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The impact of combined nutraceutical supplementation on work-related stress, mood and eating disorders during the menopausal transition: a pilot study

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Abstract. *Objectives:* Menopause represents a "window of vulnerability" in women's life. This transition comprehends many changes: physical, metabolical and psychological. It could, also, cause difficulties at work and the most problematic symptoms are poor concentration and memory, tiredness, feeling depressed and lowered confidence. Moreover food becomes, often, a practical, easy and fast solution to manage negative emotions. The aims of this pilot study were: to analyze the existence of a possible link between menopausal transition, mood, eating behavior and well-being perception on the workplace and to verify the possible influence of nutraceutical supplementation on the above mentioned factors. *Method:* 40 women, with mean age 52 years old and mean BMI 33.27 were enrolled and divided into two groups: diet + behavioral advices (D), or diet + behavioral advices and a nutraceutical compound (D+N) (Assist Forte Retard® 1 cp in the evening) for four months. The following psychological questionnaires were administrated at the beginning and after four months: Zung depression scale, (ZDS); Binge Eating Scale (BES); Job Content Questionnaire (JCQ) used to measure the investigate job related stress. After the test, each woman had an individual psychological interview aimed to investigate her personal experiences, related to what come out from the results. *Results:* After four months: women (D+N) achieved a statistically significant improvement in both tests (ZDS $p < 0.0001$ Bes $p < 0.0083$). The women (D) had no statistically significant changes in BES, even if there was better management of feeding behavior, and ZDS did not show an improvement in mood. JCQ analysis showed: women (D+N) had a moderate increase of decision-making capacity (DL 64 to 66) compared with an unchanged workload (JD 33 to 33.5); social-support perception (SS) showed a slight improvement even if it remained below the median line of the reference sample. In the (D) group we observed a slight increase of the workload , accompanied by a reduction of the decision-making capacity (DL 74 to 69) and by a tiny lowering of the perception of the social support (SS). *Conclusions:* the combination of a diet program, behavioural advice and nutraceuticals, compared to the sole diet, made it possible to relieve the emotional and eating disturbs related to the menopause and to improve the perception of a satisfactory work.

Key words: menopause, work-related stress, eating disorders, mood disorders, nutraceutic

Introduction

The transition to menopause occurs from 45 to 55 years old, it is a progressive event associated with a series of symptoms due to estrogen reduction. Hormonal changes increase the possibility of some risk factors such as cardiovascular disease, type II diabetes and osteoporosis. (1-3). Recent guidelines of gender medicine revealed substantial differences between women and men, both in work place behavior and specific diseases risk (4, 5). Two researches found out that menopause could have significant negative effects on the employment situation, the most relevant symptoms emerged were: concentration difficulties, decreased memory capacity and fatigue (6, 7). 11.8% women claimed to have recourse to supplementary hormonal therapy to manage occupational stress resulting from the menopausal transition, while 57.5% reported this condition among the main reasons for the same choice. Moreover, two researches conducted on a vast sample of women showed that the transition to menopause was associated with an increase of eating disorders and body image worsening (8, 9). Finally, an American research revealed that among menopausal symptoms nocturnal awakenings have a great impact on the daily and work life (10). For these reasons, it becomes more and more necessary and useful to investigate the impact of menopausal transition on occupational, physical, mental and behavioral distress.

The present study aims: a) at analyzing the existence of a possible link between menopausal transition, mood, eating behavior and well-being perception on the workplace and b) at verifying the possible influence of nutraceutical supplementation on the above mentioned disorders.

Methods

Among women workers with excess weight admitted to the Obesity and Work Center for a nutritional and behavioral program, 40 of them in menopausal transition were recruited. All had a similar medical history profile, an average age of 52 years (SD 4.33) and a BMI of 33.27 (SD 4.65), no previous cardiovascular disease. Inclusion criteria required: the presence of a job, disorders related to menopausal transition, BMI higher than 25.9. The criteria for the exclusion: presence of mental disorders (in particular eating behavior and depression) and intake of other products for the management of menopausal symptoms. 30% were blu collars, 60% white collars and 10% healtcare workers .

A non-randomized, open-label, 1:1 clinical trial was performed in parallel groups. The sample of subjects, which met the inclusion/exclusion criteria, was assigned to the four-month experimental protocol. The trial was approved by the Ethical Board of the hospital (Milan) where the study took place (study registration number: 1370).

During enrolment, participants were divided into two groups: diet + behavioral advices (D), or diet + behavioral advices and the use of a nutraceutical compound registered for management of menopausal symptoms Assist Forte Retard® 1 cp in the evening (Genistein 80 mg, Griffonia simplicifolia 25 mg, Verbena officinalis 20 mg, Melatonin 1 mg, Lutein 3 mg, folico Acid 200 mcg, Niacin 16 mg, Iron 14 mg, Vit. B6 1,4 mg, Vit. K 75 mcg, Biotin 50 mcg, Vit. D2 5 mcg.) (11-13) (D+N).

The subjects had an anthropometric assessment, blood tests and food frequency questionnaire (OGP) in order to provide an individualized dietary program (data not shown).

The following psychological questionnaires were given and every woman had an individual psychological interview aimed at investigating and deepening the menopausal personal experience.

At the end of the 4 months, tests were administered another time.

In addition:

- *Zung Self-evaluation Depression Scale (1974):* selfassessment scale designed by William WK Zung to quantify the depression level. It consists of 20 questions associated with a four-point Likert scale answer (Almost Never, Some Time, Often, Very often) referred to the last week. Considered the prototype of the self-assessment scales for its simplicity, the ZDS has been developed to achieve rapid quantitative assessment of psychological symptoms (10 items), affective (2 items) and somatic (8 items)

in depressed patients. A cut-off score of 50 leads to a correct diagnostic classification in 88% of cases (sensitivity = 88%, specificity = 88%) (14).

- *Binge Eating Scale (BES)* (Gormally et al., 1982) It aims to evaluate compulsive overeating (binge eating disorder BED) an eating disorder characterized by a huge food intake in a short period of time. It is a 16 items scale on both behavioral symptoms and feelings/thoughts experienced during binges (loss of control, guilt, fear of being unable to stop). A score higher than 27 is the cut off for identifying serious eating disorders, while more than 16 is the reference value for excluding compulsive overeating (15).
- *Job Content Questionnarie (JCQ):* the Italian version of the tool developed by Karasek et al. it was used. It is a self-administered questionnaire composed by 49 questions on three dimensions: Decision Latitude (DL), Job Demand (JD) and Social Support (SS). The results were calculated using a specific software developed by ISPELS (Institute Prevention and Safety at Work). The questionnaire is based on the assumption that work-related stress and its consequences on health, both physical and psychological does not depend from a single variable, but from the interaction between the required workload (JD), the level of autonomy and decision-making capacity (DL) and the perception that workers could relay on the support of both colleagues and superiors (SS). For this study were considered as median references those obtained from larger female workers sample of the Obesity and Work Center (16,17).

Statistical

Scores obtained from different psychological tests were analyzed using a descriptive point of view. It was analyzed the frequency distribution of each score, assessing the deviation from normality. Each distribution was described by means of median, Q1 and Q3. Because of the non-normality of the distributions, non-parametric methods of comparison were used.
It was investigated whether there was a difference between the center of the initial score and the final score, within the two groups of women, applying the Wilcoxon statistical test for paired data for each psychological test. The tests were conducted by accepting an error alpha level of 0.05. Analysis were performed with SAS 9.2 software (SAS Institute Inc., Cary, NY) and with the GraphPad Prism version 6.3 software.

Results

Baseline

The sample presented some important general features: a group of women not showing a full-blown psychological distress. Mood, detected by the scale of the ZDS, resulted with a low depression score (median: 39). A deeper analysis of some items (20:15) showed that the most considerable risk areas are those related to the feeling that "there has been more changes in recent times than in the past". This difference was further manifested in the areas of satisfaction (Fig. 1) and irritability (Fig. 2). Only few liked doing the same activities of the past, the majority perceived "a some kind of change". Similar results could be observed in the subjective perception of irritability: more than half noted a slow change from "some time before".
As regards the feeding behavior it does not emerged the expected full-blown disorder (Median: 7), but the widespread tendency to use "comfort food" (Fig. 3-4).

Mood and emotional eating

After four months (Tab 1): women treated with diet+ Nutraceutic (D+N) achieved a statistically significant improvement in both tests (ZDS $p < 0.0001$ BES $p < 0.0083$) Wilcoxon statistical test for paired data for each psychological test. The women treated with diet (D) showed no statistically significant changes, no improvement in mood but a better management of feeding behaviour.

Work related stress

JCQ analysis showed differences between the two groups (Tab. 2): compared to the three dimensions of the reference median values: the women (D+N) had a slight increase of decision-making capacity (DL 64 to 66) compared with an unchanged workload (JD 33 to 33.5). Moreover, the social-support perception (SS 22 to 23), the possibility of sharing spaces with colleagues, the feeling of being able to divide the workload and to count on the support of the higher in charge, undergo a slight improvement (p 0,02) even if they remain below the median line of the reference sample (63 DL, JD:

38 and SS: 25). In the (D) group, instead, is observed a slight increase of the workload which reaches the reference value (JD = 38), accompanied by a considerable reduction of the decision-making capacity (DL 74 to 69) and a slight lowering of the perception of the social support (SS).

Discussion

Change accompanies human life from the birth and on; in transitional phases the mind swings like a pendulum between two poles: the fear of the unknown that drives us to strengthen ties with the past and the exploration impulse that throws into the future.

The ethnologist Vann Gennep (1909) underlines that rites of passage support and accompany "critical stages", they originate a structure capable to create change confines. The ritual allows abandoning old roles and accepting new ones, through three main phases: separation, transition and reintegration (18).

Menopause is a "changing event" in women's life, and it is a marked biologically step, body centered, demanding needs and specific attention requests. The same words used to define this step, menopause or climaterio, recall two different attitudes to cope with the transition: climacteric comes from the greek "climacterion" actually a critical step, a disruptive and dangerous age. Interruption in the collective imagination is something definitive, final, which does not necessarily involve a new start. Menopause, however, carries inside the term "pause" that instinctively evokes something lighter: it implies the concept of rest, followed by an upturn. Menopause, therefore, could represent the end of a fertile phase and the transition to a new one of wisdom. This step is not a problem when a woman's life is full of sense and body gently welcomes the change, it is rather an opportunity to grow, taking a further leap forward in life. Anyway, sometimes menopause takes place not so peacefully; Heilbrun (1995) found out that some women experience a "threshold shock". The transition and its symptoms, physical or psychological, makes them so painfully aware of a door closing behind them and impede to see that one opens in front, as if their eyes remained nostalgically turned backwards (19). What seems to be missing from the past and that could probably help, at least from a psychological point of view, is a ritualization of change, which allows to make it manifest without relegating it in a dark corner of the personal life. Self-esteem, the chosen and attributed roles and the resources available could become key variables to afford these challenges (18-19).

Behind a psychological understanding and acceptance of menopause a medical intervention is important to reduce impact of symptoms on daily life. Gender Medicine researches suggest that there are real and cogent changes in the daily management that push women to seek a pharmacological solution to face them.

In a 2013 research the answer to a question about how difficult it was to manage the work during the transition to menopause 5% of women said that "it was very or extremely difficult", 48% "partially or quite difficult" and 47% "not at all". 11.8% of women claimed to have recourse to a supplementary hormonal therapy only to manage occupational stress, while 57.5% reported this as one of the main reasons for the choice (6) (Tab. 3). Without a specialist support, women seek do-it-yourself solutions to alleviate the growing perception of discomfort and fatigue. Among them, food seems to be one of the easiest choices and practices. Also in 2013, in fact, a research is conducted in Austria aimed at investigating the association between menopause and eating disorder; the authors confirm that there are not many researches on this subject, and their results show that the period of transition to menopause is associated with an increase in eating disorders and a deterioration of the body image (8). According to the Ministry of Health, 26.8% of Italians are overweight (including 10% with obesity), an unbalanced diet, is one of the largest modifiable risk factors associated with death before age 65 (4, 5). A proper and balanced nutrition associated with regular physical activity, could effectively help to mitigate menopause symptoms and prevent and treat diseases associated. The results of our research seem to confirm what said above. The sample analyzed does not present pathological traits, but a mild low mood which, combined with the findings of the BES, suggests a dysfunctionalactivation of compensatory gratification to reduce tensions, the so-called "emotional eating." The

emotions are an important part of healthy human experiences but they could impact so much on the eating behavior to be almost impossible to "control" it both in terms of quantity and quality. This type of hunger is not responding to biological needs, but is designed to satisfy a psychological need, and leads us to consider food a comfort, a safe place in which to isolate in front of emotions and difficulties (8). It is the research for the "comfort food", an English term used to indicate the foods or dishes that provide a sense of pleasure to those who consume them, fulfilling an emotional need and are known for the feeling of well-being thay give to the body. These interpretations could be also confirmed by the emergence, of a general "before", lived as a better period, (Zung test item Fig. 1, 2) attributable to "before of the approaching menopause". This transition is accompanied by an increased tiredness, a reduced sense of self-efficacy and the tendency to the use of food as a consolation. Women also report a number of symptoms, particularly hot flashes and irritability, triggering the anxious feeling of not having control over their own bodies and emotions / reactions. The reduced perception of self-efficacy seems, then, affect the mood, especially because to a changed physical and psychological condition does not correspond a change in the load of requests from the external environment, especially from the workplace. Many women report sleeping difficulties, which confirm data that associate the transition to a number of sleep disorders in people who previously did not report them (Fig. 3) (3, 9, 10). These results could have serious repercussions on the work context. Analyzing the results obtained after 4 months in the (D+N) group we could infer that the use of a nutraceutic may have contributed to a decreasing in biological symptoms. In fact the group of women treated (D+N) presents statistically significant provements as regards both the mood and the feeding behavior; whereas in the (D) group feeding behavior im-

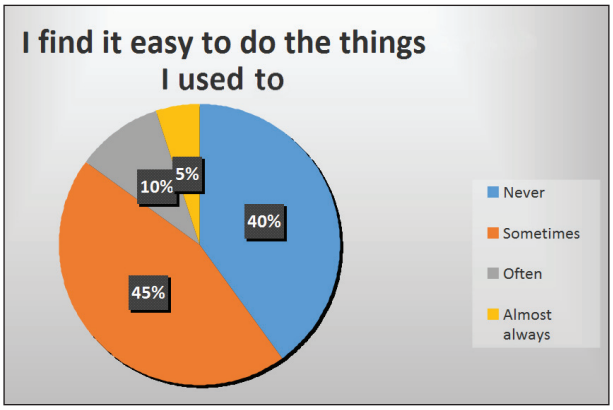

Figure 1. Satisfaction area (Item 20 Zung Depression Scale)

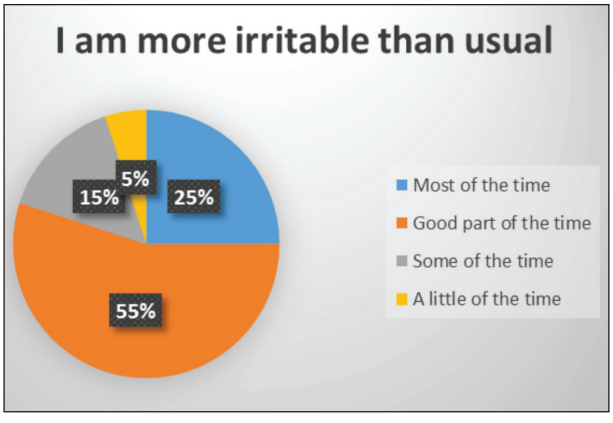

Figure 2. Irritability area (Item 15 Zung Depression Scale)

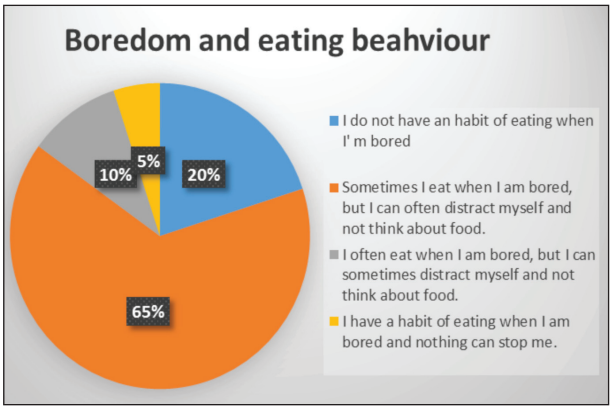

Figure 3. Analisi BES (item 4)

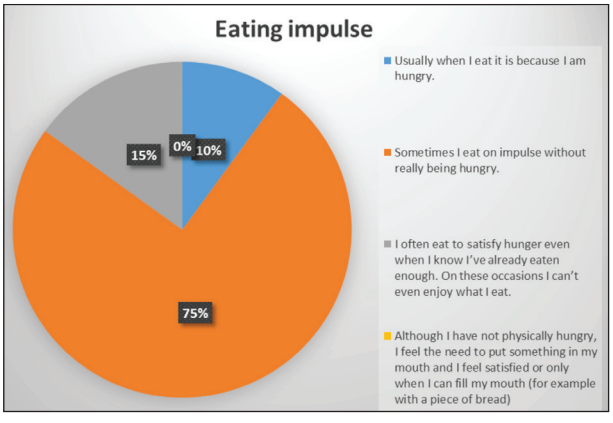

Figure 4. Item 4 Binge Eating Scale (1982).

proves, but mood seems to present a slight worsening. Therefore we can speculate the compounds present in the Assist Forte Retard®, given the presence of active phytocompounds, can be effective on anxiety (Verbena offcinalis), sleeping disorder (melatonine), emotional eating (Griffonia angustifolia) together with menopausal symptoms (Genistein) (11-13). As regards the results of the JCQ, values relate to the subjective perception of the workload, the decision-making and social support and are therefore not based on an objective assessment of the type of duty carried out by the sample. Based on the foregoing, , we can therefore see two opposite conditions in the two groups: women of (D+N) , compared with a nearly identical perceived workload, report greater autonomy and support from colleagues. The (D) group, instead, reported a decline on all fronts: the women feel more burdened, less autonomous and less supported. We cannot be certain that there was a real change in working enviroment of the women tested because the two evaluations were carried out in four months.

Althogheter, we can assume that the introduction of Assist Forte Retard® may have had beneficial effects:

- In mood and eating disorders;
- In the perception of better management of the female body and resources. In fact, some symptoms (hot flashes, irritability and fatigue) made difficult to accept what until a short time before was manageable, but the reduction of symptoms allows to regain a share of energy (Tab. 1).
- In the sense of self-efficacy: in fact, if we look at the data of the JCQ (Tab. 2), compared with a nearly identical work demand there was an improvement in the perception of their decision-making capacity.
- In the perception of social support: always relatively to the JCQ data (Tab. 2), we note a slight improvement in the perception of not being alone.
- In the perception of "being cared for" from several points of view (medical, psychological, and behavioral) promoting a reduction of symptoms, defined as normal events in the life cycle.

Critical points of the study are non-randomized, non-double-blinded, non-placebo-controlled, few subjects per groupand short time of observation. For this reason, it takes the form of a pilot study whose future goal has to be extended to a larger sample. In fact, as already stated by international authors, menopause is a little in-depth field of study, which instead could have a big impact on quality of life, particularly in the employment context. It is therefore of prime importance to build in Health Promotion Units including

Tabella 2. Job Content Questionnarie results at T0 and T1 in the two groups. Reference medians DL 63, JD: 38 and SS: 25.

JCQ Dimensions	Starting	Final	p-value
DL (D+N)	64	66	0,2759
DL (D)	74	69	0,2667
JD (D+N)	33	33,5	0,5898
JD (D)	36,5	38	0,6895
SS (D+N)	22	23	0,0266
SS (D)	25	24	0,088

Tabella 3.

	Relevance of symptoms at work %	Relevance of symptoms in daily life %
Poor concentration	50.9	34.9
Fatigue	50.7	53.4
Low memory	50.5	42.1
Feeling down or	41.9	39.7
Minor self-confidence	38.9	21.9
Sleep disorders	37.3	56.5
Irritability	35.6	37.8

Cit. Griffith et al, 2013 mod.

Tabella 1. Comparison of Zung Depression Scale and Binge Eating Scale results at T0 and T1 in the two groups. (Wilcoxon test for paired data for each psychological test)

	Starting Median	Q1	Q3	Final Median	Q1	Q3	P value
ZDS D+N	39	25	45	26,5	22,5	35,75	<0,0001
BES D+N	7	5	14,5	5,5	3	10	0.0083
ZDS D	28	23	41,5	28	23,5	46,75	0,7432
BES D	8	4,5	17	7,5	4,5	8,5	0,219

not only information on the physiological menopause, but able to embrace the person, such as medicine, nutritional and psychological, providing support and behavioral strategies, to encourage a better management of a natural event.

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