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**A Cross-sectional Survey on Burnout Prevalence and Profile
in the Sicilian Population of Ambulance Driver-Rescuers**

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A Cross-Sectional Survey on Burnout Prevalence and Profile in the Sicilian Population of Ambulance Driver-Rescuers

Abbreviations:

Maslach Burnout Inventory-Human Service Survey (MBI-HSS)

Maslach Burnout Inventory (MBI)

Emotional Exhaustion (EE)

Depersonalization (DP)

Personal Accomplishment (PA)

Principal Component Analysis (PCA)

Abstract

Introduction: Burnout is present at a high rate in emergency medicine. The ambulance driver-rescuers, who furnish the first aid to the victims, are the non-medical part of the Italian *118-service* staff. There is a lack of research on burnout risk in emergency medical Italian services and, particularly, for this category of workers. The two Italian studies, including a little group of ambulance driver-rescuers, reported inconsistent findings.

Hypothesis: The survey investigated for the first time the prevalence and exact profile of Burnout in a large sample of Italian driver-rescuers. As a secondary aim, the study additionally described how the items of the Italian version of the Maslach Burnout Inventory-Human Services Survey (MBI-HSS) cluster in components in this sample.

Methods: This cross-sectional survey was conducted between June 2015 and May 2016 and involved all the driver-rescuers operating in Sicily, the biggest and most southern region of

25 Italy. The subjects received a classification, according to different profiles of Burnout, by
26 using the Italian version of the MBI-HSS, i.e., Burnout, engagement, disengagement,
27 overextension, and disengagement. In order to explore the existence of independent factors, it
28 was conducted a Principal Component Analysis (PCA) on the survey to obtain eigenvalues
29 >1 for each component in the data.

30 **Results:** The final sample comprised 2.361 responders (96.6% of the initial sample). 29.8%
31 of them were in burnout [95% confidence interval (CI) 27.8% to 31.8%], and 1.7% presented
32 a severe form (95% CI 1.1% to 2.3%); 30% were engaged in their work (95% CI 21% to
33 34.8%). 24.7% of responders were disengaged (95% CI 22.9% to 26.5%), 1.2% presented an
34 overextension profile (95% CI 0.8% to 1.7%), while 12.6% felt work-inefficacy (95% CI
35 11.3% to 14.1%). The factors loaded in a five-factor solution at PCA, explaining 48.1% of
36 the variance and partially replicating the three-factor structure. New dimensions from
37 Personal Accomplishment and Depersonalization subscales described empathy and
38 disengagement with patients respectively and were responsible for the increased risk of
39 Burnout.

40 **Conclusions:** These results endorse the importance of screening and psychological
41 interventions for this population of emergency workers, where Burnout could manifest itself
42 more insidiously. It is also possible to speculate that sub-optimal empathy-skills could be
43 related to the disengagement and inefficacy feelings registered.

44

45 **Introduction**

46 *Background*

47 Burnout is a maladaptive response to chronic emotional distress due to a highly
48 interpersonally-oriented work, that the World Health Organization (WHO) recently
49 recognized as a work-related syndrome, and described as a form of emotional exhaustion,

50 detachment with patients and professional role, and loss of professional satisfaction.^{1,2} Leiter
51 and Maslach³ have recently presented five latent burnout profiles, based on a person-centered
52 analysis, which enriched the traditional dual definition, by adding three intermediate steps
53 between Burnout and engagement. The authors proposed that having one of the three factor-
54 scores out of the cut-off describes a state of disengagement (high in Depersonalization),
55 overextension (high in emotional exhaustion), and ineffectiveness (low in Personal
56 Accomplishment). This approach could provide a more tailored measurement of the burnout
57 phenomenon in different groups of people, particularly if their professional role has not been
58 studied before.

59 The available reviewed literature on Burnout in emergency medicine detects burnout
60 levels of more than 60% in emergency physicians.⁴ A recent meta-analysis confirmed that
61 about 30% of emergency nurses are affected with at least high Emotional Exhaustion or
62 Depersonalization, or low Personal Accomplishment;⁵ unpredictability, overcrowding and
63 continuous confrontation with traumatic events in the emergency could be specific risk
64 factors for Burnout in this population.⁶

65 However, emergency staffs include also other technicians that are involved in the
66 rescue operation, sometimes as the first-line or only team. In 1992 was instituted in Italy the
67 *118-service*, a cross-national institute of emergency, working on the public health
68 ambulances and in an operating center. *118-service* ambulance driver-rescuers drive the
69 ambulance and furnish the first aid to the victims, and they are frequently responsible for
70 quick and crucial decisions; in some preselected occasion, a nurse or an emergency physician
71 intervene, in a medical ambulance. They are the non-medical part of the multidisciplinary
72 team, present with different names and training characteristics all around the world, for
73 example, drivers and attendants, Except Emergency Medical Technicians or EMT-B in the
74 United States. In Italy, ambulance driver-rescuers achieved a regional course to obtain the

75 license to be a driver and a rescuer of the ambulance; but they do not constitute a professional
76 category, codified into a professional order, and patients and other emergency operators
77 working with them often misinterpret their role. These characteristics could represent an
78 additional risk factor for unacknowledged and untreated Burnout in this group of operators,⁷
79 which may present specific features.

80 Even if they are likely to be exposed to witnessing distress and to experience higher
81 levels of physical and psychological symptoms, and job dissatisfaction, as compared to other
82 professions,⁸ they have received less attention in research. To date, only two studies
83 examined Burnout in driver-rescuers operators in Italy. Argentero and Setti⁹ found out higher
84 levels of Burnout in 42 operators of *118-service*, compared to police operators. Angius and
85 colleagues¹⁰ examined 176 health professionals by comparing them with 79 emergency
86 operators (42 of them were the same group of operators of *118-service* already tested in the
87 previous study), and this last group showed a lower burnout risk and a condition of
88 wellbeing, as compared to the other.

89 The *Maslach Burnout Inventory-Human Service Survey* (MBI-HSS)¹¹ has been widely
90 used to assess Burnout. The questionnaire includes three dimensions: Emotional Exhaustion
91 (EE), Depersonalization (DP), and Personal Accomplishment (PA). Despite general
92 reliability of the three-factorial structure, this has not been fully replicated in the Italian
93 version of the MBI,¹²⁻¹⁵ as it was in other versions.¹⁶ Authors attributed this inconsistency to
94 item redundancy, misplacement in factors, or "lost in translation" phenomena and loss of
95 cross-cultural adaptation.^{16,17} Not surprisingly, the specific profession of survey-responders at
96 MBI accounts for high variance in factorial loading replication; differences in the
97 interpretation of the meaning of the item could be sample-specific and linked to professional
98 history, current context and goals of the subjects.^{18,19}

99

100 *Importance*

101 The lack of research in this contest makes it challenging to picture the on-the-job training and
102 psychological surveillance required for these semi-professional figures. Moreover, these
103 operators are the first-line interface with patients, and their wellbeing and professional
104 satisfaction is an essential factor of success in the multidisciplinary work team and the rescue
105 operations.

106

107 *Goals of this Investigation*

108 This survey investigated for the first time the prevalence and the exact profile of the Burnout
109 in the Sicilian population of ambulance drivers-rescuers. Firstly, the study aimed to classify
110 subjects according to different burnout profiles.³ As a secondary aim, it wanted to describe
111 how the 22 items of the Italian version of the MBI-HSS cluster in components in this
112 category of workers.

113

114 **Methods**

115 *Study Design and Setting*

116 The study was a descriptive cross-sectional survey, with a self-selection sampling strategy,
117 which included the entire population of ambulance driver-rescuers of *118-service* operating
118 in Sicily (Italy) in the study period, i.e., between June 2015 and May 2016. The subjects
119 surveyed were attending an on-the-job training, that involved all the Sicilian *118-service*
120 operators, aimed to improve emergency-management through psychological, legal, and
121 technical training. Each tutor, who followed-up the class along with all the course, informed
122 participants before the survey distribution, together with the psychologist who was
123 responsible for the general training and supervised inter-reliability of administration mode, in
124 the group setting during the first meeting. They instructed to work individually. Those

125 fulfilling the questionnaires were consenting anonymous responders. All data were
126 anonymous and voluntarily furnished; empty questionnaires were accounted as refusers. The
127 tutor in chief for each district received the questionnaires that were then recollected in
128 Palermo. Researchers from the Institute of Psychiatry at Department of Biomedicine,
129 Neuroscience and advanced Diagnostic (BiND), University of Palermo, checked data for
130 accuracy and internal consistency and performed statistical analyses.

131 Sicily is the largest region of Italy (25.832,39 Km²) and the fourth in terms of
132 population (5.026.989 resident people in 2018), with 350.538 annual 118-emergency
133 interventions (2015) (on a national mean of 170.594),²⁰ thus our results have a potential
134 external validity for the entire Country and can generate hypotheses to test in other
135 geographical areas.

136

137 *Measurement*

138 It was administered the MBI-HSS because the survey had descriptive aims on the individual
139 wellbeing (vs. Burnout), while the *Organizational Checkup System* (OCS)²¹ has a substantial
140 organizational watch (with a higher amount of items dedicated to this part) and it best fits in
141 studies which include hypothesized risk-factors.

142 The Italian Maslach's version of the MBI-HSS is a self-report scale constituted by 22
143 items describing feelings about the work and the contact with patients, to score on a 7-point
144 Likert frequency-scale from 0 (never) to 6 (every day). The test was validated on an Italian
145 sample of 1.779 subjects.¹² It consists of three factors: Emotional Exhaustion (9 items)
146 [Cronbach's Alpha (α)=0.87] that measures feelings of being emotionally overextended and
147 exhausted by one's work. Depersonalization (5 items) (α =0.68) measures an unfeeling and
148 impersonal response toward patients. Personal Accomplishment (8 items) (α =0.76) that

149 measures feelings of competence and achievement in one's work. The socio-demographic
150 sheet included age, gender, and years of career in the ambulance-service information.

151

152 *Outcomes*

153 The primary outcomes of the study were the scores obtained at MBI-HSS, differentiated in
154 the three factors. To explore the exact profile of Burnout,³ we used cut-off for each summed-
155 scale scores (S-Table 1) to initially classify subjects according to their level of Burnout.

156 Burnout syndrome would be classically present when scores at EE and DP are high, and
157 scores at PA are low. High PA and low EE and DP describe a strict definition of

158 engagement.¹² Other burnout profiles³³ were disengagement, with high scores in

159 Depersonalization only, overextension high in Emotional Exhaustion, and inefficacy, low in
160 Personal Accomplishment. Subjects' characteristics not fulfilling the abovementioned

161 categories were considered as moderate Burnout (broader definition) if two subscales at least
162 presented medium or high scores (medium or low for PA), and we defined as engaged people

163 presenting only one scale with average scores. The only exposure-variable considered was to
164 be enrolled as a worker in the *118-service*. Potential effect modifiers were age, gender, and

165 years of career. It was also estimated the mean-workload per operator for each district in

166 2015, by dividing the number of emergency interventions completed in that district in this

167 year by the number of operators working there in the same year. Similarly, it was possible to

168 obtain a mean sickness absence rate for each district in 2015, dividing the number of the day

169 of sickness-absence in 2015 by the number of operators working in each district in the same

170 year. Both mean workload and mean sickness absence, were then classified in quantiles (S-

171 Table 2; S-Table 3).

172

173 *Statistics*

174 There were examined mean, and standard deviation of each sub-scale, by three summary
175 independent sample t-tests to compare them with the Italian normative data mean and
176 standard deviation from the MBI-HSS (S-Table 1).¹² Chi-square test from ordinal regression
177 analysis was used to compare the proportion of responders to refusers among different
178 districts, to address any sampling bias. ANOVAs, for continuous variables, and Chi-square
179 tests for categorical variables from ordinal regression, were used to assess effect modifiers by
180 comparing responders classified in each specific burnout profile in terms of age, gender,
181 years of career, workload and sickness absence. Bootstrap confidence intervals were bias
182 corrected and accelerated. Alpha coefficient could be affected under variations of the number
183 of items in a measurement,²² resulting in more significant values for clusters including a
184 bigger number of items²³ and vice-versa. Thus, to check the reliability and internal
185 consistency of the components, it was used Cronbach's Alpha (α acceptable if ≥ 0.65) and
186 average inter-item correlations (r acceptable if ranging between 0.15 and 0.50) to overcome
187 the problem of few items included in some components.^{22,23} To understand and describe the
188 structure of the answers to the items in this specific population, a Principal Component
189 Analysis (PCA) was conducted on the 22 items with orthogonal rotation (Varimax), to obtain
190 eigenvalues for each component in the data and to explore the existence of independent
191 factors (extraction criteria = eigenvalues > 1). The Kaiser-Meyer-Olkin measure verified the
192 sampling adequacy for the analysis (KMO). Bartlett test of sphericity tested if correlations
193 between items were sufficiently large for PCA. The reliability of the test, both in this original
194 structure and in the new five-components solution, was controlled. Work overload is related
195 to burnout²⁴ and Emotional Exhaustion in particular,^{25,26} and estimated mean sickness
196 absence was indicated as a frequent consequence of burnout.²⁷ As an exploratory analysis,
197 there were calculated percentages of responders who had an average Likert score ≥ 4 (at least
198 once a week) at the items clustering in each sub-factor, to see which of those factors

199 accounted for the highest median response to the original component. Missing data were
200 addressed with the listwise method in all the analyses, apart from PCA, which included a
201 pairwise exclusion method. Statistics were performed by using SPSS 25.0 for Mac.²⁸

202

203 *Ethical Approval*

204 The study was conducted following the Code of Ethics of the World Medical Association
205 (Declaration of Helsinki) and received ethical approval from the Sicilian Emergency and
206 Urgency Society (SEUS) 118-service at the time of administration. Further ethical approval
207 was obtained from the Palermo 1-Ethical committee (verb. 2/2019 – 18.02.2019) before the
208 data acquisition and analysis.

209

210 **Results**

211 *Characteristics of Study Subjects*

212 The SEUS 118-service organized 73 courses for a total of 2-684 participants (about 36
213 participants per class), coming from the nine Sicilian districts as part of the National Health
214 Plan (PSN) Action 1.4 Training Projects. The MBI-HSS was proposed to all classes, except
215 Palermo from 1 to 6 (N=216 subjects) and N=20 subjects from Agrigento 1, because they
216 started earlier as the pilot-in-training groups. Thus, a final sample of 2-444 subjects
217 approached the survey (91% of the participants). The final sample comprised 2-361
218 responders, which constituted the 96.6% of the surveyed population, while N=83 subjects
219 (3.4%) refused to participate in the survey (Figure 1).

220 Responders were mostly males (77.9%), with a mean age of 44 years (SD=7.1); they
221 had a mean of 12.2 years of a career (SD=4.4) in the *118-service*. There were no differences
222 in terms of the distribution of responders and refusers' proportion across the nine Sicilian
223 districts [$\chi^2(2)=12.3$, $p=0.091$] (S-Table 4).

224

225 *Comparison of the Sub-Scales Scores with the Normative Sample and Cut-Off*

226 None of the MBI-HSS items and the three subscales had missing values >5% (Figure 1 and
227 Table 2). As compared with the normative sample, mean scores for EE scale resulted
228 significantly lower than those expected [mean difference (M^{diff})=-10.8; 95% CI=-11.6 to -
229 10.1]; the opposite was true for DP [M^{diff} =2.1; 95% CI=1.4 to 2.7] and PA [M^{diff} =0.6; 95%
230 CI=0.2 to 1.0], which resulted slightly higher in *118-service* operators than in the normative
231 sample (Table 1).

232 Based on factor cut-off, 7.8% [95% confidence interval (CI) 6.8% to 9%] present high
233 levels of EE, 36% (95% CI 34.9 to 39.1) present high levels of DP, and 41.3% (95% CI
234 41.8% to 45.8%) have low PA scores (Table 2).

235

236 *Burnout Prevalence and Profile*

237 Looking at latent burnout profiles (Leiter and Maslach, 2016), 1.7% of responders (N=36,
238 95% CI 1.1% to 2.3%) presented severe burnout, based on scale cut-off, while 29.8%
239 (N=629, 95% CI 27.8% to 31.8%) were in some intermediate form of burnout. As much as
240 30% (N=483, 95% CI 21% to 34.8%) were engaged in their work, according to a broader
241 definition, while the strict definition of engagement embraced 7.1% of subjects only (N=151,
242 95% CI 6.1% to 8.3%). The profile of disengagement was present in the 24.7% of responders
243 (N=521, 95% CI 22.9% to 26.5%), the dimension overextension enclosed the tiny percentage
244 of 1.2% people (N=25, 95% CI 0.8% to 1.7%), and 12.6% felt inefficacy in their work
245 experience (N=267, 95% CI 11.3% to 14.1%) (Figure 2). Responders with distinctive burnout
246 profiles did not differ regarding gender [$\chi^2(1)=0.03$; $p=0.845$], and years of career [F(6,
247 2005) =0.304; $p=0.935$]. A difference among subjects emerged in terms of age [F(6,
248 2092)=2.7, $p=0.011$], responders good engaged were slightly younger than disengaged

249 ($M^{\text{diff}}=-1.9$, 95% CI -3.9 to -0.008, $p=0.048$). There were no differences in the relationship
250 between sickness absence mean [$\chi^2(2)=0.26$; $p=0.878$] and workload [$\chi^2(2)=0.61$; $p=0.973$]
251 among districts, and burnout profiles.

252

253 *Reliability of the Original Test*

254 The reliability of the test resulted acceptable ($\alpha = 0.689$; α Based on Standardized Items =
255 0.701). EE subscale was the most reliable ($\alpha = 0.825$; α Based on Standardized Items =
256 0.827; $r = 0.34$). PA subscale was reliable, but less than that expected from Maslach¹¹ (α
257 =0.612; α Based on Standardized Items = 0.639; $r = 0.18$). DP did not present acceptable
258 levels of reliability ($\alpha = 0.354$; if item 22 is deleted $\alpha = 0.384$; α Based on Standardized
259 Items = 0.388; $r = 0.11$).

260

261 *Principal Component Analysis (PCA) on MBI-HSS Items*

262 The sample was adequate for the analysis (KMO=0.874), and all KMO values for individual
263 items were >0.5 . The correlations between items were sufficiently large for PCA [$X^2(231) =$
264 9223.212, $p<0.001$].

265 Five components had eigenvalues over 1 and, in combination, explained 48.1% of the
266 variance. The scree plot was slightly ambiguous and showed inflections that would justify
267 retaining both components 3 and 5 (Figure 3). Given the large sample size and the
268 convergence of the scree plot and the Kaiser's criterion on five components, this is the
269 number of components that were retained in the final analysis.

270 Table 3 shows the factor loadings after rotation. The item that cluster on the same
271 components suggest that Component 1 (EE) represents emotive exhaustion, and it
272 corresponds with the Emotional Exhaustion original subscale. Component 2 and component 3
273 represents two aspects of Personal Accomplishment: Component 2 (PA-W) collects items

274 describing positive feelings about the work, Component 3 describes a positive emotional
275 engagement with patients (PA-P). Finally, Component 4 and Component 5 define two aspects
276 of Depersonalization: Component 4 (DP-W) expresses worries about personal hardening due
277 to work, Component 5 (DP-P) describes the feeling not to be positively engaged with patients
278 and their problems (Item 15 and 22).

279 The first two components had acceptable reliability (EE: $\alpha = 0.825$, $r = 0.34$; PA-W:
280 $\alpha=0.678$, $r=0.3$). Average inter-item correlation, but not Cronbach's Alpha, resulted into the
281 acceptable range for PA-P ($\alpha =0.556$, $r = 0.29$) and DP-W ($\alpha = 0.413$, $r = 0.21$) components.
282 DP-P did not present sufficient reliability and internal consistency ($\alpha = 0.131$, $r = 0.07$).

283

284 *Exploratory Analyses*

285 83.3% (95% CI 81.7% to 84.8%) of responders had positive feelings about their work, but
286 only 42.7% (95% CI 40.6% to 44.7%) of them felt engaged with patients during a week.

287 While a small percentage of 2.5% (95% CI 1.8% to 3%) of responders presented worries of
288 personal hardening due to work, 11.5% (95% CI 10.1% to 12.8%) declared to feel
289 disengaged with patients at least once a week.

290

291 **Discussion**

292 *Summary of the Main Results*

293 Among responders, less than one-third appeared engaged in their work. However, the
294 remaining part presented some form of Burnout, particularly a disengagement-profile, whit a
295 little 1.7% suffering of severe Burnout. The three dimensions of the *Maslach Burnout*

296 *Inventory* were partially replicated, but it presented higher reliability in a final five-

297 component loading. The Emotional Exhaustion scale loaded in an independent component.

298 The Personal Accomplishment factor resulted in five items concerning positive feelings about

299 the work and three items about empathy with patients, which resulted in low-scores in 60%
300 of responders. The Depersonalisation clustered in three items expressing hardening due to
301 work, and two items about disengagement with patients. This last dimension appeared not
302 reliable, but these two items registered 11.5% of high-frequency answers.

303

304 *Interpretation of the Results*

305 This sample was mainly constituted by males, in the middle age of 44 years, and with a mean
306 of 12 years of career, in line with the sample analyzed by Argentero and Setti.⁹

307 Some authors have recently shown differences in percentages of Burnout detectable in
308 emergency in-training doctors, by applying a broad (80.9%) or a strict (18.2%) definition of
309 Burnout,²⁹ as it was the case in our study. According to cut-off at the three factors, 1.7% only
310 of the sample stayed in the classical and severe definition of Burnout, in line with Angius.¹⁰
311 The most in-depth look to latent burnout profiles³ revealed that more than two-thirds of the
312 responders were struggling with some burnout patterns, similarly to percentages revealed on
313 emergency-nurses in an Italian sample³⁰ and the meta-analysis by Gómez-Urquiza and
314 colleagues.⁵ The latent burnout profile emerged was mostly disengagement, that was
315 indicated as the minimum early phase of Burnout,³¹ the most negative dimension among the
316 burnout continuum and a more distinctive and central aspect of Burnout than Emotional
317 Exhaustion alone, according to Leither and Maslach.³ A negative perception of the teamwork
318 was suggested as a variable highly associated to a disengaged and cynic burnout profile in
319 nurses,²⁵ as it was probably the case in this sample. During the psychological training, people
320 referred highly conflictual relationship with nurses and physicians when working together,
321 which they attributed to the low consideration of their work-experience from their colleagues;
322 this is probably a consequence of the lack of a professional profile for this group of operators.

323 Additionally, 12% of the sample refers to a negative work experience of inefficacy,

324 which could predict a future disengagement.³ The role of young age in a better engagement
325 confirms previous studies.^{32,33} The recodification of districts according to mean workload,
326 and with sickness absence, did not influence the subjects' classification in different burnout
327 profiles, differently from the previous researches.^{25,27,34}

328 However, there were not have specific data for each subject, so these modifiers had a
329 different significance in this research than in previous studies.

330 There was a partial replication of the three dimensions of the MBI-HSS; the EE
331 component was a more reliable subscale, compared with DP and PA, as in the previous
332 literature.^{14,19}

333 However, the answers of this specific sample provided a better fit of the test by
334 clustering in two sub-components for the PA and the DP factors, as compared to the original
335 subscales.

336 The DP factor was particularly unreliable (see also Sirigatti and Stefanile¹⁴), and it
337 could have suffered from translation and wording issues or defensive responses which driven
338 to inconsistent answers, as already suggested in previous researches.^{16,17,35}

339 The analysis proposed a little increase of reliability if item 22 was deleted (see also
340 Squires and colleagues¹⁷), but this not raised reliability to the level of acceptability. Patient-
341 care stress is a primary source of daily stress for EMT workers.³⁶ However, an extensive
342 survey that included EMTs American workers found a lower patient-related burnout in these
343 subjects than in other EMS profession (5% vs. 14.4%).³⁴ The DP-P component was
344 analogously detected in a previous study by Chao and collaborators³⁵ as a form of
345 indifference for patients, in a sample of American workers in a care-staff of people with
346 intellectual disability. Analogously to what measured in this latter study, a two-item solution
347 is not likely to be reliable in itself and did not reach acceptable reliability in this sample.
348 However, according to exploratory analysis, these two items were highly responsible for the

349 elevation at the DP subscale, i.e., a higher percentage of responders felt more disengaged
350 with patients, than presenting worries of personal hardening due to work. The PA-W
351 component was very similar to the *self-competence* component, identified by Gil-Monte in a
352 Spanish sample of different professional roles³⁷ and, according to exploratory analyses, the
353 majority of our sample scored high these items, while subjects suffering from low PA,
354 presented a scarce engagement with patients (i.e., low PA-P scores). Thus, these particular
355 components' loading could alternatively suggest a specific difficulty for driver-rescuers in
356 interacting with patients.

357 An explicit focus on the emotional-regulation and empathy-skills in emergency
358 physicians has been proposed, given its close influence on patients' satisfaction^{38,39} and
359 burnout prevention,⁴⁰ and this solution is probably highly auspicious also for the non-medical
360 part of an emergency-staff, during their first preparation and on-the-job training.

361 In summary, these results endorse the importance of screening and psychological
362 interventions for this population of emergency workers, where Burnout could manifest itself
363 more insidiously. It is also possible to speculate that sub-optimal empathy-skills could be
364 related to the disengagement and inefficacy feelings registered. Future research in this
365 population could be focused on self-awareness of emotions rather than on broad burnout
366 measurements and, consequently, specific psychological training should be predisposed to
367 ensure better work experience and satisfaction.

368

369 **Limitations**

370 The group-administration could have biased some results; however, the district in which the
371 information was collected did not influence the presence of different burnout profiles. The
372 self-selection sampling strategy did not allow to collect data on gender and age for refusers
373 that, in retrospect, should have been included; however, these responders' characteristics were

374 representative of the whole population, as compared with data from SEUS *118-service*
375 human-resources office. The survey did not include the collection of variables which could
376 have predicted different levels of Burnout, such as sleep habits^{41,42} and coping strategies⁴³, or
377 psychiatric disorders and personality characteristics^{6,44,45}. Additionally, there was not the
378 opportunity to collect their exposure to traumatic work experiences, such as critic incidents,
379 disasters or patients' death, which could have increased their stress levels^{46,47} and risk of
380 Burnout.^{34,48}

381 To ensure anonymity, it was not possible to differentiate between single levels of
382 leadership and responsibility (for example, in the specialization in the use of defibrillator)
383 achieved by different driver-rescuers, since this could have affected stress-levels.

384 Nonetheless, this was a descriptive cross-sectional design, which did not include hypotheses
385 on putative risk factors for the disease but only some correlational post hoc explorative
386 analyses.

387

388 **References**

- 389 1. Maslach C, Jackson S. *MBI, maslach burnout inventory: Manuale. adattamento*
390 *italiano*. Sirigatti S, Stefanile C, eds. Firenze, Organizzazioni Speciali, 1993.
- 391 2. WHO | Burn-out an occupational phenomenon. International Classification of
392 Diseases. WHO. World Health Organization website.
393 https://www.who.int/mental_health/evidence/burn-out/en/. Accessed June 02, 2019.
- 394 3. Leiter MP, Maslach C. Latent burnout profiles: A new approach to understanding the
395 burnout experience. *Burn Res*. 2016; 3(4):89–100.
- 396 4. Arora M, Asha S, Chinnappa J, et al. Review article: Burnout in emergency medicine
397 physicians. *Emerg Med Australas*. 2013; 25(6):491–495.
- 398 5. Gómez-Urquiza JL, la Fuente-Solana EI De, Albendín-García L, et al. Prevalence of

- 399 Burnout Syndrome in Emergency Nurses: A Meta-Analysis. *Crit Care Nurse*. 2017;
400 37(5):e1–9.
- 401 6. Adriaenssens J, Gucht V De, Maes S. Determinants and prevalence of burnout in
402 emergency nurses: A systematic review of 25 years of research. *Int J Nurs Stud*. 2015;
403 52(2):649–661.
- 404 7. O'Connor K, Muller Neff D, Pitman S. Burnout in mental health professionals: A
405 systematic review and meta-analysis of prevalence and determinants. *Eur Psychiatry*.
406 2018; 53:74–99.
- 407 8. Johnson S, Cooper C, Cartwright S, et al. The experience of work-related stress across
408 occupations. *J Manag Psychol*. 2005; 20(2):178–187.
- 409 9. Argentero P, Setti I. Percezione del lavoro, contesti professionali e burnout negli
410 operatori dell'emergenza. *G Ital di Med del Lav ed Ergon*, Suppl A, Psicol. 2008; 30(1):
411 A64–70.
- 412 10. Angius P, Campana G, Cattari F. Burnout in emergency health care workers. *G Ital*
413 *Med Lav Ergon*. 2011; 33(3):339–342.
- 414 11. Maslach C, Jackson SE, Leiter MP. *Maslach Burnout Inventory Manual, 3rd Edition*.
415 Palo Alto, California., Consulting Psychologists Press, 1996.
- 416 12. Sirigatti S, Stefanile S. *Adattamento e taratura per l'Italia*. In: Maslach C, Jackson
417 SE, eds. *MBI Maslach Burnout Inventory. Manuale*. Firenze, OS Organizzazioni
418 Speciali, 1993: 33–42.
- 419 13. Sirigatti S, Stefanile C. Per una scala di misurazione del burnout [A scale for
420 measuring burnout]. *Bollettino di Psicologia Applicata*. 1988; 29(32):187–188.
- 421 14. Sirigatti S, Stefanile C. Maslach Burnout Inventory in Italia alla luce dell'analisi
422 fattoriale confirmatoria. = Factorial structure of the Maslach Burnout Inventory in Italy.
423 *Giunti Organ Spec*. 1991; 200:39–45.

- 424 15. Pisanti R, Lombardo C, Lucidi F, et al. Psychometric properties of the Maslach
425 Burnout Inventory for Human Services among Italian nurses: A test of alternative models.
426 *J Adv Nurs*. 2013; 69(3):697–707.
- 427 16. Loera B, Converso D, Viotti S. Evaluating the psychometric properties of the Maslach
428 Burnout Inventory-human services survey (MBI-HSS) among Italian nurses: How many
429 factors must a researcher consider? *PLoS ONE*. Federici S, ed. 2014; 9(12): e114987.
- 430 17. Squires A, Finlayson C, Gerchow L, et al. Methodological considerations when
431 translating “burnout.” *Burn Res*. 2014; 1(2):59–68.
- 432 18. Vanheule S, Rosseel Y, Vlerick P. The factorial validity and measurement invariance
433 of the Maslach Burnout Inventory for human services. *Stress Heal*. 2007; 23(2):87–91.
- 434 19. Wheeler DL, Vassar M, Worley JA, et al. A reliability generalization meta-analysis of
435 coefficient alpha for the Maslach burnout inventory. *Educ Psychol Meas*. 2011;
436 71(1):231–244.
- 437 20. Home - SIS118. 118 website <http://www.sis118.it/>. Accessed May 20, 2019.
- 438 21. Borgogni L, Galati D, Petitta L, et al. *Il questionario Checkup organizzativo. Manuale*
439 *dell'adattamento italiano*. Firenze, O.S. Organizzazioni Speciali, 2005.
- 440 22. Cortina JM. What is coefficient alpha? An examination of theory and applications. *J*
441 *Appl Psychol*. 1993; 78:98–104.
- 442 23. Streiner DL: Starting at the beginning. An introduction to coefficient alpha and
443 internal consistency. *J Personal Assessment*, 2003; 80:99–103.
- 444 24. Nirel N, Goldwag R, Feigenberg Z, et al. Stress, Work Overload, Burnout, and
445 Satisfaction among Paramedics in Israel. *Prehosp Disaster Med*. 2008; 28; 23(6):537–546.
- 446 25. Consiglio C, Borgnioni L, Vecchione M, et al. Self-efficacy, perceptions of context,
447 and burnout: a multilevel study on nurses. *Med del Lav*. 2014; 105(4):255–268.
- 448 26. Maslach C, Schaufeli WB, Leiter MP. Job Burnout. *Annu Rev Psychol*. 2001;

- 449 52(1):397–422.
- 450 27. Duijts SFA, Kant I, Swaen GMH, et al. A meta-analysis of observational studies
451 identifies predictors of sickness absence. *J Clin Epidemiol.* 2007; 1;60(11):1105–1115.
- 452 28. SPSS Statistics. Version 25.0, USA, IBM Corporation, 2019.
- 453 29. Lin M, Battaglioli N, Melamed M, et al. High Prevalence of Burnout Among US
454 Emergency Medicine Residents: Results From the 2017 National Emergency Medicine
455 Wellness Survey. *Ann Emerg Med.* doi: 10.1016/j.annemergmed.2019.01.037. [Epub
456 ahead of print]
- 457 30. Cicchitti C, Cannizzaro G, Rosi F, et al. Il burnout in emergenza preospedaliera e
458 ospedaliera. Indagine conoscitiva in due coorti di infermieri. *Recenti Progressi in*
459 *Medicina.* 2014;105(7–8):275–80.
- 460 31. Golembiewski RT, Munzenrider RF. *Phases of burnout: developments in concepts and*
461 *applications.* Choice Rev Online. Santa Barbara, CA, USA: Preager; 2013:26-5926.
- 462 32. Camerino D, Conway PM, Heijden BIJM Van der, et al. Low-perceived work ability,
463 ageing and intention to leave nursing: a comparison among 10 European countries. *J Adv*
464 *Nurs.* 2006; 56(5):542–552.
- 465 33. Tomietto M, Paro E, Sartori R, et al.. Work engagement and perceived work ability:
466 An evidence-based model to enhance nurses' well-being. *J Adv Nurs.* doi:
467 10.1111/jan.13981 (Epub ahead of print).
- 468 34. Crowe RP, Bower JK, Cash RE, et al. Association of Burnout with Workforce-
469 Reducing Factors among EMS Professionals. *Prehospital Emerg Care.* 2018; 4;
470 22(2):229–236.
- 471 35. Chao S, McCallion P, Nickle T. Factorial validity and consistency of the Maslach
472 Burnout Inventory among staff working with persons with intellectual disability and
473 dementia. *J Intellect Disabil Re.* 2011; 55:529–536.

- 474 36. Boudreaux E, Jones GN, Mandry C, et al. Patient Care and Daily Stress Among
475 Emergency Medical Technicians. *Prehosp Disaster Med.* 1996; 28;11(3):188–193.
- 476 37. Gil-Monte P. Factorial validity of the Maslach Burnout Inventory (MBI-HSS) among
477 Spanish professionals. *Rev Saude Publica.* 2005; 39(1):1-8.
- 478 38. Holmes M, Wang H. 423 Association Between Physician Empathy and Patient Real-
479 Time Satisfaction. *Ann Emerg Med.* 2017; 70(4):S165–6.
- 480 39. Ali K, Shayne P, Ross M, et al. Evaluation of the Patient Satisfaction Performance of
481 Emergency Medicine Resident Physicians in a Large Urban Academic Emergency
482 Department. *Ann Emerg Med.* 2013 ;62(4):S139.
- 483 40. Carney D, Mongelluzzo J, Foster A, et al. 379 TF Understanding Emotions:
484 Combating Burnout With Empathy During Emergency Medicine Residency. *Ann Emerg*
485 *Med.* 2017; 70(4):S148–149.
- 486 41. Barger LK, Runyon MS, Renn ML, et al. Effect of Fatigue Training on Safety,
487 Fatigue, and Sleep in Emergency Medical Services Personnel and Other Shift Workers: A
488 Systematic Review and Meta-Analysis. *Prehospital Emerg Care.* 2018; 15;22(sup1):58–
489 68.
- 490 42. Patterson PD, Weaver MD, Frank RC, et al. Association Between Poor Sleep, Fatigue,
491 and Safety Outcomes in Emergency Medical Services Providers. *Prehospital Emerg Care.*
492 2012; 5;16(1):86–97.
- 493 43. Holland M. The Dangers of Detrimental Coping in Emergency Medical Services.
494 *Prehospital Emerg Care.* 2011; 8;15(3):331–337.
- 495 44. Chng CL, Eaddy S. Sensation Seeking as It Relates to Burnout Among Emergency
496 Medical Personnel: A Texas Study. *Prehosp Disaster Med.* 1999; 28;14(4):36–40.
- 497 45. Palmer RG, Spaid WM. Authoritarianism, Inner/Other Directedness, and Sensation
498 Seeking in Firefighter/Paramedics: Their Relationship with Burnout. *Prehosp Disaster*

499 *Med.* 1996; 28;11(1):11–5.

500 46. Ricciardi M, Valsavoia R, Russo M, et al. The effects of different levels of exposure
501 on persistence of stress disorders in rescue volunteers: The case of the ATR 72 air disaster
502 in Palermo. *Ital J Psychopathol.* 2011;17(3).

503 47. Donnelly E. Work-Related Stress and Posttraumatic Stress in Emergency Medical
504 Services. *Prehospital Emerg Care.* 2012; 5;16(1):76–85.

505 48. Boerner K, Gleason H, Jopp D. Burnout After Patient Death: Challenges for Direct
506 Care Workers. *Journal of Pain and Symptom Management.* 2017; 54(3):317-325.

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Table 1. Comparisons between the responders 118-service operators and the Italian normative sample in Maslach Burnout Inventory factor scores.

| | N | 118 operators Mean (SD) | N | Normative sample Mean (SD) | Mean differences ^a | 95% C.I. | p-value |
|-----------|-------|-------------------------|-----|----------------------------|-------------------------------|--------------|---------|
| EE | 2-254 | 9.34 (8.95) | 748 | 20.18 (11.29) | -10.8 | -11.6, -10.1 | <0.001 |
| PA | 2-242 | 34.63 (7.72) | 748 | 32.52 (8.66) | 2.1 | 1.4, 2.7 | <0.001 |
| DP | 2-281 | 7.65 (4.78) | 748 | 7.03 (5.90) | 0.6 | 0.2, 1.0 | 0.009 |

^aHartley-Test for equal variance <0.001.

Legend: EE: Emotional Exhaustion; DP: Depersonalization; PA: Personal Accomplishment; SD: standard deviation; N: number; df: degree of freedom; Normative sample from Sirigatti and Stefanile (1993).

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Table 2. Medium scores at EE, DP, PA factors from MBI

| | Low N (%) | Medium N (%) | High N (%) | Missing N (%) | Valid N (%) | Total |
|-----------|--------------|--------------|------------|---------------|--------------|-------|
| EE | 1-733 (73.4) | 338 (14.3) | 183 (7.8) | 107 (4.5) | 2-254 (95.4) | 2-361 |
| DP | 432 (18.3) | 999 (42.3) | 849 (36.0) | 81 (3.4) | 2-280 (96.4) | 2-361 |
| PA | 974 (41.3) | 786 (33.3) | 482 (20.4) | 119 (5.0) | 2-242 (94.9) | 2-361 |

Legend: EE: Emotional Exhaustion; DP: Depersonalization; PA: Personal Accomplishment; N: number; Normative sample from Sirigatti and Stefanile (1993).

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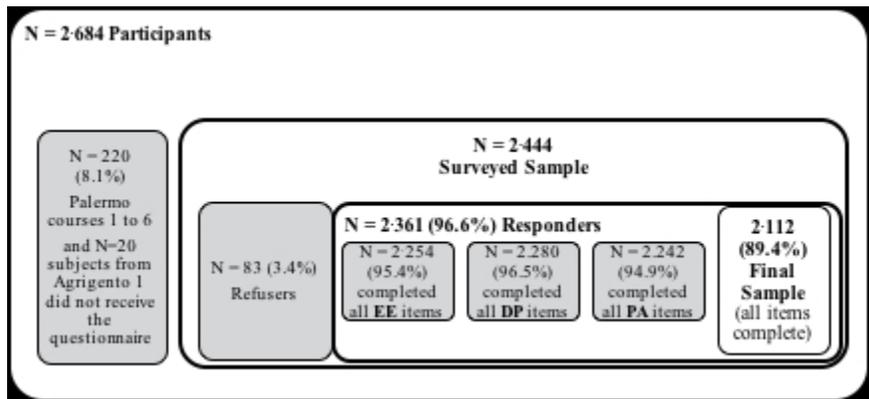
Table 3 Rotated Component Matrix^a for PCA

| | Components | | | | |
|---|------------|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| Factor 1= Emotive Exhaustion (EE) | | | | | |
| ITEM 1 “I feel emotionally drained from my work” | .722 | | | | |
| ITEM 8 “I feel burned out from my work” | .715 | | | | |
| ITEM 14 “I feel I’m working too hard on my job” | .710 | | | | |
| ITEM 18 “Working with people directly puts too much stress on me” | .668 | | | | |

| | | | | | |
|---|------|------|------|------|-------|
| ITEM 13 “I feel frustrated by my job” | .625 | | | | |
| ITEM 6 “Working with people all day is really a strain for me” | .592 | | | | |
| ITEM 3 “I feel fatigued when I get up in the morning and have to face another day on the job” | .584 | | | | |
| ITEM 2 “I feel used up at the end of the workday” | .492 | | | | |
| ITEM 20 “I feel like I’m at the end of my rope” | .454 | | | | |
| Factor 2= Positive Feelings about the work (PA-W) | | | | | |
| ITEM 17 “I can easily create a relaxed atmosphere with my patients” | .735 | | | | |
| ITEM 21 “In my work, I deal with emotional problems very calmly” | .725 | | | | |
| ITEM 7 “I deal very effectively with the problems of my patients” | .685 | | | | |
| ITEM 12 “I feel very energetic” | .583 | | | | |
| ITEM 19 “ I have accomplished many worthwhile things in this job” | .435 | | | | |
| Factor 3= Engagement with patients (PA-P) | | | | | |
| ITEM 4 “I can easily understand how my patients’ feel about things” | | .819 | | | |
| ITEM 16 “I feel exhilarated after working closely with my patients” | | .803 | | | |
| ITEM 9 “I feel I am positively influenced by other people’s lives through my work” | | .430 | | | -.402 |
| Factor 4= Worries of personal hardening due to work (DP-W) | | | | | |
| ITEM 10 “I have become more callous toward people since I took this job” | | | | .766 | |
| ITEM 5 “I feel I treat some patients as if they were impersonal ‘objects’” | | | | .516 | |
| ITEM 11 “I worry that this job is gardening me emotionally” | .421 | | | .471 | |
| Factor 5= Disengagement with patients (DP-P) | | | | | |
| ITEM 15 “I don’t really care what happens to some patients” | | | | | .785 |
| ITEM 22 “I feel patients blame me for some of their problems” | | | | | .430 |
| Chronbach’s Alpha | .825 | .678 | .556 | .413 | .131 |
| Average Inter-item correlation | .34 | .30 | .29 | .21 | .07 |
| ^a Rotation converged in 6 iterations. Legend: Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. Suppression of values <.4. | | | | | |

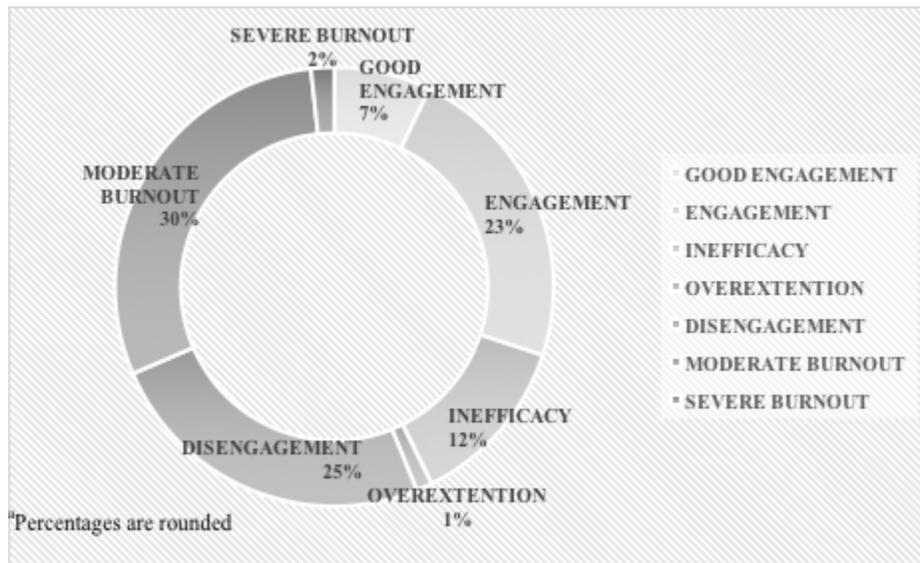
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511 **Figure 1. Flow-Chart of Subjects Included in the Analysis**512 **Figure 2. Subjects’ Classification^a According to their Burnout Profiles**513 **Figure 3. Scree Plot of the eigenvalues for components’ retention in PCA**



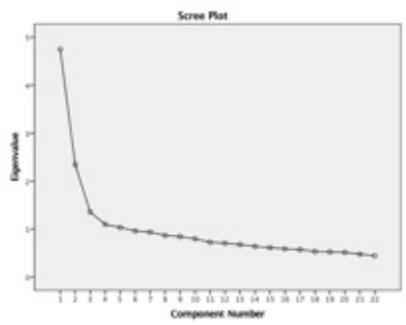
Flow-Chart of Subjects Included in the Analysis

153x70mm (72 x 72 DPI)



Subjects' Classification According to their Burnout Profiles

164x99mm (72 x 72 DPI)



Scree Plot of the eigenvalues for components' retention in PCA
71x57mm (72 x 72 DPI)