




General psychological distress among Japan Self-Defense Forces personnel dispatched on United Nations peacekeeping operations and their spouses

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Aim: The importance of family care during international deployment is emphasized within military organizations, but mental health interactions between deployed personnel and their spouses have not yet been assessed. This study addressed this gap by examining couples' mental health throughout a deployment period.

Methods: The mental health of 324 spousal dyads of Japan Self-Defense Forces personnel dispatched for a half-year United Nations Disengagement Observer Force mission was examined, using longitudinal data derived from a survey at four time points: one-month pre-deployment, initial deployment, middle deployment, and immediately after homecoming. The 30-item General Health Questionnaire was used to evaluate general psychological distress, with high scores (≥ 7) indicating adverse mental health.

Results: The spouses' general psychological distress was significantly higher compared with the deployed personnel ($P < 0.001$). The high general psychological distress of personnel was significantly related to that of their spouses (odds ratio = 2.24; 95% confidence interval, 1.32–3.80), and vice versa (odds ratio = 2.38; 95% confidence interval 1.39–4.08).

Conclusion: Mental health care will be beneficial for not only deployed personnel but also their spouses.

Keywords: Japan Self-Defense Forces, military, psychological distress, spouse, United Nations peacekeeping operations.

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Military personnel of the United Nations Peacekeeping Operations (PKO) are potentially exposed to traumatic events during their deployment. Missions are designed to maintain peace and security, facilitate the political process, protect civilians, assist with disarmament, demobilize former combatants, protect and promote human rights, and assist with restoring the rule of law.¹ Isolation, ambiguity, powerlessness, danger, and boredom have been identified as typical psychological stressors shared by peacekeepers.^{2,3} Mental and behavioral health outcomes include, among others, post-traumatic stress disorder, depression, and increased use of alcohol and other substances.⁴

Military personnel's spouses also experience stressful events, regardless of whether the former are deployed or not. In a study focusing on soldiers' female spouses during peacetime, spousal distress was linked to periodic separation during training, and the spouses' own employment being affected by frequent job relocation.⁵ Female spouses of deployed soldiers demonstrated higher stress levels than those of non-deployed soldiers. This elevated stress could be associated with the soldier being on active duty, and/or the spouse being pregnant, having one or more children at home, and being emotionally affected by media coverage of military conflicts.⁶ The risk of spouses of deployed soldiers developing depression and anxiety disorders increases with prolonged

deployments, as well as total length of deployment over multiple deployments.^{7,8}

The United Nations Disengagement Observer Force (UNDOF) was tasked with peacekeeping activities related to monitoring a ceasefire between Syria and Israel. The Japanese Government dispatched members of the Japan Self-Defense Forces (JSDF) to serve as a unit within the UNDOF in the Golan Heights starting in 1996. Forty JSDF personnel were deployed on a 6-month rotation; their duties included logistics support to the Indian Army. The JSDF mission ceased in 2013 because of a rapidly deteriorating political climate in Syria. During the deployment period, the JSDF personnel never engaged in actual combat missions and thus their mental conditions have been stable overall.^{9,10}

Mental health concordance among couples has been reported, with most studies focusing on depressive symptoms.¹¹ Depressive symptomatology has been observed reciprocally in older married couples.¹² Thus, this study hypothesized that deployed personnel's distress during deployment would be affected by that of their spouse at home, and vice versa. To the best of the researchers' knowledge, no prior study has addressed the interrelationships between deployed personnel and their spouses' mental health within a peacekeeping context. The psychological dynamics among spouses were determined among couples who comprised the JSDF personnel dispatched to the UNDOF and their wives.

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Methods

Participants and procedure

This study was conducted with the approval of the Ethics Committee of the National Defense Medical College (Approval No. 1262). All 733 male JSDF personnel, who were deployed to UNDOF from 2004 to 2013, and their family members at home were recruited for this study. Registered (i.e., non-anonymous) self-written questionnaires were distributed four times during the half-year deployment period to the personnel and their family members: one-month pre-deployment (Time 1), initial deployment period (Time 2), middle deployment period (Time 3), and immediately after the personnel returned home (Time 4).

This survey was conducted as a part of a health management program for the deployed personnel; written informed consent and responses were obtained from nearly all personnel at each time point (see Fig. 1). Written informed consent and responses were also received from 531 family members (response rate: 72.4%) for at least one of the four time points. To examine the psychological interrelationships between personnel and their spouses, the analysis was restricted to personnel–spouse pairs ($n = 429$, 80.8% of the 531 responses). As the data from 105 pairs were excluded, owing to missing demographic data, those from 324 pairs were available for full analyses. The total number varied between time points, owing to missing outcome variable data (personnel: $n = 322$ [Time 1], $n = 324$ [Time 2], $n = 322$ [Time 3], $n = 298$ [Time 4]; spouses: $n = 319$ [Time 1], $n = 288$ [Time 2], $n = 267$ [Time 3], $n = 233$ [Time 4]).

Measurements

The following independent variables from personnel and their spouses were evaluated: age (≤ 29 , 30–39, or ≥ 40 years), personnel rank (enlisted vs officer; personnel only), personnel's assigned post (transport unit, corps headquarters, or detachment unit; personnel only), living status (whether or not the party had lived together prior to the personnel's deployment), whether or not the couple had children, personnel's previous international deployment experience (yes vs no), previous experience with long-term separation owing to past deployments or solo assignments (yes vs no; spouse only), personnel's attitude toward deployment (positive vs not positive), and spouses' attitude toward deployment (supportive vs not supportive).

Dependent measures included general psychological distress (GPD), measured by the Japanese version of the 30-item General Health Questionnaire (GHQ-30). The GHQ-30 total scores range from 0 to 30, with high scores indicating adverse mental health. In

the validated Japanese version, those with scores of ≥ 7 (defined as high GPD here) indicate minor psychiatric disorders.¹³ The personnel and their spouses provided GHQ-30 scores at all time points.

Data analyses

The GHQ-30 distribution showed no normality or equal variance violations at any time point. For each group, the longitudinal changes of GPD and high GPD rates between the four time points were evaluated using Friedman's test and Cochran's Q -test, respectively. Multiple comparisons were conducted with Bonferroni corrections. The personnel–spouse groups' differences on the total GPD and high GPD rates at each time point were compared using Wilcoxon signed-rank and McNemar tests, respectively. To assess the differences in GPD as a function of demographic characteristics and personal attributes at each time point, Mann–Whitney or Kruskal–Wallis tests were performed; these analyses were conducted separately for the personnel and spouse groups.

To identify risk factors for high GPD throughout the study period, multiple logistic regression analyses (forced entry method) were conducted. For each group, those who scored ≥ 7 on the GHQ-30 at least once during the study period were allocated to the high GPD subgroup (personnel: $n = 93$ [28.7%], spouses: $n = 179$ [55.2%]). For the personnel group analysis, the following independent variables were entered into the model: age, rank, post, pre-deployment living status, having children, previous international deployment, personnel's attitude toward deployment, spouses' attitude toward deployment, and spouses' high GPD status. Likewise, the following independent variables were entered for the spousal group analysis: age, pre-deployment living status, having children, long-term separation experience, personnel's attitude toward deployment, spouses' attitude toward deployment, and personnel's high GPD status.

SPSS Version 21.0 (IBM, Armonk, NY, USA) was used for statistical processing. Significance level was set at $P < 0.05$.

Results

Figure 2 shows the time course of GPD and high GPD rates for both groups. The number of high GPD readings for each study period is as follows: [Personnel – Time 1: $n = 47$ (14.6%), Time 2: $n = 56$ (17.3%), Time 3: $n = 44$ (13.7%), and Time 4: $n = 42$ (14.1%); Spouses – Time 1: $n = 117$ (36.7%), Time 2: $n = 97$ (33.7%), Time 3: $n = 88$ (33.0%), and Time 4: $n = 74$ (31.8%)]. Of 93 personnel presenting high GPD at least once during the study period, 13 personnel presented high GPD four times, 17 personnel three times, 23 personnel twice, and 40 personnel once, respectively. Also, of 179 spouses presenting high GPD at least once during the study period, 33 spouses presented high GPD four times, 31 spouses three times, 37 spouses twice, and 78 spouses once. In the within-subjects longitudinal analysis on GPD, significant differences were obtained for deployed personnel ($\chi^2 = 8.94$, $P = 0.03$), and non-significance when adjusting for multiple comparisons with Bonferroni corrections; but not for spouses ($\chi^2 = 5.17$, $P = 0.16$). In the within-subjects longitudinal analysis on high GPD, no significant differences emerged for deployed personnel ($\chi^2 = 4.23$, $P = 0.24$) or spouses ($\chi^2 = 1.76$, $P = 0.62$). In the between-group comparison, spouses exhibited significantly higher GPD scores and high GPD rates when compared with deployed personnel at each of the four time points (GPD at Times 1–4: $P_s < 0.001$; high GPD rate at Times 1–4: $P_s < 0.001$).

Table 1 shows the personnel group's proportions of personal attributes and corresponding GPD scores for each time point. The following attributes differed significantly at least once throughout the survey period: rank (Time 2), assigned post (Times 1 and 2), international deployment experience (Time 1), and personnel's attitude toward deployment (Times 1 and 4).

Table 2 displays the spousal group's proportions of personal attributes and corresponding GPD scores for each time point. The following attributes differed significantly at least once during the survey

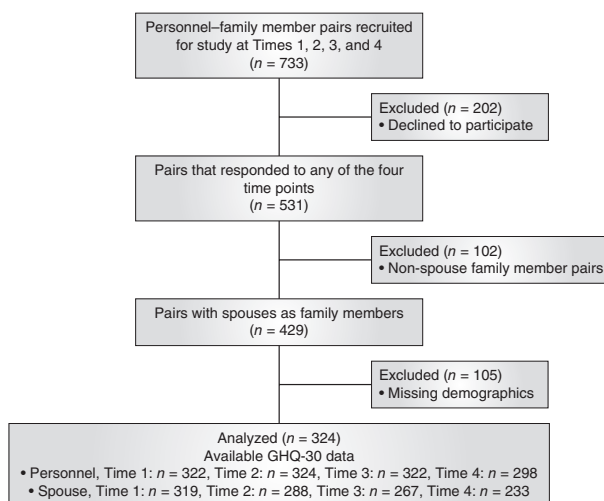


Fig. 1 Protocol flowchart. GHQ-30, 30-item General Health Questionnaire; Time 1, 1 month pre-deployment; Time 2, initial period of deployment; Time 3, middle period of deployment; Time 4, immediately after homecoming of the personnel.

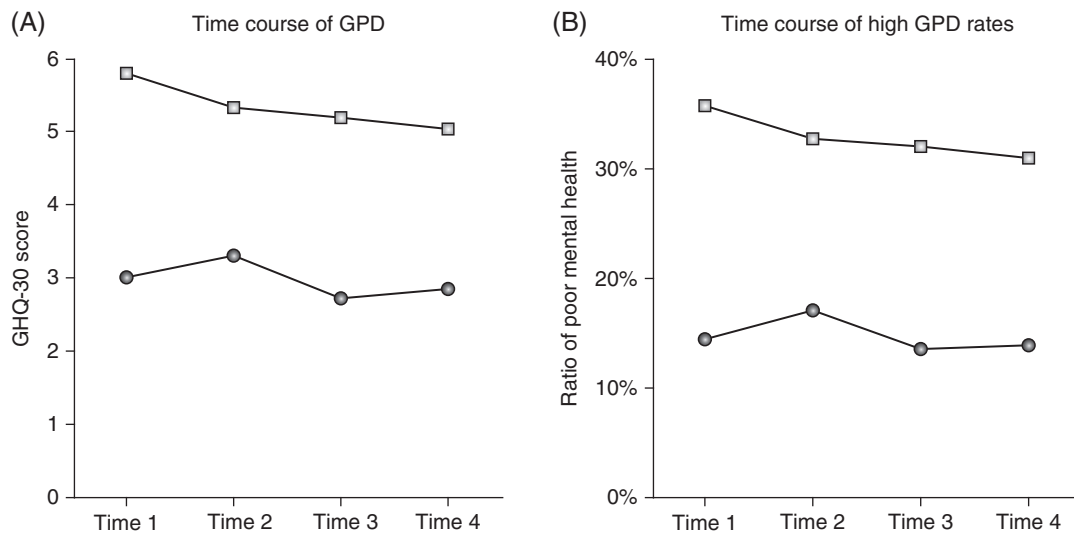


Fig. 2 Time course of (a) general psychological distress (GPD) and (b) high GPD rates in (□) deployed personnel and (●) their spouses. GHQ-30, 30-item General Health Questionnaire; Time 1, 1 month pre-deployment; Time 2, initial period of deployment; Time 3, middle period of deployment; Time 4, immediately after homecoming of the personnel.

Table 1. Proportions of personal attributes and corresponding general psychological distress for deployed personnel ($N = 324$)

Variable	<i>n</i>	%	GPD							
			Time 1 (<i>n</i> = 322)		Time 2 (<i>n</i> = 324)		Time 3 (<i>n</i> = 322)		Time 4 (<i>n</i> = 298)	
			<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Age (years)										
≤29	66	20.4	2.59	3.30	2.45	3.24	2.51	3.42	2.45	3.17
30–39	161	49.7	2.83	3.98	3.45	4.43	2.91	4.24	2.79	4.25
≥40	97	29.9	3.51	5.49	3.49	4.98	2.42	4.48	3.09	4.86
Rank										
Officer	71	21.9	3.83	5.21	4.04*	4.28	3.48	4.72	3.73	4.72
Enlisted	253	78.1	2.75	4.09	3.04	4.42	2.46	3.97	2.55	4.09
Post										
Transport unit	114	35.2	2.54	3.20	2.67	3.34	2.19	3.07	2.12	3.02
Corps headquarters	122	37.7	4.08**	5.51	4.30*	5.44	3.61	5.15	3.63	5.09
Detachment unit	88	27.2	2.08	3.61	2.59	3.73	2.03	3.60	2.53	4.17
Pre-deployment living status										
Lived together	295	91.0	2.98	4.32	3.29	4.48	2.71	4.22	2.86	4.37
Lived separately	29	9.0	3.03	4.92	3.00	3.56	2.39	3.47	2.30	2.92
Have children										
No	60	18.5	2.92	3.88	2.95	4.69	2.97	4.24	2.88	4.40
Yes	264	81.5	3.00	4.48	3.33	4.34	2.62	4.14	2.80	4.23
Previous international deployment experience										
No	271	83.6	3.12	4.45	3.34	4.45	2.85	4.34	2.97	4.37
Yes	53	16.4	2.27*	3.90	2.87	4.16	1.85	2.98	1.93	3.45
Personnel's attitude toward deployment										
Positive	279	86.1	2.51	3.61	3.05	4.12	2.54	3.96	2.45	3.74
Not positive	45	13.9	5.95**	6.95	4.56	5.75	3.61	5.18	5.07*	6.24
Spouse's attitude toward deployment										
Supportive	218	67.3	2.79	4.23	3.17	4.17	2.61	4.11	2.69	3.95
Not supportive	106	32.7	3.39	4.64	3.46	4.85	2.84	4.28	3.07	4.84

* $P < 0.05$.

** $P < 0.01$.

GPD, general psychological distress evaluated using the 30-item General Health Questionnaire; Time 1, 1 month pre-deployment; Time 2, initial period of deployment; Time 3, middle period of deployment; Time 4, immediately after homecoming of the personnel.

period: pre-deployment living status (Times 1 and 2), personnel's attitude toward deployment (Times 2 and 4), and spouse's attitude toward deployment (Times 1, 3, and 4).

The multivariate analysis results for the personnel group are shown in Table 3. Personnel's high GPD was associated with their spouses' high GPD (vs low GPD, odds ratio [OR] = 2.38, 95% confidence interval [CI], 1.39–4.08) but not with any other independent variable.

Table 4 shows the spousal group's multivariate analysis results. The spousal group's high GPD was associated with living separately prior to the deployment (vs having lived together, OR = 2.49, 95%CI, 1.04–6.00), spouses' unsupportive attitude (vs supportive attitude, OR = 2.11, 95%CI, 1.28–3.50), and the personnel's high GPD (vs low GPD, OR = 2.24, 95%CI, 1.32–3.80).

Discussion

To the researchers' knowledge, this is a pioneering study assessing the interactive impact of adverse mental health status between PKO personnel and their spouses. Results revealed that spouses had significantly higher GPD than the personnel at all time points. These findings are consistent with previous studies demonstrating high psychological distress among soldiers' spouses.^{5,6} In military settings, personnel are likely to be screened for pre-deployment mental health status; thereby only healthy personnel are likely to be selected for deployment (or, the so-called 'healthy warrior effect').^{14,15} In fact, the rates of those deployed personnel who exceeded the cut-off score of GPD in this study are consistent with those of healthy subjects.¹³ This trend is also seen in the previous study targeted at Swedish peace-keeping soldiers.¹⁶ This situation does not apply to spouses, which might explain the differences in outcomes observed between the two

groups to some extent. There are, however, disparities between the GPD results obtained in this study and those shown in the only other similar research report currently available. A survey of National Guard couples in the USA showed that non-military spouses reported psychological risk rates not very different to those of their service member partners¹⁷; however, because of different methodologies, comparing these results with ours is difficult. Further research is required to try and explain these differing research outcomes.

Another important finding was the interactive impact of GPD between personnel and spouses: high GPD among personnel significantly affected spouses' high GPD, and vice versa. Several studies have reported the negative effects of personnel's post-traumatic stress symptoms on the personnel–spousal relationship.^{18–20} Other studies have challenged this relationship.^{21,22} The present study is the first to demonstrate these interrelationships between personnel and spouses during deployment based on longitudinal empirical data.

There are several possible explanations for this interaction. First, 'emotional contagion' must be considered. Theories of emotional contagion suggest that spouses experience affective or emotional states mutually.²³ Consistent with these theories, recent literature has reported the importance of psycho-education for both spouses in the post-deployment phase.²⁴ In this context, spouses seem to be always negatively affected, to a greater or lesser extent. When personnel–spouse pairs are living together during non-deployment situations, the personnel are likely to be able to appropriately adjust their work schedule to provide care for their spouses, particularly if the spouse is suffering from high GPD. Similarly, spouses can also provide support more effectively when present. However, in the case of an international deployment, even if the spouse is aware of their partner's high GPD, the spouse often cannot provide appropriate care because of

Table 2. Proportions of personal attributes and corresponding general psychological distress for spouses ($N = 324$)

Variable	<i>n</i>	%	GPD							
			Time 1 (<i>n</i> = 319)		Time 2 (<i>n</i> = 288)		Time 3 (<i>n</i> = 267)		Time 4 (<i>n</i> = 233)	
			<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Age (years)										
≤29	66	20.4	6.32	5.21	5.91	5.36	6.13	5.65	5.32	5.72
30–39	182	56.2	5.69	5.65	5.34	5.80	4.90	5.38	5.04	5.85
≥40	76	23.5	5.57	5.87	4.79	5.16	5.13	5.64	4.80	5.98
Pre-deployment living status										
Lived together	295	91.0	5.43	5.24	5.00	5.37	5.03	5.45	4.83	5.60
Lived separately	29	9.0	9.70**	7.69	8.96**	6.54	7.19	5.80	7.88	8.10
Have children										
No	60	18.5	6.35	5.64	6.29	5.99	5.83	5.37	5.91	6.69
Yes	264	81.5	5.66	5.60	5.09	5.44	5.05	5.53	4.83	5.60
Long-term separation experience										
No	216	66.7	5.69	5.28	4.95	5.31	4.89	5.15	4.77	5.77
Yes	108	33.3	5.99	6.21	6.05	6.00	5.89	6.17	5.65	5.97
Personnel's attitude toward deployment										
Positive	279	86.1	5.49	5.29	5.00	5.25	4.96	5.35	4.62	5.71
Not positive	45	13.9	7.66	7.07	7.17*	6.88	6.56	6.18	7.36**	6.07
Spouse's attitude toward deployment										
Support	218	67.3	4.99	5.36	5.04	5.36	4.74	5.35	4.48	5.67
Not supportive	106	32.7	7.44***	5.75	5.95	5.97	6.32**	5.71	6.21*	6.02

* $P < 0.05$.

** $P < 0.01$.

*** $P < 0.001$.

GPD, general psychological distress evaluated using the 30-item General Health Questionnaire; Time 1, one month pre-deployment; Time 2, initial period of deployment; Time 3, middle period of deployment; Time 4, immediately after homecoming of the personnel.

Table 3. Results of logistic regression analyses for personnel (*N* = 324)

Variable		β	SE	OR	(95%CI)
Age (years)	≤29			Reference	
	30–39	−0.02	0.37	0.98	(0.48–2.01)
	≥40	0.13	0.40	1.14	(0.52–2.49)
Rank	Enlisted			Reference	
	Officer	0.45	0.35	1.58	(0.80–3.12)
Post	Transport unit			Reference	
	Corps headquarters	0.59	0.34	1.80	(0.92–3.53)
	Detachment unit	−0.22	0.36	0.80	(0.39–1.64)
Pre-deployment living status	Lived together			Reference	
	Lived separately	−0.26	0.47	0.77	(0.31–1.93)
Have children	Yes			Reference	
	No	0.01	0.34	1.01	(0.52–1.98)
Previous international deployment	Yes			Reference	
	No	0.60	0.39	1.82	(0.85–3.89)
Personnel's attitude toward deployment	Positive			Reference	
	Not positive	0.64	0.37	1.91	(0.93–3.90)
Spouse's attitude toward deployment	Supportive			Reference	
	Not supportive	0.08	0.29	1.09	(0.62–1.92)
Spouse with high GPD	No			Reference	
	Yes	0.87	0.28	2.38**	(1.39–4.08)

***P* < 0.01.

CI, confidence interval; GPD, general psychological distress evaluated using the 30-item General Health Questionnaire; OR, odds ratio.

physical distance. Consequently, individuals might experience feelings of inadequacy and intensified anxiety in relation to their spouses. In such cases, it is possible that high spousal GPD could induce high GPD within personnel. The present results support the importance of deployed personnel's communicating with their families, and suggest that health-care providers aim to provide care support for the mental health of not only deployed personnel but also their spouses.

In addition, the present study outlined other risk factors for high GPD among spouses (i.e., living separately during pre-deployment and not being supportive of the deployment). It is easy to understand the negative impact of not being supportive of the deployment on the spouse's own mental health. Living separately during pre-deployment negatively affected spouses' mental health, but this was not the case for personnel. Such issues could have arisen because couples were

Table 4. Results of logistic regression analyses for spouses (*N* = 324)

Variable		β	SE	OR	(95%CI)
Age (years)	≤29			Reference	
	30–39	−0.22	0.31	0.81	(0.44–1.48)
	≥40	−0.35	0.37	0.71	(0.34–1.45)
Pre-deployment living status	Lived together			Reference	
	Lived separately	0.91	0.45	2.49*	(1.04–6.00)
Have children	Yes			Reference	
	No	−0.01	0.31	0.99	(0.54–1.82)
Long-term separation experience	No			Reference	
	Yes	0.35	0.25	1.42	(0.87–2.31)
Personnel's attitude toward deployment	Positive			Reference	
	Not positive	0.13	0.35	1.14	(0.57–2.29)
Spouse's attitude toward deployment	Supportive			Reference	
	Not supportive	0.75	0.26	2.11**	(1.28–3.50)
Personnel with high GPD	No			Reference	
	Yes	0.81	0.27	2.24**	(1.32–3.80)

**P* < 0.05.

***P* < 0.01.

CI, confidence interval; GPD, general psychological distress evaluated using the 30-item General Health Questionnaire; OR, odds ratio.

likely to live separately owing to solo assignments involving job relocations or existing difficulties with the marital relationship. The present analyses did not allow for the consideration of these two situations separately. Previous reports have shown that female spouses' mental health may be more 'relationship-related' than that of their male spouses.^{25,26} Runge and colleagues⁵ reported that separation due to training or solo assignments can become a significant stressor for spouses, which is consistent with the present results.

The present findings suggest that the families of international deployment personnel ought to receive more support in addition to the present services, such as psychoeducation, as-needed psychological consultation, and outpatient care provided by the JSDF clinical psychologists or psychiatrists.¹⁰ Aspects of familial separation are discussed in the United Nations Stress Management Booklet during pre-deployment education,²⁷ which also describes the establishment of support systems available to families. Certain military organizations in the United States have implemented a family-centered preventive intervention, designed to enhance familial psychological health and positive benefits have been recently reported.²⁸ Moreover, there are social connections with other military families beyond the core ties between military couples.²⁹ These communities take important roles in organizational investment. The present study provides further evidence of this need.

Several study limitations must be noted. First, the personnel were all male; thus, there was no information regarding the relationships between female personnel and their male spouses. To generalize the results better, further study is needed to investigate the interrelationships between female personnel and their spouses' mental health during the deployment of PKO. Second, this survey was conducted using registered forms. Thus, respondents may have underreported their symptoms compared with if we had used an anonymous survey.³⁰ The Japanese culture also tends to promote restraint in expressing psychological distress.³¹ Third, the contents of psycho-education provided for personnel and their spouses over the period studied were not homogeneous, which might affect our results. Fourth, although personnel and their spouses were able to avail of mental health services provided by the JSDF, we have no data on such interventions; this might also influence the results. Lastly, data on potential confounds (e.g., medical histories, life events) were excluded in this investigation.

In summary, high GPD among personnel significantly affected their spouses' high GPD, and vice versa. This study's findings constitute extremely important evidence to be considered regarding military organizational mental health. For instance, providing mental health-care services to personnel should be linked with providing care to spouses, including opportunities to be connected socially in military communities.

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Disclosure statement

The authors have no conflicts of interest to declare.

Author contributions

T.Y., T.S., Y.T., and K.S. conceived the original study concept and developed the study design. M.N., T.Y., T.S., Y.T., A.O., and K.S. engaged in collecting the data. M.T., M.N., A.O., and J.S. performed the statistical analyses. H.T., Y.T., A.Y., and K.S. supervised the overall research project. M.T. wrote the first draft of the manuscript,

and all authors contributed to the critical revision of the manuscript. All authors read and approved the final manuscript.

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