

1 **Job burnout reduces hand hygiene compliance among nursing**
2 **staff**

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11 **Objectives:** Health professional burnout has been associated with suboptimal
12 care and reduced patient safety. However, the extent to which burnout influences
13 hand hygiene compliance among health professionals, has yet to be explored.
14 The aim of the present study was to examine whether job burnout reduces hand
15 washing compliance among nursing staff.

16 **Methods:** A diary study was conducted. 40 registered nurses working in a
17 General city hospital in Thessaloniki, Greece completed a questionnaire, whilst
18 they were monitored for hand hygiene compliance following the World Health
19 Organization protocol for hand hygiene assessment. Burnout was measured
20 using validated items from the Maslach Burnout Inventory. Data was collected
21 from September to October 2015.

22 **Results:** Multiple regression analysis showed that controlling for years in
23 practice, burnout was negatively associated with hand hygiene compliance
24 [$R^2=.322$, $F [3, 36] = 5.704$, $p<.01$]. Nurses reporting higher levels of burnout
25 were less likely to comply with hand hygiene opportunities [$b= - 3.72$, 95%
26 confidence interval [CI]: - 5.94, - 1.51].

27 **Conclusions:** This study showed that burnout contributes to suboptimal care by
28 reducing compliance to hand hygiene among nurses. Poor hand hygiene
29 compliance is one of the most critical threats to patient safety today, and it will
30 not be successfully addressed unless we target organizational factors, such as job
31 burnout.

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34 **Keywords:** burnout, hand hygiene compliance, nurse, health care-associated
35 infections

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41 **INTRODUCTION**

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43 Burnout is a prolonged psychological reaction to chronic emotional and
44 interpersonal work stressors and is defined by three dimensions: emotional
45 exhaustion, defined as the depletion of work-related emotional resources,
46 depersonalization, defined as the psychological detachment from those
47 associated with the job, and reduced personal accomplishment, a belief that one
48 is not as good at the job as he or she once was.¹ Health professional burnout is a
49 critical issue worldwide with a higher prevalence among nurses.²⁻⁴ About 40% of
50 nurses in the US are burnt out⁵ while similar rates have been reported in several
51 countries in Europe.⁶ This is mainly due to stressors associated with the hospital
52 working environment, such as exposure to pain and death,⁷ role ambiguity,⁸ or
53 interpersonal conflicts.⁹ Several studies have shown that burnout accounts for
54 nurses' absenteeism,¹⁰ somatic complaints,¹¹ sleep disturbances and impaired
55 memory.¹²

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57 In the clinical setting, burnout has a bilateral role as it affects not only the health
58 of the care provider but also the safety of the patient.¹³ For example Prins found
59 that burnt-out residents reported more mistakes,¹⁴ while Shanafelt reported a
60 significant relationship between burnout and surgical errors.¹⁵ It has also been
61 found that nursing burnout is associated with an increased odds of reporting
62 negative patient outcomes.¹⁶⁻¹⁷ The link between job burnout and patient safety
63 outcomes was recently highlighted in a recent systematic review by Hall and
64 colleagues.¹⁸

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66 However, in terms of patient safety, studies have mainly focused on physicians,
67 while the evidence concerning the association of nursing burnout to patient
68 safety is limited. This is surprising given the evidence suggesting that burnout
69 can skew nurses' cognitive vigilance to specific aspects of the job that are
70 perceived to be "important".¹⁷ This in turn may reduce nurses' concentration
71 during "less important" daily routine tasks, such as hand hygiene.^{19,20}

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73 Even though hand hygiene has been systematically shown to effectively prevent
74 in-hospital infections, hand hygiene compliance rates in health professionals is
75 very low (i.e. < 40% on average).²¹ Although in general, nurses seem to have
76 higher compliance than physicians,²² this is still very low, if one considers that
77 the majority of interventions aimed at increasing hand hygiene compliance have
78 mainly targeted nurses.²³ Studies show that even after successful intervention

79 implementation, hand hygiene compliance among nurses does not exceed on
80 60%, on average.²⁴

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82 Risk factors for poor hand hygiene compliance among nurses, include workload
83 pressure and lack of time ²⁵, poor knowledge concerning hand washing
84 guidelines and attitudes toward good hand hygiene practice²⁶, clinical setting-
85 lower compliance in critical care settings ,²⁷ time of day- drop of compliance at
86 the end of shift,²⁸ experience and age ²⁹, poor role modeling by other health care
87 professionals³⁰ and lack of organizational support.³¹

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89 However, few studies have examined the relationship between health
90 professional burnout and hand hygiene compliance. For example Cimiotti
91 showed that burnout is associated with increased urinary tract infections due to
92 possible inadequate hand hygiene.³² However, no study has so far examined the
93 direct association between burnout and hand hygiene compliance in health
94 professionals in general, or nurses in specific.

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96 The aim of present study was to examine the relationship between burnout, and
97 hand hygiene compliance among nursing staff.

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100 **METHODS**

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102 **Design**

103 A diary study was conducted. Data collection took place from September 1st to
104 October 31st, 2015. Daily assessments were conducted using a mixed method
105 approach, with questionnaires and observational methods.

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107 **Measures**

108 Burnout was assessed using the items from the Maslach Burnout Inventory
109 (MBI)³³ with the highest factor loadings in depersonalization and emotional
110 exhaustion. Single item measures of emotional exhaustion ("I feel burnt out from
111 my work") and depersonalization ("I have become more callous toward people
112 since I took this job") have been shown to provide valid and reliable information
113 of burnout.³⁴ The items were answered on a 7-point Likert scale ranging from

114 “never” to “every day”. The reliability of the questionnaire was satisfactory (α
115 $=.73$).

116 Hand hygiene compliance was assessed using the Hand Hygiene Observation
117 Tool distributed by the Hellenic Center for Disease Control & Prevention³⁵
118 which is translated and adapted from the (WHO) Hand Hygiene Observation
119 Tool.³⁶ The tool assesses all five key indicators for hand hygiene provided by the
120 (WHO) and concern five moments of patient care: before patient contact, before
121 aseptic task, after body fluid exposure risk, after patient contact and after contact
122 with patient surroundings. The tool produces a total hand hygiene compliance
123 score, which is calculated by dividing the number of actual hand hygiene cases
124 using alcohol-based hand rub, by the total number of hand hygiene opportunities,
125 in which the nurse should have used alcohol-based hand rub. In other words, a
126 compliance rate of 50% means that hand hygiene is performed in one-half of the
127 opportunities for hand hygiene according to the WHO guidelines. The
128 observation was direct and captured one nurse at a time. To reduce biases, all
129 observations were conducted by the first author. In order to test whether the
130 observation affected hand washing behavior, alcohol based hand rub
131 consumption data was assessed for the observation period and compared to
132 previous time points.

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134 **Sample/participants**

135 The study sample comprised of nurses working in a General city hospital in
136 Thessaloniki, Greece. Participants were recruited by posters displayed in the
137 nursing stations of all hospital departments. Nurses interested in participating
138 received further information about the study electronically. The inclusion criteria
139 were nurses with at least one year of work experience, and a permanent
140 employment status. Interested nurses who met the inclusion criteria were invited
141 to participate, informed about objectives of the study and requested to sign an
142 informed consent letter.

143

144 From a total of 145 nurses working in the hospital, 81 nurses expressed interest
145 in participating in the study. After applying the inclusion criteria, 48 registered
146 nurses participated in the study. The final sample consisted of 40 registered
147 nurses, who completed all assessments in all time points (response rate of
148 44.4%).

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152 **Data collection**

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154 Nurses completed the questionnaire ten minutes before the end of the morning
155 shift. The morning shift was chosen in order to keep working conditions
156 comparable for all participants and to eliminate potential biases associated with
157 shift changes. Participants completed the assessment for three consecutive
158 workdays. A total of 120 questionnaires were collected.

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162 **Data analysis**

163 Mean scores from all days were calculated for burnout and hand compliance.
164 Independent samples Students t-test and Pearson's R were used to examine
165 univariate associations between hand hygiene compliance, burnout and
166 demographic and job characteristics. Variables showing a significant association
167 were entered in a multiple regression model as predictors, with hand hygiene
168 compliance as a dependent variable.

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171 **RESULTS**

172 Demographic and job characteristics of the study sample are shown in Table 1.

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174 -----Insert Table 1 about here-----
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176 The mean score for emotional exhaustion was 19.39 (SD= 6.82, range: 2 - 29).
177 For depersonalization, the mean score was 16.95 (SD= 8.52, range: 0 - 30).
178 Overall hand hygiene compliance ranged from 14% to 63%. Results showed that
179 hand hygiene compliance was significantly related to burnout [R=-.48, p=.002]
180 and years in practice [R=-.35, p=.029]. No associations were found between
181 hand hygiene compliance and age, gender or type of department.

182 Multiple regression analysis showed that controlling for years in practice,
183 burnout was negatively related to hand hygiene compliance [$R^2 = .322$, $F [2, 37]$
184 $= 8.790$, $p < .001$]. Nurses reporting higher levels of burnout were less likely to
185 comply (Beta = $-.453$, $p < .001$), as well as nurses with many years in practice
186 (Beta = $-.298$, $p < .05$)

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----Insert Table 2 about here-----

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190 **DISCUSSION**

191 This study was the first to directly assess the relationship between hand hygiene
192 compliance and burnout among health professionals. Results show that nurses
193 scoring high in burnout were less likely to comply with the recommended hand
194 hygiene practices. The overall low hand washing compliance rates indicated by
195 this study, are similar to those reported in previous studies in nursing
196 populations.³⁷

197 The reported association between burnout and poor hygiene compliance can be
198 explained in the context of previous studies showing that burnout is predictive of
199 poor job performance.^{38,39} Previous studies have also suggested that reduced
200 motivation for work resulting from increased levels of burnout is possibly
201 responsible for less safe practices and low performance.⁴⁰ Suboptimal decisions
202 may be triggered by negative emotions associated with burnout and compromise
203 patient safety.⁴¹ Additionally, individuals experiencing high levels of stress are
204 prone to behaviors that may increase the chances to cause harm.⁴²

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206 The conservation of resources theory provides a potential explanation of the
207 reported association between burnout and hand hygiene compliance is.⁴³
208 According to this theory, individuals strive to obtain and maintain their own
209 resources. In terms of patient safety, hand hygiene compliance is usually
210 considered to be of “secondary importance” as it does not result in immediate
211 patient harm. It is likely that nurses overwhelmed by increased job demands,
212 start to become selective in their use of resources by redirecting their attention to
213 specific tasks of "imminent" importance.^{22,44} Beyond that, burnout as a
214 multidimensional construct may deactivate moral thoughts which in the context
215 of health care settings may be responsible for an inadequate hand hygiene
216 behavior.

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218 Our study showed no relationship between demographic or job characteristics to
219 hand hygiene compliance. This could be due to the fact that the majority of study
220 participants were female (75%) and of similar age (mean age 41,6 ±4,7 years).

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222 **Implication for Clinical practice**

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224 Results of this study indicate that burnout contributes to suboptimal care by
225 reducing hand hygiene compliance. Given the crucial role of hand hygiene
226 compliance for the prevention of in-hospital infections, this study highlights the
227 need for interventions targeting the prevention of burnout among nursing staff.

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229 **Limitations**

230 The most important limitation of the study was the possibility of a Hawthorne
231 effect caused by the observational assessment of hand hygiene compliance.
232 However, direct observation of hand hygiene is considered the “gold standard”
233 for determining hand compliance rate among health care workers.^{45,46} In
234 addition, all observations were conducted by the first author who is also the
235 hospital’s infection control nurse, whose presence in the nursing departments is
236 part of their daily routine. There was no change in the alcohol based hand rub
237 consumption between the study period and previous periods suggesting no
238 Hawthorne effect. Another limitation concerns the relatively small sample size.
239 However, the daily assessments as well as the mixed method approach utilized in
240 this study increased the reliability of the reported findings and reduced the
241 common method variance, which is a common bias in self-report studies. Finally
242 future studies should examine the role of confounding factors within the hospital
243 setting, which could both influence burnout rates and hand washing compliance,
244 such as low morale, work place relationships, and workload.

245

246 **CONCLUSION**

247 Poor hand hygiene compliance is one of the most critical threats to patient safety
248 today, and it will not be successfully addressed unless we adopt a comprehensive
249 approach targeting structural as well as organizational factors. Job burnout
250 affecting almost 50% of health professionals today is also rooted in hospital
251 organizational factors, and is a critical predictor of patient safety. So far research
252 on the link between burnout and patient safety has mainly focused on physicians.

253 This study shows that burnout contributes to suboptimal care by reducing
254 compliance to hand hygiene among nurses.

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