

Mind Matters: Psychological Factors in Aircrew Illness

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ABSTRACT

Psychological factors contribute significantly to the pathogenesis of medical illnesses, affect their course and may be a target for effective intervention. Emotional and perceptual factors have been implicated in the maintenance of illness behaviour in both the general and aircrew populations. In aircrew it may influence not only the duration and course of illness but also return back to flying. The aim of this study was to determine whether there is a statistically higher incidence of certain personality characteristics in three different groups of referred military aircrew.

One hundred and fifteen aircrew were studied in three groups; non clinical (NC), musculoskeletal disabilities (MD) group and other medical disabilities (OMD) group using the Rorschach test indices. All underwent a clinical interview and were administered the Rorschach test individually with no testing of limits by one of two trained psychologists. Responses were scored following Rapaport's method in terms of location, determinants and content. Results were then tabulated according to the presence or absence of 18 personality characteristics derived from the Rorschach indices which was then statistically analysed using the χ^2 test.

Results indicated that all three groups showed deviations from optimal perceptual generalization and the NC group also had difficulty in differentiation, deficiencies in affectional needs and emotional over reactivity. A significant number of aircrew in the clinical groups showed anxiety and somatisation. A significantly high number of aircrew in all three groups showed non optimal emotional responsivity and reactivity. Different patterns of emotional and perceptual responses are observed in referred clinical and non clinical aircrew groups. The implications for interventions and remedies are discussed.

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Introduction

Clinical and research interest in the psychosocial and behavioural aspects of medical illness is rapidly growing, particularly over the last fifteen years [1], and extensive data has accumulated supporting a bi-directional relationship of high clinical significance. Psychological factors contribute significantly to the pathogenesis of medical illnesses, affect their course and may be a target for effective intervention [2]. These factors in turn may also influence illness behaviour. Illness behaviour refers to the ways in which symptoms are perceived, evaluated and acted on by different people [3] It can be conceptualized as having emotional, cognitive and behavioural components.

Emotional factors have been implicated in the maintenance of illness behaviour. In a study of

rheumatoid arthritis outpatients, Murphy et al [4] found that depression was associated with disability and maladaptive coping strategies. In studies of low back ache various psychological factors such as emotional dysfunction and personality have been implicated [5,6,7,8,9] as they have been in other disorders such as migraine [10]. Psychosocial factors have also been found to be important in aircrew with vasovagal syncope and musculoskeletal disabilities [11, 12]. Moreover emotional consequences of illness such as anxiety and depression are associated with a poorer outcome

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and influence duration of disability in low backache patients [13, 14].

Cognitive behavioural theory and research have emphasized the role of cognitive factors in the etiology and maintenance of maladaptive illness behaviour. People may develop their own cognitive model of illness, that include beliefs about its etiology, its symptoms, the personal consequences of the illness, and the extent to which the illness is amenable to control or cure [15]. In the case of fighter aircrew this cognitive model could also include rationalizations and beliefs about whether he can go back to fighter flying and if so whether he would be able to safely eject out of the aircraft without the possibility of dire/fatal consequences. This “illness perception” has been shown to be related to health outcome in chronic fatigue sufferers [15].

Some researchers have suggested that “somatic sensitivity” is an important determinant of illness behaviour, with certain individuals being unusually sensitive to and intolerant of normal bodily sensations [16]. These patients may misattribute benign symptoms as a sign of serious disease, visit their doctor more often and become dissatisfied with their treatment. Health anxiety which may also influence illness behaviour, refers to a concern about health in the absence of a pathology or excessive concern when there is some degree of pathology. High levels of health anxiety lead to actions aimed at improving health or ruling out the presence of disease, including repeated consultations with medical practitioners [17]. It may also lead to hypervigilance for bodily events and misinterpretations of normal bodily sensations, thus contributing to somatic sensitivity [16]. Aircrew are generally concerned about their health status/category because it is directly related to their flying status.

IAF aircrew, who are referred through either medical or administrative channels, for evaluation of their physical and mental fitness are evaluated by aviation medicine specialists at the Medical Evaluation Centre, Institute of Aerospace Medicine, Indian Air Force, Bangalore. Cases with medical disabilities in which subjective symptoms are not commensurate with the objective findings on evaluation are referred to the Dept of Aviation Psychology to investigate for the presence of psychological factors influencing disease. Musculoskeletal disabilities form more than 60% of these cases which are referred from the Dept of Human Engineering. The rest of the cases are referred from various other departments at IAM. Another group of aircrew are sent for evaluation after they have been behaviourally observed as having “loss of confidence in flying” or as having “low motivation for flying”. These aircrew are referred so that adaptability for military aeronautics can be evaluated by the psychologist.

Aim of the Study

To derive the incidence of common personality characteristics in three different groups of referred military aircrew ie non-clinical group (NC), musculoskeletal disabilities (MD) group and other medical disabilities (OMD) group using the Rorschach test indices.

Material and Methods

Subjects

Aircrew predominantly from Air Force and some from Navy and Army were referred for psychological evaluation, to the Dept of Aviation Psychology from Medical Evaluation Center, as a part of medical evaluation. During the course of over a decade, 115 aircrew under different diagnostic categories, constituted the sample for the study.

The subjects were studied under three groups; NC, OMD and MSD. The NC group consisted of aircrew who were referred because they had been categorized as medically fit but had low motivation/loss of confidence for flying. The MSD/OMD groups were referred because the Av Med specialist felt that their symptoms were not in line with the clinical evidence for their musculoskeletal or other disability. The demographic characteristics of the three samples are shown in the following tables (Tables 1-4).

Procedure

Subjects underwent detailed clinical interviews and there after were individually administered the

Table 1: Categories of aircrew sample based on clinical condition.

Category	No.	%
Non clinical	28	24
Musculoskeletal disabilities	59	52
Other Medical illness	28	24

Table 2: Demographic characteristics of the NC Group

Characteristic	No.	%	
Sex	Male	28	100
	Female	00	00
Marital status	Single	12	43
	Married	16	57
Present ac stream	Fighter	23	82
	Transport	01	04
	Helicopter	04	14

Table 2B: Demographic characteristics of the NC Group

Characteristic	Group Mean (SD)
Age in years	28.64 (5.11)
Years of Education	15.00 (0.00)
Years of Service	7.11 (4.25)
No. of flying hours	997.92 (809.92)

Table 3: Demographic characteristics of the MD Group

Characteristic	No.	%	
Sex	Male	58	98
	Female	01	02
Marital status	Single	15	25
	Married	43	75
Present ac stream	Fighter	36	61
	Transport	09	15
	Helicopter	14	24

Table 3B: Demographic characteristics of the MD Group

Characteristic	Group Mean (SD)
Age in years	30.15(4.36)
Years of Education	15.03 (0.26)
Years of Service	8.13(4.10)
No. of flying hours	1070.75 (797.25)

Table 4: Demographic characteristics of the OMD Group

Characteristic	No.	%	
Sex	Male	28	100
	Female	00	00
Marital status	Single	13	46
	Married	15	54
Present ac stream	Fighter	20	72
	Transport	04	14
	Helicopter	04	14

Table 4B: Demographic characteristics of the OMD Group

Characteristic	Group Mean (SD)
Age in years	27.39(4.54)
Years of Education	15.10(0.42)
Years of Service	6.17 (4.00)
No. of flying hours	806.00 (778.50)

Rorschach inkblot test using a standard method [18] after other objective tests were administered. The subjects were asked to say what the pictures looked like. The responses for all the cards were elicited

verbatim in succession, after which the inquiry was conducted; direct questioning for accurate coding of certain responses was done. No testing of limits was utilized. Two trained psychologists administered the tests to the majority of aircrew in English, and to a very few in Hindi.

Scoring

Several scoring procedures are available which often overlap. Responses were scored under several categories using Rapaport's method of scoring [18]. Responses were scored based on location, determinants and content. Variables under location were percentage W (whole) D (large detail) Dd (unusual detail) and S (space response). Determinants were M (Human movement) FM (animal movement) and m (inanimate movement) Fc (texture) FC' (achromatic color) FK (depth) F (form) and color responses such as FC (form predominant color), CF (colour predominant form) and C (pure colour). Apart from these, content responses like H (human), Hd (human detail), A (animal), Ad (animal detail), Pl (plant), Geol (geology), Geo (geography), Sex, etc were also scored resulting in a number of variables. Certain mean ratios of different variables were also calculated.

Results were then tabulated according to the presence or absence of 18 personality characteristics derived from the Rorschach indices. These were deficiencies in perceptual generalization (W%), deficiencies in perceptual differentiation (D%), intellectual opposition towards self (S%>10), low stress tolerance (M), anxiety and somatisation, overdeveloped affectional need, under developed affectional need, traumatic experiences, emotional overstimulation and understimulation (R% to chromatic cards), impulsivity (CF), emotional over or under reactivity (Sum C >3 or Sum C <3), difficulties in interpersonal functioning (M)/ social

maladjustment (A%), personalized reactions (F%<20) and neurotic constriction (F%>50).

Statistical Analysis

The number and percentages of the above characteristics in the three groups were manually calculated. Some of the characteristics were then grouped and the χ^2 test was calculated on the incidence of aircrew with and without these characteristics to determine whether their presence could be attributed to a chance occurrence or not.

Results

The number and percentages of personality characteristics in the three groups are shown in the following table:

The number, percentages, χ^2 values and *one tailed* significance values of these characteristics in the three groups are shown in the Table 6.

All three groups had deviations of organizing processes and the associative processes which aids in perceptual structuring of life situations. It is according to this that the emphasis divides between W and D. All groups show difficulties in optimal generalization of perceptual experiences and the NC group also showed significant deviations in differentiation of perceptual experiences. A significantly larger number of the aircrew in the OMD and MSD groups showed intellectual opposition to self indicating feelings of inadequacy and guilt and also symptoms of depressive feelings. The MSD group showed significant anxiety and somatisation and the aircrew in the OMD group also showed a trend towards significance in this characteristic. Over and underdeveloped affectional need was observed in a higher number of aircrew in the NC and OMD groups as the χ^2 value showed a trend towards significance. All three groups had a significantly high number of aircrew who showed

Table 5: Number of Aircrew with common Personality Characteristics among three groups

Personality Characteristic	NC (N=28)	OMD(N=28)	MSD (N=59)
Generalisation deficiencies	19	22	42
Differentiation deficiencies	19	18	27
Intellectual opposition	18	19	40
Low stress tolerance	09	07	11
Anxiety/somatisation	15	19	37
Overdeveloped affectional need	15	19	30
Underdeveloped affectional need	03	00	05
Traumatic experiences	10	06	14
Emotional overstimulation	10	17	11
Emotional understimulation	10	07	18
Impulsivity	12	14	30
Emotional over reactivity	19	18	33
Emotional under reactivity	09	08	15
Difficulties- interpersonal functioning	09	04	09
Social maladjustment	08	05	08
Personalised reactions	07	14	17
Neurotic constriction	03	01	02

Table 6: Significant Percentages (Number) of Aircrew with Personality Characteristics in 3 Groups.

Personality Characteristic	NC (N=28)	X2 value	OMD(N=28)	X2value	MSD (N=60)	X2value
Perceptual Organisation	93 (26)	18.90****	100 (28)	26.04****	87 (52)	30.82****
Generalisation deficiencies	68 (19)	2.90**	79 (22)	8.04****	72 (43)	10.42****
Differentiation deficiencies	68 (19)	2.90**	64 (18)	2.28*	45 (27)	0.42
Intellectual opposition	64 (18)	1.76	68 (19)	2.90**	68 (41)	7.35***
Anxiety/somatisation	54 (15)	0.14	64 (18)	2.28*	63 (38)	3.75**
Affectional need	64 (18)	2.28*	64 (18)	2.28*	58 (35)	1.35
Emotional Responsivity	71 (20)	4.32**	89 (25)	15.75****	82 (49)	22.82****
Emotional Reactivity	100 (28)	26.04****	89 (25)	15.75****	82 (49)	22.82****
Emotional Overreactivity	68 (19)	2.90**	64 (18)	2.28*	57 (34)	0.82

*p < 0.10 **p < 0.05 ***p < 0.01 ****p < 0.005

less or more than optimal emotional responsivity and emotional reactivity. A significantly higher number in the NC group showed emotional over reactivity with the OMD group showing a trend towards significance.

From Table 5 it is seen that in all three groups about 50% of the aircrew showed emotional impulsivity. In the OMD group 50% of subjects had

personalized reactions and in the NC group about 30% had low stress tolerance.

Discussion

A significantly larger number of the aircrew in the OMD and MSD groups showed intellectual opposition to self indicating feelings of inadequacy and guilt, symptoms of depressive feelings. The

MSD group showed significant anxiety and somatisation and the aircrew in the OMD group also showed a trend towards significance in this characteristic. A lack of optimal regulation of emotional processes was also observed in the clinical groups. Previous literature has reported the role of psychological factors in neck and back pain. Anxiety as well as mood and emotions and cognitive functioning were found to be significant factors [5,6]. Somatic aspects also play an important role [7,9]. A previous study found that aircrew with delayed recovery of musculoskeletal disabilities showed significantly higher MPQ scores on hysteria compared to the normal recovery group [12].

Based on the Rorschach test results of these aircrew the primary issue of concern here are the *emotional factors* which appear to be influencing recovery. These could have well influenced the pain perception, which could in turn have affected recovery from illness, as it is known to do. One study found that anxiety and depression are not only associated with pain intensity but also predict pain intensity [19]. A number of non pharmacological interventions and remedial measures can be suggested:

(a) Psychological assessment and brief psychotherapy. Symptoms of psychological distress in individuals predict the subsequent onset of low back pain [20] In the provision of pain/symptom relief to these patients, psychological interventions like brief psychotherapy and cognitive behavioural therapy may be used to deal with the symptoms of anxiety /depression /somatisation These patients would benefit from support and reassurance from a professional psychologist. It is important to effectively manage emotional factors early when treating musculoskeletal disorders such as LBA [14]. One study found that if the duration of the musculoskeletal pain problem was more than one year, there was a relationship between

psychological components and function [21]. However psychologists should also be aware that the use of more dynamic psychotherapy may be contraindicated since therapy of this sort may lead to further breakdown of healthy defense mechanisms, which are needed in a good flier.

(b) Psychological Evaluation of Aircrew who have ejected. Emotional experiences and disturbances have been reported in ejection survivors [22,23]. An aviation psychologist needs to interview all aircrew post ejection during their review at IAM and assess their emotional status. Further probing may be carried out based on the results of the interview and if required counseling sessions can be planned according to the need. Once experience is gained with such aircrew, specific test inventories can be utilized for evaluation.

(c) Critical Incident Stress Debriefing (CISD) to be done after such events such as an ejection or any other accident in which the pilot sustains serious injuries. This is group debriefing with the aid of a mental health professional. Ideally three to ten days after the event, the group talks about the experience, their reactions and symptoms and are educated about what signs to look for. It should be part of the ongoing support including support groups, family, stress management etc. [24].

(d) Psychological/emotional support. Psychological and emotional support plays an important role in recovery. While the support from family (wife, children and parents) is expected and available, it is the support from colleagues/superiors at workplace and the medical authorities that could prove critical in a fast and complete recovery. This probably is all the more important in disabilities like backache where there are likely to be psychosocial variables affecting recovery. Frequent one-on-one interactions with the medical officer can help clarify the aircrew's doubt regarding treatment protocols.

The MO in turn should regularly brief the squadron supervisors on the functional and clinical impairment, thus ensuring a comprehensive support at the base level.

(e) Aircrew selection tests for emotional stability. Emotional stability is a very important factor for a flier and this should be addressed at selection level. It was seen that almost 25% of the aircrew did not have strong stress coping mechanisms. There is a dire need to introduce newer tests to measure emotional stability at selection level.

Conclusion

It is concluded that psychological variables such as emotional factors are important and are likely to be related to perception of pain and disability in aircrew with medical categories for musculoskeletal or other disabilities. Psychosocial risk factors and not structural MRI variables have been found to predict the development of low back pain disability [25]. Even though these factors/symptoms may be at the subclinical level they need to be addressed early in treatment of disabilities/illness in aircrew to prevent progression and facilitate early return back to flying.

Conflict of Interest - none

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Answer to Aviation Medicine Quiz on Page 50

1.a 2.a 3.c 4.c 5.b 6.b 7.b 8.c 9.c 10.d 11.b
12.a 13.c 14.b 15.c 16.a 17.a 18.a 19.c 20.d