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Psychiatric symptoms and psychosocial functioning among hospital personnel during the Gaza War: A repeated cross-sectional study

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ABSTRACT

Studies of mental health among hospital personnel during armed conflict are scarce and usually include single time point investigations without a comparison group. The authors compared the psychiatric symptoms and psychosocial functioning of exposed and unexposed hospital personnel at two time points. The research was conducted during 2009 and included a survey of two random samples of hospital personnel (physicians and nurses), one collected during the Gaza War and the other 6 months later. Each sample included hospital personnel who were exposed to war-related stress and others who were not (Study 1: n = 67 and 74 for exposed and unexposed, respectively; Study 2: n = 57 and 50 for exposed and unexposed, respectively). Levels of psychiatric symptoms and psychosocial functioning were measured. Compared to unexposed hospital personnel, exposed hospital personnel had a significantly higher level of post-traumatic symptoms during the Gaza War and 6 months later. In addition, during the Gaza War, exposed hospital personnel had a significantly higher level of depressive symptoms. However, in the second study, depressive symptoms were similar to those found in the unexposed group. These findings may suggest that war-related stress is associated with post-traumatic symptoms among hospital personnel even 6 months after exposure.

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1. Introduction

On 28 December 2008, an armed conflict erupted between Israel and Gaza. Israel suffered 13 fatalities (3 civilians and 10 soldiers) and 518 wounded (182 civilians and 336 soldiers). During the war the southern city of Ashkelon was targeted by hundreds of missiles and mortars. The Barzilai Hospital is the largest and most important hospital in southwest Israel and serves a population of half a million people with about 100,000 admissions each year. A large proportion of the civilians and military casualties were admitted to the hospital during the war. The hospital itself was also targeted, with dozens of missiles landing in the hospital vicinity.

Relatively few studies have examined the effect of exposure to extreme stress on hospital personnel (Firth-Cozens et al., 1999; Weinberg and Creed, 2000; Luce et al., 2002; Hodggets et al., 2003; Maunder et al., 2003; Maunder, 2004; Weiniger et al., 2006; Grieger et al., 2007; Ben-Ezra and Soffer, 2010). These studies were conducted mainly on hospital personnel who were exposed to severe acute respiratory syndrome (SARS), treated victims of bombings, terror attacks, sniper shooting or natural disaster (earthquake). Not much is known about hospital personnel in the midst of direct exposure to war-related stress and in its aftermath.

During wartime, hospital personnel are faced with an overwhelming workload combined with immediate threats to their own lives as well as to the lives of their family members. These stressors have a potential effect on both physical and mental functioning. Studies that have examined the impact of direct war-related stress on hospital personnel are scarce (Ben-Ezra et al., 2007; Koren et al., 2009; Palgi et al., 2009). This is mainly due to the difficulties in assessing hospital staff when they are under heavy workload pressure such as during wartime. These studies (Ben-Ezra et al., 2007; Palgi et al., 2009) lacked a comparison group that could reflect the relative impact of war-related stress. In addition, they assessed the psychiatric symptoms of hospital personnel at one time point.

In the current study, we compared the psychiatric symptoms and the psychosocial functioning (self-rated health, subjective well-being, and perceived coping) of randomly sampled hospital personnel directly exposed to war-related stress during the Gaza War to those of unexposed hospital personnel. This comparison was conducted on two occasions; the first sampling took place 3 weeks after the...
beginning of the war (when the war was still raging; Study 1) and the second took place 6 months after the end of the war (Study 2). The current study encompassed more factors than previous research (Firth-Cozens et al., 1999; Luce et al., 2002; Maundar et al., 2003; Maunder, 2004; Ben-Ezra et al., 2007; Palgi et al., 2009), including additional background characteristics and markers of psychosocial functioning. These additional factors gave us a broader scope of the mental state of exposed hospital personnel.

Our first hypothesis focused on separate comparisons within each of the two time points (comparisons between exposed vs. unexposed hospital personnel). First, based on previous research (Solomon et al., 1988; Ben-Ezra et al., 2007; Grieger et al., 2007; Palgi et al., 2009), we hypothesized that hospital personnel exposed to war-related stress would have higher levels of psychiatric symptoms and lower levels of psychosocial functioning in comparison to unexposed hospital personnel 3 weeks after the war began (Study 1) and 6 months after the end of the war (Study 2). Our second hypothesis focused on comparisons across time. We hypothesized that psychiatric symptoms and psychosocial malfunctioning would be more prominent in the exposed hospital personnel at Study 1 in comparison to exposed personnel at Study 2 and in comparison to unexposed hospital personnel across studies (Study 1 vs. Study 2).

2. Method

2.1. Participants and procedure

Hospital personnel exposed to war-related stress (constant and immediate threats to life) represent a highly select population of hospital personnel. Two studies with separate groups of participants were conducted. At Study 1, participants were comprised of hospital personnel selected at random from two hospitals during the week of January 12–15, 2009, 3 weeks after the war had begun. The recruitment of potential participants was done by interviewers who directly approached the hospital personnel and asked them to participate in the study. Each potential participant that consented was interviewed. The two hospitals were the Barzilai Medical Center in Ashkelon (exposed) and the Sourasky Medical Center in Tel Aviv (unexposed). During the Gaza War, more than 750 rockets were launched into southern Israel, approximately 100 of which targeted the city of Ashkelon. Each participant was interviewed in the hospital as a result of the armed conflict while under direct rocket attacks. Apart from southern Israel, the rest of the country was not within missile range and was considered as unexposed. Therefore, the Sourasky Medical Center in Tel Aviv and its personnel were not exposed to war-related stress during the Gaza War. The response rate in our study was 85% at Barzilai Medical Center (exposed) and 90% at Sourasky Medical Center (unexposed). Those who declined were asked about their reasons for refusal. A lack of time was the most frequent reason given for not participating. The total number of hospital personnel eligible for this study was 107: 57 previously exposed participants (who did not participate in the first study) from Barzilai Medical Center (mean age 40.65 (S.D. = 10.63); range 25–63; 46 women; 34 married; 12 physicians), and 50 previously unexposed participants from Sourasky Medical Center (mean age 37.30 (S.D. = 9.07); range 23–58; 40 women; 34 married; 19 physicians). The two groups did not differ in background demographics. See Table 1 for more details. All hospital personnel who participated in the studies (both Study 1 and Study 2) as part of the exposed groups from Barzilai Medical Center worked there during the war and were exposed to direct rocket attacks. There were no significant differences in all the background characteristics between the entire Study 1 sample and the entire Study 2 sample. See Table 1 for more demographic details.

At Studies 1 and 2, none of the participants reported a history of severe health problems, mental disorders (including severe stress-related disorders or prior major depression) or substance abuse, and they did not report prior exposure to war-related stress. It is important to mention that although the south of Israel was targeted 8 years before the eruption of the operation, the city of Ashkelon, and Barzilai Medical Center were not targeted before the operation started. Each participant was interviewed in person. All participants were guaranteed complete anonymity. The study was approved by the school of social work ethics committee at Ariel University Center of Samaria.

2.2. Instruments

The instruments used at Study 1 and Study 2 were identical for the purpose of replication. Each participant was interviewed for background characteristics (age, gender, marital status, profession, religion, and income). For more details, see Table 1. The following demographic variables were coded as following: Gender (0 = men; 1 = women), marital status (0 = married; 1 = not married), profession (0 = physicians; 1 = nurses), religiosity (0 = secular; 1 = conservative; 2 = religious), and income (the average monthly income in Israel 8113NS = 2134US; 0 = below average; 1 = average; 2 = above average). War-related exposure was coded as present or absent (0 = unexposed, Sourasky Medical Center; 1 = exposed, Barzilai Medical Center).

Psychiatric symptoms were assessed by two measures. Post–traumatic symptoms (PTS) were assessed by the Impact of Event Scale–Revised (IES-R) (Weiss and Marmar, 1997), which includes 22 items in three subscales (intrusion, avoidance, and hyperarousal). Respondents were asked to rate each item on a Likert scale of 0–4 (0 = not at all, 1 = a little bit, 2 = moderately, 3 = quite a bit, and 4 = extremely) while referring to the past 7 days. The possible range for an IES-R score is between 0 and 88. Internal reliability was excellent (Cronbach α = 0.913 and 0.918 for Study 1 and Study 2, respectively).

Depressive symptoms were assessed by the Center for Epidemiologic Studies Depression Scale (CES-D) (Radloff, 1977), which includes 20 items representing four subscales of depressive symptomatology (negative affect, positive affect, somatic

### Table 1

| Variable                      | Study 1 Exposed Group (n=67) | Study 1 Unexposed Group (n=74) | Test statistics | P value |
|-------------------------------|------------------------------|--------------------------------|-----------------|---------|
| Age, years (SD)               | 40.67 ± 10.11                | 38.46 ± 9.45                   | t = 1.343       | 0.181   |
| Gender, women, no. (%)        | 50 (74.6)                    | 51 (68.9)                      | χ² = 0.748      | 0.454   |
| Marital status, Married, no. (%) |                               |                                | χ² = 0.054     | 0.292   |
| Bachelor                      | 16 (23.9)                    | 24 (32.4)                      |                |         |
| Married/cohabitation          | 47 (70.1)                    | 46 (62.2)                      |                |         |
| Divorced/separated            | 3 (4.5)                      | 4 (5.4)                        |                |         |
| Widowed                       | 1 (1.5)                      | 0 (0.0)                        |                |         |
| Profession, physician, no. (%)| 21 (31.3)                    | 33 (44.5)                      | χ² = 1.611      | 0.207   |
| Religiosity, no. (%)          | 51 (76.1)                    | 58 (78.3)                      | χ² = 0.123      | 0.250   |
| Secure                        | 10 (14.9)                    | 11 (14.9)                      |                |         |
| Religious                     | 6 (9.0)                      | 5 (6.8)                        |                |         |
| Income, no. (%)               | 33 (49.3)                    | 22 (29.7)                      | χ² = 0.757      | 0.307   |
| Below average                 | 15 (22.4)                    | 31 (41.9)                      |                |         |
| Above average                 | 19 (23.4)                    | 23 (31.1)                      |                |         |

### Table 2

| Variable                      | Study 2 Exposed group (n=57) | Study 2 Unexposed group (n=50) | Test statistics | P value |
|-------------------------------|-------------------------------|--------------------------------|-----------------|---------|
| Age, years (SD)               | 40.65 ± 10.63                 | 37.30 ± 9.07                   | t = 1.740       | 0.085   |
| Gender, women, no. (%)        | 46 (80.7)                    | 40 (80.0)                      | χ² = 0.091      | 0.928   |
| Marital status, Married, no. (%) |                               |                                | χ² = 0.572      | 0.767   |
| Bachelor                      | 15 (26.3)                    | 13 (26.0)                      |                |         |
| Married/cohabitation          | 34 (55.6)                    | 34 (68.0)                      |                |         |
| Divorced/separated            | 7 (12.3)                     | 2 (4.0)                        |                |         |
| Widowed                       | 1 (1.8)                      | 1 (2.0)                        |                |         |
| Profession, physician, no. (%)| 12 (21.1)                    | 19 (38.0)                      | χ² = 1.757      | 0.157   |
| Religiosity, no. (%)          | 37 (64.9)                    | 36 (72.0)                      |                |         |
| Secure                        | 17 (29.8)                    | 9 (18.0)                       |                |         |
| Religious                     | 3 (5.3)                      | 5 (10.0)                       |                |         |
| Income, no. (%)               | 22 (38.6)                    | 14 (28.0)                      | χ² = 0.891      | 0.373   |
| Below average                 | 18 (31.6)                    | 15 (30.0)                      |                |         |
| Above average                 | 27 (48.0)                    | 21 (42.0)                      |                |         |
symptoms, and interpersonal problems). Respondents were asked to rate each item on a Likert scale of 0–3 (0 = not at all, 1 = sometimes, 2 = most of the time and 3 = all the time) while referring to the past 7 days. The possible range for a CES-D score is between 0 and 60. Internal reliability was very good (Cronbach α = 0.836 and 0.829 for Study 1 and Study 2, respectively).

Psychosocial functioning was assessed by three widely used single-item measures. Self-rated health was assessed on a 4-point Likert scale: “Would you say that in general your health is...? (1=poor, 2=fair, 3=good and 4=excellent)” (Benyamin et al., 2003). Subjective well-being was assessed on a 4-point Likert scale of 1–4 by the question: “All things considered, how satisfied are you with your life these days?” (1 = not at all, 2 = a bit, 3 = much and 4 = very much) (Osvald and Wu, 2010). Perceived coping was assessed by the question: “How well do you think you are handling the situation given the circumstances?” on a 5-point Likert scale of 1–5 (1 = not at all, 2 = a little bit, 3 = moderately, 4 = much and 5 = very much) (Bandura, 1989).

2.3. Statistical analysis

The main analysis of the study was a multivariate analysis of covariance (MANCOVA) where the dependent variables were as follows: post-traumatic symptoms, depressive symptoms, self-rated health, subjective well-being, and perceived coping. The independent variables were war-related stress (exposed vs. unexposed), and time period (Study 1 vs. Study 2). Demographics were included as covariates (age, gender, marital status, religiosity, profession, and income). The MANCOVA included effect size estimates (partial eta squared). A p-value of 0.05 was used for interpreting statistical significance in the MANCOVA, while a Bonferroni correction was used to determine a p-value of 0.01 (0.05 divided by 5 dependents) in the post-hoc tests (Bland and Altman, 1995).

The MANCOVA was followed by t-tests for each study and time point. At Study 1, the two groups were compared using t-tests and chi-square tests. For each t-test, an effect size estimate was calculated using Cohen’s d (Cohen, 1988) along with a Bonferroni correction that was used to determine a p-value of 0.01 (0.05 divided by 5 dependents) for the set of t-tests (Bland and Altman, 1995). At Study 2, we applied the same statistical analyses. All analyses were performed using SPSS statistical software (version 16.0, SPSS Inc, Chicago, IL).

3. Results

The conducted MANCOVA revealed only two main effects: exposed hospital personnel had elevated levels of post traumatic symptoms (F = 20.361, d.f. = 1/239, P = 0.001, \( \eta^2_p = 0.079 \)) and depressive symptoms (F = 8.843, d.f. = 1/239, P = 0.003, \( \eta^2_p = 0.036 \)) in relation to unexposed participants. In addition, being older was associated with lower self-rated health (F = 17.351, d.f. = 1/239, P = 0.001, \( \eta^2_p = 0.068 \)), and lower subjective well-being (F = 14.687, d.f. = 1/239, P = 0.001, \( \eta^2_p = 0.058 \)) in relation to younger participants. Women had a higher level of post-traumatic symptoms in comparison to men (F = 10.828, d.f. = 1/239, P = 0.001, \( \eta^2_p = 0.043 \)). No interaction effects were found as significant.

3.1. Study 1

Relative to unexposed hospital personnel, exposed hospital personnel reported a higher level of post traumatic symptoms (r = 3.858, d.f. = 139, P = 0.001, Cohen’s d = 0.57). Comparisons with other variables were non-significant. See Table 2 for more information.

3.2. Study 2

Relative to unexposed hospital personnel, exposed hospital personnel reported a higher level of post-traumatic symptoms (t = −2.939, d.f. = 105, P = 0.004, Cohen’s d = 0.57). Comparisons with other variables were non-significant. See Table 2 for more information.

3.3. Study 1 vs. Study 2

The t-test comparison of the exposed (Study 1 vs. Study 2) and unexposed personnel (Study 1 vs. Study 2) revealed no significant differences among the groups in any of the dependent variables. See Table 2 for more information.

4. Discussion

The results suggest that exposure to war-related stress takes its toll on the mental health of hospital personnel. The exposure to rocket attacks, the extreme workload and pressure were associated with higher levels of stress and depressive symptoms among exposed personnel. Furthermore, even 6 months after the end of the armed conflict, there was an association of war-related stress with higher levels of post–traumatic symptoms among exposed hospital personnel. There were significant differences in depressive symptoms in Study 1, but not in Study 2. This is in line with previous studies that challenge the common view that hospital personnel are not affected by stress (Firth-Cozens et al., 1999; Luce et al., 2002; Ben-Ezra et al., 2007). Although hospital personnel are considered resilient in comparison to the general population, they are not invulnerable (Neimeyer et al., 1983; Einav et al., 2008). It seems that prolonged and repeated exposure, even for a very selected and professional population, takes its toll. This is to say, that the inoculation of this population has its limits and represents only a part of the picture. Professional populations that are re-exposed to traumatic events has a price even among hospital personnel (Firth-Cozens et al., 1999; Luce et al., 2002; Ben-Ezra et al., 2007).

The current study had two main limitations: first, no longitudinal study was conducted due to the strict anonymity specifically requested by the study participants. However, the use of random sampling in the two studies may have reduced this limitation to some extent. Indeed, participants at Study 1 and Study 2 did not differ in demographic background. Moreover, the fact that the hospital personnel had similar pre- and post-conflict history may have also strengthened this study’s conclusions. The second limitation is that no actual psychiatric diagnosis was made. Although the interviewers had
an extensive background in psychology, the time constraints did not enable a thorough clinical assessment, and also affected the length of the questionnaire battery being used. On the other hand, as psychiatric symptoms were assessed while being in an unsheltered hospital that was targeted by rockets, it may have been that extreme circumstances enhanced the reliability of the measured constructs to some extent.

Future studies should perform prospective assessments of hospital personnel during wartime crisis and natural disasters and investigate ways to enhance their resilience and lower their vulnerability. Future studies should also document the nature of wartime exposures (contact with patients vs. personal threat of injury or death) (Fain and Schreier, 1989; Tattersall et al., 1999; Dekel et al., 2007) in order to assess the relative effect of different exposure types.

Although hospital personnel are not frequently exposed to prolonged war stress with actual threats to their lives, its consequences were noticeable. As it is likely that those hospital personnel may be exposed to similar crises in the future, longitudinal studies targeting the same hospital personnel are needed. In addition, general policies for preventing and reducing stress among them should be formulated while investigating the possible exposure to future traumatic events.

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