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National Ambulance Services in India: A Narrative Review

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ABSTRACT

Background: A strong and effective emergency referral transport network is a prerequisite for a country's assured emergency ecosystem. Ambulances have grown exponentially since the start of National Ambulance Services under the National Health Mission (NHM) a decade ago. This paper aims to understand the referral systems, strategies and the progress and undertaken by the Government of India to upgrade and strengthen the referral transport system. **Methods:** We conducted a narrative review and secondary data analysis on referral transportation systems from government portals. Key Interviews were held with key stakeholders' expertise in health systems. **Results:** The number of ambulances increased by 57.5 % from 2012 to 2022. Hitherto, 32.2 % of Advanced life support (ALS) ambulances have been shorted against population norms. Although the accessibility of referral services has improved, there is a significant gap in delivering timely in-transit service. **Conclusions:** The existing referral system requires the rational deployment of well-equipped BLS & ALS ambulances as per population norms with adequately trained staff or EMTs (Emergency Medical Technicians). A systematic plan for monitoring and accountability to ensure timely arrival within the "golden hour" is the need of the hour.

Keywords: Referral transport, Ambulance Service, Emergency, Health System, Emergency Medical Technician

INTRODUCTION

The ambulance services have become a household and integral part of the health care system as they play a significant role in conjoining the patient with a health care facility¹. The aim is not just to move a patient from one facility to the other, instead provide with a robust and assured emergency service at the hospital as well as during the transit.

The National Health Mission has become indistinguishable with accessible and affordable health care system in India. It guides the states towards ensuring attainment of universal access to healthcare through strengthening of health systems in an egalitarian way. National ambulance services have traversed a long way, playing a crucial role in reducing out of pocket expenditure making it accessible to all especially for poor. Ambulances have become an integral part of health system and it is pertinent to say that now, ambulances have become more visible, and services improved over the years. During the prevention and

containment of the COVID-19 pandemic in India, the ambulances under the National Ambulance Services of NHM also played a crucial role in transporting infectious patients².

It took almost a decade to reach the current standards of ambulances and has long and exciting journey. Over the year advancement in standards and technology coupled with increased number of these ambulances led to improved referral services in the country. Although there are certain loopholes in the existing system, but there has been continuous steps undertaken to upgrade and improve the functionality of these services. This article has tried to capture the history which these ambulances have traversed over the years along with the critical analysis of the existing system with suggestions and recommendations for the future planning.

MATERIALS & METHODS

Review Process

Under this narrative review on national ambulance services, we conducted secondary data analysis on referral transport systems from government portals such as NHM Quarterly progress reports and state programme implementation plans from the year 2012 to 2022. The Joint Review Missions and Common Review Missions were also reviewed along with key stakeholders' expertise in health systems to understand the genesis of ambulance services in India during pre & post covid era.

RESULTS

History of ambulances services: Global and Indian context

The origin of ambulance dates to ancient times, with the use of carts to transport vehicles. Ambulances were first used for emergency transport in 1487 by the Spanish forces during the siege of Malaga by the Catholic monarchs against the Emirate of Granada³. The civilian variants of the transport vehicles were put into operation in the 1830s. Advances in technology throughout the 19th and 20th centuries led to the invention of modern ambulances. As of today, each country is following its own model of ambulances, whichever they find suitable to their context and as per their locale conditions. For example, in some parts of Europe, physician led ALS ambulances are functioning, while some parts have trained nurses led ambulances. On the other hand, countries like North America, the UK, South Africa and Australia, advance life support services are being provided by specially trained paramedics, who are skilled and independent practitioners in their own way⁴.

Global commitments for achieving MDGs led India to bring and place a system for timely transportation of pregnant women or a complicated case to the health facility. In India with this in vision funds were allotted to Panchayat in RCH-I, states issued vouchers during ANC check-ups and several other initiatives but this could not succeed, since vehicles were not available in rural areas for transportation even on providing payments⁵. During the same period some states took some state specific initiatives like Chiranjeevi in Gujarat, Matri-Yaan Prakalpa in West Bengal, and the Sambhav voucher scheme in Uttar Pradesh. Several other issues cropped up like non-availability and inadequate number of ambulances resulting in difficulty in accessing vehicles especially if sought care at night and at the time of need. Dependence on the Gram Pradhan for clearing the vouchers, delayed certification by Gram Panchayat/Pradhan, lack of birth preparedness and readiness amongst beneficiaries, lack of communication facility (telephone services) were also the key issues. Although with these initiatives there was rise in maternal mortality along with high out-of-pocket expenditure in some parts of the country⁶.

With the launch of demand generation scheme like JSY in 2005-06, there was an increase in institutional births and to enable all pregnant women do not incur any expenses during pregnancy, childbirth and in post-partum period, the JSSK was launched which entitled free transportation and drop back & free referral for management of complication⁷⁸.

It was felt that the referral system should not be restricted in providing services to pregnant females. So, for the first time Andhra Pradesh introduced, 108 toll free number in PPP mode and provided ambulances both advanced and basic, not only for pregnant women but for any patient requiring referral services. Slowly this was replicated in many States, and it was supported under NHM by GoI. A systematic study of ALS and BLS model was undertaken, and findings of the study indicated that the well, knowledgeable Emergency Medical Technician (EMT) with dedicated equipped ambulance were able to save lives and undertake timely transportation of all sick patients to the designated health facility⁹.

To establish a network of responsive ambulances with trained EMTs, became a felt “need” for the country. This led to the launch of NAS under NHM in the year 2012. Subsequently two types of ambulance services 108(ALS/BLS) and 102 were launched⁹. Dial 108 is predominantly an emergency response system, primarily designed to attend to patients of critical care, trauma, and accident victims etc. Dial 102 services essentially consist of basic patient transport aimed to cater the needs of pregnant women and children though other categories are also taking benefit and are not excluded¹⁰. Currently, 35 States/UTs have the facility where people can dial 108 or 102 telephone number for calling an ambulance. There are 22,654 Dial 102/108 ambulances and 5176 patient transport vehicles (PTV) running across the country¹¹.

During the process of prevention and containment of the Covid 19 pandemic, these ambulances played an important role in transporting infectious patients from home to covid centres and back. The existing National Ambulance Services under NHM were the first of the line in the health care department to act on the movement and in transit management and transport of COVID suspect and positive patients to either quarantine or isolation facilities¹².

Ambulance Services during COVID-19

Indian Scenario

Owing to high infectious nature of the corona virus, it was pertinent that proper infection prevention and control practices are followed while maintaining a safe distance with the infected patient. While transporting these patients, this was a major challenge faced by the service providers, particularly the drivers and the EMTs of NAS who were directly involved in their transportation and referral.

During the lockdown period, it was difficult for the Centre or the State authorities in the country to suddenly plan for a new/modified type of ambulance especially for covid patients. Patients were transported to the hospital or Quarantine centres by the existing ambulances without following any proper precautions and infection prevention protocols.

During the surge of Covid infection, a decision was taken to identify certain number of vehicles in every district which can provide timely transport to a functional health facility while following adequate infection prevention protocols. States/UTs were given flexibility to convert some of the existing ambulances under NAS exclusively for COVID Patients¹³. This certainly improved the access of the patients to a health facility, but this badly affected assured treatment for non-covid cases and their complication management. Parallely, North-Eastern States also highlighted that there were lack of service providers and running of ambulances with time to care approach which further highlighted the challenges

being faced by the state. So based on the recommendations of the expert group a decision was taken to provide Patient transport vehicle in every block of North-Eastern and hilly states.

Since 2012, the number of ambulances in India has been increased by 57.5% in 2022 (**Fig.1**). **Fig-2 indicates** a comparison of the total number of ambulances operational across states and required number of ambulances. The country has already fulfilled the requirements of BLSs as per the norms of one BLS per one lakh population. Till 2022, there have been 25% additional BLS ambulances functional in the country against the requirement. However, the numbers of ALS ambulances are deficient by 32.2 % against the norm of one ALS per five lakh population. There are States who has already achieved the target of running ambulances against the national norm's requirements like: Arunachal Pradesh, Assam, Bihar, Haryana, Himachal Pradesh, Jharkhand, Meghalaya, Mizoram, Odisha, Sikkim, Tamil Nadu, Tripura, Uttarakhand, DD & DNH, J&K and Ladakh.

States like Andhra Pradesh (97.06%), Karnataka (92.48%), Madhya Pradesh (97.7%), Rajasthan (97.12%), Telangana (92.2%), UP (94.6%), and Delhi (95.9%) have completed the requirement beyond 90% against the required norms. While some state like Chhattisgarh (84.9%), Gujarat (52.1%), Kerala (73.6%), Maharashtra (63.4%), Nagaland (0%), Punjab (0%), West Bengal (9.21%), Chandigarh (42.8%), Lakshadweep (0%), Puducherry (88.2%) and Manipur (0%) are yet to achieve the required number of BLS ambulances. (**Fig.3**). **Fig.4** shows the requirement of ALS ambulances against population saturation. The data shows that states and UTs like Delhi, Goa, Gujarat, Haryana, Uttarakhand, Himachal Pradesh, Jammu & Kashmir and Meghalaya have achieved 100% saturation for ALS ambulances against requirements. However, there are some states who don't have any ALS ambulances like Andaman & Nicobar, Arunachal Pradesh, Kerala, Manipur, Nagaland, Mizoram, Tripura, and West Bengal. Apart from these states like Assam (20%), Bihar(34%), Chhattisgarh(50%), Jharkhand(65%), Karnataka(98%), Madhya Pradesh(39%), Maharashtra(94%), Rajasthan(77%), Tamilnadu(80%), Telangana(39%), and UP(53%) are on the trajectory to achieve the population saturation for ALS as per national norms.

DISCUSSION

The accessibility and affordability of ambulances have for sure drastically improved in the recent years and people are now able to avail its services. Experiences from the Common Review Mission (CRM) visit reports, and field visit reports depicts that now the population has knowledge regarding the 108 and 102 Ambulance services and hence the utilisation of these ambulances has increased to two folds. The Talli Bidda Express in Andhra Pradesh, Mamta Vahan in Jharkhand, Jaccha Baccha Vahan/Bike ambulance in Madhya Pradesh, Adarani/ Mrityunjyoy in Assam are some of the special initiatives taken by the states to augment the service delivery of ambulances⁶.

There are still many challenges which are existing in the current ambulance services network in the country. Taking into consideration the total ambulances functioning under NHM in the country, the population saturation comes to around 50,000. By this way, the country has already achieved the WHO norm of 1: 1 lakh population. However, these ambulances are utilized merely as patient transport vehicles (in some of the States) and the basic function for which the ambulances were being introduced is either missing or compromised. Saving life and stabilisation of the patient during transit is missing in most of the incidents. AIS 125 standards as prescribed by the Ministry of Road Transport mandates certain equipment's to be present in the ambulance both for Advance life support and basic life support¹³. However, compliance to these equipment's list is still missing in most of the ambulances. Basic equipment like portable oxygen, electric portable suction aspirator, emergency delivery kit etc even if available in

these ambulances are hardly utilized due to lack of orientation of the EMT. There is also irrational deployment of these ambulances, as some states have more than the required number of ambulances and some states have a lesser number of ambulances. Despite having enough number of ambulances, the utilization of these is not up to the mark. The location or the point of deployment of ambulances is either irrational or based on some recommendations by any powerful local authority, thereby affecting the services meant for the actual patients. Maintaining the infection prevention protocols and quality services while referring the patients is another area which needs strengthening.

Recently, NITI Aayog conducted a study which highlighted that the country has seen a better movement for patient requiring emergency care from the site of injury or illness to the hospital but still there are gaps in onsite care, during transport and after reaching the hospital. As per the study results 88% of the hospitals had in house ambulances but only 3% of them had EMTs. Also, 12% of all the hospitals have provision of specialized care during transportation. Lack of assured ambulances service, trained staff, EMT, well-functioning equipment's in the ambulances were some of the other issues noted¹⁴. Lack of a standard toll-free number which is pan India along with lack of a systematic plan for monitoring and accountability to ensure timely and optimal care are some of the other areas needs action.

RECOMMENDATIONS

Merely transportation of the sick patients to the health facility is not enough in fact readiness of the emergency medical services at the hospital by availability of adequately trained staff, equipment and emergency protocol are equally important for provision of assured referral services. Certain points which needs urgent attention are as follow:

1. Need to revise the population norms thereby to improve the population saturation in the country.
2. One model may not fit for all the States since geographical location and territory differs from one region to another.
3. Certification, monitoring, and supervision needs to be reinforced for effective running of ambulances with a vision of 20 minutes response time.
4. Outsourcing in Capex mode is a good process with caveat for transparent and robust monitoring criteria and ensuring timely payments.

Continuous and sustained steps and efforts are required for the rational deployment of ambulances in the country. Currently, states are providing support for ambulance services so as to have a response time of less than 30 minutes. The location or point of deployment of the ambulance should be determined both by the density of the population as well as the time-to-care approach (access to a health facility within 1 hour), as the case may be. States which have already achieved one ambulance per lakh population criteria should work towards achieving one ambulance per 50, 000 population in plain and high population density areas and one ambulance for 15,000-20,000 population in hilly and sparsely populated areas. Further, based on the assessment of terrain/population density/road infrastructure etc. the States/UTs may ensure SRT (Site Response Time) of not more than 30 minutes in rural and sparsely populated areas while maintaining SRT of not more than 20 minutes in urban areas.

All ambulances need to be analysed monthly on various performance indicators and utilization of vehicles. Regular training of EMTs (6 weeks training for ALS, 4 weeks for BLS and two weeks for JSSK ambulances) for handling basic emergencies and life support while deployed in BLS and competent to resuscitate and handle emergencies like trauma, spinal injuries, coma, heart attacks, poisoning, snake bites etc. in ALS ambulances should be conducted. Prehospital, assured referral and hospital care form a

continuum of care approach is a prerequisite for an assured emergency care services delivery system in any country.

The extended services package provided under the PM-Ayushman Bharat HWC scheme includes the management of common emergencies, burns and trauma at the primary care level¹⁵. For the management of cases at secondary care facilities, the focus is being provided to strengthen the emergency and critical facilities at District level health facilities¹⁶. The Critical care blocks under the PM -ABHIM scheme will also strengthen emergency care services at the district level and assured care will be available to all¹⁷. All these initiatives need to be linked with the National ambulance services and their referral pathways.

CONCLUSION

The Government of India is also taking cognizance of the Supreme Court Judgement in a case wherein it upheld the right of a seriously ill person to get hospitalised for life-saving medical aid in government hospitals. It further issued directions to the government that ambulances are adequately provided with the necessary equipment and medical personnel be kept ready for transport of patients from the primary health centre to subdivisional to district to state hospitals¹⁸.

The National Guideline on Ambulance services is under development and will include the revised norms and protocols keeping in mind the requirement of the States. More focus has been given to the rational deployment of ambulances, infection prevention and control practices, Quality control practices, training, and monitoring of the ambulance staff.

The country needs an integrated model which is responsive to the needs of the population for meeting their medical, surgical, accidental, and other emergencies along with assured transport with a trained technician. This will be possible through a robust EMS, supported by state-of-the-art communication and command centre. To achieve this, the GoI with the support of NITI Aayog along with MoHFW & NHSRC is preparing a roadmap world-class integrated model of Emergency care services which will not only include assured ambulance services but will also cater to the prehospital and emergency departments at the health facility.

DISCLAIMERS

None

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None

ETHICAL ISSUES

Nil

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Not Applicable

DECLARATION OF COMPETING INTEREST

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Government of India. The last author has previously worked at Ministry of Health and Family Welfare as Deputy Commissioner and at NHSRC as Advisor.

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APPENDICES (as appropriate):

FIGURES:

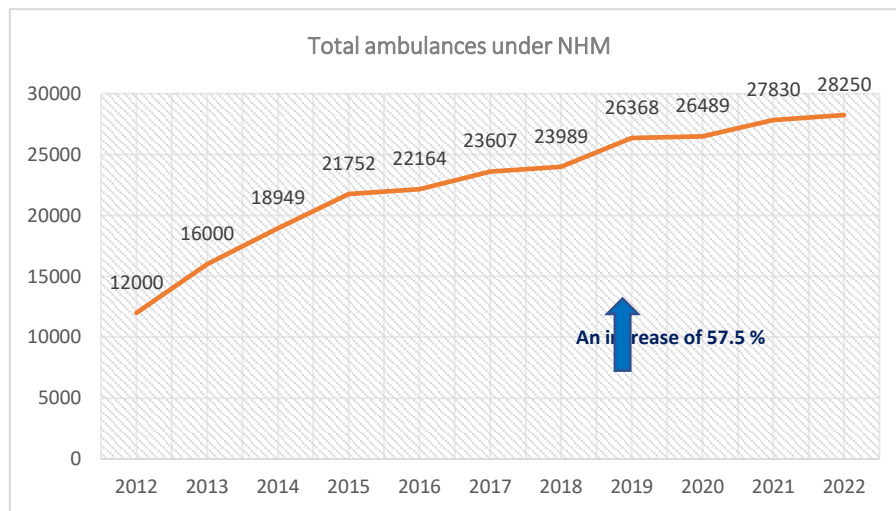


Fig 1- Year wise increment in number of ambulances under NHM

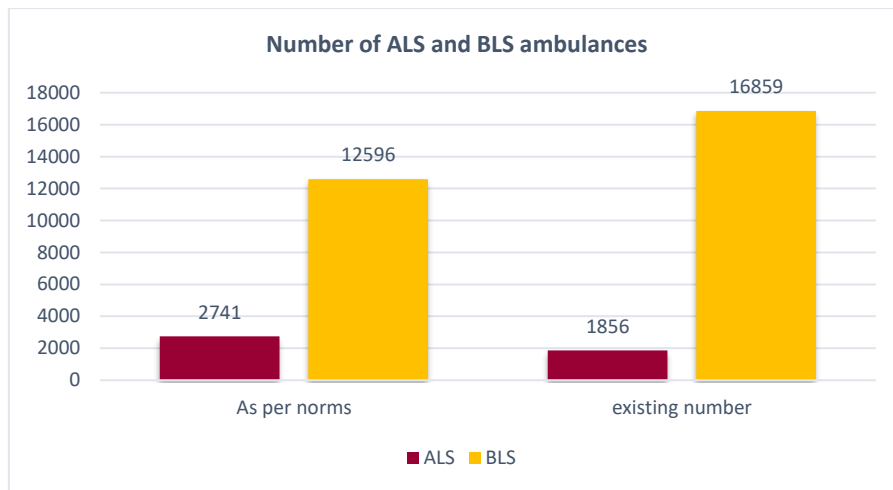


Fig 2- Total Existing Vs Required as per norms.

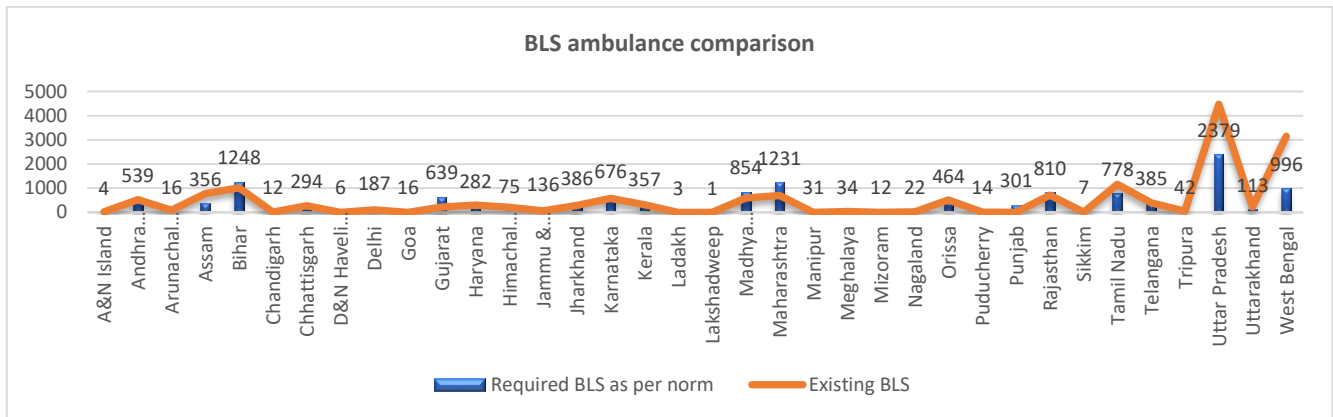


Fig 3-All States data- Required Vs Existing BLS

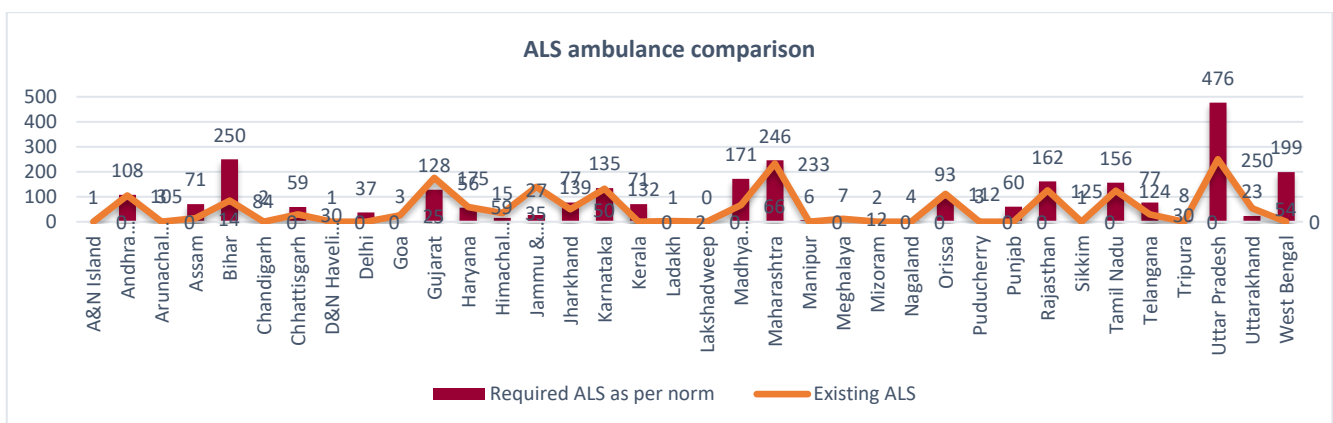


Fig 4-All States data- Required Vs Existing ALS