Introduction

More than 300 million people are affected by major depressive disorder, with a general population prevalence estimate of 4.4% globally, and far higher rates when minor depression, bipolar manic-depressive disorder, and anxiety disorders with depressive features are added; prevalence is rising owing to population growth and improved clinical recognition (Ferrari et al., 2013; WHO, 2017). Major depression alone is a leading contributor to the global burden of disease (Vos et al., 2020), and the largest contributor to disability worldwide (WHO, 2017). In addition, depression is associated with high morbidity, functional impairment, and increased mortality associated with suicide and with co-occurring general medical disorders (Lindwall et al., 2011; WHO, 2017). Anxiety disorders are the sixth leading cause of years lived with disability; they compromise quality of life and are frequently associated with other mental illnesses, including depression (Kim et al., 2020).

Typically, and for this study, physical activity (PA) describes "any bodily movement produced by skeletal muscles that require energy expenditure," whereas physical exercise (PE) is "a subcategory of physical activity which is planned, structured, repetitive, and purposefully focused on improvement or maintenance of one or more components of physical fitness" (Caspersen et al., 1985; Dasso, 2019; WHO, 2018).

Common treatments for depression involve pharmacological agents and psychotherapy (Oberste et al., 2020), with similar therapeutic strategies also used to treat anxiety disorders (Aylett et al., 2018; Bandelow et al., 2017). There has been growing interest in PA and PE as a potential alternative or complementary treatment for depression and anxiety (Aylett et al., 2018; Cooney et al., 2013; Krogh et al., 2010; McDowell et al., 2019; Oberste et al., 2020; Rebar et al., 2015; Schuch et al., 2017). Indeed, PA and PE are reported to reduce severity of depressive symptoms (Cooney et al., 2013; Krogh et al., 2010;

Oberste et al., 2020; Schuch et al., 2017), and risk of depression is lower with more PA (De Mello et al., 2013; Marques et al., 2020).

PA was recently associated with lower depression ratings in an international study of over 30,000 subjects older than 50 years, with greater effects when exercise was taken more than once a week (Marques et al., 2020). Moreover, a meta-analysis of 49 studies involving nearly 267,000 subjects found that PA was protective against the emergence of depression, independent of age and geographic location (Schuch et al., 2017). Other prospective studies reported a protective effect of PA against developing depressive syndromes later (Mammen and Faulkner, 2013; Marques et al., 2020). Anxiety symptoms also have been reduced with increased levels of PA or PE (Henriksson et al., 2022; Kim et al., 2020; Panza et al., 2020; Stubbs et al., 2017).

Benefits of PA and PE also have been demonstrated for anxiety in both non-clinical populations and among patients diagnosed with anxiety disorders (Aylett et al., 2018; McDowell et al., 2019; Rebar et al., 2015). A meta-analytic review of 15 controlled studies concluded that aerobic exercise led to significant reduction in anxiety symptoms (Aylett et al., 2018).

For the purpose of this study, we have investigated only PE to decrease the heterogeneity of our main outcome and focus on planned activities to improve physical fitness. In this context, a primary aim of the present study was to investigate associations between the occurrence and frequency of PE with quantified symptoms of depression and anxiety, based on consistent application of well-validated rating scales in a large cohort of psychiatric patients with a variety of major mood or anxiety disorders. A secondary aim was to test selected socio-demographic and clinical factors for their association with levels of PE.

Methods

Clinical sample

We collected data from 2,190 consecutive, consenting adult participants diagnosed, evaluated, treated and followed at the Lucio Bini Mood Disorder Center in Cagliari, Sardinia, from its founding in 1977 through February, 2021. All study participants provided written, informed consent for anonymous and aggregate reporting of their clinical information, in accord with local and national Italian legal requirements. Sardinia is the second largest Mediterranean island, with an area of 24,090 km^2 and a population of approximately 1.65 million (density: 68.5 persons/km^2). Each subject's residence at intake was related to local population density and altitude (m) above sea level.

All patient-subjects were assessed by a mood disorder expert and attending psychiatrist (LT) at intake and regularly during follow-up, with systematic recording of relevant sociodemographic variables, clinical status, and results of formal symptom ratings. Patients were treated with standard pharmacological and psychotherapeutic interventions.

PE was considered such when patients engaged in planned, repetitive activity with the purpose of improvement or maintenance of physical fitness (Caspersen et al., 1985; Dasso, 2019; WHO, 2018). Information about PE was collected at intake and considered to include any type of individual activity such as brisk walking, jogging or running, swimming, tennis; or a sport activity such as soccer or basketball engaged in individually or in teams, at fitness or sport facilities, or competitively. Subjects were asked the frequency of their PE in five categories: never or only in the past, once or less per week (≤1/week, also indicating nonstructured or erratic exercise), two or three times per week (2–3/week) and more than three times per week (>3/week), as well as characterized as currently participating in PE at any level or not. We included participants with virtually absent regular PE (≤1/week, in the past or never) or present repeated PE (≥2/week) as a single group, so as to provide more rigorous testing of effects of regularly repeated exercise.

All subjects were initially evaluated with standard clinical rating scales, independently of their diagnoses: 21-item Hamilton Depression Rating Scale [$HDRS_{21}$] (Hamilton, 1960), Montgomery and Åsberg Depression Rating Scale [MADRS] (Montgomery and Åsberg, 1979), Mood Disorder Questionnaire [MDQ] (Hirschfeld et al., 2000), Hamilton Anxiety Rating Scale [HARS] (Hamilton, 1959), and TEMPS-A for assessment of temperament types (Akiskal et al., 2005).

Additional covariates of interest included: sex, age at clinic intake and estimated age at the onset of psychiatric illness, total years of illness, DSM-5 diagnoses of anxiety or mood disorders (updated after 2013), number of siblings, first-degree family history of any psychiatric illness, marital status, level of education, employment status, socio-economic status (SES), religious practices, history of physical abuse during childhood or adolescence, body mass index (BMI, in kg/m^2), misuse of alcohol or other substances, and morbidity indices (episodes/year and percentage of total time ill) before intake and during treatment and follow-up at the study site, as well as geographical location by population density and elevation as indices of social isolation. In addition, we evaluated association of PE with scores for individual symptom items in the $HDRS_{21}$.

Data analysis

All authors participated in literature searching, data analysis, and reporting. Data are presented as means (either percentage or score) with 95% confidence intervals (CI). We compared factors listed above for their associations with PE. We made comparisons using standard bivariate methods: ANOVA (*t*-scores) or Spearman's rank test (*r* scores) for continuous measures, and contingency tables (χ^2) for categorical measures. Findings of interest arising from these preliminary associations with the presence or absence of PE at $p \leq 0.10$ (two-tailed) were then entered stepwise into multivariable logistic regression modeling

with *absence* of PE as the outcome measure. In all other analyses, significance was set for a two-tailed p value of ≤ 0.05. Statistical analyses used commercial software (Statview.5®, SAS Institute, Cary, NC) for spreadsheets, and Stata.13® (StataCorp, College Station, TX) for computations.

Results

Demographic and clinical variables

In the total study sample of 2,190 consenting adult subjects (57.8% women), age averaged 42.6 [CI: 41.9–43.3] years. Diagnostic groups were major depressive (44.8%), bipolar (40.6%), and anxiety disorders (14.6%). Their respective proportions reporting engagement in current PE at any level of intensity were 20.8%, 21.0%, and 25.3%, which did not differ significantly ($\chi^2 = 2.68$, p=0.26), and averaged 22.5% [20.8–24.3] overall.

Men were significantly more likely to engage in PE than women (p=0.0008). In addition, subjects with a level of PE ≥2-times/week were significantly more likely to be: [a] unmarried, [b] educated at least through high school, [c] of higher socio-economic status, [d] male, [e] identify as being less religious, [f] and to have been less exposed to physical abuse during childhood or adolescence. Moreover, engagement in PE was significantly associated with [g] being younger at intake and [h] at illness onset, [i] with fewer total years of illness, [j] lower BMI, [k] fewer siblings, [l] hyperthymic temperament selectively, and [m] less total time (months) in depression before intake. Presence of PE also was significantly associated with lower scores on the $HDRS_{21}$ and MADRS scales for depression, as well as on the HARS scale for anxiety. Some differences also were found for geographic factors, particularly with doing PE more frequently if living in more densely populated areas and at a lower altitude (Table 1). Values not significantly associated with PE were: diagnosis or having comorbid ADHD, employment status, having a family history of psychiatric disorder, morbidity indices of illness such as episodes/year and %-of-time- ill either before intake or during treatment at

the study site, temperament type scores other than for hyperthymic (anxious, cyclothymic, dysthymic, irritable); and MDQ score for the likely presence of a mood disorder.

[Table 1 about here]

Frequency of exercise

We found a total of 39.2% of the 2,190 subjects had never participated in PE, 29.5% had in the past, 8.85% currently exercised once weekly or less often, 16.8% 2–3 times/week, and 5.61% >3 times/week. That is, a total of 31.3% [CI: 29.3–33.3], of subjects reported some regular current exercise, and 22.5% exercised twice or more/week. Frequent exercise at >3-times a week was approximately 70% more prevalent among men than women (Table 2). Also, as expected, PE declined with age in both women (r = –0.19) and men (r = –0.14; both p<0.0001), and BMI declined with greater exercise among women (r = –0.16; p<0.0001) but not in men (r = –0.05; p=0.13; not shown). More frequent exercise was associated with less depressive symptom-severity but did not affect ratings of anxiety. In detail, HDRS depression ratings declined more among women (r = 0.10; p=0005) than men (r = 0.09; p=0.009), and MADRS ratings of depression declined significantly overall (r = 0.11; p=0.0005), but preferentially more in men (men r = –0.13, p=0.01) than in women (r = –0.08, p=0.07; not shown). Finally, HARS scores for anxiety were not affected by the frequency of PE overall, although they averaged 13% lower with PE at least twice/week compared to lower levels of exercise (Table 2).

[Table 2 about here]

Effects of exercise on specific depressive features

By comparing ratings of individual $HDRS_{21}$ items for subjects with vs. without current PE (Table 3), we found significantly lower ratings of 11/21 items among those participating in PE at least twice/week. Subjects lacking participation in current PE were more depressed (item 1), reported more suicidal ideation (item 3), awakened more frequently at night (item

5), avoided work and activities (item 7), showed more psychomotor slowness (item 8), experienced more anxious preoccupations (item 10), reported decreased appetite (item 12) and more fatigue (item 13), had less sexual libido (item 14), felt less depressed in the morning than later in the day (item 18), and were less suspicious or paranoid (item 20).

[Table3 about here]

Multivariable model of factors associated with lack of exercise

We considered all factors that were tentatively associated with current participation in PE (Table 1) in developing a multivariable logistic-regression model (Table 4). Five factors remained independently associated with *lack* of current PE. In order of significance, they ranked: older age at intake > higher BMI > educated less than through high school > lower socio-economic status > female sex (Table 4).

[Table 4 about here]

Discussion

In the study sample, 2,190 unselected subjects with mood or anxiety disorders were assessed, treated, and followed-up by the same investigator (LT). Among them, 31.3% engaged in some regular PE and 22.5% exercised at least twice per week. This rate among psychiatric patients is considerably lower than in the international general population, whose engagement in some PA may be as high as 75% [Guthold et al., 2018; WHO, 2020] . However, our results are closer to estimates of PA levels in Italy, with 31% of adults engaging in some PA (WHO/Europe, 2018), although such activity does not necessarily represent regular PE. Other studies also found less participation in any PA or in regular PE among persons diagnosed with a mental illness [Mangerud et al., 2014; Nyboe and Lund, 2013] . The association of the presence or absence of PE was significant in 18 of the analyzed factors (Table 1).

The main result of this study were confirmatory and extended findings of lower standardized ratings of depression and anxiety in subjects engaging regularly in PE (Table 1). Apparently beneficial effects of exercise on mood are well documented [Aylett et al., 2018;

De Mello et al., 2013; Marques et al., 2020; Panza et al., 2020; Schuch et al., 2017, 2018; Stubbs et al., 2017] , although being depressed may well lead to decreased activity and exercise (Schuch et al., 2017). We also found that more frequent PE was associated with less severe depression (Table 2), as has been reported previously [Marques et al., 2020; Murphy et al., 2020].

Engagement in PE was associated with being unmarried, more educated, and more affluent, suggesting that availability of time and economic resources contribute to engagement in PE by mood-disorder patients, as has been noted in the general population [Active Lives Survey, 2020; Droomers et al., 2001] . This conclusion also is supported by a recent English survey, in which participation in PE differed as 53% vs. 72% among persons with low vs. high SES (Active Lives Survey, 2020).

That unmarried subjects were more likely to engage in PE (Table 1) may or may not reflect availability of spare time, and such an association has not been found consistently [Pettee et al., 2006; Puciato, 2019] . The association of less PE and greater number of siblings (Table 1) may be related to lower SES, as is supported by the secondary finding of an average of 3.2 [CI: 2.8–3.6] vs. 2.4 [2.3–2.5] siblings/subject with low vs. high SES (t = 4.57; p<0.0001; not shown).

That lower levels of religious practice were found among those engaging in PE (Table 1) may be confounded by higher educational level (χ^2 = 15.8; p<0.0001) and higher SES (χ^2 = 8.28; p=0.004; not shown), as has been suggested previously [Arias-Vazquez, 2012; Schwadel, 2015] . Another possible interpretation is that those who engage in PE may be less interested in spirituality and religious practice.

The significance of a negative association of early physical abuse with current engagement in PE (Table 1) is not clear. It may reflect a direct association of early abuse with current affective illness [Strathearn et al., 2020]. This possibility is supported by a

moderate association of a history of physical abuse with higher current $HDRS_{21}$ depression ratings (16.2 vs. 14.7; t=2.13; p=0.03; not shown).

We also found several other factors that may affect relationships between current affective symptoms and participation in PE. They include: age, sex, SES, and BMI, as has been noted previously (Freeman et al., 2016; Luppino et al., 2010; Marques et al., 2020). In addition, we verified expected associations of any PE and of more intensive PE with male sex, younger age, and lower BMI (Tables 1 and 2), as have been reported previously [Active Lives Survey, 2020; Lancet Public Health, 2019; Marques et al., 2020). Men also are less likely than women to experience clinical depression [Marques et al., 2020; WHO, 2017] , and higher BMI has been associated with depression [De Wit et al., 2010] as well as with less participation in PE (Table 1). However, cause and effect relationships involved in such associations are not always clear.

We found that younger subjects were more likely to engage in PE, based on both younger age at illness-onset and at clinic-intake, as were subjects who had been ill for a shorter time (Table 1). Moreover, subjects who engaged in any PE were more likely to be born approximately eight years after those not practicing PE (averaging 1964 vs. 1972; t=9.51; p<0.0001; not shown). This difference in birth years is consistent with a rising popularity of regular PE and leisure time activities over time [Knuth and Hallal, 2009; van Oostrom et al., 2019].

Of interest, engagement in PE also was related to some geographic characteristics, including living in areas with greater population density and at somewhat lower altitude, in Sardinia. These associations with PE may be related to less social isolation, higher average SES, and greater availability of sport facilities in more densely populated areas.

We also confirmed that subjects with hyperthymic temperament, selectively, were more likely to participate in PE (Table 1) [Krumm-Merabet and Meyer, 2005; Meyer et al.,

2007; Siwek et al., 2015]. As already noted, scores on 11/21 individual $HDRS_{21}$ items had significant associations with PE (Table 3). In particular, subjects who did not engage in regular PE were more likely to struggle with work and activity commitments (Table 3), consistent with findings that those engaging in regular PE have reported better job-satisfaction and more work-productivity [Arslan et al., 2019; Wattles and Harris, 2003]. PE was associated with less fatigue and muscular pain (Table 3), as has also been reported in the general population [Geneen et al., 2017; Puetz, 2006]. PE also was associated with less psychomotor slowness, decreased appetite, middle insomnia, and lesser anxiety symptoms as well as higher levels of sexual libido (Table 3). Notably, too, suicidal thoughts were less likely among participants who engaged in PE, would be expected if they were less depressed [Grasdalsmoen et al., 2020]. Paranoid thinking was found less often among subjects who exercised, and is more likely among severely depressed patients [Dold et al., 2021; Tondo et al., 2020]. Improvement of sleep with exercise has been reported previously [Chen et al., 2017; D'Aurea et al., 2019; Lowe et al., 2019; Passos et al., 2010].

4.1. Limitations and strengths

A strength of this study is that multiple, well-validated and widely employed ratings were used to evaluate symptomatic status, including $HDRS_{21}$ and MADRS for depression and HARS for anxiety, in addition to consistent, semi-structured clinical examinations of large samples of participants by the same experienced psychiatrist-investigator (LT). We also addressed various sociodemographic, clinical and other factors and their relation to both exercises. Moreover, we considered relationships of the presence and frequency of PE to affective symptoms in three major disorder-types under the same conditions.

A limitation of the study is that assessment of PE did not include its type, intensity, or duration per session. Some of the information provided may be subject to recall bias, though it should arise randomly among subjects. In addition, this study of participants at an

academic mood disorder center in Sardinia may not generalize to other circumstances. Another possible limitation is that participants were treated with different types of medicines, some of which may affect engagement in PE. Finally, recall bias might have impacted our findings given that those who are inactive may be prone to over-report PE due to social desirability bias.

Future studies of associations of PE and psychiatric illness should assess the age when exercise started, as well as its frequency, type and intensity, duration per session and sessions/week, ideally with prospective designs to help clarify cause-effect relationships between exercise and psychiatric morbidity.

5. Conclusions

The present findings based on a large sample of patients with mood or anxiety disorders included a strong association between the occurrence and frequency of current PE and presence and severity of depressive symptoms, with less association with ratings of anxiety. The results accord with previous related findings and yield a rich set of associations with PE in a well evaluated clinical sample. We conclude that PE should be strongly recommended to patients with major affective disorders to improve their symptoms and to limit adverse effects of some pharmacological treatments.

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Table 1. Characteristics of study participants

Factor (% [95%CI])	Physical Exercise		χ^2	*p*-value
	Present	Absent		
All subjects (N=2190)	22.5 [20.7–24.3]	77.5 [75.7–79.3]	——	——
Ever married[a]	33.7 [29.5–38.0]	49.7 [47.3–52.1]	39.2	<0.0001
Socioeconomic status:			13.1	0.0003
Low	10.4 [6.28–15.9]	89.6 [84.1–93.7]		
Medium or high	22.2 [20.2–24.3]	77.8 [75.7–79.8]		
Sex:			11.3	0.0008
Female	19.9 [17.7–22.2]	80.1 [77.8–82.3]		
Male	26.0 [23.2–28.9]	74.0 [71.1–76.8]		
Educated ≥ high school	28.4 [24.5–32.6]	21.7 [19.8–23.7]	9.62	0.002
Religious practice	73.3 [68.9–77.3]	78.9 [76.8–80.9]	6.45	0.01
Prior physical abuse	7.91 [4.90–11.9]	13.2 [11.0–15.6]	5.19	0.02
Factor (Mean [95%CI])	**Present**	**Absent**	***t*-score**	***p*-value**
Age at intake	36.6 [35.3–37.9]	44.3 [43.5–45.1]	8.89	<0.0001
BMI at intake	22.8 [22.4–23.1]	24.4 [24.2–24.6]	6.53	<0.0001
Number of siblings	1.98 [1.82–2.14]	2.54 [2.44–2.64]	6.15	<0.0001
Onset age	25.7 [24.5–26.9]	30.4 [29.6–31.2]	5.65	<0.0001
Total illness years	14.4 [13.3–15.5]	17.9 [17.2–18.6]	4.74	<0.0001
Months depressed before intake	18.6 [15.7–21.5]	24.6 [22.6–26.6]	2.75	0.006
Hyperthymic temperament score[b]	3.90 [3.64–41.6]	3.55 [3.40–3.70]	2.29	0.02
Rating scale scores:				
$HDRS_{21}$ (depression)	12.9 [12.2–13.6]	15.6 [15.2–16.0]	7.21	0.0001
MADRS (depression)	13.8 [12.4–15.2]	17.8 [16.2–19.0]	3.46	0.0006
HARS (anxiety)	10.3 [9.25–11.3]	11.8 [11.2–12.4]	2.52	0.01
Home geography:				
Greater population density[c]	54.7 [45.1–49.3]	45.3 [43.0–47.6]	3.67	0.0002
Higher altitude[d]	52.9 [40.2–65.6]	74.1 [66.4–81.8]	2.56	0.01

a. Married, separated, divorced, or widowed; **b**. anxious, cyclothymic, dysthymic, and irritable temperaments assessed with TEMPS-A scale were not associated with exercise; **c**. population/km^2; **d**. meters above sea-level. Nonsignificant factors were: DSM-5 diagnoses of anxiety or mood disorder types; employment status, alcohol or other substance misuse, first-degree family history of any psychiatric illness, and morbidity indices (episodes/year and percentage of time ill) before intake, and MDQ scores.

Table 2. Factors associated with frequency of physical exercise (with 95%CI)

Factor	Physical Exercise					χ^2 or *r*	*p*-value
	Never	Past	≤1/week	2–3/week	>3/week		
Subjects (n)							
Sex (%):						108	<0.0001
Female	48.3 [45.5–51.1]	24.7 [22.4–27.2]	7.11 [5.75–8.67]	15.6 [13.6–17.7]	4.34 [3.29–5.62]		
Male	26.7 [23.9–29.7]	36.0 [32.9–39.2]	11.3 [9.29–13.5]	18.6 [16.2–21.3]	7.36 [5.76–9.24]		
Age (years)	51.9 [50.6–53.1]	44.4 [43.2–45.6]	44.6 [42.4–46.7]	41.4 [39.8–43.0]	36.2 [33.6–38.8]	0.20	<0.0001
$HDRS_{21}$ score	16.2 [15.7–16.7]	15.4 [14.8–16.0]	13.7 [12.7–14.7]	13.2 [12.4–14.0]	11.9 [10.6–13.2]	0.13	<0.0001
BMI at intake	24.8 [24.4–25.2]	23.9 [23.5–24.3]	24.6 [23.9–25.3]	22.9 [22.5–23.3]	22.5 [21.9–23.1]	0.09	0.0002
MADRS score	19.2 [17.0–21.4]	17.5 [16.2–18.8]	14.0 [12.1–15.9]	14.1 [12.5–15.7]	13.2 [10.2–16.2]	0.11	0.0005
HARS score	11.9 [10.9–12.8]	11.9 [11.1–12.8]	11.2 [9.75–12.6]	10.2 [8.99–11.4]	10.6 [8.42–12.8]	0.03	0.38

Ranked by significance.

Table 3. HDRS depression items versus physical exercise

$HDRS_{21}$ Items		Physical Exercise (mean [95%CI])		*t*-score	*p*-value
No.	**Item**	**Present**	**Absent**		
7	Work & activities	1.33 [1.21–1.45]	1.92 [1.85–1.99]	8.05	<0.0001
13	Fatigue, muscle pain	0.96 [0.88–1.03]	1.26 [1.22–1.30]	6.97	<0.0001
1	Depressed mood	1.63 [1.52–1.74]	1.96 [1.90–2.02]	5.39	<0.0001
8	Psychomotor slowing	0.22 [0.17–0.27]	0.39 [0.36–0.42]	4.74	<0.0001
14	Low libido	0.75 [0.67–0.83]	0.98 [0.93–1.03]	4.16	<0.0001
3	Suicidal	0.38 [0.31–0.44]	0.53 [0.48–0.56]	3.24	0.001
18	Worse in morning	0.69 [0.61–0.77]	0.83 [0.79–0.87]	3.01	0.003
20	Paranoid symptoms	0.25 [0.19–0.31]	0.37 [0.33–0.41]	2.76	0.006
12	Appetite change	0.33 [0.28–0.38]	0.42 [0.39–0.45]	2.72	0.007
10	Anxiety	1.77 [1.67–1.87]	1.92 [1.87–1.97]	2.69	0.007
5	Middle insomnia	0.43 [0.36–0.50]	0.52 [0.48–0.55]	2.25	0.02

Differences were not significant for items: 2 (feelings of guilt), 4 (early insomnia), 6 (late insomnia), 9 (agitation), 11 (somatic anxiety), 15 (hypochondriasis), 16 (weight-loss), 17 (insight), 18 (worse in the evening), and 21 (obsessive-compulsive symptoms). Ranked by significance.

Table 4. Logistic regression modeling: Factors associated with *lack* of physical exercise

Factor	OR [95% CI]	χ^2	*p*-value
Older age	1.02 [1.01–1.03]	22.0	<0.0001
Higher BMI at intake	1.08 [1.05–1.12]	19.4	<0.0001
Higher HDRS score	1.04 [1.02–1.06]	15.5	<0.0001
High school or less	1.49 [1.10–2.01]	6.74	0.009
Lower SES	1.88 [1.06–3.33]	4.64	0.03
Female sex	1.36 [1.03–1.80]	4.61	0.04

Ranked by significance.