



AFRL-SA-WP-TR-2018-0006

A Reassessment of Risk Factors and Frequency of Suicide Ideation Among U.S. Air Force Remote Warriors



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January 2018

**Final Report
for September 2016 to January 2018**

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REPORT DOCUMENTATION PAGE			<i>Form Approved</i> <i>OMB No. 0704-0188</i>		
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1. REPORT DATE (DD-MM-YYYY) 30 Jan 2018		2. REPORT TYPE Final Technical Report		3. DATES COVERED (From – To) September 2016 – January 2018	
4. TITLE AND SUBTITLE A Reassessment of Risk Factors and Frequency of Suicide Ideation among U.S. Air Force Remote Warriors			5a. CONTRACT NUMBER		
			5b. GRANT NUMBER		
			5c. PROGRAM ELEMENT NUMBER		
6. AUTHOR(S) Tanya Goodman, MS; Lillian Prince, MS, Wayne Chappelle, PsyD, ABPP; Craig Bryan, PsyD, ABPP			5d. PROJECT NUMBER		
			5e. TASK NUMBER		
			5f. WORK UNIT NUMBER		
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) USAF School of Aerospace Medicine Aeromedical Research Dept/FHO 2510 Fifth St., Bldg. 840 Wright-Patterson AFB, OH 45433-7913			8. PERFORMING ORGANIZATION REPORT NUMBER AFRL-SA-WP-TR-2018-0006		
9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES)			10. SPONSORING/MONITOR'S ACRONYM(S)		
			11. SPONSOR/MONITOR'S REPORT NUMBER(S)		
12. DISTRIBUTION / AVAILABILITY STATEMENT DISTRIBUTION STATEMENT A. Approved for public release. Distribution is unlimited.					
13. SUPPLEMENTARY NOTES Cleared, SAF/PA, Case # 2018-0305, 30 Apr 2018.					
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15. SUBJECT TERMS Suicide ideation, remote warriors, RPA, cyber, intelligence, U.S. Air Force, burnout					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON Wayne Chappelle, PsyD
a. REPORT U	b. ABSTRACT U	c. THIS PAGE U			19b. TELEPHONE NUMBER (include area code)

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1.0 SUMMARY

The U.S. Air Force remote warrior community is largely composed of distributed common ground system intelligence operators, cyber operators, and remotely piloted aircraft (RPA) operators. While the nature of the mission varies across these populations, all conduct highly demanding, 24/7 operations that provide real-time, intelligence, and precision-strike capability in support of combat operations around the globe. The demand for these remotely conducted capabilities has increased exponentially over the past decade, and remote warrior skills are considered essential to maintaining situational awareness and operational effectiveness in the field of conflict. Sustaining an intellectually strong and psychologically resilient workforce is crucial to ensuring the continued effectiveness of this operationally critical mission area.

Recent studies assessing occupational stress suggest that long-term engagement in operations such as these may contribute to negative health outcomes among certain operators. For some individuals in particular, prolonged occupational stress alone, or in combination with traumatic exposure, can result in severe psychological distress, resulting in increased risk for suicidal thoughts or actions. A previous assessment of suicide ideation among the U.S. Air Force remote operations, conducted in 2011-2013, reported that 5-6% of personnel participating in the study experienced suicide ideation to some extent at some point within the week prior to being surveyed.

A total of 3513 remote warriors (60.46% intel and cyber from the 25th Air Force, 32.71% RPA, and 6.83% intel and cyber from the 24th Air Force) participated in the current study, a reassessment including distributed common ground system, cyber, and RPA operator samples from units that had also been surveyed in the earlier study. All three datasets include active duty, Reserve, and Air National Guard participants. An anonymous survey was completed that assessed demographics, occupational demands, psychological distress, burnout, and suicide ideation. Outcomes of the current reassessment reveal increased suicide ideation rates of 6-11%, with 2-4.5% reporting suicidal thoughts more often than “rarely.” Results of multinomial logistic regression indicate risk factors similar to those identified in the initial assessment: being unmarried, experiencing relational crises, engaging in chronic, long work hours, being an Air National Guard member, and endorsing elevated rates in certain facets of burnout. These risk factors were associated with increased risk for suicide ideation even when psychological distress was included as a covariate. Validation of the previous risk factors, along with other findings discussed in this report, offers insights into how mental health providers may better screen for suicide risk within the remote warrior populations.

2.0 INTRODUCTION

The high rates of suicidal thoughts, attempts, and completions are of great concern to the U.S. Air Force (USAF) and the Department of Defense. The suicide completion rate among USAF active duty personnel was 14.4 per 100,000 in 2013 and has increased each subsequent year to 19.1 per 100,000 in 2014 and 20.5 per 100,000 in 2015, according to the calendar year 2015 Department of Defense Suicide Event Report [1]. In addition to the suicide completions, there were 276 suicide attempts recorded by the USAF in 2015. Although the 2016 annual report is not currently available, trends in quarterly reports for 2016 suggest that the number of suicide completions remains high in 2016, with 61 active duty and 24 Air National Guard (ANG)/Reserve reported completions as compared to the 64 active duty and 30 ANG/Reserve suicide

completions in 2015 [2]. The endurance of high suicide rates has plagued not just the USAF but all military branches.

Researchers and military leaders continually seek to identify factors most closely associated with increased risk for suicidal thoughts and behaviors among military personnel, to include demographics, occupational stressors, burnout, emotional distress, and psychopathology [1-9]. While most literature conducted to date on military occupational stressors and suicide ideation has focused on deployments and deployment-related experiences, results indicate that deployment itself is not associated with an increased risk for suicidal thoughts or behavior [10-13]. However, research that examined particular aspects of the deployment experience, specifically exposure to death and killing, found this to be correlated with suicide thoughts and behaviors [14].

The USAF remote warrior community is largely composed of distributed common ground system (DCGS) intelligence operators, cyber operators, and remotely piloted aircraft (RPA) operators, who are deployed-in-garrison, as opposed to in-theater, and conduct critical classified combat, surveillance, and reconnaissance missions. Often based within the continental United States and largely hidden from public view, these highly skilled operators sustain operational situational awareness of the battle space for combatant commanders, 24 hours a day, 7 days a week.

Executing tip-of-the-spear, intelligence support to the battlefield, the DCGS community is primarily composed of intelligence operators who focus on the exploitation of real-time and near-real-time visual and technical information [15,16] to facilitate conventional and special operations in zones of conflict. Cyber operators are tasked with network-based defense, attack, and exploitation activities [17]. RPA pilots, sensor operators, and mission intelligence coordinators collaborate to execute real-time intelligence, surveillance, and reconnaissance, close air support, and precision-strike through the employment of remotely piloted platforms [18]. The unique skillsets of these operators are considered essential to maintaining situational awareness and operational effectiveness across the global field of conflict; thus, the demand from combatant commanders has increased exponentially over the past 10-15 years.

While all three missions are typically conducted from a great distance, the results are precise and lethal, thereby exposing remote warriors to circumstances of severe injury and death on a regular basis, albeit via electronic means. When combined, the strain of sustaining 24/7 operations (i.e., long hours and inadequate manpower) and the graphic nature of the combat exposure may pose a risk to the physical and psychological health of airmen tasked to conduct these operations.

While there is a robust body of literature addressing the physical and psychological impacts and risk factors when deployed, there is still comparatively little research focused on how occupational stressors and job-related factors among personnel deployed-in-garrison are related to suicidal thoughts and behaviors. Recent organizational health studies have identified occupational stressors affecting remote warriors that include low unit manning and long work hours, extra duties/administrative tasks, organizational communication concerns, sleep issues associated with shift schedules, and leadership and management issues [15-19]. Although limited, occupational health literature centered on remote warrior populations does cite these stressors and documents their associations with emotional exhaustion and distress, thereby suggesting the possibility of increased risk for suicide ideation. That said, the specific associations between identified stressors and suicide ideation have not been formally examined. International studies addressing persistent life stress report that chronic stress can be a significant

factor in the emergence of negative physical and emotional health outcomes, to include suicide ideation [20,21]; therefore, examining sources of stress more closely may elucidate suicide risk in this unique work force.

Work schedule, workload, and low manning in the remote warrior community pose a particular concern as they pertain to chronic stress. Shift work has been reported as a leading job stressor, a finding that aligns with nonmilitary research identifying nontraditional work schedules (i.e., shift work) and shift rotation as sources for increased risk of sleep disturbance, depression, and anxiety [21-26], all of which are risk factors for suicidal thought and behaviors.

The workload levied on remote warriors is high and often accompanied by elevated rates of self-reported emotional exhaustion, medically significant psychological distress, and post-traumatic stress disorder when compared with airmen working in more traditional support or logistics type units [17,19,27-30]. Recent studies on remote warriors have also revealed high cynicism, in conjunction with high exhaustion, thus constituting elevation in two of the three dimensions of occupational burnout. In these studies, approximately 22-31% of virtual warriors reported high exhaustion, 15-24% reported high cynicism, and 4-8% reported low professional efficacy. A number of studies since the early 1980s have demonstrated the relationship that can exist between burnout dimensions and depression [31-34], post-traumatic stress disorder [31], and suicide ideation [33,34]. Specifically, the study by Dyrbye and colleagues found that emotional exhaustion could be a risk factor for suicidal ideation and that depersonalization (cynicism) and low (professional) efficacy were also predictive of suicide ideation, with the largest effect found for depersonalization [34]. In another study by Pompili, depersonalization was also the highest correlated risk factor with hopelessness, a well-established risk factor for suicidal thoughts and behaviors [35].

An initial assessment of demographics, occupational stressors, and burnout dimensions as indicators of suicide ideation was completed on the remote warrior community from 2011 to 2013 [36]. Suicide ideation was measured by the self-reported frequency of a participant's thoughts of ending his or her life in the past week. Response options were never, rarely, sometimes, frequently, and always, and suicide ideation was separated into the categories of "never," "rarely," and "sometimes to always," indicating the level of suicide ideation experienced in the past week. The study found that remote warriors with elevated suicide ideation tended to align with the following demographic indicators: being a government civilian employee, being unmarried, being 35-39 years of age, and having relationship difficulties with a significant other. The finding that civilian employees were significantly more likely than active duty military personnel to report frequent thoughts about suicide ideation was cautiously attributed to the thought that civilian employees do not receive or have access to many of the resources that are available to military personnel (e.g., mental health care, family support services); however, more research with larger comparison groups of civilian and contractor employees is needed. The findings that being unmarried and experiencing relationship difficulties with a significant other lend support to the role of loneliness, another well-established risk factor for suicide thoughts and actions [14,37]. However, because loneliness is often stigmatized as a personal weakness, military members may be reluctant to report feeling lonely or to seek assistance for dealing with loneliness, much as there is reluctance to seek help for mental health problems because of concerns of appearing weak [38].

Occupational indicators were also found to be associated with significantly increased risk for suicide ideation in the 2011-2013 study. Among these were being in one's duty position for more than 2 years and working an average of 51-60 hours per week [36]. Working long duty hours over an extended period of time, particularly when executed in a rotating shift schedule, may also contribute to loneliness, thereby increasing the risk of suicide ideation [14,37].

In addition to specific demographic and operational variables, all three dimensions of burnout and role strain were associated with significantly increased risk for suicide ideation experienced "rarely" and "sometimes to always," even when the demographic and occupational variables were used as covariates. This suggests that work-related stress is correlated with suicide risk among USAF remote warriors, especially when work-related stress persists over time. According to the fluid vulnerability theory of suicide [39], suicide ideation emerges when the stressors that an individual experience interact with his or her individual-level vulnerabilities. Among individuals with many risk factors, for instance, the presence of relatively mild or transient stressors may lead to suicide ideation, whereas among individuals with few risk factors, suicide ideation would be expected to emerge only in the presence of very severe or long-lasting stressors. Long-lasting stressors are especially relevant to the experience of burnout and may account in part for how suicide risk might emerge in groups characterized by few risk factors and/or many protective factors. As occupational strain endures for extended periods of time, the individual may begin to experience mood disruption and hopelessness, which elevates the individual's vulnerability across multiple domains of risk. As the individual's vulnerability level increases with chronic occupational strain, the threshold of activation for suicidal thinking lowers, such that suicide ideation emerges in connection with seemingly "benign" or mild stressors.

When adjusting for severity of levels of psychological distress in the 2011-2013 study, emotional exhaustion remained a significant predictor of less severe suicide ideation only; it did not significantly predict more severe levels of suicide ideation. In addition, cynicism and professional efficacy were not associated with any level of suicide ideation beyond the effects of psychological distress. These results suggest that relatively infrequent thoughts about suicide may be associated with elevated levels of emotional exhaustion via processes that are separate from generalized emotional distress. In contrast, the correlation of emotional exhaustion with more frequent (and therefore severe) suicidal thinking may be more closely related to generalized psychological distress.

With a foundation in literature and findings from the preliminary remote warrior suicide ideation study as a base, the purpose of the current study was to reexamine the associations among burnout, deployed-in-garrison operational characteristics, and suicide ideation in a new sample of USAF remote warriors. The primary hypothesis was that all three facets of burnout (high levels of emotional exhaustion, high levels of depersonalization/cynicism, and low levels of personal accomplishment/low professional efficacy) would be significantly associated with increased risk for self-reporting suicide ideation. An additional objective was to examine associations among various work-related factors (e.g., rank, duty position, shift schedule, average number of hours worked per week, experience level), as well as demographic variables (e.g., age, gender, marital status), and the endorsement of suicide ideation. Based on the initial assessment, we hypothesized that unmarried individuals, those with relational difficulties, those working long work hours, and those in their current duties for a longer period (25 months or longer) would be significantly associated with increased risk for self-reporting suicide ideation.

3.0 METHODS

3.1 Participants

A total of 3513 USAF remote warriors (RPA, intelligence, and cyber warfare operators) participated in an occupational health screening between 2015 and 2016 and completed the applicable sections of the survey for the current study. Of these, 2124 (60.46%) intelligence and cyber participants were from 25th AF DCGS, 1149 (32.71%) were RPA operators (pilots, sensor operators, and mission intelligence coordinators), and 240 (6.83%) were intelligence and cyber participants from 24th AF operational wings. A subset sampling of virtual warrior participants from the reassessment of 25th AF included only those directly involved in DCGS missions (Total Force), along with cyber and RPA operators who had also been surveyed in the previous study. Participants from the 24th and 25th AF were those who indicated intelligence or cyber Air Force Specialty Codes, and all three datasets included active duty, Reserve, and ANG participants. To maximize disclosure of operators engaged in classified operations, the occupational health screenings were anonymous and voluntary, and participants could opt out of answering any questions in the survey. Participation rates across these three career fields, calculated as the number of respondents divided by the total number of personnel in the career field, were comparable to or higher than average response rates when using online surveys [40]: from 25th AF, 42% of the 480th Intelligence, Surveillance, and Reconnaissance Wing, 24% of the ANG DCGS, and 11% of the Reserve DCGS; for RPA operators, 31% of the Total Force; and from 24th AF, 11% of cyber operators.

Descriptive statistics for participant demographics are shown in Table 1, along with a breakout of responses to suicide ideation. A comparison with demographic data from participating military units reveals participants were largely representative of their respective population.

3.2 Measures

3.2.1 Demographics and Operational Duty Questionnaire. Participants completed a questionnaire consisting of items assessing demographics (e.g., age range, marital status, dependents living at home, quality of relationship with significant other or spouse, such as recent relationship crises) and operational duty variables (e.g., rank range (officer vs. enlisted), length of time serving in current duty position, number of hours worked in a typical week, and current shift schedule). This section was developed to sustain anonymity to promote genuine self-disclosure in an atmosphere where there tends to be stigma associated with mental health problems.

Table 1. Demographics and Proportions of USAF Personnel in Each Suicide Ideation Group

Variable	Overall Demographics n (%)	Suicide Ideation		
		Never n (%)	Rarely n (%)	Sometimes to Always n (%)
<i>Demographic Variables</i>				
Male	2777 (79.57)	2561 (92.22)	139 (5.01)	77 (2.77)
Age range, yr				
18-25	839 (23.95)	770 (91.78)	36 (4.29)	33 (3.93)
26-30	1005 (28.69)	939 (93.43)	43 (4.28)	23 (2.29)
31-35	800 (22.84)	731 (91.38)	44 (5.50)	25 (3.13)
36-40	497 (14.19)	457 (91.95)	28 (5.63)	12 (2.41)
41+	362 (10.33)	341 (94.20)	16 (4.42)	5 (1.38)
Unmarried	1301 (37.46)	1182 (90.85)	67 (5.15)	52 (4.00)
Relationship crisis	664 (18.95)	557 (83.89)	65 (9.79)	42 (6.33)
Has dependents	1635 (46.62)	1524 (93.21)	73 (4.46)	38 (2.32)
<i>Occupational Variables</i>				
Military affiliation				
Active duty	2737 (78.02)	2518 (92.00)	140 (5.12)	79 (2.89)
Reserve	235 (6.70)	225 (95.74)	6 (2.55)	4 (1.70)
ANG	536 (15.28)	499 (93.10)	21 (3.92)	16 (2.99)
Enlisted rank	2612 (74.71)	2416 (92.50)	118 (4.52)	78 (2.99)
25+ mo in current duties	1201 (34.26)	1102 (91.76)	68 (5.66)	31 (2.58)
<i>Work Schedule</i>				
Standard 8-h day	1356 (38.71)	1260 (92.92)	57 (4.20)	39 (2.88)
12-h day shift	218 (6.22)	199 (91.28)	10 (4.59)	9 (4.13)
12-h night shift	243 (6.94)	213 (87.65)	20 (8.23)	10 (4.12)
8-h day shift	525 (14.99)	488 (92.95)	22 (4.19)	15 (2.86)
8-h mid shift	400 (11.42)	376 (94.00)	16 (4.00)	8 (2.00)
8-h night shift	324 (9.25)	306 (94.44)	13 (4.01)	5 (1.54)
10-h shift/varies	437 (12.48)	396 (90.62)	29 (6.64)	12 (2.75)
<i>Hours Worked per Week</i>				
30-50	2610 (74.49)	2433 (93.22)	113 (4.33)	64 (2.45)
51-60	697 (19.89)	631 (90.53)	39 (5.60)	27 (3.87)
61+	197 (5.62)	175 (88.83)	14 (7.11)	8 (4.06)

3.2.2 Occupational Burnout. The Maslach Burnout Inventory [41] is a 16-item self-report scale that assesses exhaustion (e.g., “I feel burned out from my work”), cynicism (e.g., “I have become less enthusiastic about my work”), and professional efficacy (e.g., “I can effectively solve the problems that arise in my work”), which coincide with the three facets of burnout. Each item is rated on a 7-point scale that assesses the frequency with which the respondent experiences each statement. Item scores range from 0 (never) to 6 (daily). The exhaustion and cynicism subscales have five items each, whereas the professional efficacy subscale consists of six items. Cutoff scores for each subscale have been established: 20 or higher for the exhaustion and cynicism

scales and 12 or lower for the professional efficacy subscale. Construct validity of the Maslach Burnout Inventory has been established, and stability coefficients range from 0.65 to 0.67 [41].

3.2.3 Psychological Distress. The Outcome Questionnaire-45.2 (OQ-45.2) was also used to assess symptoms of clinical distress. Respondents indicate the frequency with which they have experienced 45 symptoms during the past week on a scale ranging from 0 (never) to 4 (always). Items are summed to yield an overall clinical distress score ranging from 0 to 180. Scores at or above 63 are indicative of elevated levels of clinical distress (i.e., adverse changes in cognitive, emotional, behavioral, and physical functioning). Concurrent validity estimates for the total score range exceed $r > 0.80$ [42]. To minimize artificial inflation of the association between general emotional distress and suicide ideation, an adjusted total score was calculated for the current study by subtracting the suicide ideation item score from the OQ-45.2 total score.

3.2.4 Suicide Ideation. The suicide ideation item (“I have thoughts of ending my life”) from the OQ-45.2 [42] was used to assess frequency of suicide ideation during the past week on a scale ranging from 0 (never) to 4 (always).

3.3 Procedures

USAF leadership encouraged survey participation via mass email in each of the occupational health screenings. In this email, potential participants were provided a link to the USAF School of Aerospace Medicine web-based survey and were informed that the study was both anonymous and voluntary. Each of the occupational health survey efforts was open for 2 to 3 months from 2015 to 2016; there were separate occupational health surveys for 24th AF, 432nd Air Expeditionary Wing RPA operators, 25th AF 480th Intelligence, Surveillance, and Reconnaissance Wing, 25th AF ANG, and 25th AF Reserve. The web-based survey began with an introductory page that reminded personnel that participation was voluntary and anonymous and that participants could withdraw from survey participation at any point. After reading the introductory page, participants were asked if they understood the nature, purpose, and instructions of the survey and that they were voluntarily consenting to participate. Those who responded “yes” were given access to the survey. Those who responded “no” were redirected to a separate page with instructions on how to obtain additional information. Approximately 1-2% of those who responded to the survey invitation opted out of participation. The survey took an average of 25-30 minutes for participants to complete, and upon completion, participants were informed on how and when to obtain the summarized results of the study. The present study was reviewed and approved by the Institutional Review Board at Wright-Patterson Air Force Base.

3.4 Data Analysis

Participants were categorized into three groups based on their suicide ideation score: “never,” “rarely,” and “sometimes to always.” To test the associations among predictor variables and suicide ideation, univariate and multivariate multinomial logistic regression analyses were conducted using PROC LOGISTIC in SAS 9.3 (SAS Institute Inc., Cary, NC) with the glogit link option. Participants reporting no suicide ideation (i.e., a response of “never”) served as the reference group. We therefore tested each predictor variable’s ability to differentiate between the “never” and “rarely” groups and between the “never” and “sometimes to always” groups. Results

were interpreted based on obtained effect sizes (relative risk [RR]) and confidence intervals (CIs) [43].

4.0 RESULTS

Overall, 167 (4.75%) participants experienced suicide ideation rarely during the past week and 99 (2.82%) endorsed experiencing suicide ideation sometimes, frequently, or always in the past week, for a total of 266 (7.57%) indicating suicide ideation to some extent in the past week. The independent proportions of suicide ideation endorsement were compared, and there were no significant differences for “rarely” endorsements among the intel, RPA, and cyber groups. However, a higher percentage of 24th AF personnel endorsed “sometimes, frequently, or always” experiencing suicide ideation when compared to RPA operators in the past week. Proportion comparisons for the three groups for the “rarely” and “sometimes, frequently or always” groups, respectively, are as follows: RPA vs. 25th AF, $p = 0.68$ and 0.07 ; RPA vs. 24th AF, $p = 0.23$ and 0.02 ; and 25th AF vs. 24th AF, $p = 0.31$ and 0.21 (see Table 2 for percentages).

Table 2. Proportion of Participants Reporting Each Level of Suicide Ideation During the Past Week by Dataset

“I have thoughts of ending my life”	Total (<i>n</i> = 3513)		25 th AF Intelligence and Cyber (<i>n</i> = 2124)		RPA Operator (<i>n</i> = 1149)		24 th AF Intelligence and Cyber (<i>n</i> = 240)	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Never	3247	92.43	1958	92.18	1075	93.56	214	89.17
Rarely	167	4.75	101	4.76	51	4.44	15	6.25
Sometimes	78	2.22	47	2.21	21	1.83	10	4.17
Frequently	12	0.34	9	0.42	2	0.17	1	0.42
Always	9	0.26	9	0.42	0	0.00	0	0.00
Total for Sometimes-Always	99	2.82	65	3.06	23	2.00	11	4.58
Total Suicide Ideation	266	7.57	166	7.82	74	6.44	26	10.83

Frequency results for the three suicide ideation groups within each predictor variable are displayed in Table 3, along with the results of the univariate multinomial logistic regression analyses, expressed as RRs. Participants who reported “rarely” experiencing suicide ideation during the past week were significantly more likely than participants who reported “never” experiencing suicide ideation to have experienced a recent relationship crisis or failure, to work the 12-hour night shift, or to work a varying shift. Working 51 or more hours a week and working 25 months or longer in their current duties were additional risk factors with lower CIs above 0.90. Participants who reported “sometimes, frequently, or always” experiencing suicide ideation during the past week were significantly more likely than participants who reported “never” experiencing suicide ideation to be unmarried, to have experienced a recent relationship crisis or failure, and to work 51-60 hours a week. When compared to two age groups (26-30 and 41+), the age range of 18-25-years was also a significant risk factor. In addition to demographic variables, all three dimensions of burnout and the adjusted OQ-45 total score for psychological

distress were associated with significantly increased RR for suicide ideation for both “rarely” and “sometimes to always” outcomes.

Table 3. Proportions of USAF Personnel in Each Predictor Variable Group Endorsing Each Level of Suicide Ideation with Univariate Associations

Variable	Suicide Ideation			Rarely vs. Never		Sometimes to Always vs. Never	
	Never n (%)	Rarely n (%)	Sometimes to Always n (%)	RR	95% CI	RR	95% CI
Demographic Variables							
Male	2561 (79.39)	139 (83.73)	77 (78.57)	1.34	0.88 – 2.04	0.95	0.58 – 1.55
Age range, yr							
18-25 ^a	770 (23.78)	36 (21.56)	33 (33.67)	--	--	--	--
26-30	939 (29.00)	43 (25.75)	23 (23.47)	0.98	0.62 – 1.54	0.57 ^{b,c}	0.33 – 0.98
31-35	731 (22.58)	44 (26.35)	25 (25.51)	1.29	0.82 – 2.02	0.80	0.47 – 1.36
36-40	457 (14.11)	28 (16.77)	12 (12.24)	1.31	0.79 – 2.18	0.61	0.31 – 1.20
41+	341 (10.53)	16 (9.58)	5 (5.10)	1.00	0.55 – 1.83	0.34 ^{b,d}	0.13 – 0.88
Unmarried	1182 (36.78)	67 (40.61)	52 (55.32)	1.18	0.85 – 1.62	2.13 ^b	1.41 – 3.22
Relationship crisis	557 (17.19)	65 (38.92)	42 (43.30)	3.07 ^b	2.22 – 4.25	3.68 ^b	2.44 – 5.55
Has dependents	1524 (47.01)	73 (43.71)	38 (38.78)	0.88	0.64 – 1.20	0.71	0.47 – 1.08
Occupational Variables							
Military affiliation							
Active duty ^a	2518 (77.55)	140 (83.83)	79 (79.80)				
Reserve	225 (6.93)	6 (3.59)	4 (4.04)	0.48	0.21 – 1.10	0.57	0.21 – 1.56
ANG	449 (15.37)	21 (12.57)	16 (16.16)	0.76	0.47 – 1.21	1.02	0.59 – 1.76
Enlisted rank	2416 (74.78)	118 (70.66)	78 (79.59)	0.81	0.58 – 1.14	1.32	0.80 – 2.16
25+ mo in current duties	1102 (34.01)	68 (40.72)	31 (31.31)	1.33	0.97 – 1.83	0.88	0.58 – 1.36
Work schedule							
Standard 8-h day ^a	1260 (38.91)	57 (34.13)	39 (39.80)	--	--	--	--
12-h day shift	199 (6.15)	10 (5.99)	9 (9.18)	1.11	0.56 – 2.21	1.46	0.70 – 3.06
12-h night shift	213 (6.58)	20 (11.98)	10 (10.20)	2.08 ^b	1.22 – 3.53	1.52	0.75 – 3.08
8-h day shift	488 (15.07)	22 (13.17)	15 (15.31)	1.00	0.60 – 1.65	0.99	0.54 – 1.82
8-h mid shift	376 (11.61)	16 (9.58)	8 (8.16)	0.94	0.53 – 1.66	0.69	0.32 – 1.48
8-h night shift	306 (9.45)	13 (7.78)	5 (5.10)	0.94	0.51 – 1.74	0.53	0.21 – 1.35
10-h shift/varies	396 (12.23)	29 (17.37)	12 (12.24)	1.62 ^b	1.02 – 2.57	0.98	0.51 – 1.89
Hours worked per week							
30-50 ^a	2433 (75.12)	113 (68.07)	64 (64.65)	--	--	--	--
51-60	631 (19.48)	39 (23.49)	27 (27.27)	1.33	0.92 – 1.94	1.63 ^b	1.03 – 2.57
61+	175 (5.40)	14 (8.43)	8 (8.08)	1.72	0.97 – 3.07	1.74	0.82 – 3.68
Stress Variables							
Occupational burnout							
High exhaustion	713 (22.00)	80 (47.90)	55 (56.12)	3.26 ^b	2.38 – 4.47	4.54 ^b	3.02 – 6.82
High cynicism	520 (16.09)	67 (40.36)	50 (50.51)	3.53 ^b	2.55 – 4.88	5.32 ^b	3.55 – 7.98
Low professional efficacy	165 (5.11)	19 (11.38)	21 (21.21)	2.38 ^b	1.44 – 3.94	5.00 ^b	3.01 – 8.30
Psychological distress							
OQ-45 total score	363 (11.47)	96 (58.18)	76 (78.35)	10.74 ^b	7.73 – 14.90	27.93 ^b	17.02 – 45.83

^aReference category.

^bStatistically significant relative risk at $p < 0.05$.

^cInverse RR = 1.75, 95% CI: 1.02 – 3.00.

^dInverse RR = 2.92, 95% CI: 1.13 – 7.58.

Results of the multivariate multinomial logistic regression analyses, expressed as RRs, are shown in Table 4. When adding burnout covariates, gender, marital status, military affiliation, hours worked per week, and relationship crisis were found to be significant predictors. Incorporation of psychological distress as a covariate again showed gender, marital status, and military affiliation as significant, but also included low professional efficacy as significant. Participants who reported “rarely” experiencing suicide ideation during the past week were significantly more likely than participants who reported “never” experiencing suicide ideation to be male and to have experienced a recent relationship crisis or failure. Similar RRs emerged for the participants who reported “sometimes, frequently, or always” experiencing suicide ideation during the past week. Those who were unmarried, had experienced a recent relationship crisis or failure, or worked 51 or more hours per week were at greater risk for suicide ideation than those who reported being married, without relationship crisis, or worked 50 or fewer hours per week. ANG participants were also a significant risk factor compared to active duty participants. When adding the OQ-45 total score to the model, the following were no longer significant risk factors for “sometimes, frequently, or always”: relationship crisis and working 51-60 hours per week. However, relationship crisis had a lower CI of 0.98 and remained significant for the “rarely” risk of suicide ideation, leading us to believe that with a larger sample size, relationship crisis would have remained as a significant risk factor for “sometimes, frequently, or always.”

When entered into a model with the demographic and occupational variables, all three burnout measures remained as significant risk factors for suicide ideation. Contrary to the previous study where high exhaustion was the highest burnout risk factor for suicide ideation, low professional efficacy was the highest risk factor for “sometimes to always.” When adding the adjusted OQ-45 total score to the model, the only burnout dimensions that remained significant were cynicism and low professional efficacy. High cynicism remained a significant risk factor for “rarely” and the lower CI of 0.95 for “sometimes to always.” Low professional efficacy remained a significant risk factor for the “sometimes, frequently, or always” group, but not the “never” group. This suggests that cynicism and professional efficacy are correlated with suicide ideation regardless of participants’ self-reported psychological distress level. In contrast, the variance explained by psychological distress severity accounts for the variance explained by emotional exhaustion.

5.0 DISCUSSION

The present study examined the relationship between occupational burnout, psychological distress, and suicide ideation in three remote warrior USAF career fields. The results of this study suggest that approximately 7.57% of remote warriors experienced some form of suicide ideation during the week preceding the survey, with 2.82% reporting a frequency of sometimes, frequently, or always. Participants from the 24th AF endorsed sometimes, frequently, or always, at the highest rate, statistically higher than RPA operators, but very similar to the 25th AF, whose endorsement rate was between the two other participant groups. The overall endorsement of suicide ideation was higher in the current study than the initial 5-6% rate reported in the 2011-2012 study. At that time, approximately 1.5% of remote warriors reported suicide ideation at the frequency of sometimes, frequently, or always. The self-reported stressors of this community, including low unit manning and long work hours, extra duties/administrative tasks, and sleep issues associated with shift schedules, as well as the demographic, occupational,

and burnout risk factors, are in many ways unchanged, and with further study provide insight into the increase of suicide ideation for the community.

Table 4. Multivariate Associations of Demographic and Occupational Variables, Occupational Stress Indicators, and Psychological Distress

Variable	Excluding OQ-45				Including OQ-45			
	Rarely vs. Never		Sometimes to Always vs. Never		Rarely vs. Never		Sometimes to Always vs. Never	
	RR	95% CI	RR	95% CI	RR	95% CI	RR	95% CI
Demographic Variables								
Male	1.63 ^a	1.03 – 2.57	1.37	0.79 – 2.36	1.66 ^a	1.04 – 2.65	1.49	0.84 – 2.65
Age Range, yr								
18-25 ^b	--	--	--	--	--	--	--	--
26-30	0.97	0.59 – 1.58	0.61	0.34 – 1.11	1.00	0.60 – 1.66	0.61	0.32 – 1.15
31-34	1.41	0.83 – 2.39	0.80	0.42 – 1.54	1.25	0.72 – 2.20	0.62	0.30 – 1.27
35-39	1.78	0.97 – 3.28	0.71	0.32 – 1.60	1.46	0.77 – 2.78	0.50	0.21 – 1.20
40+	1.39	0.66 – 2.90	0.37	0.12 – 1.10	1.34	0.62 – 2.87	0.32	0.10 – 1.02
Unmarried	1.18	0.78 – 1.78	2.27 ^a	1.29 – 3.99	1.01	0.65 – 1.56	1.94 ^a	1.06 – 3.55
Relationship crisis	2.49 ^a	1.75 – 3.53	2.85 ^a	1.81 – 4.48	1.57 ^a	1.08 – 2.28	1.59	0.98 – 2.57
Has dependents	0.79	0.52 – 1.21	1.09	0.61 – 1.95	0.77	0.50 – 1.20	1.09	0.58 – 2.05
Occupational Variables								
Military affiliation								
Active duty ^b								
Reserve	0.62	0.26 – 1.48	1.28	0.44 – 3.72	0.71	0.29 – 1.73	1.92	0.62 – 5.91
ANG	0.82	0.47 – 1.43	2.40 ^a	1.25 – 4.61	0.92	0.52 – 1.62	3.21 ^a	1.59 – 6.50
Enlisted rank	0.81	0.54 – 1.21	1.47	0.83 – 2.61	0.78	0.52 – 1.18	1.46	0.80 – 2.65
25+ mo in current duties	1.34	0.95 – 1.90	0.83	0.51 – 1.35	1.21	0.84 – 1.74	0.76	0.46 – 1.27
Work schedule								
Standard 8-h day ^b								
12-h day shift	0.83	0.40 – 1.70	0.91	0.41 – 2.02	0.83	0.39 – 1.76	0.76	0.31 – 1.86
12-h night shift	1.46	0.82 – 2.60	0.61	0.27 – 1.36	1.58	0.87 – 2.87	0.64	0.27 – 1.50
8-h day shift	0.82	0.48 – 1.40	0.70	0.36 – 1.34	0.92	0.53 – 1.60	0.81	0.41 – 1.61
8-h mid shift	0.78	0.43 – 1.42	0.50	0.22 – 1.14	0.91	0.49 – 1.68	0.64	0.27 – 1.50
8-h night shift	0.79	0.41 – 1.51	0.37	0.14 – 1.01	0.77	0.39 – 1.50	0.31	0.11 – 0.88
10-h shift/varies	1.32	0.80 – 2.18	0.43	0.20 – 1.00	1.32	0.78 – 2.21	0.38	0.17 – 0.84
Hours worked per week								
30-50 ^b								
51-60	0.95	0.62 – 1.46	1.87 ^a	1.09 – 3.21	0.86	0.55 – 1.35	1.57	0.88 – 2.78
61+	1.17	0.61 – 2.22	2.37 ^a	1.02 – 5.52	1.04	0.54 – 2.03	2.18	0.91 – 5.24
Stress Variables								
Occupational burnout								
High exhaustion	2.02 ^a	1.37 – 2.97	2.62 ^a	1.55 – 4.43	1.02	0.66 – 1.57	0.97	0.54 – 1.73
High cynicism	2.04 ^a	1.37 – 3.02	2.61 ^a	1.55 – 4.39	1.58 ^a	1.05 – 2.39	1.65	0.95 – 2.87
Low professional efficacy	1.80 ^a	1.04 – 3.09	3.25 ^a	1.82 – 5.80	1.45	0.82 – 2.58	2.76 ^a	1.46 – 5.21
Psychological distress								
OQ-45 total score	--	--	--	--	7.83 ^a	5.20 – 11.79	23.11 ^a	12.52 – 42.66

^aStatistically significant relative risk at $p < 0.05$.

^bReference category.

Significant demographic and occupational risk factors in this study were similar to the initial assessment, with unmarried and relational issues (worsening relationship in the previous study and relational crises in the current study) identified in both studies. These findings lead to further support of the loneliness theory as a risk factor of suicide ideation, along with the finding of 18-25 years of age as a risk factor for suicide ideation. The loneliness theory, as it relates to mitigating depression and suicidal risk, identifies critical functions inherent to social

relationships, recognizing the value of friendships as a complement but not a substitute for intimate relationship with a partner [44]. It is possible that individuals with the support structure inherent to marriage, or being in a relationship absent of crisis, may be less likely to have suicidal thoughts and actions. Working the 12-hour night shift or varying shifts also emerges as a significant risk factor for less severe suicide ideation. This may be, in part, attributable to the loneliness theory, as these individuals are not as easily able to sustain intimate relationships, or exhaustion, as the change from working day shift to night shift, as well as the long length of the 12-hour night shift, can lead to issues with circadian rhythms.

When adding covariates of burnout to the model, the demographic and occupational risk factors (except for shift work) discussed remained significant, and the demographic risk factors remained significant when adding psychological distress as a covariate. When considering subgroups within this study, a significant risk factor emerged for ANG participants compared to active duty participants in a similar way as the finding in the initial study that highlighted elevated risk to civilian employees. ANG personnel, who must balance civilian lives and jobs as well as military responsibilities, may (like civilians in the previous study) not receive or have access to many of the occupational health resources that are available to active duty military personnel (e.g., mental health care, family support services).

All three facets of burnout were significant risk factors for suicide ideation when examined independently. When entered into a model with the demographic and occupational variables, all three burnout facets remained significant risk factors. Low professional efficacy emerged as the highest risk factor among the three dimensions, even when adding psychological distress as a covariate. High cynicism also remained a significant risk factor for the less severe category of suicide ideation; however, high exhaustion did not remain as a significant risk factor. This suggests that cynicism and professional efficacy are correlated with suicide ideation independent of level of psychological distress. These results are different from the initial assessment, where emotional exhaustion was the only burnout risk factor that remained significant for the less severe form of suicide ideation, and none of the dimensions were significant for the more severe category of suicide ideation, when psychological distress was added as a covariate. With the risk factor for high exhaustion and more frequent (and therefore severe) suicide ideation remaining non-significant in both studies, the current study furthers the claim that the correlation of emotional exhaustion with suicidal thinking may be more closely related to generalized psychological distress. This finding aligns with previous research in military [31] and nonmilitary studies showing that burnout is positively correlated with depression [32] and often precedes the onset of depression [33].

The present study, therefore, suggests that burnout, especially low professional efficacy and high cynicism, may serve as an early link in the chain of adversity that results in suicidal thinking among military personnel. It is possible that the lack of individuals from the 2011-2013 study reporting professional efficacy at the low threshold limited the significance of findings at the time. Implementation of mitigation strategies that are geared toward alleviating rates of emotional exhaustion, cynicism, and lack of professional efficacy, and related signs of burnout, could offer military and medical leadership a means of reducing the risk of suicide ideation and behavior within this unique community of military personnel. While the significance of a significant risk factor was overcome by psychological distress, it remains nonetheless a dimension of burnout. The lack of significant results in the current study may have been attributable to the same individuals reporting both high cynicism and exhaustion, and cynicism claiming the variance in the model that would have otherwise been explained by exhaustion.

6.0 RECOMMENDATIONS

Results of this study suggest that mental health providers tasked with intervening and mitigating the incidence of suicide ideation among remote warrior military personnel may do so by targeting certain facets of occupational burnout, psychological distress, and other relevant work-related factors (e.g., chronically high number of hours worked per week). Mental health providers may strive to offset the deleterious effects of occupational burnout and psychological distress via the use of cognitive-behavioral therapies aimed at reducing life skills deficits in the areas of cognitive flexibility and emotional regulation, two central mechanisms that have been implicated in military suicide prevention interventions and treatments [45]. For example, brief cognitive-behavioral therapy has been shown to reduce suicidal behavior among military personnel reporting suicide ideation and/or a recent suicide attempt [46]. A more recent study of crisis response planning, a 30-minute procedure that is central to brief cognitive-behavioral therapy, has similarly shown significant reductions in follow-up suicide attempts among military personnel [6]. These treatments and interventions may be useful for assisting personnel in crisis.

Additionally, providers may seek to employ strategies aimed at preventing the emergence and onset of suicidal crises. For example, a strong sense of purpose and efficacy has been shown to be associated with reduced emotional distress and suicidal thinking among military personnel and may reduce the likelihood that suicide ideation and/or suicide behavior will emerge among those experiencing high levels of stress [5,47]. Meaning and purpose may facilitate cognitive flexibility and emotion regulation, thereby serving as a protective factor. Reductions in negative occupational stress outcomes can be further enhanced by helping employees to foster and strengthen their interpersonal and social interactions and support networks, thereby reducing risk of loneliness resulting from social and interpersonal isolation [44,48].

Research indicates that employee-level interventions are effective for reducing burnout, but larger effects are seen when these interventions are complemented by organization-level programs [49]. In light of these findings, mental health professionals engaged in operational units as embedded or dedicated care providers should also pursue opportunities to provide direct consultation with military leaders regarding organization-wide changes that could practically and positively impact rates of cynicism and professional efficacy. From a prevention perspective, the present findings suggest that workplace supervisors and leaders could potentially reduce suicide risk by remaining cognizant of the inherently unique nature of remote warrior operations and by addressing work-related factors, particularly chronically long work hours, personnel locked into positions for greater than 2 years, and organizational need for additional manpower.

7.0 STRENGTHS AND LIMITATIONS OF THE STUDY

Several differences in the initial assessment by Bryan and colleagues [36] and the current study are worth noting. The initial assessment included operational wing personnel of the Air Force Intelligence, Surveillance and Reconnaissance Agency, which subsequently reorganized into the 25th AF. A narrowed sampling was implemented in the current study to only include the DCGS aspects of the 25th AF, and therefore to include only those directly engaged in remote warrior operations, from the 480th Wing, ANG, and Reserve. The reassessment did not include civilians or contractors. Civilians were a significant risk factor for suicide ideation in the initial study, but the voluntary nature of the current assessment resulted in a less robust sampling of civilians and contractors. The surveys relied on civilians and contractors to write in a job code,

and many opted not to provide necessary information to classify them as intelligence, cyber, or other job fields. While the 24th AF cyber survey in general garnered a lower than expected rate of response, a brief, but systematic network error also impacted select items. In particular, the “worsened relationship” variable was affected; therefore, it was not included in the current study. Instead, another item from the 2015-2016 assessments that asked if a “relational crises or failure” had occurred in the past year was used in place of the worsened relationship item.

Self-report surveys are prone to response bias from a self-selected sample that might affect generalization of results. Simply put, whenever assessing for the impact within an organization, it is always a possibility there will be sampling bias. This bias may occur as a result of those individuals who are at highest risk and wanting to expose their concerns or, alternately, those at the highest risk withholding information.

Other limitations are noted. The current study was restricted to only three career fields in the Air Force; results, therefore, may not generalize to other professions and occupations in the Air Force or to military personnel in other branches of service. A second limitation is our cross-sectional design, which limits our ability to understand and examine temporal trends among burnout, emotional distress, and suicide ideation. Longitudinal studies are needed to more definitively understand how these variables emerge and influence each other over time. Another limitation is our use of a single-item measure of suicide ideation. Recent research suggests that measurement methods that use multiple items to assess suicide thoughts and behaviors may yield slightly better results than single-item assessment methods [50]. Furthermore, the restriction of the assessment of suicide ideation to the past week could have resulted in “missed” cases who were experiencing fluctuations in suicidal thoughts. Additional research is needed to determine how burnout and occupational stressors may be related to chronic versus more time-limited periods of suicidal thinking. Despite these limitations, the present study suggests that certain workplace characteristics and job-related stress may play a role in the emergence of suicide risk among military personnel and may warrant greater empirical attention in future research and prevention efforts.

8.0 CONCLUSIONS

The present study suggests that certain demographics, workplace characteristics, and job-related stressors play a role in the emergence of suicide ideation. Because suicide ideation is a strong risk factor for subsequent suicidal behavior, these variables may contribute to increased risk for suicide attempts and suicide death. Of note, being unmarried and/or experiencing relational crises (i.e., domestic factors) and low professional efficacy and high cynicism at work (i.e., occupational factors) remain critical indicators of suicide ideation. Furthermore, elevated levels of psychological distress appear to outweigh the effects of emotional exhaustion and other occupational factors such as shift work. Attention to the demographic, occupational, and job-related risk factors by line and medical leaders is encouraged. Organizational efforts to mitigate these risk factors are also implicated. In summary, the results of the present study suggest outreach strategies focused on strengthening the “Wingman” concept, building supportive supervisory and peer-to-peer relationships, and responding to emotional-social challenges at home and work may help to reduce the severity of suicide ideation among USAF remote warriors.

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LIST OF ABBREVIATIONS AND ACRONYMS

ANG	Air National Guard
CI	confidence interval
DCGS	distributed common ground system
OQ-45.2	Outcome Questionnaire-45.2
RPA	remotely piloted aircraft
RR	relative risk
USAF	U.S. Air Force