not related to class membership, age was negatively related to it (Table IV).

Compared to the baseline class, people at a higher risk of psychosis were more likely to fall in the intermediate class and, with greater odds, in the "high propensity to hypomania" class.

The model had a god fit (LRT: χ^2 = 35.56, df = 6, p < 0.0001; Pearson chi-square = 98.65, df = 102, p = 0.57), albeit the variance explained by this model was low (Cox and Snell pseudo-R^2 = 7.5%; McFadden pseudo-R^2 = 3.6%).

Discussion

The study provided further robust evidence about the cross-cultural validity of the I-HPS. Reliability of the Italian version of the I-HPS was excellent, with gold-standard values of interval coherence. Concurrent validity was in

TABLE IV. *Association between latent classes of i-HPS and predictors, taking into account gender and age.*

All data: no. (%); reference term above	LC1 Baseline	LC2 Intermediate	LC3 High
	n = 195 (42.8%)	n = 109 (23.9%)	n = 152 (33.3%)
Gender			
Females	103 (52.8%)	71 (65.1%)	72 (47.4%)
Males	92 (47.2%)	38 (34.9%)	80 (52.6%)
OR (95%CI)	1	1.52 (0.93-2.49); p = 0.095	0.72 (0.48-1.12); p = 0.147
Age			
Mean (SD)	25.1 (3.5)	23.6 (3.1)	23.6 (3.7)
	1	0.89 (0.83-0.96); p = 0.002	0.88 (0.83-0.94); p < 0.0001
Risk of psychosis			
Low	185 (94.9%)	95 (87.2%)	131 (86.2%)
High	10 (5.1%)	14 (12.8%)	21 (13.8%)
OR (95%CI)	1	2.57 (1.08-6.10); p = 0.032	3.03 (1.36-6.77); p = 0.007

Latent Class I, corresponding to the Baseline class, was used as a reference term.

the expected direction, with higher correlations of I-HPS with measures within the hypomanic spectrum (cyclothymic, irritable, and hyperthymic subscales of the short TERMS-A), rather than measures within the dysthymic spectrum (dysthymic and anxious subscale of the short TEMPS-A).

Links of the I-HPS with levels of psychological distress were modest, supporting the tenet that the traits measured by the tools are more within the risk of affective disorders than indicative of the full-blown syndrome. Nevertheless, I-HPS scores showed a strong relationship with measures of delusion- and hallucinations-proneness.

Healthy people with high scores on the I-HPS were found to be more likely to report distressing perceptual anomalies and proneness to hallucinations [66], and in general a positive correlation between hypomanic and attenuated positive symptoms of psychosis was described in undergraduate students [67 68].

It should be borne in mind that both the PDI and the E-LSHS are measures of the risk of psychosis rather than tools aimed at screening people with a full-blown psychosis. Moreover, people with hypomanic traits can be more likely to reveal socially undesirable beliefs and experiences and, indeed, I-HPS scores showed a negative relationship with social desirability scores, albeit modest.

However, people with high scores on the PDI and evidence of high levels of psychological distress on the GHQ-12, our proxy for the risk of psychosis, were discriminated by the I-HPS, confirming past studies on the link between I-HPS scores and the risk of psychosis [30 31].

The LCA distinguished one baseline class, including 42% of the sample, and two classes with an enhanced risk of psychosis. These two classes of proneness to hypomania showed some kind of overlap, and probably correspond to the second Gaussian distribution retrieved by the finite mixture model. Albeit both showing an enhanced risk of psychosis, these two classes might relate to different degrees of the risk of bipolar disorder, with the intermediate class being possibly related to a nonspecific risk of depression and anxiety, which in turn may be related to a higher chance of psychotic-like experiences [69], and the other class being more specifically linked to the risk of bipolar spectrum disorders.

It is worth mentioning that the I-HPS also intercepts non-pathological traits related to the hypomanic/bipolar spectrum, such as those measured by the TEMPS-A Hyperthymic subscale with items covering socially desirable traits in the Italian population [26 70]. Adaptive traits of hypomania were linked to the greater involvement in creative activities of patients diagnosed with bipolar disorder [71 72].

Limitations

We had no opportunity to further evaluate the people identified at potential (psychometric) risk with a detailed follow-up interview (e.g. with dedicated tools such as SIPS/SOPS, CAARMS or SPI-A) [73]. Moreover, since participants were undergraduates still attending university courses, it is unlikely that they had a full-blown episode of psychosis at the time of the study. However, they could have an attenuated form of bipolar disorder that puts them at a high risk of onset of a manic episode.

The exclusive reliance on self-report measures is a major limitation of this study; nevertheless the use of self-report measures allows the enrollment of large samples, and given the guarantee of anonymity, participants might be more forthcoming when filling in the questionnaires. Thus the associations observed in the study and, in particular, the greater links of I-HPS scores with measures of hypomania- and psychosis-proneness than with measures of anxiety, depression or generalist psychological distress, may be considered a reflection of the links between the corresponding latent traits.

Conclusions

The I-HPS might be considered a tool to identify trait, non-symptomatic disposition to bipolar disorder. Kraepelin considered hypomanic states within the cyclothymic predisposition to bipolarity [74] and, indeed, there is some evidence that people scoring higher on the I-HPS suffer an increased risk of developing bipolar disorder [30 33].

The Italian version of the I-HPS has demonstrated good psychometric properties, and may be added to the armory of tools to be used for screening help-seeking people at risk of psychosis.

Conflict of interest

Antonio Preti, Marcello Vellante, Giulia Zucca, Mariangela Melis, Matthew Brown, Carmelo Masala and Donatella Rita Petretto did not receive any grant and were not consultants or speakers at symposia sponsored by companies that may be related to the study subject of this article.

Dr. Andrea Raballo holds a research fellowship from the Norwegian Centre for Mental Disorders Research (NORMENT), Centre of Excellence of the University of Oslo, and did not receive any grant and was not a consultant or speaker at symposia sponsored by commercial companies that can be connected to the study described in this article.

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Appendix

Per cortesia, per ogni affermazione scelga l'opzione (Vero o Falso) che meglio si adatta a lei. Non salti nessuna riga. Grazie		Vero	Falso
1	Mi considero proprio il tipo della persona media.	V	F
2	Mi sentirei nervoso se dovessi fare il pagliaccio davanti ad altra gente.	V	F
3	Sono su di giri così spesso che i miei amici, per prendermi in giro, mi chiedono che droga prendo.	V	F
4	Penso che sarei un bravo comico da cabaret.	V	F
5	A volte mi vengono idee o intuizioni così velocemente da non riuscire a esprimerle tutte.	V	F
6	Quando sono con altra gente, di solito preferisco che sia qualcun altro a stare al centro dell'attenzione.	V	F
7	In ambienti a me non familiari, mi capita spesso di essere così socievole e sicuro di me stesso da stupirmene io stesso.	V	F
8	Ci sono spesso occasioni nelle quali sono così irrequieto che per me è impossibile rimanere seduto.	V	F
9	Molta gente mi considera divertente, ma anche un po' stravagante.	V	F
10	Quando sento un'emozione, solitamente la percepisco con grande intensità.	V	F
11	Sono spesso così su di giri che mi riesce difficile concentrarmi su qualsiasi cosa per molto tempo.	V	F
12	A volte ho l'impressione che non mi può capitare nulla fino a quando non avrò compiuto quello cui sono destinato nella vita.	V	F
13	La gente viene spesso da me quando ha bisogno di un'idea intelligente.	V	F
14	Non credo di essere più consapevole di me stesso della maggior parte delle persone.	V	F
15	Mi capita spesso di sentirmi eccitato e felice senza apparente motivo.	V	F
16	Non riesco a immaginare che a qualcuno possa venire in mente di scrivere un libro sulla mia vita.	V	F
17	Di solito sono di umore medio, non troppo alto né troppo basso.	V	F
18	Ho spesso dei periodi durante i quali mi sento così pieno di energia e così ottimista da pensare che riuscirei a battere chiunque in qualunque campo.	V	F
19	Ho un tale ampio ventaglio di interessi, che spesso non so cosa farò più tardi.	V	F
20	Ci sono spesso stati dei periodi durante i quali avevo un tale eccesso di energia che sentivo poco il bisogno di dormire la notte.	V	F
21	Il mio umore non sembra oscillare più di quel che capita agli altri.	V	F
22	Mi capita molto spesso di provare il desiderio di essere dappertutto e fare tutto allo stesso tempo.	V	F
23	Mi aspetto che prima o poi avrò successo in più settori professionali.	V	F
24	Quando mi sento molto eccitato e felice, quasi sempre so perché.	V	F
25	Quando vado ad una festa dove non conosco nessuno, di solito ci metto un po' prima di sentirmi a mio agio.	V	F
26	Credo che potrei essere un buon attore, perché riesco a recitare ruoli diversi in modo convincente.	V	F
27	Mi piace che gli altri pensino che io sono il tipo della persona media.	V	F
28	Spesso metto per iscritto i pensieri e le intuizioni che mi vengono in mente quando penso in modo particolarmente creativo.	V	F
29	Ho spesso convinto gruppi di amici a fare cose davvero avventate o proprio pazze.	V	F
30	Mi piacerebbe davvero essere un uomo politico ed essere il protagonista di una campagna elettorale	V	F
31	Di solito riesco a calmarmi quando lo voglio.	V	F
32	Sono considerato un tipo iperattivo.	V	F
33	Sono spesso così felice e pieno di energia da esserne quasi ubriacato.	V	F
34	Ci sono così tanti campi nei quali potrei avere successo, che è proprio un peccato doverne scegliere uno.	V	F
35	Spesso il mio umore è tale che mi sembra che molte regole della vita non si applichino a me.	V	F
36	Mi riesce facile indurre gli altri a trovarmi sessualmente attraente.	V	F
37	Sembro il tipo di persona il cui umore passa facilmente dall'alto al basso e viceversa.	V	F

		Vero	Falso
38	Mi succede spesso che i miei pensieri corrano incontrollati.	V	F
39	Sono così bravo a manipolare gli altri che mi stupisco di me stesso.	V	F
40	Agli incontri sociali di solito sono io "l'anima della festa".	V	F
41	Spesso realizzo le mie opere migliori in brevi e intensi periodi di ispirazione.	V	F
42	Mi sembra di avere un'abilità inconsueta nel persuadere e motivare gli altri.	V	F
43	Mi è spesso capitato di essere così così entusiasta di un progetto coinvolgente da dimenticarmi quasi di mangiare o dormire.	V	F
44	Mi capita di frequente di entrare in uno stato d'animo in cui mi sento come accelerato ed irritabile.	V	F
45	Mi è capitato spesso di sentirmi felice e irritabile allo stesso tempo.	V	F
46	Spesso il mio stato d'animo è così eccitato che per me è quasi impossibile smettere di parlare.	V	F
47	È sempre meglio avere un normale successo nella vita piuttosto che ottenere gloria e visibilità con un fallimento clamoroso	V	F
48	Cent'anni dopo la mia morte, probabilmente i miei successi saranno ormai dimenticati.	V	F

The Hypomanic Personality Scale
Eckblad M, Chapman LJ. Development and validation of a scale for hypomanic personality. J Abnorm Psychol 1986;95:214-22.

Punteggio:
Somma totale delle risposte in direzione della ipomaniacalità.
Per gli item: 3, 4, 5, 7, 8, 9, 10, 11, 12, 13, 15, 18, 19, 20, 22, 23, 26, 28, 29, 30, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46
Risposte "Vero" = 1, Risposte "Falso" = 0
Per gli item: 1, 2, 6, 14, 16, 17, 21, 24, 25, 27, 31, 47, 48
Risposte "Vero" = 0, Risposte "Falso" = 1

JOURNAL OF PSYCHOPATHOLOGY
2017;23:48-49

The "Personality Disorder Pie" An imaging modality to illustrate the prevalence of a pathological character

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Many ways have been carried out to represent abnormal psychological characters. A lot of movies have been produced to involve the attention of the audience and engaging the affective response on soul burdens [1], as well as cartoons and books. Whereas life seems to be the incarnated mean of soul developing through difficulties and trials, the analyst could be more comfortable with a tool allowing him to have the "big picture" of the patient in a blink of the eye. On this route, the author has conceived a visual monitor that make use of a "visual pie" (with related slices) to make confrontations between different basic attitudes. To make an example, when a psychological disorder (i.e. narcissistic) is prevalent in a patient (Fig. 1), the residual characters tend to shrink. Sometimes narcissistic disorder [2] may be supported by obsessive disorder [3] and viceversa. In this latter example, the slices representing these attitudes are both bigger than the residual ones. Insight analysis carried out by the psychologist can grossly quantify which of the two is prevalent on the second and others, therefore representing the first by mean of a slice that is slightly bigger when compared to the second one and to residual ones. Through mental tests adminis-

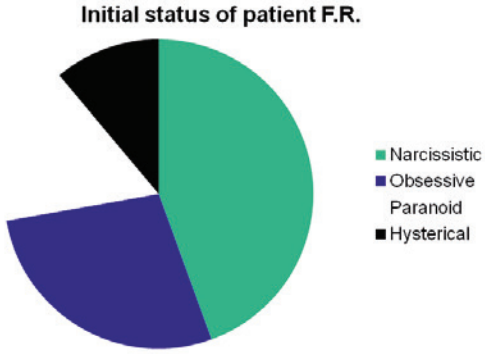

FIGURE 1. *In this graphic tool, at the beginning of an hypothetical psychotherapy of the patient "F.R."the slice representing the narcissistic disorder is the biggest and the one representing the obsessive disorder is the second bigger when compared to the others.*

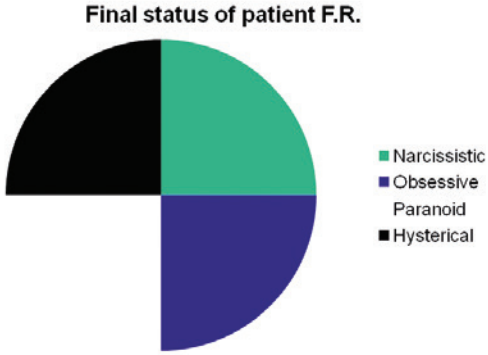

FIGURE 2. *At the end of the same hypothetical psychotherapy, the graphic shows a balance between different characters of the patient. Each slice has the same size, therefore the outcome of a genital character has been successfully reached.*

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tered on a periodical basis, psychologist can check if the pathological character under examination has reduced its prevalence with the advancement of another one, basing this reflection on the fact that when all slices are equal in size, a smaller slice means another bigger slice next to it. To make an example, if an hysteric character reduces its prevalence, maybe obsessive can increase and occupy a part of the previous hysteric size. This could mean that patient is going to abandon a habit in which everything he/she does is justified with another attitude in which a superego is starting to rule a person once completely deprived of meaning of rules. Advancement of the analytic cure could reverse the situation, therefore making possible to change the size of the slices, under a dynamic point of view. This visual tool could be of great help when psychologist must examine in real time the eventual improvement of the mental conditions of the patient. When the slices each other come to an identical size (Fig. 2), it means that patient has healed through psychological evolution, the ideal adulthood genital character [4] has been achieved, with a consequential mental well being.

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Printed by Pacini Editore - February 2016
Journal printed with total chlorine free paper and water varnishing

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