

Original Article

## Post-accident support system: Supporting aircrew safely back into the cockpit

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### ABSTRACT

**Objectives:** The incidence of post-ejection psychological sequelae is at par with spinal injuries. While policies recommend evaluation and close follow-up for physical injuries, no clear policy exists for psychological support for aircrew after an accident. This paper presents a basic review of the literature, followed by an algorithm for the psychological evaluation and rehabilitation of an aircrew following a flying accident.

**Material and Methods:** The authors carried out a comprehensive review of the literature regarding the approach toward post-aircraft accident psychological support in the various air forces across the world. The various aspects of psychological sequelae including the effect on flight safety were studied. The spectrum of psychological problems starting from acute stress reaction to post-traumatic stress disorder was discussed. The concept of psychological first aid as applicable in this context was also studied.

**Results:** The authors propose post-accident support system (PASS) as a comprehensive approach to psychological first aid to the aircrew following an accident. The aim is early identification of possible chronic psychological or psychiatric conditions with an intention to institute early interventions. It leverages the inherent ethos of the IAF to help an aircrew survivor and provide standard of care in the aftermath of a flying accident. The authors present the composition of the PASS team, the tenets of training this team, along with an algorithm to follow in case of an aircraft accident. The authors also present a roadmap for implementation of PASS in in any aviation organisation, whether civil or military.

**Conclusion:** Accidents are life-changing events for pilots. Regardless of the cause, the aircraft accident is traumatic for the pilot. Psychological effects vary over time and between people. The IAF must recognize aircrew's psychological reactions during a crash. This acknowledgment must become a policy to help the pilot after an accident. The policy must promote healthy coping, facilitate early return to flying, and identify pilots who need specialized interventions. A successful post-accident psychological first aid program needs guidelines, training, implementation, and monitoring.

**Keywords:** Aircraft accident, Aircrew, Post-ejection, Psychological first aid, Psychological support

### INTRODUCTION

A flying accident is a traumatic event. It is generally understood that it may be associated with psychological sequelae. International literature clearly brings out the incidence of such sequelae along with its impact on flight safety. Most air forces recommend evaluation and close follow-up.<sup>[1,2]</sup> Clearly, this situation is serious enough to require intervention. The incidence of psychological sequelae is at par with spinal injuries. While the aeromedical disposal for physical

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injuries is laid down, no clear guideline/policy exists for psychological support to the aircrew.<sup>[3]</sup>

A recent accident with unfortunate psychological consequences reiterated the need for psychological support in the immediate post-accident period. This paper presents a basic review of literature, followed by an algorithm for the psychological evaluation and rehabilitation of an aircrew following a flying accident with a view to reducing psychological consequences and improving operational effectiveness as well as flight safety. This activity of providing psychological first aid is hitherto referred as post-accident support system (PASS). The paper closes with a table depicting a roadmap for implementation of such a policy in an aviation organization.

## REVIEW OF LITERATURE

Early studies have shown that post-ejection psychological consequences have been identified by the aeromedical community as early as the 1970's.

In the 1970's Zeller studied the emotional responses of 200 United States Air Force aircrew who had survived combat accidents in South East Asia (mostly by ejection). Of these, 67% equated the experience to a text-book procedure. However, 33% showed clear emotional consequences, including aimless and inept behavior, panic, time distortion, and transient psychotic states. Zeller concluded that cold, factual, unemotional reporting in the military was responsible for the impression that surviving combat and ejection were routine and of no significance. He recommended detailed psychological assessment.<sup>[1]</sup> Paykel in 1974 brought out that the links between life stress and psychiatric disorder are not straight-forward; the life event is important, but its interaction with predisposing factors, including personality, is vital.<sup>[1]</sup>

Fowlie and Aveline in 1985 conducted a survey of 175 Royal Air Force officers who had survived ejection from an aircraft. They found that 40% of survivors from high performance military aircraft accidents experienced continued emotional consequences, but 28% flew again, despite having significant fears, apprehensions, resentment, and anger. These concealed consequences could influence performance, efficiency, commitment, and motivation. Five subjects experienced ejection on a second or third occasion.<sup>[1]</sup>

Daudin *et al.* in their experiences with the French Air Force have recommended that each ejection event must be considered on a case-by-case basis. They have recommended thorough mental health evaluation and close follow-up to optimize return of well-adjusted and highly functional aircrew to duty.<sup>[2]</sup> Daudin *et al.* have succinctly described the psychological aspects of ejection.<sup>[2]</sup> Ejection is when the pilot suddenly stops trying to get the plane back and transits

into a passive situation where he (or she) is often helpless and sometimes exposed to the hostile environment where he lands. This is a "break point." The ejection can be thought of as a "successful" ejection if it has been planned and is justified, e.g., if the engine fails. It is then seen by the pilot as a "plus" in his career, almost like a "heroic achievement," and it may be a good idea to look into whether it is appropriate to do so. Other pilots, on the other hand, may feel bad about "breaking the machine" which can lead to soul-searching.

Taneja *et al.* studied the aircrew experiences of 20 IAF fighter pilots who had ejected. While the study focused on factors leading to a successful ejection, it is the only available account of the emotional response of Indian fighter crew to ejection.<sup>[4]</sup>

While there is a wealth of information on ejection injuries in fighter pilots and other injuries in military helicopter and transport aircraft crashes, the literature on post-crash psychological issues is rare. Anecdotal accounts from individual crew are available. However, being a traumatic life experience, a flying accident is generally connected with psychological repercussions. The psychological reaction would thus follow a similar pattern to that of the general population when faced with similar life-threatening or traumatic occurrences. However, being military personnel, the initial selection and military training may be an additional factor to consider in terms of resilience and recovery.

With the paucity of literature specifically associated with psychological effects in aircrew post-crash, acute anxiety disorder and post-traumatic stress disorder (PTSD) associated with other traumatic life events may be used as reasonable analogs for looking at evaluation and rehabilitation.

U.S. Air Force Aviator PTSD Study Group provides a summary of the aeromedical concerns regarding PTSD along with preliminary psychometric findings.<sup>[5]</sup> The aeromedical issues in PTSD are discussed in the document are summarized below:

Intrusive symptoms in PTSD pose a risk of sudden incapacitation. These symptoms include dissociative reactions like flashbacks, where the aviator loses awareness of their surroundings. PTSD causes intense psychological distress when exposed to cues that remind the aviator of the traumatic event, reducing their ability to function in the aviation environment. Distress and/or strong physiological reactions to internal or external trauma cues may also incapacitate a flyer.

Negative cognitive and mood changes may also cause subtle performance decline. PTSD symptoms that can affect performance include decreased concentration, sleep disturbance, hypervigilance, and exaggerated startle response. Concerningly, these symptoms are subtle, and

the stresses of aviation may exacerbate them. Interpersonal relationships are a common operational issue with PTSD. Angry outbursts and feelings of detachment from others can negatively impact crew resource management. Finally, PTSD is highly comorbid with alcoholism.<sup>[5]</sup>

Many studies have now mapped posttraumatic stress trajectories from acute to chronic phases across multiple assessment points, yielding remarkably consistent findings by noting the following.<sup>[6]</sup>

- (a) A resilient class with initial distress then gradual remission
- (b) A recovery class with initial distress then gradual remission
- (c) A delayed reaction class with initial low symptom levels but increased symptoms over time
- (d) A chronic distress class.

The aim of psychological evaluation following a flying accident is the early identification of possible chronic psychological or psychiatric conditions with an aim to institute early interventions. It is important to note that while around 70% of persons with autism spectrum disorder (ASD) later on meet PTSD criteria, a large number of persons who have been diagnosed with PTSD did not meet ASD criteria initially.<sup>[7-9]</sup> Therefore, while early psychological reactions may predict PTSD later, the absence of manifest psychological reactions in the days following a flying accident does not preclude later development of long-term psychiatric or psychological issues.

## ALGORITHM FOR PASS

A few basic tenets need to be adhered to as follows:

- (a) Aircrew are the most precious resource in the IAF, and their conservation is of paramount importance.
- (b) PASS will follow universal first-aid principles, assisting the aircrew as soon as possible with local resources, before the availability of professional psychological assistance.
- (c) Following the principles of “Primum non nocere” (first do no harm), the team providing PASS will be equipped through focused training to avoid further traumatizing the traumatized aircrew.

## Objectives

The objectives of PASS team are the following:

- (a) To reduce the mental trauma and associated burden of the accident
- (b) To prevent/mitigate long-term psychological morbidity
- (c) To enhance operational effectiveness and flight safety.

## COMPOSITION OF PASS TEAM

In the aftermath of a flying accident, the CO/Flight Cdr and other unit authorities, as well as medical personnel, routinely reassure and support the aircrew. The PASS team will fortify this very ethos of IAF.

The PASS team at the station will be designated by the Station Commander or suitable authorities as a standing team comprising the following members.

### Ops/Adm member

This member will be CO or Flight Cdr from any of the flying squadrons.

### Medical member

Aerospace medicine specialists (Aerosp Med Spl) of the station will be ex-officio member of the PASS team. In case, there is no Aerosp Med Spl posted, and the senior medical officer (SMO) will be the medical member.

*Note:- Psychological counselors are employed at certain stations on contractual basis. Because these mental healthcare professionals are hired on a temporary basis, standard PASS training may not be possible. Moreover, most flying accidents involve sensitive and confidential occurrences reflecting upon various practices of the IAF operations and maintenance. Considering the above, the contractual psychological counselor is not recommended as a part of the PASS team. The psychological first aid is to be provided by non-mental health professionals of the station.*

## TRAINING

Since psychological first aid is to be given by persons other than mental health professionals, training of the team is considered essential to deliver standard of care. Training will include brief education followed by skill development based on workshops, group discussions, and role-playing.

The goals of training are the following:

- (a) Training on roles and responsibilities of each member for implementing PASS following a flying accident
- (b) Training on limits of role and capabilities of each member
- (c) Training on administering PASS and recognition of behaviors requiring specialized professional mental healthcare services
- (d) The medical member administering PASS to be additionally trained in the administration of simple questionnaire-based tools for the assessment of peritraumatic dissociation, peritraumatic distress, and acute stress disorder

- (e) Training on documentation, record keeping, reporting, and confidentiality
- (f) Training on practice and demonstration of PASS implementation as part of post-accident plan of the station.

The aircrew will be administered PASS at the earliest available opportunity after due clearance by the medical authorities. This action is coordinated by the Medical Member. This is depicted as a flowchart in Figure 1.

Post-accident psychological support will constitute two key elements of assessment and support. Both these elements are essential to meet the primary aims of reducing psychological morbidity as well as mitigating long-term effects.

## ASSESSMENT

The basic assessment to be done is to recognize whether the psycho-emotional trauma requires intervention, using simple bedside tools. The administration and scoring will be part of PASS training. While the premise of a simple assessment is undeniable, the exact tools used may vary depending upon the organization or the level of training given to the PASS team. The authors recommend the following three questionnaires to be administered in approximately 10 min. It is understood that various organizations may want to devise their own methodology for carrying out this basic screening, depending on the availability of trained personnel and extent of training that may be imparted to the PASS team.

- (a) Peritraumatic dissociative experience questionnaire (10 items): Cut-off score  $>15^{[10,11]}$
- (b) Peritraumatic distress inventory (13 items): Cut-off score  $>15^{[10,12]}$
- (c) National stressful events survey acute stress disorder short scale (7 items): Cut-off score  $\geq 2^{[12,13]}$

### Frequency of assessment

If up to one of the three scores is above the cut-off value, reassessment is done on the 3<sup>rd</sup> day and thereafter every 7–10 days. In case the aircrew proceeds out of station, the questionnaires may be administered telephonically. A minimum of four assessments must be carried out within the 4 weeks when the aircrew is still grounded, before proceeding to a boarding center for review. The assessment must not be carried out beyond these 4 weeks.

### Referral for specialized evaluation

In case, two or more of the questionnaires have scores greater than the cut-off values, the aircrew is admitted and transferred to a suitable center for specialized evaluation by the psychiatrist and the aviation psychologist. Thereafter, further disposal is to be as per existing applicable policy.

## SUPPORT

Following a flying accident, the CO/Flight Cdr and other unit authorities along with the medical personnel routinely provide support and help to the aircrew in a military flying set up. This role may be taken up by senior supervisors within other organizations. PASS provides these persons with additional skills that make such support more structured and effective.

The following key elements constitute the PASS:

- (a) Initiating contact and engaging with the aircrew
- (b) Gathering information on immediate needs and concerns and addressing them
- (c) Reassurance and establishing a sense of safety
- (d) Provide practical assistance and facilitate social support for the aircrew and his family
- (e) Simple advice on coping with the traumatic experience, based on international best practices.

The PASS team will interact with the aircrew and provide support to the best of their abilities in their respective fields.

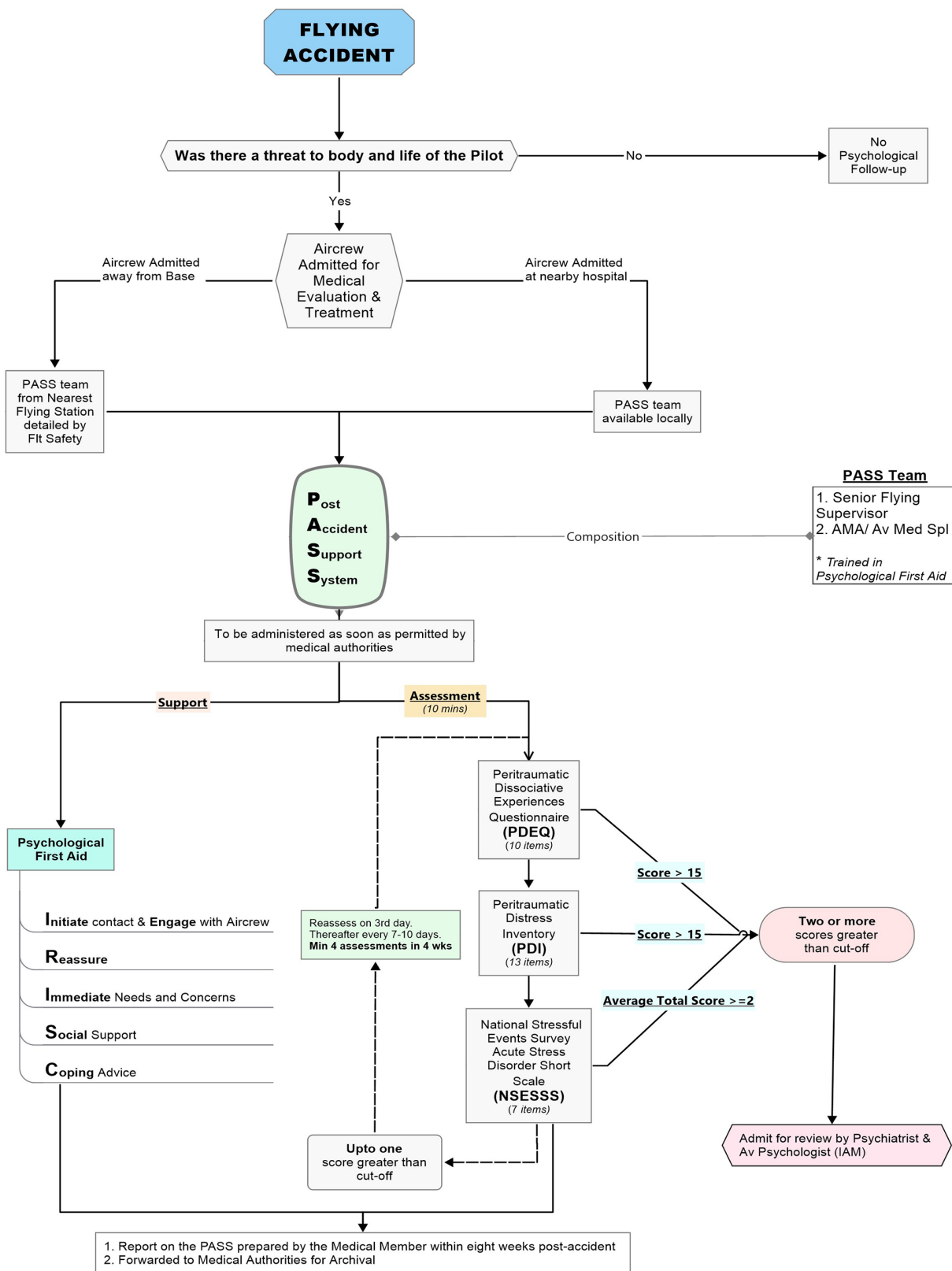
- (a) The operational member would have a larger role in establishing a sense of safety while allaying immediate fears and concerns. He would even be better placed to provide practical assistance and facilitate social support.
- (b) The SMO or the Aerosp Med Spl would be better trained for initiating early contact, help in coping, and assess need for intervention by specialized mental health professionals.

## REPORTING

The entire activity involving PASS is to be recorded and reported in the following manner:

- (a) The key points of the interactions will be recorded in a simple-to-use Likert scale-based format provided during training
- (b) The PASS team will brief the appropriate authorities after each session with the aircrew
- (c) All such communications and documents will be treated as “Medical Confidential.” The screening questionnaires will not form any part of the medical board nor will they contribute to medical categorization. As they reflect a dynamic psychological state, they will not be produced before the team investigating the accident
- (d) A report on the PASS along with copies of the assessments and interactions will be prepared by the medical member of the inquiry and forwarded to the suitable authorities within the organization within 8-week post-accident for archival.

A roadmap for phase-wise implementation and evaluation roadmap of PASS is placed in Table 1.



**Figure 1:** Flowchart for administration of post-accident support system. PASS: Post accident support system, AMA: Authorised medical attendant.

**Table 1:** Roadmap for phase-wise implementation and evaluation roadmap of post-accident support system.

Roadmap for implementation of post accident support system (PASS) programme for aircrew			
	Aim	Key elements	Evaluation
PASS policy and procedures	Provide optimal organisational environment for implementation of PASS	<ol style="list-style-type: none"> <li>1. Organisational recognition of psychological aftermath of flying accident.</li> <li>2. De-stigmatisation of Self reporting of psychological issues.</li> <li>3. Roles and responsibilities of the operational, administrative and medical personnel.</li> <li>4. Procedures for monitoring overall implementation of PASS</li> </ol>	Expert review of Policy and documentation.
PASS training at various levels	Protocol for structured training for the various groups of people associated with providing PASS	<ol style="list-style-type: none"> <li>1. Identification of various groups viz. operational supervisors, peer groups, administrative support group and the medical support personnel.</li> <li>2. Training on roles and responsibilities.</li> <li>3. Training on limits of role and capabilities.</li> <li>4. Preparation of training syllabus.</li> <li>5. Additional training for AMA and Aerosp Med Spl.</li> <li>6. Focus on skill development.</li> <li>7. Training of documentation and confidentiality.</li> <li>8. Training on integration with post accident plan.</li> </ol>	<ol style="list-style-type: none"> <li>1. Pretraining survey of personnel.</li> <li>2. Post training survey of personnel.</li> <li>3. Expert audit of didactics and workshops.</li> </ol>
Implementation of PASS after a flying accident	SOP for implementation of PASS post flying accident	<ol style="list-style-type: none"> <li>1. Initiating contact with aircrew.</li> <li>2. Engaging with aircrew.</li> <li>3. Gathering information on immediate needs and concerns.</li> <li>4. Establish sense of safety.</li> <li>5. Provide practical assistance and facilitate social support.</li> <li>6. Simple advice on coping.</li> <li>7. Assess need for further intervention.</li> </ol>	<ol style="list-style-type: none"> <li>1. Assessment of PASS implementation under simulated conditions during Inspections.</li> <li>2. Early and late post-accident aircrew feedback on PASS.</li> </ol>
Long-term monitoring of PASS	Long term monitoring of outcomes	<ol style="list-style-type: none"> <li>1. Central database of PASS provided post flying accident.</li> <li>2. Three yearly review and analysis of PASS data and programme.</li> <li>3. Assessment of PASS as part of aerospace safety inspections.</li> </ol>	<ol style="list-style-type: none"> <li>1. Analysis of pre and post training feedback of personnel undergoing PASS training.</li> <li>2. Monitoring of intervention outcome of PASS wherever possible.</li> <li>3. Comparison of 3 yrs pre-PASS mental health data with 3 yr post-PASS mental health data of post-accident aircrew.</li> </ol>

PASS: Post accident support system, SOP: Standard operating procedure, AMA: Aerospace medicine advisors.

## CONCLUSION

For the pilot, a flying accident is a life-changing event. Regardless of the cause of the accident, the pilot perceives it as a potentially fatal traumatic event. The psychological consequences of such events vary over time and between individuals. During such a situation, a well-structured mechanism in the form of post-accident psychological first aid would help in minimizing the psychological aftermath while recognizing those who may need specialized intervention. PASS must be seen as an organizational

effort toward minimizing psychological impact of flying accidents and conserving trained aircrew for gainful employment.

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