

## Role of Aviation Nursing In Medical Tourism and Civil Aviation in India

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**Abstract:** Today, in India medical tourism sector witnessing a paradigm shift in the field of Aviation Medicine and Civil Aviation industry. Medical Tourism serves as a boon for Civil Aviation Industry and its hospitality, albeit, occurrence of in-flight medical events are potentially significant problem as of now leading not only to diversion of flights, at times loss of precious human lives. It becomes imperative on the part of Indian Commercial Airlines to ensure the health needs of Medical Tourist and ensure a favorable impression of safe air travel in India. This study does agree that there exists 'Flight Nurse' system in countries like Australia, who are Certified Emergency Nurse., Certified Flight Registered Nurse and Critical Care Registered Nurse, rendered their service only for rescue evacuation for helicopters, propeller aircraft and Jet aircraft. The study underscores that none of the above exist in commercial airline industries in India. The cabin crew are placed in an unenviable situation and expected to tackle such medical emergencies without adequate aviation nursing training. The aim and objectives of this paper is (1) to analyze factors responsible for increasing in-flight medical emergencies during Medical Tourism in India (2) to assess the practical difficulties and challenges in treating in-flight medical emergencies. This paper underscores the need to explore new avenues to provide "Specially trained Aviation Nursing cum cabin crew services" in long haul flights.

**Keywords:** Medical tourism-Civil Aviation-in-flight medical emergencies-challenges.

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### I. Introduction

Dating back to Indus Valley civilization, practice of mantras, spirits, rituals and searching for medicinal plants and herbal healers were in vogue. The author underscores and did support the findings of previous author, Isishrath Humarath et al that the Indian system of medicine has been practicing based on diet, climate, beliefs, supernatural, empirical, and culture combined with rituals, charms, mantras, medicines and surgical intervention. <sup>1</sup> Medical tourism has its origin several thousand years ago and one literature revealed that Greek pilgrims travelled from all over the Mediterranean to the small territory in the Saronic Gulf called Epidauria. <sup>1,2</sup>

This 21<sup>st</sup> century is an era of medical tourism and people from many developed countries like United States and Europe, Thailand, Philippines, South Africa, are traveling to India as Medical tourists, combining medical treatments with inexpensive vacation. The Niti Aayog has identified that Medical Value Travel (MVT) as a major source of foreign exchange earnings. It has been estimated that by 2020, India's medical tourism industry could earn \$9 billion, which account for 20% of the global market share. The city of Chennai in India is a "Hub" of Medical Tourism and attracts about 45 percent of health tourists from abroad and 30 to 40 percent of domestic tourists.

In India Medical Tourism is promoted by the Indian Government and fuelled by the Corporates in medical care. Available data revealed that people from foreign countries travelling to India as medical tourist, often opt for Allopathy, followed by Indian system of medicine like homeopathy, Siddha, Meditation and Yoga. The National Health Policy, 2002, supports medical tourism and since 2006, the government has relaxed issuing M (medical) visas to patients and MX visas to the accompanying spouse. Furthermore, Indian Corporate Hospitals are governed by international accreditation schemes so as to infuse confidence by alleviating individual concern about the quality of medical care in India. The National Health Policy, 2002, supports medical tourism and since 2006, the government has relaxed issuing M (medical) visas to patients and MX visas to the accompanying spouse. Further, the Indian Corporate Hospitals are governed by international accreditation schemes so as to infuse confidence by alleviating individual concern about the quality of medical care in India.

The Study was conducted by face to face interview with air passengers and cabin crew from various Airlines in Chennai base, consolidating the experience encountered by air passengers and the aeromedical experience of the author by working as Pre-Flight Medical Officer in various Airlines and also as a Civil Aviation Medical Examiner for various countries, for the last ten years. The secondary data collected by reviewing various literature, periodicals, data being sourced from DGCA website and notifications., data from website like PubMed, Wikipedia, DNA etc. and newspaper and media publication on flight diversion and

emergency landing due to in-flight medical emergencies in India. The collected data were consolidated, evaluated and arrived at a valid conclusion that there are increasing incidents post medical complication during medical tourist return to their home country after taking treatment in India. This paper brings out some candid suggestions and recommendations for the growth and development of Medical Tourism Industry and Civil Aviation Industry in India by providing “Specially trained cabin crew Services” by imparting hands on training to the cabin crew by a qualified ICU trained nurse in intensive care unit to cater the health needs of Medical Tourism air passengers from their home country to India and from treating hospitals of India to their home country. This study aims to identify the risk factors for the increasing in-flight medical emergencies, and to identify the appropriate in-flight health care treatment for air passengers in India. The objectives to assess the benefit and risk of Medical Tourism and Commercial Airlines in India and to assess and evaluate the compounding factors for increasing inflight medical emergencies and development of Medical Tourism and Civil Aviation Industry in India.

The Civil aviation industry encounters increasing in air passenger medical emergencies while coming from and returning to their home country after their Medical Tourism in India. In-flight medical emergency events are quite complex and challenging due to restricted cabin space and resources leading to diversion of flights or emergency landing despite telemedicine and sophisticated equipment on board.<sup>4</sup> Despite expansion of commercial airlines in its infrastructure and flying frequencies in the recent one decade, there are no prescribed guidelines for managing in-flight medical emergencies from the point of a volunteer- passenger turned doctor on board. It becomes imperative on the part of the Commercial Airlines to identify the triggering factors for increasing in-flight medical emergencies and to assess the new avenues to cater the health needs of Medical Tourists and also to ensure safe air travel in India.

## **II. Methods**

The present study is an observational and participatory study by random sampling - by randomly interacting with the air passengers. The Study was conducted by face to face interview with air passengers and cabin crew from various Airlines in Chennai base. Data were collected by consolidating the experience encountered by air passengers and the aeromedical experience of by virtue of working as Pre-Flight Medical Officer in various Airlines and also as a Civil Aviation Medical Examiner for various countries, for the last ten years. The secondary data were collected by reviewing various literature, periodicals, data being sourced from DGCA website and notifications., data from website like PubMed, Wikipedia , DNA etc. and newspaper and media publication on flight diversion and emergency landing due to in-flight medical emergencies in India. Primary and secondary data were collected and the data were consolidated and arrayed based on the following Study design

By participatory and clinical approach, health condition, requirement, availability of medical facilities and medical management of air passengers during inflight medical emergency were collected by face to face interview. Interacting with cabin crew and collecting the on board challenges being faced and collected the inflight experience gained by the cabin crew in seeking the help of doctor on board during medical emergencies and treating such medical emergencies and the inputs put forth by air passengers. Collected data were diligently reviewed with previous authors and previous in-flight medical emergencies, arrayed, analyzed and discussed.

Aviation Industry and Commercial Airlines - Practical Difficulties during Inflight Medical Emergencies: Medical Tourism serve as a boon for several associated industries especially Civil Aviation Industry and its hospitality. In-flight medical emergency events are critical component of emergency medical management due to aircraft at 25,000 feet far from advanced medical care, restricted cabin space and resources with increasing frequencies of passengers becoming patients in the midair, leading to diversion of flights and events of emergency landings despite telemedicine and sophisticated equipment on board. Cummins et al examined that worldwide the death on board were middle aged men, with 77% apparently not suffering from any health problem prior to travel.<sup>5</sup> In India, the Director General of Civil Aviation has emphasized the need for cabin crew to be trained with lifesaving procedures so as to ensure the safety of the air passengers. An emergency landing of a domestic flight may cost an airline about \$30,000, while that of an international flight, \$70,000 to \$230,000.<sup>5</sup> Besides on board preliminary medical attention., cabin crew are always prepared for any such in-flight emergency., provided with a First Aid box with all essential equipment to administer First Aid and in cases of acute illness and injury on board. To put it, the cabin crew are left with no option than to 1.Diagnosis., 2.Treatment and 3.Disposal of air passengers on board.<sup>6</sup>

### **In-Flight Medical Emergencies**

Data collected by the Directorate General of Civil Aviation showed that between August 2012 and August 2013, revealed that total of 46 emergency landings and 38 were because of medical emergencies. As a matter of fact, the increasing load of aged and chronically ill patients often opt for air travelling for seeking speedy and affordable medical treatment as medical tourists. This study observes that the above myriad of air

passengers is one of the major triggering factors for increasing incidents of Inflight medical emergencies inside the aircraft cabin. It is further estimated that 7.3 % inflight medical emergencies culminated in flight diversion worldwide. Out of 11920 medical emergencies recorded as of 2010, 38 cardiac arrests have been attended with 22 (58%) flight diversion. The study has further observed that the prevalence of Syncope 25%., Cardiac symptoms 19%., Seizures 9%., Respiratory symptoms 9% and Stroke 40%.<sup>7</sup>

It has been estimated that one in-flight medical emergency will occur in every 604 flights.<sup>5</sup> By and large, the decision of flight diversion becomes inevitable for the commander in case of on board death, or on board cardiac arrest, myocardial infarction ( heart attack ), stroke or uncontrolled seizures and complicated on board deliveries. A previous study has pointed out that out of the 36 deaths identified, 30 occurred during the flight., on board assistance was provided by physicians in 48.1%, and nurses in 20.1% of cases. The common inflight medical management were oxygen (49.9%), intravenous 0.9% saline solution (5.2%), and aspirin (5%).<sup>8</sup> The author describes that the above epidemiology reveals one valid observation is that there must be a standard operating procedure common to all airlines to maintain an in-flight mitigation system able to maintain balance between occurrence and management of in-flight medical emergencies do endorses the observation of the previous author, Chandrasekaran Rajasekaran et al Jan 2017.<sup>9</sup> This author endorses the observation of Amit Chandra and Shauna Conry et al, 2013, that after globalization, despite expansion of commercial airlines in the recent one decade, there are no prescribed guidelines for managing inflight medical emergencies from the point of a volunteer- passenger turned doctor on board.<sup>10</sup> This study also highlights the contribution of Press and Media personnel on board, politicians on board, Journalist on board and Social workers on board and the Airline Research and Development (R&D) wing and the think tankers of commercial airline industry work together to mitigate in-flight medical emergencies in India.<sup>4</sup>

#### Physiology of Flight

The physiology of flight is that 40-50% of cabin air is re-circulated and cleaned by special filters and the outside air is 60% bleed air and physiology of human during flying at the cruise level 25000-40000 feet in the horizon gets altered due to: Hypoxia by 15-20%., Hypobaric by 15-18%., Reduced humidity by 5-8%., Gas Expansion., Expansion of hollow organs like intestine, stomach pain, ear pain etc., Concentrated urine and Renal stones., Jet lag and Deep Vein Thrombosis., Constant Vibration., Radiation Exposure 100% and Pregnancy and cancer related problems.<sup>10</sup> The author like to quote one such fitting example as pointed out by Dr. Keith J. Ruskin et al is that about the simple delivery of route of medication of injectable medications in the Physician's medical kits, may be administered via the intramuscular route. While administering Injection epinephrine, the 1:1000 concentration of epinephrine in the medical kit is the concentration is typically reserved for intramuscular administration for the treatment of anaphylaxis and that the medication that carries the highest risk of error in administration. Injecting 0.3–0.5 mL of this concentration intravenously could have serious adverse consequences, such as arrhythmia or a hypertensive emergency and sudden cardiac arrest. Intravenous delivery of this concentration is reserved for patients in cardiac arrest, that too be administered in titrated concentration of 1:100000 dilutions, to be given very slow by monitoring the pulse and systemic vital signs. It is in very minute dose in one hundredth of division of one ml should be given intravenously as cardiac stimulator, vasopressor or antitode for anaphylactic shock or to release respiratory stridor. And intramuscular route it should be given as an anti-allergic and anti-asthmatic dose in some cases on case to case clinical evaluation.

It is imperative that unless the physician has experience with critical care medical practice, drug induced inflight emergency with catastrophic end at times, cannot be curtailed. Previous author, DR. SALEH AL-Hinai and colleagues have found that 15% of the patients experienced complications after their treatment abroad.<sup>13</sup> This study do agree that there exists 'Flight Nurse' system in some countries like Australia, who are holders of- Certified Emergency Nurse (CEN)., Certified Flight Registered Nurse (CFRN) and Critical Care Registered Nurse .(CCRN), being rendered their service for rescue evacuation for helicopters, propeller aircraft and Jet aircraft but none in commercial aircraft.<sup>13</sup>

### III. Discussion

Civil Aviation Industry and Medical Tourism: The result of the study shows that, there is a positive opinion of foreign patients about the medical and non-medical facilities provided by Indian Hospitals. However, Medical tourist patients do encounter many obstacles/problems during their pre-treatment period and post-treatment air travel back to their home country. The author of this study, by virtue of his vast experience in the commercial airlines, observes that Patients(Passengers), Nurses (crew), Doctor ( Doctor on Board), Emergency Room/ICU ( Cabin space and cabin environment) and emergency ICU equipment (Cabin medical equipment) are the pre-existing challenges in the event of inflight medical emergencies and its management. Further, the author describes and concludes that there exist lack of Data, sparse research activities, lack of applied cabin crew training, lack of six 'C' for both cabin Crew and volunteer doctor on board- competency, consent, communication, confidence, co-ordination with treating doctor/crew on board, and constant monitoring of the

medical emergencies till the ill-passenger get shifted to the ground support. Further, load of the passengers, composition of passengers like passenger with sick and elderly, infant, pre-existing disease, post medical complications., health of the crew, role and responsibility of doctor on board are some of the determining and compounding factors for high epidemiology and increasing incidents of inflight medical emergencies and flight diversion and emergency landing. Air India Flt AI 173 Delhi to San Francisco diverted to SPK due to a medical emergency, An airline spokesperson said a passenger on the flight had suffered a heart problem.<sup>14</sup>

#### **IV. Conclusion**

The study points out that paucity of available data and lack of epidemiological details of inflight medical emergencies are invariably seen in all most Commercial Airlines globally is the present prevailing scenario. Foreign air travellers after availing expert medical care, are potentially exposed to/subjected to immediate post-operative complications triggered by air travel.<sup>20</sup> Further, passenger load, composition of passenger like passengers with extreme age, sick and elderly, children and infant, pre-existing diseases getting aggravated by air travel, post-operative complications on board, health of the crew role and responsibility of the doctor on board are some of the determining and compounding factors for high epidemiology and increasing incidents of inflight medical emergencies leading to flight diversion and emergency landings.

#### **Limitations of the Study**

The author observes that paucity of available data and lack of epidemiological details on inflight medical emergencies are invariably seen in all most all Commercial Airlines globally is the present prevailing scenario. i. The present study is limited to highlight the current scenario of Indian medical tourism sector in Chennai without any primary or secondary data from the Commercial Airlines. ii. There is no structured questionnaire or in depth questionnaire used in this study as most of the air passengers are undertaking post-operative air journey hardly find no time to spare to share their clinical history with the author and iii. Many of the airline staff hesitant to give a clear picture due to fear of disclosing the inflight details of their Airlines.

#### **V. Recommendations**

This study recommends to formulate:

Standard Operating Procedure (SOP) common to all commercial airlines in India.,

to maintain an in-flight medical emergence mitigation system (IMEMS).,

to have primary data on the occurrence of all in-flight medical emergencies.,

to establish Research and Development (R&D) wing.,

to impart hands on training by qualified Intensive Care Unit Nurse (ICU Nurse),

to give due consideration and to seek the valuable contribution of Press and Media personnel on board, Politicians on board, Journalists on board, Social workers on board.,

so as to provide the health needs and to ensure safe air travel passengers in medical tourism coming from and returning to their home country from India and vice versa.

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