

**Analysis of the Ambulance Busy Cases in Himachal Pradesh and
Scope for its Improvement**

**Internship Training
at
GVK Emergency Management and Research Institute**

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**Under the Guidance of
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**Post Graduate Diploma in Pharmaceutical Management
2012-2014**



**Institute of Health Management Research,
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TO WHOMSOEVER MAY CONCERN

This is to certify that Mr.Sunil Dhal student of Post Graduate Diploma Pharmaceutical Management (PGDPM) from Institute of Health Management Research, Jaipur has undergone internship training at GVK EMRI Hyderabad from 20th February to 28th May 2014.

The Candidate has successfully carried out the study designated to her during internship training and her approach to the study has been sincere, scientific and analytical.

The Internship is in fulfillment of the course requirements.

I wish her all success in all her future endeavors.



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The certificate is awarded to

Sunil Dhal

In recognition of having successfully completed his
Dissertation in the department of

Operations Research

And has successfully completed his Project on

“Analysis of the Ambulance Busy cases in Himachal Pradesh and scope for its improvement”

20/05/2014

GVK Emergency Management and Research Institute

He comes across as a committed, sincere & diligent person who has a
Strong drive & zeal for learning

We wish him all the best for future endeavors



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CERTIFICATE BY SCHOLAR

This is to certify that the dissertation titled“**Analysis of the Ambulance Busy cases in Himachal Pradesh and scope for its improvement.**”submitted by Sunil Dhal, Enrollment No. IIHMR/PGDHM/2012-14/04-191 under the supervision of Rahul Sharma for award of Postgraduate Diploma in Pharmaceutical Management of the Institute carried out during the period from 20th February 2014 to 28th may 2014 embodies my original work and has not formed the basis for the award of any degree, diploma associate ship, fellowship, titles in this or any other Institute or other similar institution of higher learning.

Signature

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Abbreviations

AB	Ambulance Busy
AAEMI	Academy of Emergency Medicine in India
AAFP	American Academy of Family Physicians
AAPI	American Association of Physicians of Indian Origin
ACLS	Advanced Cardiac Life Support
AED	Automated External Defibrillator
AHA	American Heart Association
AP	Andhra Pradesh
BLS	Basic Life Support
CCS	Call Center Server
CEMONC	Comprehensive Emergency Obstetrics and Neonatal Care
CHC	Community Health Center
CMU	Carnegie Mellon University
CPR	Cardio Pulmonary Resuscitation
CO	Communication Officer
DO	Dispatch Officer
EMT	Emergency Management Technician
ENT	Ear, Nose, Throat
ERCP	Emergency Response Care Physician
ERO	Emergency Response Officer
ERS	Emergency Response Service
GIS	Geography Information System
GPS	Geography Positioning System
IFT	Inter Facility Transport
ILCOR	International Liaison Committee on Resuscitation
IT	Information Technology
ITLS	International Trauma Life Support
JSSK	Janani Shishu Suraksha Karyakram
MOU	Memorandum of Understanding
MMU	Mobile Medical Van
NENA	National Emergency Number association
NFPA	National Fire Protection Association
NGO	Non Government Organization
NL	Nearby Location
PALS	Pediatric Advanced Life Support
PGPEC	Post Graduate Program in Emergency Care
PHC	Primary Health Center
PHFI	Public Health Foundation of India
PPH	Post Partum Hemorrhage
PPP	Public Private Partnership
RH	Regional Hospital
SNR	Service Not Required

INTRODUCTION OF THE ORGANIZATION

1.1 Company Profile

The GVK Foundation represents the overall corporate social responsibility of the GVK group. GVK's vision looks well beyond the bottom line and forays into the initiatives that touch lives and add value to the society. GVK Emergency Management and Research Institute (GVK EMRI) is the major corporate social responsibility arm of GVK group, was established in April, 2005. It provides Integrated Emergency Response services in Public Private Partnership, with a vision to support and build capabilities to save 1 Million lives per annum nationally and establish GVK EMRI as a premier Research and Training Institute.

Dr. GVK Reddy, Chairman of GVK is committed to provide services surpassing global standards with improved transparency, following the modern principles of management and leadership to serve the nation and work towards taking the organization across the country.

GVK is a diversified business entity with a predominant focus on Energy, Urban Infrastructure, Life Sciences, Transportation, Hospitality and Manufacturing.

GVK EMRI is based on the following Standard Practices:

1. Process of Emergency Management which involves the following primary functions:

- Sense: Emergency victim/ attendant dial 108. Communication Officer (CO) Screen helps facilitate collect facts, Dispatch Officer (DO) Screen helps facilitate and scope emergency, assign strategically located vehicle (Ambulance/ Police/ Fire).
- Reach: Vehicle(s) to reach the site/scene
- Care: Emergency Medical Technician (EMT) to provide passionate pre-hospital care while transporting patient/ victim to appropriate hospital for stabilization. Emergency Response Centre Physician (ERCP) advises patient care with the support of ERO, EMT to ensure optimal pre-hospital care.

The Government of India has allotted a three-digit number – 108 and made it toll-free across each State for Medical, Police and Fire Emergencies. 108 are accessible from fixed lines and mobile phones.

GVK EMRI provides ERS (Emergency Response Services) under PPP framework and manage 4178 state of the art **Ambulances** in **Andhra Pradesh, Gujarat, Uttarakhand, Goa, Tamil Nadu, Karnataka, Assam, Meghalaya, Madhya Pradesh, Himachal Pradesh, Chhattisgarh, Daman - Diu and Dadra Nagar Haveli, Uttar Pradesh** while ensuring pre-hospital care and covering a population of > 600 million.

2. Employees: Our employees are known to be **Energetic, Modest, Reliable and Inquisitive** and exhibit high levels of **Commitment, Ability, Resourcefulness and Empathy** while performing their respective roles - Communication Officer, Dispatch Officer, Emergency Medical Technician, Pilot, Physicians and support staff.

3. Infrastructure: GVK EMRI Head Quarters is **housed** in 39 acres **campus** at Hyderabad with modern facilities for Emergency Management, Research and Training.

4. Technology: State of the art integrated technology is deployed in our Emergency Response Centers in 12 States & 2 Union Territories which enables us to provide world class services.

5. Alliances and partnership-

A. Governments: 12 State governments (Andhra Pradesh, Gujarat, Uttarakhand, Goa, Tamil Nadu, Karnataka, Assam, Meghalaya, Madhya Pradesh, Himachal Pradesh, Chhattisgarh and Uttar Pradesh) & 2 Union Territories (Daman Diu, Dadra Nagar Haveli) in India have recognized GVK EMRI as nodal agency for emergency response services. GVK EMRI recognizes critical role of Governments for the success of the projects undertaken under PPP framework. Our ongoing and uninterrupted services since inception in 12 States & 2 Union Territories speak for itself about healthy relationship with respective Governments. GVK EMRI in collaboration with Govt. of Goa for runs Emergency rooms in Community Health Centers (CHC) also.

B. Global Institutions:

GVK EMRI is having partnership with global organizations like Stanford School of Medicine, Carnegie Mellon University, 9-1-1, Shock Trauma Centre, Baltimore, USA; American

Association of Physicians of India; GEOMED etc., in order to strengthen its competencies, skills and to adopt the best international practices.

GVK EMRI is recognized as international training organization by AHA (American heart Association) and ITLS (International Trauma Life Support) to conduct training programs on their behalf. GVK EMRI also in collaboration with Stanford School of Medicine, USA is conducting training programs in Emergency care for physicians & Paramedical staffs of Government hospitals. Mahindra Satyam is the technology partner of GVK EMRI in providing free IT solutions.

6. PPP (Public Private Partnership) framework

- Operational expenses and Infrastructure borne by Government (Public)
- GVK EMRI bears costs of Leadership, Technology, Innovation, Research & Training

The **Values** of GVK EMRI are:

- Involving people
- Applying Knowledge
- Making this happen

Vision:

- To provide Free emergency response services for Medical, Police and Fire emergencies across India in PPP (Public Private Partnership) framework
- To respond to 30 million emergencies and save 1 million lives annually
- To deliver services at global standards through Leadership, Innovation, Research & Training and Technology

Emergency Management at GVK EMRI

The Emergency Management system at GVK EMRI has been successfully providing most comprehensive & efficient Emergency Response Services (Medical, Police and Fire) under PPP framework for the past 7 years.

Today Emergency Management wing of GVK EMRI has:

- An agreement with 12 states (Andhra Pradesh, Gujarat, Uttarakhand, Goa, Tamil Nadu, Karnataka, Assam, Meghalaya, Madhya Pradesh, Himachal Pradesh, Chhattisgarh, Uttar Pradesh & 2 Union Territories (Daman and Diu, Dadra and Nagar Haveli) and currently operating in 12 states.
- 4,701 ambulances, covering over > 600 million population
- 23,566+ GVK EMRI Associates.
- An agreement with 6,700 + Private Hospitals/ Nursing homes
- Networked with 2,000 Police/ Fire Stations

With contribution of all the stakeholders listed above, GVK EMRI is:

- Taking 90% calls in first ring
- Attending 16,682+ emergencies per day (19.3 Million Cumulative)
- Pregnancy related – 33%, Vehicular Trauma – 17%, Acute Abdomen – 12%, Cardiac – 5%, Respiratory – 4%, Suicidal – 4%, Animal Bites -2% (Jun'12)

Key Components of Emergency Management at GVK EMRI:

1. Integrated and comprehensive ERS, Village Outreach Services provider:

The emergency management system at GVK EMRI aims at providing most comprehensive & efficient Emergency Response Services in medical, police or fire, using a single 3 digit toll free number 108. GVK EMRI has the expertise and is fully equipped to respond to medical emergencies including complex ones like cardiac arrests, strokes, neonatal, maternal, snake bites and emergencies like natural calamities, accidents, fire break-outs, industrial hazards, rioting, terrorist attacks etc. GVK EMRI also provides MMU Services in Andhra Pradesh and Uttarakhand. GVK EMRI also supports the Andhra Pradesh, Assam, Uttarakhand and Gujarat Population under JSSK Scheme for drop back facilities for the mother and neonate after initial 48 hour hospitalization.

2. Public and Private Partnerships (PPP):

GVK EMRI has been successfully providing ERS under PPP framework. Operational and Capital expenditure of running the service in each state is met by the respective State Governments (Public) while GVK EMRI (Private) contributes to costs of Leadership, Management, Innovation (Process, Medical & Research) and Mahindra Satyam provides IT solutions.

3. Ambulances:

GVK EMRI has developed its own ambulance design specifications with unique features meeting ergonomic and safety requirements. Ambulances are fully equipped with modern day medical and communication equipment and categorized as Advanced Life Support, Basic Life Support and Rural Life Support depending on the facilities and pre-hospital care services available.

4. Processes: S-R-C model

At every level in GVK EMRI, integration is the keyword. Not only it works as a single response centre for all emergencies – Medical, Police and Fire, but also, it has developed the Sense-Reach-Care paradigm that integrates the critical areas of emergency response system (call taking, processing and ambulance dispatching, reaching the victim in time and transportation to a hospital, Pre-Hospital medical care rendered through Medical Directions by Physicians).

5. JSSK (Janani Shishu Suraksha Karyakaram): GVK EMRI also operates Vehicles/ Services in Partnership with AP, Assam, Uttarakhand and Gujarat Governments JSSK Program (Reverse Transport/ Drop Back Services (AP), Adarani Services (Assam), Khushion Ki Sawari (Uttarakhand) and Khilkhilat (Gujarat) to ensure wholesome support for the mother and child which provides for drop back facility for mother and child to curtail IMR, MMR. These services are offered to the mother and child if they have continued to stay in the Government Hospitals for 48 Hours of Child Birth.

6. **MMU (Mobile Medical Units):** GVK EMRI operates MMUs in AP, Uttarakhand since Dec '10 and Jun '11 respectively with the aim to reach the underserved villages in the districts in organizing regular primary health services. The focus is on diagnostic, curative and preventive health services. Maternal and Child health services and treatment of common ailments are prioritized

7. **104 Health Helpline Services:** GVK EMRI is slated to launch the 104 Head Advice Helpline Services in Partnership with the Government of India (in the Union Territories of Daman and Diu, Dadra and Nagar Haveli) shortly.

8. **Technology**

GVK EMRI is managing Emergency Response Service with own ERS application software. Presently, it has 24 x 7 Centralized Emergency Response Center for each State, having following key technological components:

- Telecom Switch / PBX with automatic call distribution features & IVR facility
- Computer Telephony Integration
- Voice Loggers
- Call Center Server (CCS)
- ERS Applications
- GIS and GPS Software
- Automatic Vehicle Location and Tracking
- GIS Maps

**Analysis of the Ambulance Busy cases in
Himachal Pradesh and scope for its
improvement.**

1. Introduction:

An Ambulance Busy Case is where the ambulance cannot be assigned due to

- o ambulance being busy,
- o already on a dispatch,
- o breakdown/ off road,
- o where ambulance cannot be reached within reasonable time frame.

Sometimes it happens that due to various reasons the ambulance may be busy so it cannot be assigned to a new emergency case. Nowadays as people are getting aware of the 108 ambulance services so the call flow and number of emergencies have also increased so as the number of ambulance busy cases because it becomes difficult to manage them with the limited number of resources.

The various reasons for high ambulance busy could be-

- High Cycle Time
 - o Call to Wheel: It means the time taken from landing up of emergency call in GVK EMRI to assignment of ambulance for the emergency.
 - o Wheel to Scene: It refers to the time taken by the ambulance to reach to the scene of emergency.
 - o Scene to Hospital: It refers to the time taken by the ambulance to reach from the scene of emergency to the hospital.
 - o Hospital to Base: It means the time taken by the ambulance to return to its base location from the hospital.
- Emergency Call flow: If the flow of emergency calls is high then the number of ambulance busy cases will also be high.
- Type of Emergency (Inter Facility Transport): When the service is given to transfer the patient from a smaller hospital to a bigger one, then the time taken to shift the victim is high which results into increased number of ambulance busy cases.
- Location of Emergency: If the location of emergency is very far then the time taken by the ambulance to complete the case will be high which results into increased ambulance busy case.

- High Traffic Hours (Morning and Evening hours): In case of traffic on roads, the response time of the ambulance increases.
- High Breakdown rate of the ambulances: In case of breakdown of one ambulance, another ambulance will be used in its place which results into more ambulance cases for that particular ambulance.
- Behavioral issues of the Emergency Management Technicians, Pilots and the Emergency Response Officers: Sometimes the EMTs refuse to take the case and ERO put it into ambulance busy.

In the Sense and Quality Meet held from March 18th, 2014 to March 20th, 2014, the benchmark set for the percentage of Ambulance Busy cases was up to 3 percent.

2. Problem Statement:

According to the Analytics department of GVK EMRI in Himachal Pradesh, currently the percentage of Ambulance Busy Cases is 9% of the total Medical Emergencies. It means that 9% of the patients are being denied of the 108 service. This percentage will increase further as according to the trend, emergency call flow increases in summers. So to provide better services, it is very important to find out the specific reasons for this problem in Himachal Pradesh.

3. Rationale:

With the increasing health issues and Road traffic accidents, it has become important to rescue the patient within the 1st hour of emergency that is the golden hour. But as the health and transportation facilities are poor in HP so it has become the responsibility of GVK EMRI 108 ambulance service to provide help in the golden hour. But with the limited resources and increased number of fatal diseases, EMRI is not being able to provide the service as it should be. With about 8000 Medical Emergency calls coming per month, approximately 700 cases are being turned up into ambulance busy cases. So it has become important to decrease the percentage of ambulance busy to 3%.

4. Research Questions:

- Q1. What are the potential causes that are leading to high percentage of ambulance busy cases?
- Q2. What are the possible measures that can be taken to decrease it to 1 percent? (1 % is the target of the organization)

5. Objectives:

The objectives of the study are

- i. To analyze the trend of ambulance busy cases from Nov. 2013 to Feb. 2014.
- ii. To identify the reasons behind increased number of ambulance busy cases
- iii. To recommend solutions for reducing the percentage of the problem from 9% to 3%.

6. Study Design and Methods

This study is an Exploratory Observational study based on collection of secondary data. The data on ambulance busy from the months of Nov. 2013 to Feb. 2014 was analyzed. The study was conducted on the AB cases in the state of Himachal Pradesh. After sorting out the ambulance busy cases according to the districts and mandals, the sample size of 45 cases was being chosen as per the convenience. Secondary Data was collected from the IT department of GVK EMRI, Himachal Pradesh and the analysis was done manually and using Microsoft Excel.

7. Demography and Ambulance Allocation in Himachal Pradesh:

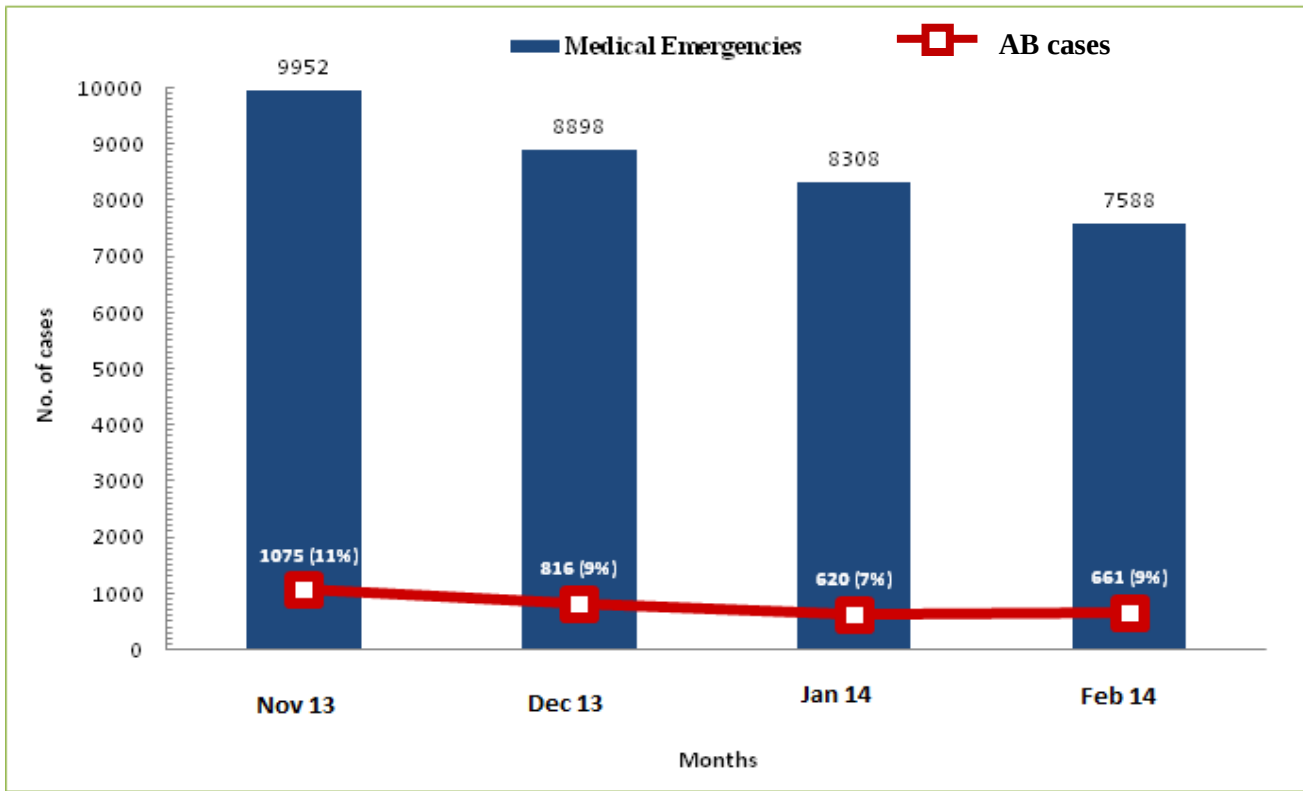
Table 1: Demography and Ambulance allocation in Himachal Pradesh

S. No.	District	Population (Lakhs)	No. of ambulances	Population Per amby (Lakhs)	EMs per lakh population (avg. from Nov. 13 to Feb. 14)
1	Bilaspur	3.8	6	0.6	592
2	Chamba	5.1	11	0.4	556
3	Hamirpur	4.5	8	0.5	620
4	Kangra	15	17	0.8	392
5	Kinnaur	0.8	3	0.2	191
6	Kullu	4.3	6	0.7	415
7	Mandi	9.9	15	0.7	473
8	Shimla	8.1	15	0.5	510
9	Sirmaur	5.3	11	0.4	616
10	Solan	5.7	9	0.6	516
11	Una	5.2	6	0.8	421
12	Lahaul & Spiti	0.3	2	0.1	155
	TOTAL	68.0	109 (+3back up ambulances)	6.3	5458

Source: census of India, 2011 and GVK EMRI

8. Trend of Ambulance Busy with respect to Medical Emergencies

Graph 1: Trend of AB with respect to Medical Emergencies



Inference:

The number of Medical Emergencies had decreased from the month of Nov. 2013 to Jan. 2014 and so as the number of AB cases. But in Feb. 2014, though the number of medical emergencies had decreased but the AB cases have increased. The reason behind it is that there was snowfall in the month of Feb., 2014 because of which the ambulances were not able to reach the patient and the response time was also high.

9. District wise distribution of Ambulance busy cases

Table 2: District wise distribution of AB cases

District	No. of ambulances	Total cases in four months	District wise % of AB cases	Total EMs in 4 months	EM/ambulance
Bilaspur	6	201	6%	2263	377
Chamba	11	289	9%	2886	262
Hamirpur	8	126	4%	2815	352
Kangra	17	400	13%	5910	348
Kinnaur	3	16	1%	161	54
Kullu	6	284	9%	1816	303
Mandi	14	450	14%	4731	338
Shimla	15	612	19%	4148	277
Sirmaur	11	394	12%	3267	297
Solan	9	274	9%	2974	330
Una	6	126	4%	2194	366
Lahaul & Spiti	3	0	0%	49	16
Total	109	3172	100%	33214	3319

Inference:

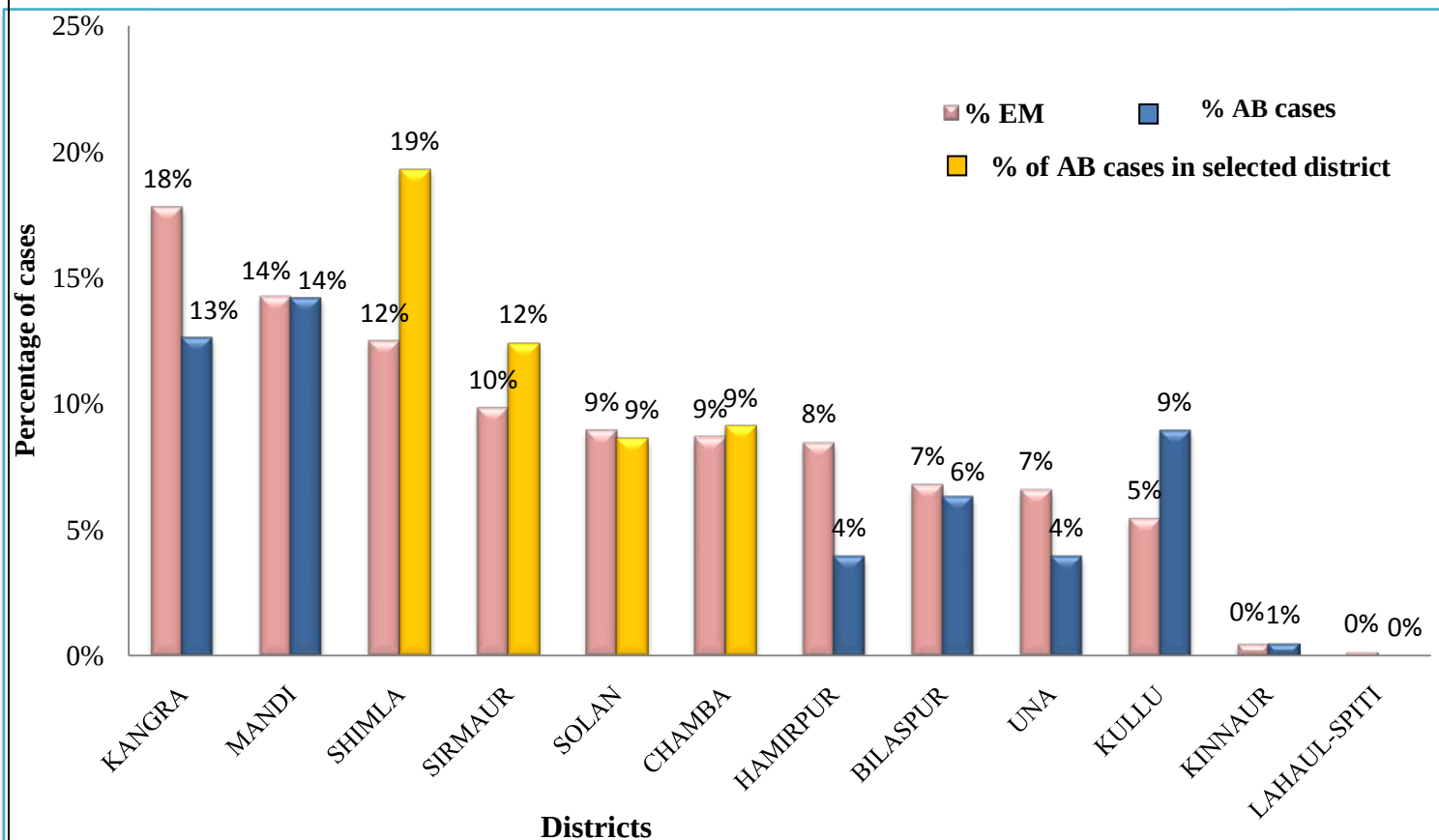
The numbers of cases are high in:

1. Chamba
2. Kangra
3. Kullu
4. Mandi
5. Shimla
6. Sirmaur and
7. Solan

As it can be seen from the table that number of cases has decreased significantly in Kangra, Kullu and Mandi. Though the cases have decreased in other four districts also but still the number of cases is high.

10. Comparison of Percentage of Ambulance Busy cases with respect to Medical Emergencies

Graph 2: Comparison of percentage of AB cases with respect to Medical Emergencies



Inference:

In the above graph, the percentage of medical emergencies is being compared to the percentage of ambulance busy cases. Here the columns in orange color show the districts which have high or equal number of ambulance busy cases as those of emergencies. In Mandi though the percentage of medical emergencies and ambulance busy cases are equal but the cases have decreased in these districts. So the following districts are being chosen where there is the problem of high ambulance busy cases:

1. Chamba
2. Shimla
3. Sirmaur
4. Solan

11. Mandal wise sorting:

After choosing the districts giving high AB cases, mandals from those districts were being chosen according to the following analysis for further study

11.1 Chamba

Table 3: Mandal wise AB cases in Chamba district

District	Mandal	Nov. 2013	Dec. 2013	Jan. 2014	Feb. 2014	Total	Percentage of AB cases
Chamba	BHALAI	0	0	1	0	1	0%
	BHARMAUR	0	4	2	0	6	2%
	BHATTIYAT	6	3	1	1	11	4%
	CHAMBA	17	21	24	28	90	31%
	CHAURAH	29	28	17	23	97	34%
	CHAURI	2	5	2	3	12	4%
	DALHAUSIE	6	4	2	1	13	4%
	PANGI	6	3	3	0	12	4%
	SALUNI	21	10	6	4	41	14%
	SIHUNTA(ST)	2	0	3	1	6	2%
Total		89	78	61	61	289	100%

Inference:

Amongst these mandals, Chamba and Chaurah had the highest percentage of AB cases.

Though the percentage of AB was also more in Saluni but the cases had decreased from Nov. 2013 to Feb. 2014. So the focus of study was on Chamba and Chaurah.

11.2 Shimla

Table 4: Mandal wise AB cases in Shimla district

District	Mandal	Nov. 2013	Dec. 2013	Jan. 2014	Feb. 2014	Total	Percentage of AB cases
Shimla	CHAUPAL	18	16	22	14	70	11%
	CHIRGAON	8	20	5	2	35	6%
	JUBBAL	7	10	3	1	21	3%
	KOTKHAI	9	4	3	2	18	3%
	KUMHARSAIN	7	3	6	0	16	3%
	KUPVI (ST)	0	0	1	0	1	0%
	NANKHARI (ST)	4	2	1	0	7	1%
	NERUA (ST)	2	1	1	2	6	1%
	RAMPUR	35	24	16	21	96	16%
	ROHRU	16	19	7	9	51	8%
	SEONI	4	3	2	2	11	2%
	SHIMLA RURAL	73	72	38	46	229	37%
	THEOG	16	10	17	8	51	8%
Total		199	184	122	107	612	100%

Inference:

In Shimla district, Shimla rural is giving the highest number of AB cases followed by Rampur. Though the number of case was also high in Chaupal but it was not the area of focus.

11.3 Sirmaur

Table 5: Mandal wise AB cases of Sirmaur district

District	Mandal	Nov. 2013	Dec. 201	Jan. 2014	Feb.2014	Total	Percentage of AB cases
Sirmaur	DADAHU (ST)	0	0	1	1	2	1%
	KAMRAU (ST)	1	1	5	0	7	2%
	NAHAN	25	30	29	33	117	30%
	NOHRA (ST)	0	3	3	1	7	2%
	PACHHAD	8	9	5	11	33	8%
	PAONTA SAHIB	21	17	8	12	58	15%
	RAJGARH	13	5	7	5	30	8%
	RENUKA	7	7	10	11	35	9%
	RONHAT	1	4	5	1	11	3%
	SHILLAI	26	20	24	24	94	24%
Total		102	96	97	99	394	100%

Inference:

The number of AB cases had increased in Nahan and these were almost constant in Shillai. Though it was also high in Paonta Sahib, but the number had fallen down from 21 in Nov. 2013 to 12 in Feb. 2014. So Nahan and Shillai had been selected as mandals to be focused upon.

11.4 Solan

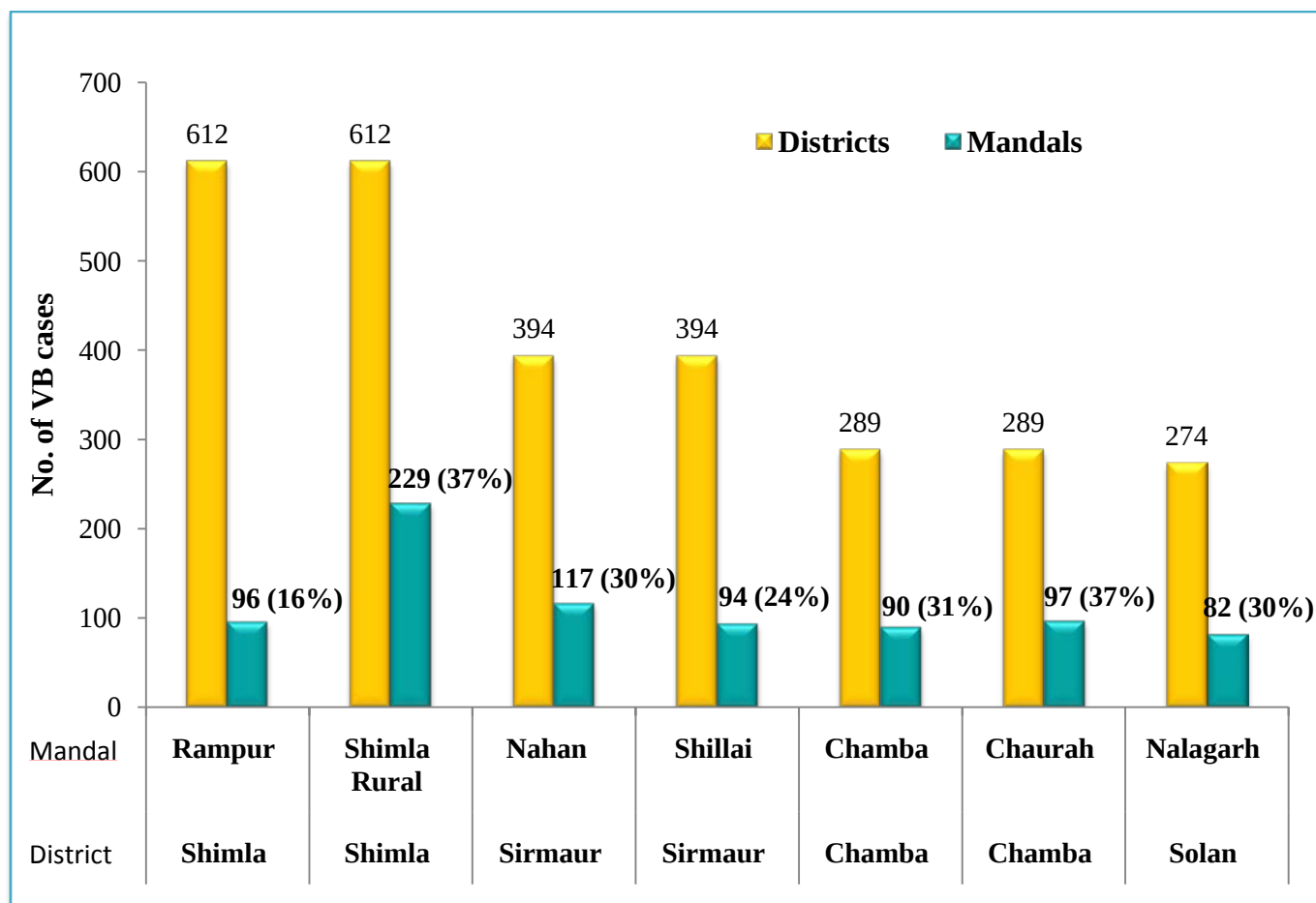
Table 6: Mandal wise AB cases of Solan district

District	Mandal	Nov. 2013	Dec. 2013	Jan. 2014	Feb. 2014	Total	Percentage of AB cases
Solan	ARKI	15	5	5	11	36	13%
	DHARAMPUR	0	0	3	5	8	3%
	KANDAGHAT	3	2	2	3	10	4%
	KASALI	10	19	9	5	43	16%
	NALAGARH	23	22	9	28	82	30%
	RAMSHAHAR	0	0	0	1	1	0%
	SOLAN	25	43	12	14	94	34%
Total		76	91	40	67	274	100%

Inference:

Nalagarh was giving the highest percentage of AB. Though the cases were also more in Solan but these had reduced from Dec. 2013 to Feb. 2014. So only Nalagarh mandal had been chosen for further study.

Graph 3: Representation of AB cases in selected mandals

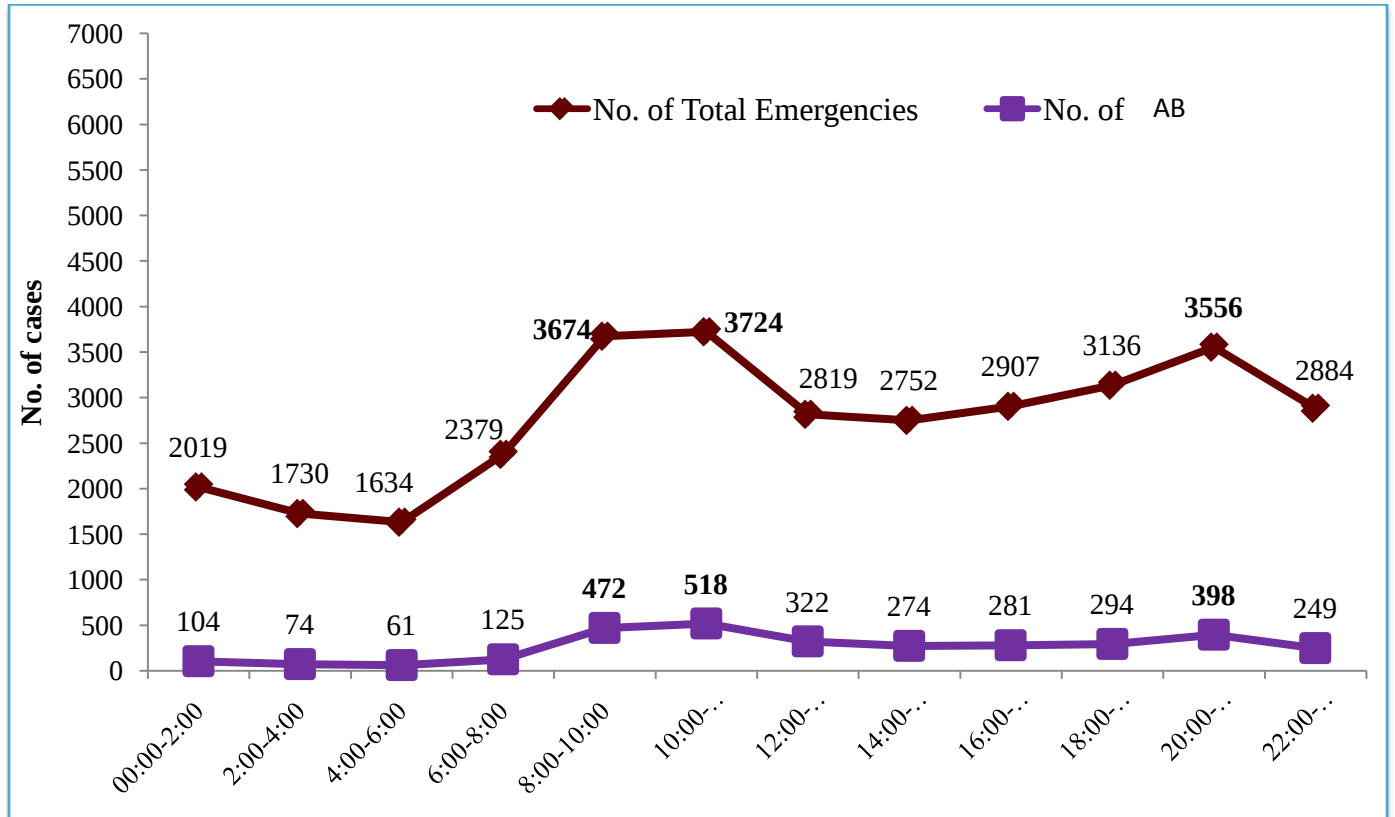


Inference:

This graph shows the number and percentage of AB cases in mandals out of the total AB cases for the respective districts. These mandals were chosen from the above given tables and these were contributing highest number of ABs in these districts. Further study was done on these mandals only.

12. Peak Hour analysis of AB cases

Graph 4: Peak hour analysis of AB cases

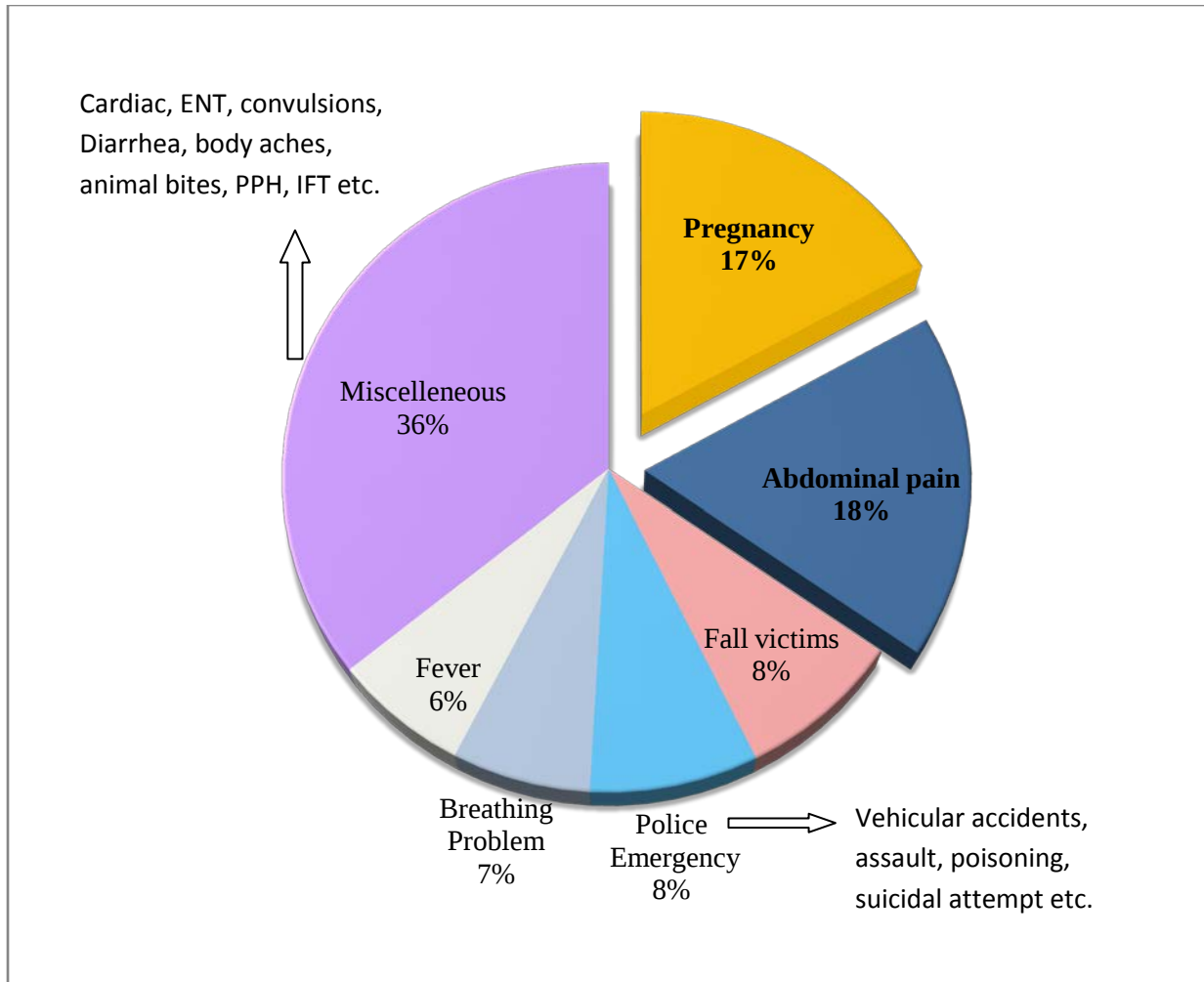


Inference

It can be seen in the graph that with the increase in number of emergency cases the AB cases also increase. The trend is same for both the categories of cases. From 8 am till 12 noon and from 8 pm till 10 pm both Emergency and AB cases are the maximum.

13. Emergency wise AB cases

Graph 5: Emergency wise AB cases



Inference:

From the graph it can be inferred that out of the all the categories of cases which are being turned up into AB, Abdominal pain and pregnancy cases alone contribute 18% and 17% respectively.

The miscellaneous category contributes 36% which include cardiac disorders, ENT related problems, convulsions, diarrhea, body aches, animal bites, post partum hemorrhage, Inter facility transfer etc. but these subcategories alone contributed a very little percentage to AB.

14. Selection of sample

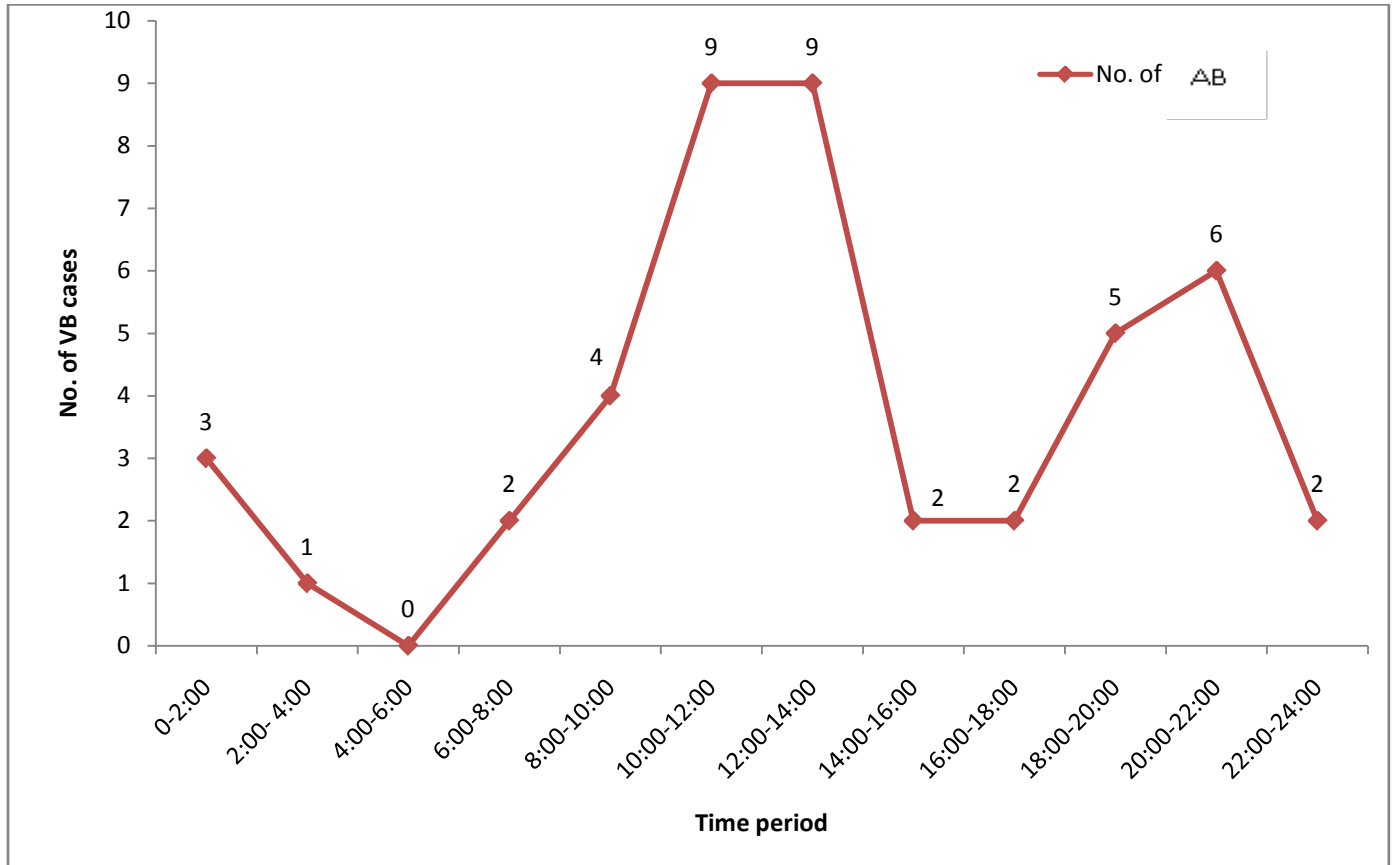
So after sorting out the 4 districts and 7 mandals which were giving high AB cases, 45 cases from these selected mandals were chosen from the available data based on convenience sampling as the information regarding these cases was available. These cases were available for the months of Dec. 2013 till Feb. 2014. After analyzing these cases, following findings and inferences had been observed. This table shows that out of the total AB cases from a Mandal what were the findings.

Table 8: Findings and Inferences of the selected cases

S.No.	Mandal	No. of AB cases	Findings	Inference
1	Chamba	8	5- Contacted NL1 2- Contacted NL2 1- SNR	• Choori is not contacted
2	Chaurah	3	3- NL1 had not been contacted	• Salooni (NL1- 50 kms) is far
3	Rampur	5	3- Not contacted NL1 3- Base to Hospital time is more by ambulance B	• Base location is 19 kms away • Base to Hosp. time is high
4	Shimla Rural	15	2- SNR 8- Hosp. to base time is more by ambulance D 1- NL2 had not been contacted	• Hosp. to base time is high
5	Nahan	5	4- NL1 had not been contacted 1- EMT did not call back after getting free 1- SNR	• NL1, NL2 are not being contacted
6	Shillai	5	2- Base to Hospital time is more by ambulance J 4- Contacted NL1, NL2	• Base to Hosp. time is high
7	Nalagarh	4	2- Base to Hospital Time is more by ambulance E 1- SNR 3- Contacted NL1, NL2	• Base to Hosp. time is high

15. Peak hour analysis of the Sample Cases

Graph 6: Peak hour analysis of the sample cases



Inference:

When peak hour analysis of the sample size was done it was seen that maximum number of AB cases was from 10 am to 2 pm and from 8 pm to 10 pm.

16. Division of Sample according to the Ambulances

Table 9: Division of the cases according to the ambulances

S. No.	Vehicle Id	Base Locations	No. of AB cases	% AB cases	ABs in Morning Shift	ABs in Evening Shift
1	A	PHC Jeori	1	2%	1	0
2	B	MGMSC Khaneri	4	9%	2	2
3	C	RH Nahan	6	13%	5	1
4	D	Shimla Rural MGMSC	11	24%	6	5
5	E	CHC Nalagarh	4	9%	3	1
6	F	CHC Tissa	3	7%	3	0
7	G	PHC Kakira	5	11%	3	2
8	H	RH Chamba 2	1	2%	1	0
9	I	RH Chamba 1	2	4%	2	0
10	J	CHC Shillai	2	4%	2	0
11	K	KNH1 Shimla	4	9%	3	1
12	L	PHC Ronhat	2	4%	2	0
	Total		45	100%	33 (73%)	12 (27%)

*The vehicle Id has been kept confidential.

Inference:

As it can be inferred from the table that Vehicle Id D whose base location is Shimla Rural MGMSC was giving maximum cases among the sample cases chosen for study followed by C and G These ambulances were taking high time to reach or shift the patient. Because of which the next case was being turned up into AB. So these ambulances were also studied further as to decrease the percentage of AB the response time should also be decreased.

It is also clear from the table that more AB cases are coming during the morning hours as the number of emergency cases is also high during morning.

17. Analysis of Base to Hospital Time of Ambulances

Table 10: Analysis of Base to Hospital Time of ambulances

Vehicle Id	Distance (km)		Time (hours)
	Base to Scene	Scene to Hospital	Base to hospital time (Hosp. admission – assign time)
B (Avg. trips/ day- 3.5)	21	21	3:21
	21	21	2:12
	11	10	3:25
J (Avg. trips/ day- 3)	28	27	4:39
	149	40	4:57
E (Avg. trips/ day- 2.5)	10	9	1:40
	24	23	2:28

Inference:

On analyzing the time taken by the ambulances to reach from the base to the hospital after going to the scene and providing him first aid, it was found that the above mentioned ambulances were taking more time to travel the distance from base to hospital.

18. Analysis of Hospital to Base Time of the ambulance

Vehicle Id- D

Average Trips/ day – 6.25

Table 11: Analysis of Hospital to Base time of the ambulance from the sample cases

Hosp to Base Distance (km)	Time taken (in minutes)	No. of AB cases
0	>10	4
2	>15	1
4	>20	2
6	>30	1

This table shows the time taken by this particular ambulance to reach the base after admitting the patient to the hospital. It can be inferred that the ambulance is taking more time than required to reach the base. E.g. When the distance between hospital and base is 0 km it means that the hospital is itself the base location, so the ambulance need not to go anywhere but still it is taking more than 10 minutes to finish the case.

Table 12: Analysis of Hospital to Base time of the ambulance from all the availed cases

for 0 km (3 min to 1:16)		for 2 km (7 min to 1:06)	
Time	AB Cases	Time	AB Cases
<5	4 (3%)	<10	2 (3%)
5-10	32 (21%)	11-15	5 (8%)
11-15	60 (39%)	16-20	16 (26%)
>15	57 (37%)	>20	38 (62%)
Total	153	Total	61

Inference:

When all the cases for this ambulance were analyzed then it was found out that it is giving more time while returning from hospital to base. The reason could be the behavior of the EMTs and pilots. After the completing the case they are not reaching the base location within time.

19. Findings:

After analyzing the sample it has been found out that:

- ✓ The EROs are not contacting the nearby ambulances when the base ambulance is busy. They are not familiar with the geography of Himachal Pradesh.
- ✓ In some of the mandals like Rampur there is no ambulance located. The first contact ambulance is situated 19 kms away from Rampur and the AB cases are continuously increasing here.
- ✓ The trend shows that the flow of emergency calls increase in the summers so as the number of ambulance busy cases.
- ✓ The distance between the base ambulance and the nearby ambulance is more in Chaurah mandal. The nearby ambulance is 50 kms away from Chaurah which is not possible to be called upon when Chaurah ambulance is busy. So only one ambulance is handling all the emergency cases and the AB percentage is increasing.
- ✓ The response time of the ambulances is more because of the hilly terrain also.
- ✓ Number of emergency calls and AB cases is more during 8 am to 12 noon and 8pm to 10pm.
- ✓ Some of the ambulances are giving high cycle time. So there are some behavioral issues with the field associates. They are taking more time than required to complete the case. Ambulances giving high cycle time are:
 - B
 - E
 - J

[Note: Please refer to the Table No17 for B, E, J ambulances]

20. Recommendations

1. Proper training of EROs regarding the usage of NL1, NL2 and NL3.
2. The ambulances giving high response time to be monitored daily and the field associates of the concerned ambulances will be warned.
3. Continuous follow up of the AB cases from AB desk till its closure.
4. Mandal wise action plan:

5. Chamba:

- Relocation of Banikhet ambulance (NL2- 45 kms) midway between Chamba and Dalhousie.
- Usage of Choori ambulance as NL1 (25 kms).

6. Chaurah:

- Relocation of Chowari ambulance to Chaurah.

7. Shimla:

- Relocation of Kandaghat Ambulance midway between Kandaghat and Shimla.
- Reduce Hospital to Base time of **D** which is serving Shimla Rural and continuously track its performance.

8. Rampur:

- Appoint an ambulance at Rampur as the AB cases are continuously increasing and the ambulance serving Rampur is located 19 kms away.
- Reduce the cycle time of ambulance **B** and continuously track its performance.

9. Shillai:

- Relocation of Ronhat ambulance (29 kms) midway between Ronhat and Shillai during morning peak hours as the number of cases are high at that time.
- Reduce the cycle time of ambulance **J** and continuously track its performance.

10. Nahan:

- Relocation of Dadahu ambulance (36 kms) midway between Nahan and Dadahu.

11. Nalagarh:

- Reduce the cycle time of ambulance **E** and continuously track its performance.

21. MONITORING AND EVALUATION

- The EROs will be monitored for the usage of NL1, NL2 and NL3.
- The relocated ambulances will be monitored on daily basis.
- The locations from where the ambulances have been moved will also be monitored daily to analyze if the relocation has resulted into high AB in those areas.
- The performance of field associates of the ambulances giving high cycle time will be monitored daily.
- The format for collecting the data for M & E is as following:

References:

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