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Mental Distress among Winter-over Personnel in Antarctica

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Abstract

Isolation and extreme environment act as significant stressors in Antarctica. The study was carried out to assess the level of mental distress experienced by winter-over personnel of Thirteenth Indian Scientific Expedition to Antarctica, during the course of stay at Maitri station. The role of coping resources in handling stress is discussed.

Introduction

Over the past decade, there has been a great upsurge of research on seasonal variation in emotional state (Kasper *et al.,* 1989a; Rosen *et al.,* 1990; Schlager *et al.,* 1993). Many individuals do not meet criteria for major affective disorder nor seek treatment for their symptoms but appear to experience mild seaonal mood swings that interfere with their productivity and well-being (Kasper *et al.,* 1989b). In recognition of these developments, Diagnostic and Statistical Manual-Fourth Edition (DSM-IV; APA, 1994) includes seasonal subtypes of affective disorders.

Places at high altitude like Antarctica provide an ideal opportunity to prospectively examine impact of seasons on asymptomatic nonclinical population where the variations in daylight through the seasons are extreme. Although technological advancement has reduced hardships and danger, but winter-over team continues to be exposed to constant darkness. Psychological disturbances like sadness, irritability, insomnia are often reported by polar expedition members.

Despite these findings, most studies do not provide independent baseline assessment, or assessment of the changes in mood over the course of one year (Palinkas *et* al., 1995).

A study was carried out to examine the psychological profile of Indian personnel on winter-over duty at the Maitri station during the 13th Indian Scientific Expedition.

Methodology

Sample: The subjects for this study were 23 men who were members of the Thirteenth Indian Scientific Expeidtion in 1993 and stayed for winter-over duty. All the subjects were screened for sufficient emotional stability and intellectual capacity by psychiatrist and clinical psychologist. Besides the group testing procedure, each individual was also assessed by an unstructured psychological interview.

Instruments

The following measures were used:

(1) Sociodemographic data sheet

(2) Self-rating Depression Scale

(3) State-trait Anxiety Inventory (Form Y)

(4) Coping Resources Inventory

Self-rating Depression Scale (SDS) (Zung, 1965)

It is a standard screening instrument that provides a quantitative assessment of depressive symptomatology. The scale consists of twenty items— ten worded symptomatically positive and ten symptomatically negative. The subject is required to rate each of the items as to how it applied to him in the following four quantitative terms: None or little of the time, some of the time, good part of the time, most or all of the time. Each item was scored on a 4-point rating scale. An index for the SDS was derived by dividing the sum of the raw scores obtained on the twenty items by 80, and was converted to a whole number which ranged from 25 to 100. Low score reflects less depression and vice-versa.

State-trait Anxiety Inventory (STAI) (Form Y) (Speilberger *et al*., 1983)

The scale consisting of 40 items is intended to measure state (i.e. level of anxiety at the time of testing) and trait anxiety (i.e. level of anxiety that is relatively enduring in nature). Ten S-Anxiety items and nine T-Anxiety are negatively worded. To obtain scores for S-Anxiety and T-Anxiety scales, the weighted scores for the twenty items that make up each scale are added. Reliability and validity of the scale has been established in the Indian population also.

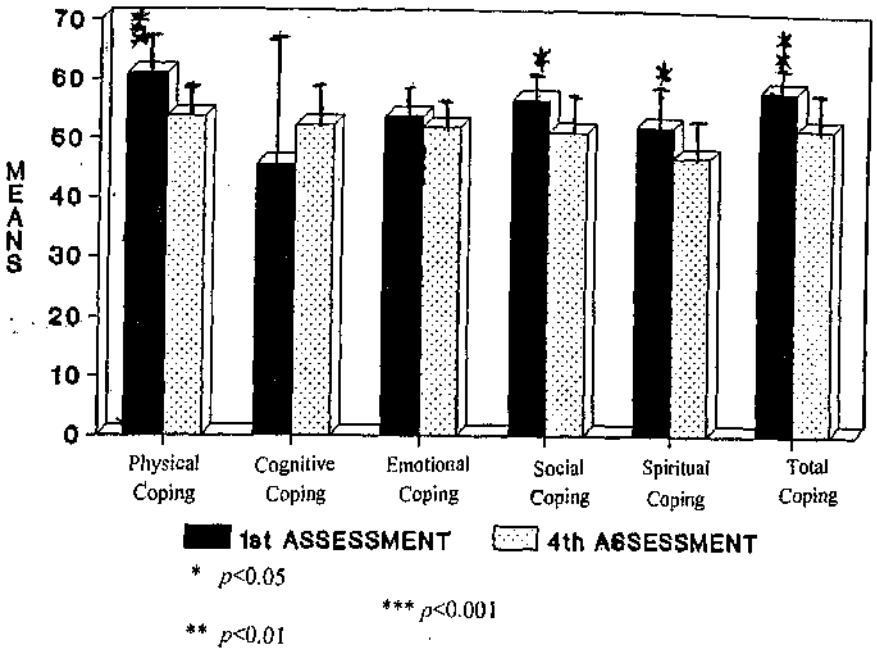

Fig.1: Coping Resources in First & Fourth Assessments

Coping Resources Inventory (CRI) (Hammer and Marting, 1988)

Coping Resources Inventory is a well standardized instrument to measure coping resources that are currently available to individuals for managing stress. It consists of sixty items, measuring resources in five domains, viz.- cognitive, social, emotional, spiritual and physical.

The cognitive domain refers to the extent to which individual maintains a positive sense of self-worth, a positive outlook toward others, and optimism about life in general. Social resources refers to the degree to which individuals are embedded in social networks that are able to provide support in times of stress. Emotional resources refer to the degree to which individuals are able to accept and express a range of affect. The spiritual domain refers to the degree to which actions of individuals are guided by stable and consistent values derived from religious, familial, cultural tradition from personal philosophy. Physical resources refer to the degree to which individuals enact health-promoting behaviours believed to contribute to increased well-being.

For each of the sixty items, the respondent is required to indicate on a 4-point rating scale how often the behaviour described in the item, is engaged in over the past three months. Six items are negatively worded and require

reverse scoring. Five individual scores are obtained by simply adding the item responses for each subscale. A total resource score is also computed by summing the five scale scores. The higher the scale score, the higher the resource. Since the scales have different number of items, the raw scores are converted to standard scores having a mean of 50 and an SD of 10 points.

Design and Procedure

Informed consent was taken from each subject. Rapport was established and information regarding demographic characteristics was obtained.

A multiple cross-sectional sampling longitudinal design was followed. Questionnaires were administered in group testing situation. The subjects were assessed in Delhi (for baseline data) before they left for Antarctica i.e. in September 1993. Second and third assessments were made in Antarctica in March and September i.e. at the beginning and the end of winter. The fourth assessment was made on the ship while the subjects were returning from Antarctica. The sample size in each assessment varied as all the subjects were not available at each testing situation due to their varied assignments. The data was brought back to AIIMS and analyzed. Paired t-tests were applied to study the comparisons.

Results

Demographic profile: The mean age of the sample was 36.17±5.19 years. Majority of the subjects were married (77%), Hindu (87%), belonged to army (62%) and had college education (90%). Fifty-six per cent were working as scientists (Table 1).

Psychological profile: On scales of depression and anxiety (Table 2), the subjects scored below the cut-off level in all assessments. Also, no significant change occurred in depressive and anxiety scores at the four assessments.

Table 3 shows high coping resources at all the assessments. Further, a gradual decrease in all the domains of the coping resources over the months was observed. However, the change was significant in three domains, namely-physical coping; social coping and spiritual coping and also in total coping resources. Significant differences emerged between the first and the last assessment i.e. before the journey was undertaken and while returning back, on physical coping ($p<0.001$), social coping *($p<0.05$),* spiritual coping ($p<0.05$), and total coping resources ($p<0.01$). Scores on social coping were also found to decrease significantly ($p<0.05$) from beginning winter to assessment in return journey.

Table 1: Sociodemographic Characteristics

S.No.	Variables	f	%
1.	Age@	36.17 ±	5.19
2.	Education		
	Matric	2	9
	Inter	7	31.8
	Graduation	4	18.2
	Professional	9	40.9
3.	Occupation		
	(a)Status		
	Skilled worker	3	13.6
	Clerical	7	31.8.
	Semi-/Major Prof.	12	55.6
	(b)Type		
	Army	15	62.5
	Civilian	9	37.5
4.	Religion		
	Hindu	21	87.5
	Others	3	12.5
5.	Marital Status		
	Married	17	77.3
	Single	5	22.7

@ age has been expressed as Mean ± SD

Table 2: Comparison between Assessments on Depression and Anxiety

Variables	Antarctica Winter				Paired T-Test					
	Delhi 1	Beginning 2	End 3	Return 4	1VS2	1VS3	1VS4	2Vs3	2Vs4	3Vs4
Depression	35.5 ±10.72	35.67 ±11.32	34.82 ±7.77	34.67 ±13.37	1.04 (12)	0.07 (14)	0.56 (13)	0.20 (12)	0.74 (8)	0.77 (11)
State Anxiety	30.25 ±7.50	33.0 ±12.02	34.9 ±12.0	33.14 ±8.26	0.68 (16)	1.85 (16)	1.41 (12)	0.11 (16)	0.52 (11)	0.74 (12)
Trait Anxiety	33.70 ±5.21	34.63 ±7.44	34.42 ±8.78	32.78 ±8.54	0.60 (15)	0.85 (16)	0.27 (12)	0.19 (14)	1.37 (10)	0.82 (12)

0 Values in parentheses show df

Discussion

The rigorous climatic condition of the Antarctica precludes evacuation during winter. This prolonged isolation and hazardous environment act as stressors for precipitating psychiatric problems (Gunderson, 1974; Shurley

Table 3: Comparison between Assessments on Coping Resources

Coping Resources	Antarctica Winter				Paired T-Test					
	Delhi 1	Beginn-ing2	End 3	Return 4	1VS2	1VS3	1VS4	2Vs3	2Vs4	3Vs4
Physical Coping	61.05 ±5.90	56.94 ±8.73	58.31 +7.20	53.80 ±5.98	1.59 (18)	1.73 (15)	4.18*** (18)	0.77 (14)	0.94 (10)	1.03 (13)
Cognitive Coping	45.62 ±21.24	52.25 ±10.21	53.05 ±8.46	52.40 ±7.83	1.16 (15)	1.50 (18)	0.24 (14)	0.12 (14)	0.19 (10)	0.51 (13)
Emotional Coping	53.80 ±4.90	52.06 +9.10	51.0 ±7.90	51.93 ±6.62	0.20 (13)	0.76 (15)	1.50 (13)	0.29 (14)	1.13 (10)	0.47 (13)
Social Coping	56.7 ±6.09	56.0 ±11.03	54.16 ±9.33	51.27 ±7.29	0.05 (13)	0.97 (15)	2.28* (13)	1.19 (14)	2.70* (10)	1.15 (13)
Spiritual Coping	52.35 ±8.71	51.12 ±7.10	49.10 ±10.18	47.13 ±7.73	0.06 (13)	0.99 (15)	2.35* (13)	0.77 (14)	1.21 (10)	0.05 (13)
Total Coping	58.50 ±5.01	55.25 ±10.55	53.95 ±9.24	52.13 ±7.75	0.80 (13)	1.55 (15)	3.32** (13)	0.59 14)	1.47 (10)	0.38 (13)

() Values show df in parentheses

** p<Q.Q5; ** p<0.01; *** p<0.00]*

1974; Palinkas, 1992). These psychological disturbances have been considered as indicative of psychopathological changes and hence maladaptive.

The results highlight the absence of mental distress at all the assessment occasions. Also, no significant differences emerged in depression and anxiety states over the months, thus negating the affect of seasonal variation. Earlier studies have reported inconsistent findings. Bell and Garthwaite (1987) reported no evidence of adverse psychological changes in initially well- adjusted subjects but a number of studies have reported psychological disturbances due to seasonal variation (Strange and Klein,1973; Natani and Shurley, 1974; Palinkas, 1992; Sandal *et al.,* 1996).

The adverse consequences (psychophysiological changes) of prolonged exposure to stress depend largely on the individual's evaluation of the situation (Levine and Ursine, 1991). A situation that is experienced as highly distressing to one person may be experienced as challenging to another. In consequence, coping is a central term in interactive stress models for integrating the psychological determinants for the stress response (Levine and Ursine, 1991). In other words, these disturbances may not essentially be maladaptive. Palinkas (1992) has also concluded from the evidence that, 'the psychological symptoms are themselves part of the process of coping and do not necessarily represent an inability to adapt to the extreme environment'.

In the present study, the results showed high coping resources in all the assessments. The finding that no mental distress changes occurred might be due to the better ability of the winter-over team to adapt to the extreme environment. This carries an important clinical implication as it may also indicate adequate screening procedure of the selection for the winter-over team. Perhaps, the in-depth psychiatric interview and psychological testing was sensitive enough to enable the identification of the risk cases, and hence in their exclusion. This hypothesis however requires empirical testing, in light of the fact that there was a significant decrease in coping resources over the course of the Antarctic winter.

The absence of distress is in contrast to the earlier evidence that have reported that the depressive symptoms peak during mid- winter, then decline after midwinter, but remain at significantly higher levels (Gunderson and Palinkas, 1991; Palinkas *et al.,* 1995; Sandal *et al.,* 1996). The contradictory findings could well be due to the small sample size and therefore need to be replicated and cross-validated. In addition, psychological changes could not be measured in peak winter and peak summer.

A point to be mentioned is that the studies at other stations have been conducted under different environmental conditions and geomagnetic fields. These differences could have some different impact on the behaviour and mood. Hence, the studies may not be generalized.

In the present study, the effect of isolation was found to be salient (rather than the effect of seasonal variation). The scores of social coping resources were significantly less in the return journey as compared to the scores that were obtained in Delhi or in beginning winter (in Antarctica), while there was no significant decrease in social coping scores between beginning and end winter.

Physical coping scores were also found to decrease significantly in return journey in comparison to the basal assessment. This may be attributed to the restricted movement and activities in the Antarctica winter. Another interesting but understandable finding was the significant difference that emerged between basal and return assessment on spiritual coping.

The decrement in coping resources is a cause for concern because those with lower coping resources may be at a greater risk for physical and psychological disorders. Though the present sample of highly selected individuals did not show maladjustment, larger groups of workers (personnel have to be selected for technical rather than purely psychological reasons) may be at risk for such maladaptations. There is thus an urgent need to elucidate the factors that undermine the ability of winter-over personnel to cope.

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