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## Investigating burnout situations, nurses' stress perception and effect of a post-graduate education program in health care organizations of northern Italy: a multicenter study

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**ABSTRACT.** Background. Burnout (BO) is increasingly considered a public health problem: it is not only harmful to the individual, but also for the organization. Therefore, in recent years, research has given particular attention to the study of the phenomenon and its antecedents among the nursing profession. In the last ten years, the literature shows the prevalence of BO in different clinical settings, but there are few recent data describing the phenomenon and its relationship with educational preventive programs.

**Objectives.** The aims of this study are:

- a) to describe the prevalence of nurses' risk of BO in the northern Italy area
- b) to describe nurses' coping and their perception of the BO antecedents
- c) to describe the effects of education on the nurses' coping and their recognition of BO antecedents

**Methods.** The study is structured into two main parts.

The first was cross-sectional, the second was prospective.

Burnout Potential Inventory (BPI) questionnaire was used in the cross-sectional part to survey risk of BO in three big hospitals in Northern Italy. The Health Profession Stress and Coping Scale (HPSCS) was used in the prospective part to survey the nurses' stress perception and their coping mechanisms in a post-graduate educational program.

**Results.** Nurses' BO risk is within the normal range, although the BPI highlighted three borderline subscales: poor team work, work overload and poor feedback. Post-graduate education had a positive effect on the stress perception, but it is not sufficient to improve coping mechanisms.

**Conclusions.** The study revealed the more stressful work situations and the effect of post-graduate education to prevent the effects of stress. This topic needs further investigation in the light of the result of this study.

**Key words:** burnout, stress, coping, education.

**RIASSUNTO.** LE SITUAZIONI LAVORATIVE CHE CAUSANO IL BURNOUT E LA PERCEZIONE DELLO STRESS TRA GLI INFERMIERI. EFFETTI DELLA FORMAZIONE POST-BASE: UNO STUDIO MULTICENTRICO NEL CONTESTO DEL NORD ITALIA.

**Background.** Il Burnout (BO) è sempre più considerato un problema di sanità pubblica, non essendo solamente dannoso per l'individuo, ma anche per le organizzazioni sanitarie in generale. La ricerca negli ultimi anni ha attribuito un'attenzione particolare al fenomeno e allo studio dei suoi antecedenti nell'ambito della professione infermieristica. Negli ultimi dieci anni è descritta la prevalenza del fenomeno in diversi contesti clinici. Tuttavia, pochi studi, prendono in considerazione il BO in relazione ad azioni formative con una valenza preventiva.

### Introduction

Burnout (BO) is increasingly considered a public health problem: it is not only harmful to the individual, but also for the organization (14). BO reduces productivity and affects the quality of services provided (33). Several studies identify nurses as a high-risk profession (17; 5; 11). Therefore, in recent years, research has given particular attention to the study of the phenomenon and its antecedents among the nursing profession (16). Many authors describe the prevalence of BO in different clinical settings, but the majority of these data are prior to the economic crisis of the last five years (18). Has anything changed over last years? There are not recent data in the literature describing the phenomenon and its antecedents in the context of northern Italy health care organizations, characterized by the presence of big hospitals, both public and private. Moreover, the literature shows how educational interventions on the group could play as a protective mechanism since the antecedents of BO (31).

Therefore, the aims of this study are:

- a) to describe the prevalence of nurses' risk of BO in the northern Italy area
- b) to describe nurses' coping and their perception of the BO antecedents
- c) to describe the effects of education on the nurses' coping and their recognition of BO antecedents.

### Background

Helping professions are susceptible to stress and BO; especially nurses are often exposed to those risks (17; 24; 5; 11; 6). Professionals can take a slow process of psychophysics "fraying" or "decay", due to the lack of energy and ability to sustain and release the stress. That process could be exacerbated in working environments by the lack of preventive interventions, continuous monitoring and targeted interventions at the first sign of discomfort (23). Therefore it could also impinge on productivity, job satisfaction (34; 22) and intention to leave the job (30; 15).

The first description of BO is given by Freudenberg in the 70s. His research provided the first direct observations of emotional depletion feeling, experienced by the same Freudenberg and his colleagues as a loss of motivation

**Obiettivi.** Gli obiettivi di questo studio sono:

- a) descrivere la prevalenza delle situazioni lavorative che promuovono il Burnout
- b) descrivere le strategie di coping utilizzate dagli infermieri e la loro percezione degli antecedenti del BO
- c) descrivere gli effetti della formazione sulle strategie di coping degli infermieri e sul riconoscimento degli antecedenti del BO

**Metodi.** Lo studio è strutturato in due parti principali. La prima è trasversale, mentre la seconda è prospettica. La parte trasversale utilizza il questionario Burnout Potential Inventory (BPI) per descrivere la prevalenza delle situazioni lavorative che promuovono il BO. La parte prospettica utilizza il questionario Health Profession Stress and Coping Scale (HPSCS) per indagare la percezione dello stress ed i meccanismi di coping tra gli infermieri sottoposti ad un'azione formativa mirata.

**Risultati.** Sono state individuate tre situazioni lavorative che espongono gli infermieri ad un maggior rischio di BO: scarso lavoro in equipe, sovraccarico di lavoro e scarsi feedback. La formazione mirata ha avuto un effetto positivo sulla percezione dello stress, pur non modificando in modo sostanziale le strategie di coping utilizzate dagli infermieri.

**Conclusione.** Lo studio ha rilevato le situazioni lavorative più stressanti e l'effetto dall'azione formativa mirata a prevenire gli esiti dello stress. Tale tematica merita di essere ulteriormente indagata alla luce degli interessanti risultati emersi.

**Parole chiave:** burnout, stress, coping, formazione.

and commitment to their work (10). BO syndrome has been studied mainly in the field of psychology. According to authors such as Maslach, Schaufeli and Leiter (21) BO arises from the inability to effectively manage chronic stress, which can be defined by three different dimensions: emotional exhaustion (EE), depersonalisation (DP) and reduced personal accomplishment (PA) (19). Those researches were aimed at describing processes and outcomes, rather than proposing interventions or possible solutions. Several theories have been proposed to explain the BO etiopathology, in which there were identified both individual and work environment factors (16). Work environment factors seem to have a stronger influence on the development of emotional exhaustion and depersonalization (25). The results of these studies are very important, especially to organize programs for prevention or intervention. Work environment factors are defined as organizational BO antecedent. BO antecedents are usually divided in three domains: organizational, occupational and individual (21). Due to the interactive nature of BO development, according to general stress theories, the characteristics in all of these domains have an effect on the relationship between man and work (21).

Responses of workers to BO antecedents are the coping mechanisms. Coping mechanisms in nurses seem to be inefficient when nurses have to manage persistent stressful events (25). Work environment factors contribute actively in BO etiopathology, impacting heavily on the actions of its antecedents (33).

In recent years, the literature shows that the education action represents an efficacious preventive tool towards the BO, inhibiting both the BO onset and its antecedents, especially for the perception of stress in the different high risk professional contexts (31). Despite the importance and

the interest raised by education action, we find few contributions in literature about these issues, considering that nurses' educational process does not end with the undergraduate education but it lasts throughout their whole professional lifetime with the continues education programs.

The research on nurses BO received extensive and continuous attention over the years because nurses appear to be the professionals more exposed to stress and BO among health care workers (24): stress, as a BO antecedent, has a certainly negative impact on nurses' mental and physical health as well as their work efficiency and productivity (12). Nurses have often to interface with suffering people: interpersonal relationships are often intense, very emotionally charged and often accompanied by tension and anxiety. Nurses offer themselves as a people capable of identifying and nurse-patient relationship leads to a very intense emotional demand, much more than in other health professionals, because nurse has to work directly with "the patient's body". Moreover, nurses must often elaborate emotions internally to establish a useful relationship (emotional labor) (2). This type of relationship creates high levels of stress in nurses (3). The literature shows how the attention to these issues has been prior to the current social and economic issues, which characterize also the Italian health system in the last decade. Therefore the recent literature seems poorer in the research aimed to describe the phenomenon of stress and BO, considering that the context is changed due to the crisis, so nurses often have to interface with the budget cuts (18).

Nurses employed in bone marrow transplantation, intensive care and oncology fields are at high risk for stress and BO: the limited clinical success cause an abnormal emotional intensity in nurses, furthermore they are in a daily contact with many critically ill patients (14).

The literature confirms the correlation between BO and coping mechanisms (3) as well as the correlation between the index of stress and personal satisfaction (22). Efficacious coping and personal satisfaction are highly predictive of nurses' well-being. Furthermore, some reviews describe an inverse relationship between seniority and BO, indicating younger nurses as at higher risk (3; 8; 4): this could be related to their poor working experience as well as to a different assignment of tasks for young nurses (33). The importance of preventive and support programs is clearly emphasized, starting from undergraduate education up to continuous education. Preventive and support programs are suggested when young nurses are involved in the team to decrease the risk BO for nurses. The educational methods that include social mediation seem very useful in improving the group's activities, the reflexivity and the sharing of strategies to be adopted in daily clinical practice. Moreover, the clinical activities in a poorly cooperative context amplify the nurses' stress (1).

Particular attention is given to the sense of belonging and motivation, especially regarding the relationship between individual and organization. In this sense, the group represents an interesting protection factor (9). Motivation is described by Potter (26) as a "psychological contract between organization and individual". According to Potter (27), BO is often a motivational problem: workers need positive consequences for a good work to prevent BO,

called “positive wins”. According to Potter, wins can be positive or negative. A “positive win” occurs when workers do something and something positive occurs as result, promoting motivation in a positive away. Otherwise “negative win” promote motivation in a negative away, when workers do something to turn off something negative. While positive and negative wins keep motivation high, they do not work in the same manner: positive wins generate the “working for positive” motivation (work enthusiasm), whereas negative wins generate “working to avoid negative” motivation (workaholic). When a performance receives no wins, motivation will usually suffer, especially when a win is expected, carrying a frustration in the individual, described as a “punishment”. Furthermore, workers are more susceptible to BO when motivation declines (26; 27). Literature shows which situations promote BO, defined them as “killer jobs”. BO promoting situations are investigated in Burnout Potential Inventory (BPI), which are: powerlessness, no information, conflict, poor team work, overload, boredom, poor feedback, punishment, alienation, ambiguity, unrewarding, values conflict (27). BPI questionnaire does not aim to investigate a full-blown BO, but it is aimed to investigate a BO risk that represents worker’s perception of the “killer jobs” situations. In this sense, BPI is very different from the questionnaires that investigate BO, among which the most used is the Maslach Burnout Inventory (MBI) (20).

Using cross-sectional data, the aim of this study was to describe nurses’ risk of BO, investigating the BO promoting situations with BPI surveys. Using prospective data, the aims of this study were to describe nurse’s coping and their perception of BO antecedents and to describe the effects of post-graduate education on the nurses’ coping and their recognition of BO antecedents. The first hypothesis was that BO prevalence is worsened due to the last decade budget cuts in the Italian hospitals. The second hypothesis was that the education actions improve the BO antecedents’ perception and coping mechanisms.

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## Methods

### Study design

The study is structured into two main parts. The first was cross-sectional, the second was prospective.

### Selection of participants

Nurses working full-time in northern Italy hospitals could be enrolled for the cross-sectional part. Nurses, coming from a post-graduation course at University of Pavia and working in the northern Italy area, could be enrolled for the prospective part.

### Cross-sectional study

Three big hospitals in Northern Italy were selected for the investigation. All participants were full-time workers and participation was voluntary. The involved nurses were employed in the following clinical settings: medical area, surgical area, critical area and outpatient area. Each recruited nurse received a study information sheet, a socio-

demographic form and the BPI, which is the tool used for the cross-sectional data collecting. Socio-demographic data were: gender, age, marital status, years of employment and educational background. Moreover, each hospital involved in the study had a site coordinator. Time required for filling the BPI was approximately 15 minutes.

The BPI (27) consists in 48 items questionnaire, taking into account twelve subscales to investigate different BO promoting situations:

1. powerlessness
2. no information
3. conflict
4. poor team work
5. overload
6. boredom
7. poor feedback
8. punishment
9. alienation
10. ambiguity
11. unrewarding
12. values conflict.

Enrolled nurses had to fill BPI rating every item, one at a time, with a Likert scale to assess how often they were bothered by each described situation. Likert scale was from 1 to 9, with 1 being “rarely” and 9 being “constantly”. Thence, enrolled nurses obtained a score adding up each rate that was indicative of a BO risk. A scoring between 48 and 168 was referred to a low BO risk; a scoring between 169 and 312 was referred to a moderate BO risk and a scoring between 313 and 432 was referred to a high BO risk. Study information sheet had to raise awareness about a correct questionnaire filling, providing information about the research purpose, the methods and the guarantee of anonymity. Socio-demographic form had to provide useful information to better define the recruited nurses profile.

### Prospective study

This part of the study arose in the context of post-graduation course at University of Pavia. All nurses were employed in the northern Italy area.

From the lectures in previous editions of the aforementioned post-graduation course emerged the need to give a specific education for the attending nurses about the conflict and stress management. The Assembly of lecturers has evaluated, for this reason, to use assessment tools to measure and explore the perceived stress and coping mechanisms, using the Health Profession Stress and Coping Scale (HPSCS) with a specific educational plane.

HPSCS is a self-administered questionnaire designed to investigate the potential stressful situations in different working activities as well as the individual coping mechanisms (31). Thus, HPSCS offers a range of potentially stressful work situations, in addition to socio-demographic data collection, in order to measure both the level of perceived stress and four possible coping mechanisms (coping focused on problem solving, on social support, on distress emotional, on problem avoidance). HPSCS allows the individual or group assessment of the situations, in which the working efficiency is threatened and there is a risk of BO.

In this study we used a HPSCS version for nurses, consisting on the following sub-scales:

- Stress sub-scales: emergency, personal attack, organizational contingencies, personal devaluation, and problematic relationship with patients and relatives.
- Coping sub-scales: problem solving, social support, distress emotional and problem avoidance.

Enrolled nurses had to fill HPSCS rating every stress situation with a Likert scale from 0 to 3, with 0 being “not at all” and 3 being “very much”. Then, they had to indicate, using the same Likert scale, the frequency they used every presented coping mechanism, from the most functional to the dysfunctional ones, so: problem solving, social support, distress emotional and problem avoidance.

The sample consisted of 56 nurses attending, in two consecutive editions, a post-graduation course at University of Pavia. Enrolled nurses were full-time employees in hospitals of northern Italy, belonging to different clinical settings.

HPSCS was filled at the beginning of the post-graduation course (pre-test) and at the end of course (post-test). Time required for filling HPSCS was approximately 25 minutes, according to the authors’ description (31). Then, we had proceeded to data analyzing.

In particular, it was calculated:

- a total score of stress, corresponding to the sum of the stressor judgments about the value of all the 19 situations presented to nurses;
- five scores corresponding to the judgment of stress expressed respect to the five dimensions identified in stress sub-scales (emergency, personal attack, organizational contingencies, personal devaluation, and problematic relationship with patients and relatives);
- a total score for each of the four coping mechanisms (problem solving, social support, distress emotional and problem avoidance), which allows to understand the overall frequency of use of each mechanism;
- a score for each coping strategies in relation with the five dimensions identified in stress sub-scales.

The raw scores were converted into standard scores through the conversion tables for the nurses’ version of HPSCS. The scales were expressed in T-Scores. T-Scores indicate how many standard deviation units an examinee’s score is above or below the mean, having a mean of 50 and a standard deviation of 10.

Ripamonti (31) suggests that HCSPS filling could be considered as a first intervention to prevent BO, because nurses have to reflect about their stress perception by filling the questionnaire. This first reflection can be subsequently shared in a group setting.

According to the literature, we have structured an educational plane to affect the maladaptive approach with stressful situations. The educational plane was aimed to promote more reflections and awareness about stressful situations, strengthening the most effective mechanisms (7; 28). Furthermore, educational plane was based on exercises and role playing, concerning real cases brought by the nurses themselves as well as cases brought by lecturers. HPSCS authors have described some educational interventions as useful to prevent BO. Those interventions should be aimed to increase communication skills, use of feedback

and to improve a sound management of aggressive patients, relatives and colleagues, adopting an assertive communication (31). During educational process, particular attention has been given to nurses’ intrinsic motivation, stimulating knowledge, personal experiences and reflections about their role in their working contest. The educational plane had to improve the perception of being able to better manage the stressful situations, using best strategies to identify the problem and to address attention on peer group, which was an essential resource. The peer group relationship could have a preventive role; however in cases of full-blown BO, a specialist intervention is required.

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## Statistical analysis

### Cross-sectional study

We used percentages values to describe qualitative variables and mean  $\pm$  standard deviation to describe quantitative variables. The BPI score and BPI subscales were described using median and 25<sup>th</sup> and 75<sup>th</sup> percentiles. To compare overall score median values between males and females was used nonparametric Mann-Whitney test.

### Prospective study

The scores were described using the median values as measures of position and the 25<sup>th</sup> and 75<sup>th</sup> percentiles as measures of dispersion. To compare the median values of the variables investigated in the first questionnaire administration (pre-test) with those of the second questionnaire administration (post-test) was used the nonparametric Wilcoxon rank. We had also performed the non-parametric sign test which confirmed the results obtained, because we had detected an asymmetry of the variables distribution.

For both studies was used a level of significance equal to 0,05. Statistics were performed using was SPSS and Excel software.

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## Results

### Cross-sectional study

As showed in Table I most of enrolled subjects were females (74,1%), moreover 53,8% were married, 80,4% were Italian, with an educational background mostly given by nursing degree or equivalent (91,6%). Quite half of the enrolled subjects came from hospital C (46,6%), while the others came respectively with percentages 25,5 and 27,9 from hospitals B and A. The clinical area most represented was the surgical area (47,2%) followed by critical area (21,8%), medical area (20,2) and outpatient area (10,8%). Mean age of enrolled nurses was 38.8 $\pm$ 8.5 years (87.1% worked in a 24 hours shift, while 12.9% worked in a 12 hours shift). The BPI median value was 100 with 25<sup>th</sup> and 75<sup>th</sup> percentiles equal to 72 and 140 respectively, showing absence of BO high risk.

Moreover the prevalence of low-risk score is 87% and moderate risk is 13%. The BPI median scores comparison by sex doesn’t result significant (Mann-Whitney U= p=0,328).

Among the nurses at moderate risk, 54.2% worked in the surgical area, 27.1% in critical area and 18.7% in out-

**Table I. Sample descriptive statistics**

Variables		N cases (%)
Sex	F	337 (74,1)
	M	118 (25,9)
	Total	455 (100)
Marital status	married	245 (53,8)
	unmarried	210 (46,2)
	Total	455 (100)
Nationality	Italian	366 (80,4)
	Other	89 (19,6)
	Total	455 (100)
Education	Post graduate education	6 (1,3)
	Nursing degree or equivalent	417 (91,6)
	master I level	27 (5,9)
	master II level	1 (0,3)
	other	4 (0,9)
Total	455 (100)	
Hospital	Hospital A	127 (27,9)
	Hospital B	116 (25,5)
	Hospital C	212 (46,6)
	Total	455 (100)
Clinical Area	Outpatient area	49 (10,8)
	Surgical Area	215 (47,2)
	Medical Area	92 (20,2)
	Critical Area	99 (21,8)
	Total	455 (100)
	<b>Mean</b>	<b>Standard Deviation</b>
AGE	38,8	8,5
	<b>Median</b>	<b>25<sup>^</sup>; 75<sup>^</sup> pct</b>
BPI	100	72;140

patient area. We calculated the scores and the medians of the 12 BPI subscales, in the 3 hospitals (Table II). The medians with an higher score were: overload, poor feedback and poor team work. These subscales represented the most frequent promoting BO working situations.

**Table II. Median and percentiles of BPI Subscales**

	powerlessness	No information	Conflict	Poor team work	Overload	Boredom	Poor Feedback	Punishment	Alienation	Ambiguity	unrewarding	Values conflict
Median	9	7	9	13	13	5	12	5	5	5	5	8
Percentile	25	5	5	6	9	9	4	9	4	4	4	5
	75	12	10	14	18	18	8	18	6	8	9	13

**Table III. Descriptive and inferential analysis of the scores of the prospective study of investigation (all cases)- Sign test**

Stress domains	n	Pre-test Median and percentile			Post-test Median and percentile			p value Two-Tailed Significance Level
		25°	Median	75°	25°	Median	75°	
		Stress for emergency	34	45	50	55	40	
Stress for personal attack	32	43	53	58	39	43	51,75	0.009
Stress for organizational contingencies	33	44	44	51	38	44	51	0.275
Stress for personal devaluation	34	50	55	61	44	50	55	0.049
Stress for problematic relationships	35	46	54	58	39	46	50	0.004
Overall Stress	34	45,5	51	54	39	42	48	0.001

**Prospective study**

**a) Overall Scores**

Table III shows the results for the comparison of the variables median values at first questionnaire administration (Pre-test) and last questionnaire administration (Post-test).

The Pre-test scores indicated normal stress levels, even if Personal Attack, Problematic Relationship and Overall Stress are borderline, placing within the upper limit range (45-55). Instead, the Organizational Contingencies scores undertaken within the lower limit of the range (35-45).

We observe a statistically significant decrease in the median values of the stress for Personal Attack (from 53 to 43, p = 0.009), for Problematic Relationships (with patients, family members and colleagues) (from 54 to 46, p = 0.004) and the overall stress (from 51 to 42, p = 0.001).

**Coping mechanisms**

The inferential analysis of coping mechanisms showed no significant differences in scores on the Pre-test and Post-test. From the descriptive point of view the median values of the Pre-test and Post-test coping mechanisms were at a “moderate” level, but within normal limit.

**b) Age Stratification**

The literature suggests that the most exposed to BO are young workers (3; 8; 4), so we had decided to stratify the sample in 2 groups: ≤30 (25.50%) and >30 (74.50%).

The under thirty years group was composed of 5 males (38.5%) and 8 females (61.5%). The over thirty years was composed of 7 males (18.4%) and 31 females (81.6%). Mean of working years in under thirty years group was 3.3 ± 1.70, if we considered working years in the same ward the mean was 3.1 ± 1.70. Mean of working years in over thirty years was 13.86 ± 6.67, if we considered working years in the same ward the mean was 6.58 ± 6.09.

*Stress domains*

The results of variables median values comparison in Pre-test and Post-test was normal in the under thirty group.

There was not a statistically significant decrease in stress median values for each situation investigated. Even the analysis of coping mechanisms showed no significant differences in scores in Pre-test and Post-test (Table IV).

The Pre-test scores indicated normal stress levels, even if the areas about Stress for Personal Attack, Stress for Problematic Relationship and Overall Stress were borderline (45-55). Rather, Stress for Organizational Contingencies was at the low level in the normality range (35-45).

In over thirty group (Table V) we observed a statistically significant decrease in the median values of Stress for Personal Attack (from 53 to 43,  $p = 0.001$ ), Stress for Problematic Relationships (with patients, family members and colleagues) (from 54 to 44.5,  $p = 0.007$ ) and the Overall Stress (from 54 to 42,  $p = 0.001$ ).

*Coping mechanisms*

The inferential analysis of coping mechanisms showed no significant differences in the Pre-test and post-test scores. There were no statistically significant differences even between males and females.

**Discussion**

Performing the cross-sectional data analysis we obtained useful information on the most critical working situations in

the 3 involved hospitals: overload, poor feedback and poor team work. Overload is referred to the feeling of being overloaded for work that could affect the worker private life. Poor feedback is referred to the lack of feedback in working environment. Poor team work is referred to a scarce communication and collaboration within the working team, sometimes worsened by bureaucracy (27). The findings showed what are most critical subscales, confirming the findings from a survey in a big hospital in Rome where emerged that overload, poor feedback and poor team work were the “critical” BO promoting situations (36). Moreover, scores of values conflicts sub-scale were borderline. Values conflict indicates a compromise of personal values, where the nurse does not fit with hospital’s values. That aspect should be further investigated to better understand the nature of that discomfort, its implications in daily life and how nurses cope stress for these situations.

Performing the prospective data analysis was useful to observe that stress for Personal Attack, Problematic Relationship and Overall Stress was borderline, even if considered normal. Aspects related to stress for Organizational Contingencies and Personal Attack were not represent critical situations to manage for enrolled nurses. Therefore, critical situations that undermine organizational wellbeing were represented only by the Stress domains regarding relationships: Personal Attack and Problematic Relationship. Analysis of the data between pre-test and post-test showed that the level of perceived stress was significantly reduced in Attack Personnel domain, Problematic Relationships domain and Overall Stress. According to literature, the reduction of per-

**Table IV. Descriptive and inferential analysis of the total scores of the prospective study of investigation (age ≤30) - Sign test**

Stress domains Age ≤30	n	Pre Test Median and percentile			Post test Median and percentile			Two-Tailed exact Significance Level
		25°	Median	75°	25°	Median	75°	
Stress for emergency	9	40	50	60	35	45	57.5	0.813
Stress for personal attack	9	39	53	53	41	48	55.5	0.813
Stress for organizational contingencies	9	38	51	57	35	38	51	0.750
Stress for personal devaluation	9	44	50	61	47	50	55	1.00
Stress for problematic relationship	9	43	50	58	40.50	46	48	0.344
Overall Stress	9	46	50	54	41	44	49.5	0.719

**Table V. Descriptive and inferential analysis of the total scores of the prospective part of investigation (age > 30)**

Stress domains Over 30 years group	n	Pre-test Median and percentile			Post-test Median and percentile			p value Two-Tailed Significance Level
		25°	Median	75°	25°	Median	75°	
Stress for emergency	36	45	50	50	40	45	50	0.74
Stress for personal attack	34	43	53	58	39	43	53	0.001
Stress for organizational contingencies	35	44	44	51	38	44	51	0.401
Stress for personal devaluation	35	50	55	61	44	50	55	0.025
Stress for problematic relationships	36	46	54	58	39	44.5	51	0.07
Overall Stress	35	44	54	56	39	42	49	0.001

ceived stress in the aforementioned domains was very significant in the over thirty years group (3; 8; 4) and in the females (31). Rather, coping mechanisms did not show changes between pre-test and post-test. Coping mechanisms described in the pre-test were representative of the normal range of mechanisms used by nurses to cope with stress. This result confirms that behaviors and coping mechanisms can be improved only after enduring specialist interventions; so the only educational plane in a post-graduation course had a positive effect on perceived stress, but it does not work on nurses' coping mechanisms. According to literature, the most useful educational strategy was the stimulation of peer group relationships, using the sharing of personal working experience and the role plays (29). Through the educational plane, nurses were able to experience directly which working activities could be useful to better manage stress and to prevent BO. This experience could be also replicated outside the post-graduate education setting, such as the professional continues education.

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### Limits

Limits of this research are given essentially by use of the self-repot questionnaires and by the gender distribution. In fact, both the samples were composed by a higher frequency of females.

Sample size of the prospective part did not allow a better analysis of the differences between the 2 age groups and the different clinical areas of belonging.

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