



## Early stage melanoma diagnosis and mental health-related: emotional influence of body self-perception

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### Introduction

Melanoma is a tumor with high impact through its rapidly growing incidence, high mortality, and increased complexity and costs of care in advanced stages. Melanoma survival exceeded 90% for 5-year relative rate for Nordic or Western countries, but is below 60% in Eastern Europe for people diagnosed as recently as this decade [1-2]. However, epidemiological data evidenced the increase of diagnosis and the stabilization of death rate; extensive screening favored higher rate for early diagnosis in early stage of disease and it is related to surgical interventions without adjuvant therapies for better and longer survivorship [3-4].

Melanoma diagnosis can be mental health disorders though diagnosed in early stage of disease and with positive adherence to foreseen follow-ups. Some studies found 30% of patients might experience psychological distress similarly to oncological patients, anxiety and depression symptoms, affecting the Quality of Life (QoL) over time [5-10]. Taking into account of literature, several risk factors for mental health disorders might intervene as well reduced coping ability, aging emotional fragility, quality of affective relationship, time from diagnosis, visibility of melanoma area, social support [11-16]. Oliveria's study [17] evidenced the psychological distress influences negatively cancer patients' QoL and even routine daily living favoring a low psychological adjustment paving the way for less flexibility for modelling

individual patterns of change over time: frequently patients tend to minimize melanoma diagnosis and no signs for physical impairments could make them less aware about the important role of screening and follow-ups for the prolonged management of their health. Moreover, high risk for progression of melanoma over the time could impact the psychosocial living of patients: abandoning medical follow-up, negative body image self-perception, negative thinking, the fear of recurrence [18]. Particularly, psychological distress could impact negatively the preventive behavior adoption such as low use of solar protective cream, self-test for skin, or periodic skin cancer screening [19-21]. Another key points for mental health in melanoma survivors are the anxiety and fear of recurrence [22]. Studies conducted on the QoL in survivorship have been focused on adult population ( $\geq 50$  years old) in advanced stage of melanoma [23-26]: few researches analyzed the emotional traits and the behavioral aspects of early stage melanoma diagnosis. The improvement of early screening in National Healthcare Plans favored the increasing of early diagnosis and this is demanding even investigation on wellness and QoL. Our study aimed to investigate the emotional impact of melanoma diagnosis in early stage. We wanted to analyse the aspects for psychological wellbeing of patients (emotional traits) and the relationship with body self-perception.

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## Methods

### Ethical approval

This study was approved by the Internal Review Board of the University of L'Aquila, Italy (Prot. No. 16372/2019). Informed consent was obtained from each participant, and the study adhered to the Declaration of Helsinki.

### Participants

We conducted an observational study to measure the prevalence of psychological traits (depression, anxiety, distress, and metacognition thinking) in patients diagnosed with early stage of melanoma. Participants were composed of n.92 outpatients aged 18-55 years old (mean age 42.2,  $\pm 8.4$ ), living in central Italy divided by gender distribution: 1) Female Group (FG, n.55) and 2) Male group (MG, n.37). Participants were outpatients received melanoma diagnosis in mean time 38.8 months ( $\pm 38.2$ ) by American Joint Committee on Cancer (AJCC) Cancer Staging Manual (AJCC, 2017): diagnosis of melanoma in stages T0 (no evidence for primary tumor), T1a (tumor thickness measurement:  $\leq 1.0$  mm), T1b (tumor thickness measurement:  $\leq 0.8$  mm). 26.1% of patients had been diagnosed less than 1 year earlier; 37% between 2 and 3 years and 37% over 5 years before. The regions of the body most often affected were legs (24.9%). The demographic and clinical characteristics of the sample are presented in [Table 1](#).

104 eligible participants were enrolled in the study protocol and then 92 patients were recruited in the research plan: 12 patients refused to be involved in the project no giving written informed consents.

### Procedure

Patients were recruited at the UOSD Dermatology, San Salvatore Hospital (ASL1 Abruzzo – Italy). Medical doctor staff enrolled and recruited the eligible participants. Research staff provided a digital form of the test protocol providing mandatory signed informed consent. The time for online form completion was about 20 minutes. The data were collected into a dedicated server, and data scoring was conducted by trained professionals, blinded to the study's objectives.

### Psychological measurements

A psychological battery composed of standardized tests for the detection of emotional variables were administered. Demographics were collected through the participants' self-reports. Clinical data were obtained by examining participants' medical records.

*Psychological Distress Inventory* (PDI) [27]. This self-administrated

**Table 1**  
Demographic data of participants.

	Female(N.56)x 42.3 sd $\pm$ 8.2	Male(N.36)x 42.2 sd $\pm$ 8.8	Total(N.92)x 42.2 sd $\pm$ 8.4
Education			
No high school	3.6%	2.7%	3.3%
High school degree	56.4%	64.9%	59.8%
Undergraduate degree	41.8%	29.7%	37%
Marital status			
Married/living with partner	65.5%	62.2%	64.1%
Single	30.9%	27%	29.3%
Divorced/widows	5.5%	8.1%	6.5%
Occupation			
Unemployed	23.6%	2.7%	15.2%
Employed	58.2%	62.2%	59.8%
Self employed	20%	32.4%	25%

questionnaire measures the psychological distress after cancer diagnosis. It is composed of 13 items by five-point Likert-type scale. The standard score estimates the presence/absence of psychological distress to measure global distress. Reliability size was good ( $\alpha = 0.86$ ).

*Depression, Anxiety and Stress Scale* (DASS-21) [29]. The DASS is a clinical assessment that measures the three emotional traits related states of a) depression, b) anxiety and c) stress. It has 21 questions and takes about 3 minutes to complete.

*Body Self-Perception Questionnaire* (BSP-q). It is an experimental questionnaire aimed to evaluate the body image perception based on 3 domains: 1) consequences of clinical treatment on body image (Treatment Consequences on Body Image, TCBI); 2) well-being in social interaction (Social Wellness, SW); and 3) well-being with your body (Physical Feeling, PF). It consists of 15 items with a 4-point response scale. The BSP-q was applied in a previous pilot study composed of a sample of 30 melanoma patients; those patients were not included in the present research. The internal reliability of the scale was good ( $\alpha = 0.91$ ).

### Statistical analyses

Descriptive statistical analyzes was conducted on demographic and clinical data, analysis of variance (ANCOVA), (Tukey) Post Hoc test and Log linear regression were performed using Jamovi statistical analysis. The significance level was set at  $\alpha < 0.05$ .

## Results

Raw scores and standard deviations of participants performance are reported in [Table 2](#).

First, we wanted to analyze age and gender effect; participants were distributed into two groups by gender: Female Group (n.55) and Male Group (n.37); then we divided the sample by median age (43 years old). Young Adult group (YAg) and Adult Adult group (AAg).

First, ANOVA statistical analysis was conducted to compare the variables of the 3 emotional traits (PDI, DASS-21, and BSP-q), gender (2: F, M) and age group (2: young, adult). Statistical analysis evidenced a significant gender effect. Between effect test indicated significant differences in psychological distress (PDI) ( $F(1,90) = 12,7$ ;  $\eta^2 = 0,12$ ;  $p = 0,001$ ), anxiety severity degree (DASS-21) ( $F(1,90) = 5,07$ ;  $\eta^2 = 0,05$ ;  $p = 0,02$ ) stress level (DASS-21) ( $F(1,90) = 4,90$ ;  $\eta^2 = 0,05$ ;  $p = 0,02$ ); regard to the body self-perception, significant differences emerged in total score (BSP-q) ( $F(1,90) = 6,51$ ;  $\eta^2 = 0,06$ ;  $p = 0,01$ ) and in the TCBI ( $F(1,90) = 6,33$ ;  $\eta^2 = 0,06$ ;  $p = 0,01$ ) and PF ( $F(1,90) = 4,11$ ;  $\eta^2 = 0,04$ ;  $p = 0,04$ ) (see [Fig. 1](#)). Females appeared psychologically more vulnerable than males; another interesting point was no aging depending. Female emotional pattern showed higher anxiety, and psychological distress associated to lower positive self-perception of body image.

We performed a linear regression to explain the relation between emotional traits and the body self-perception (TCBI and PF indexes). The TCBI resulted to be impacted by psychological distress ( $F(1,90) = 8,0$ ;  $R^2 = 0,14$ ;  $t = -3,95$ ;  $p = 0,01$ ) by anxiety level ( $F(1,90) = 16,5$ ;  $R^2 = 0,15$ ;  $t = -4,07$ ;  $p = 0,01$ ) depression ( $F(1,90) = 11,0$ ;  $R^2 = 0,109$ ;  $t = -3,32$ ;  $p = 0,001$ ), stress ( $F(1,90) = 6,60$ ;  $R^2 = 0,06$ ;  $t = -2,57$ ;  $p = 0,01$ ). The PF index resulted influenced by psychological distress ( $F(1,90) = 9,77$ ;  $R^2 = 0,09$ ;  $t = -3,13$ ;  $p = 0,002$ ).

Our study aimed to investigate the emotional impact of melanoma diagnosis in early stage. We wanted to analyse the aspects for psychological wellbeing of patients (emotional traits) and the relationship with body self-perception

## Discussion and conclusions

Aim of the study was to analyze the emotional implications of melanoma diagnosis in early stage and its impact on body self-perception; in particular, focus of the study was to define the influence of diagnosis on QoL, paying the attention on the gender, age and staging effects.

**Table 2**

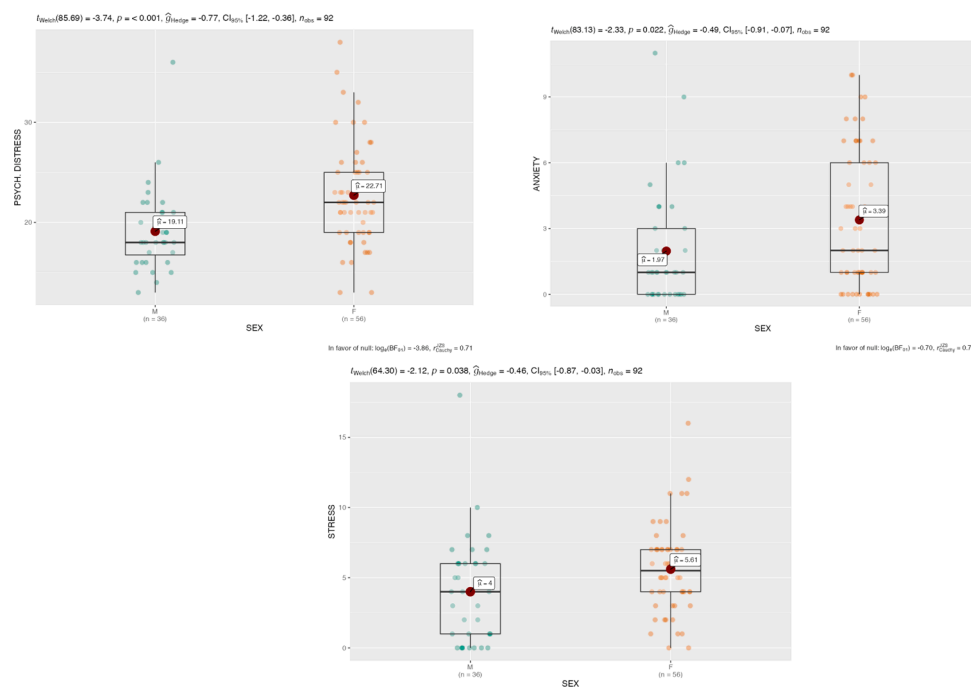
Table 2 Raw score (mean/standard deviation) of psychological evaluation distributing sample in aging groups: YAg and AAg.

	Young Adult group			Adult Adult group			Total		
	Female x sd	Male x sd	TOTx sd	Female x sd	Male x sd	TOTx sd	Female x sd	Male x sd	TOTx sd
PDI	21.6±4	18.8±4.9	20.6±4.5	23.7±5.9	19.9±4	22±5.4	22.6±5.1	19.4±4.4	21.3±5
DASS-21									
Depression	2.6±2.6	1.6±3.6	2.2±3	3.5±3	2.7±2.6	3.1±2.8	3±2.8	2.2±3.1	2.7±2.9
Anxiety	2.9±3	1.8±2.9	2.5±3	3.9±3.3	2.3±2.6	3.2±3.1	3.4±3.1	2.1±2.7	2.8±3
Stress	5.3±3.6	3.5±4.8	4.6±4.1	5.9±2.5	4.6±2.7	5.3±2.7	5.6±3.1	4.1±3.8	5±3.5
BSP-q									
TCBI	13.4±2	14.6±0.8	13.8±1.8	12.6±2.8	13.7±1.6	13.1±2.4	13±2.5	14.1±1.4	13.5±2.1
SW	12±2.6	13.2±2.3	12.4±2.5	11.9±2	12.2±2.1	12±2	11.9±2.3	12.6±2.2	12.2±2.3
FP	11.3±2.3	11.7±2.4	11.5±2.3	10.7±2.1	12±2	11.3±2.1	11±2.2	11.9±2.1	11.4±2.2
TOT	36.7±5.5	39.5±4.2	37.7±5.2	35.2±5.9	37.9±3.4	36.4±5.1	36±5.7	38.6±3.8	37±5.2

**Table 3**

Table 3 Raw score (means and standard deviations) of TNM groups in psychological testing.

	Female(n.56)			Male(n.36)		
	TNM 0 (n.13)x±sd	TNM IA (n.33)x±sd	TNM IB (n.10)x±sd	TNM 0 (n.11)x±sd	TNM IA (n.18)x±sd	TNM IB (n.7)x±sd
PDI TOT	20.8±4.22	23.2±5.61	23.5±4.09	18.8±1.54	18.3±5.18	21.6±2.82
DASS-21						
D	6.31±3.90	7.15±6.50	3.00±4.03	4.73±4.58	2.78±6.73	6.00±5.42
A	5.54±6.94	7.52±6.42	6.00±4.81	4.36±4.37	3.22±5.45	5.14±6.72
S	11.7±3.73	11.5±7.04	9.80±6.36	9.09±6.02	6.67±8.70	9.71±7.06
BSPQ						
TCBI	14.2±0.832	12.5±2.75	13.1±2.28	14.5±1.04	14.2±1.20	13.6±2.15
SW	11.9±2.47	11.9±2.43	12.1±1.91	12.5±2.42	13.2±2.15	11.3±1.98
PF	11.6±1.19	11.2±2.21	9.60±2.80	11.7±1.90	12.2±2.26	11.7±2.36
TOT	37.8±4.00	35.6±6.02	34.8±6.05	38.7±3.47	39.5±3.73	36.6±4.47



**Fig. 1.** Gender differences in emotional variables (distress, anxiety, body image self-perception).

According to our findings, the early melanoma diagnosis impacts negatively the QoL of patients affecting emotional traits. First, our finding confirmed the negative impact on emotional pattern of female population regardless to aging [30-33]. Taking into account the study of Lichtenthal et al., women showed high vulnerability regard to the experience dissatisfaction with the appearance of their surgical scar [34]: our study showed that psychological distress in women is related to the perception of their body, and in particular to the possible consequences of clinical treatment on the body image. On contrary males

appeared to be preserved thought resilient emotional patterns in early melanoma diagnosis.

By psychological perspective, the stage of disease doesn't influence directly the psychological condition of the patients; findings showed as patients don't feel the early diagnosis of melanoma as dangerous for them: associated factor for negative emotional reaction is related to the gender variable and the melanoma staging isn't perceived as a protective factor. According to Tesio's suggestions [33], emotional screening is an important step for clinical process, but our finding suggested to

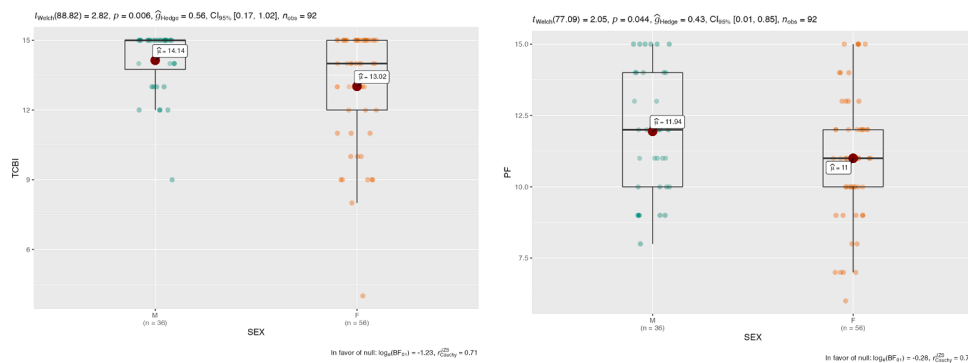


Fig. 2. Representation of indexes (TCBI and PF) of Self-body perception.

integrate the diagnosis procedure by the improvement of patient-centered approach balancing internal and external factors influencing the mental health of patients and addressing the negative impact of melanoma diagnosis on mental health and wellbeing: women need to better cope the diagnosis in term of clinical pathways, significance of caring and outcomes in order to be more compliant with effective clinical condition and more adherent making negative beliefs and thoughts less invasive. In our opinion, psychological supports should be based on those emotional aspects making the post-diagnosis to cope better not only by innovative clinical primary treatment, and early screening, but even more adherent to efficient wellness model. Moreover, a psychoeducational approach might empower the patients to real significance of diagnosis in order to favor health protective behaviors reducing risk behaviors o/and maladaptive daily habits. Following our outcomes, the emotional distress can influence the psychological wellness of patients already in early stage melanoma diagnosis; more, finding highlighted the gender effect for emotional fragility evidencing women more impacted than men.

As melanoma survival has improved in recent years, patient reported outcomes such as Quality of Life have become an important aspect of cancer-specific research. Several studies are addressing Quality of Life issues [30–34]. However, while there are many studies for cancer sites such as breast, prostate and colorectal cancer, few have focused on the long-term effects of melanoma diagnosis on patients' wellness. In tumors treated with relatively non-aggressive therapies, with relatively good survival rates, as well in melanoma diagnosis, the living perspective of the patients is very important. In addition to clinical therapy, psychological support might be foreseen in order to manage the positive and higher effects of clinical treatments not only by instrumentals evaluations, but even improving wellness and QoL of patients by the increasing of own health awareness.

Preventive protocols should be adapted taking into account gender differences in the adoption of protective behaviors and compliance with clinical recommendations. Last, our finding highlighted the regular screening of psychological distress as associated factor to the improvement of adherence of the patients to long-term follow-up, paying to attention to the personalized and diversified psychological support pathways.

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### Declaration of Competing Interests

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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