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PlasmaGen Biosciences Pvt.Ltd.

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Plasma Product Therapy and Blood Banking Scene in India-Facts and Fictions

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**Under the Guidance of
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**Post Graduate Diploma in Pharmaceutical Management
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**Institute of Health Management Research,
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Certificate

This is to certify that Mr. Prem Shankar from Institute of Health Management Research, Jaipur has undergone summer training in PlasmaGen Biosciences Pvt. Ltd., Bangalore from 18th April to 3th June 2012.

The Candidate himself carried out the project. His approach to the study has been sincere, scientific and analytical. This summer training is partial fulfilment of the course requirement is recommended for the award Post Graduate Diploma in Pharmaceutical Management.

I wish him success in all his future endeavours.



Dr. P.R Sodani

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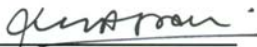
Certificate Of Appreciation

This certificate is awarded to

.....MR. Prem Shankar.....

*in recognition of the valuable
contribution made towards the project*

*"Plasma Products Therapy And Blood Banking
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Plasma product therapy and blood banking scene in India –Facts and Fictions

This project aims to understand the existing systems of blood banking in India focusing on Jharkhand and Bihar states. A mix of methodologies, including literature review (including government documents), and interviews with key officials was used. Results of analysis showed that there are many challenges in blood-banking services, which must be corrected as soon as possible. Bihar can help the two states as there are many blood banks which are already looking into this business.

Key words: Blood-banks; Blood-storage centres; Blood transfusion; Blood Componentization, Plasma, India

INTRODUCTION

Blood banking, the process of collecting (donation), testing, processing, and storing blood for later use (transfusion), is of immense need in emergency and surgical medicine. Blood transfusion is therefore considered as medicine and it must be available in all the major healthcare facilities for emergency use. Blood is considered as a Drug according to Drugs and cosmetics act, 1940. And as per some data's many deaths per year could be saved through the supply of safe blood. A blood transfusion involves the transfer of blood or blood components from one person (the donor) to another person (the recipient). A blood transfusion can be a life-saving process. It is often done to replace blood that has been lost due to severe bleeding or in some cases for the treatment of severe anaemia.

Plasma is a complex mixture of over 700 proteins and other substances which are crucial for the smooth running of our bodies. When extracted, these proteins and substances become key ingredients in medical products designed to replace body fluids, antibodies and clotting factors. Plasma is quite simply a lifesaving resource that benefits thousands of people every day. As the largest single component of blood, plasma makes up about 55 percent of total blood volume. It's a clear, straw coloured liquid, mostly made up of water, in which platelets, red and white cells are carried. It provides a 'storage area' for fluids for the body, helping maintain blood pressure as well as cooling and warming the body.

Once separated from blood cells, plasma for patient use goes in one of two directions. It can be used for blood transfusion as fresh frozen plasma and other transfused plasma products. It can also be directed to a plasma fractionation plant to undergo a more complicated type of processing to separate out its many individual proteins.

A fractionation plant breaks down plasma into a vast array of substances that can be used to make all sorts of medical products. These products can be grouped into three main types: coagulation factors, human albumin solutions and immunoglobulin's.

Plasma is first tested for viruses to be sure that it's safe to use, in just the same way that whole blood is tested. Depending on the product to be made, it undergoes many chemical and physical processes, such as spinning and heat treatments to separate the individual proteins.

The fractionation process takes place in huge Cohn vessels, named after the ‘grandfather of fractionation’ Dr Edwin Cohn.

The fractionation process is a fully automated system and takes up to five days to complete. Solvent/detergent treatment, dry heat treatment, filtration and pasteurisation are also used to kill or remove any viruses that may be present. All of the finished products undergo further testing to make sure that they contain the right biological make-up. Once the processing and testing is complete, the products are labelled, coded and packed ready to be used by hospitals, clinics and GP surgeries. The total number of products that can be made with plasma fractionation runs into hundreds.

In 1989 the Indian Government suspended manufacturing licences for blood plasma products pending process changes by manufacturers to implement viral inactivation to improve the safety of plasma derivatives. This move initiated the end of commercial blood donation and plasma fractionators ceased operations. In 2006, collection of recovered plasma has commenced and there is now a limited product supply from contract fractionation of Indian plasma. India faces a choice of technologies for plasma fractionation. Domestic fractionation needs to be seen as a new endeavour in India.. The Indian market is only 0.25% of the global plasma products market. Plasma fractionators in India face a major challenge with low price imports. Economic pressures mean pressures on technology to deliver multiple products from high yielding processes. The country must support more than one fractionation plant to even begin to meet the needs of the Indian population. The challenges in relation to current healthcare development and the immensity of the issues in a country of 1.1 billion people are discussed in the HIV context are discussed. India is a country of major opportunity and boasts advantages in science and education, biopharmaceutical R & D, productivity and a low age population. However, the sciences and technologies particular to plasma fractionation are generally lacking even if skills in biopharmaceutical development and manufacturing are present. Investment and processing costs are similar, independent of the technologies chosen since the bulk of the cost is associated with downstream processing and viral inactivation procedures. The greatest threat to failure is likely to be an insufficiently funded project but the key to success will be a dedicated, organized team of Indian scientists and technologists.

OBJECTIVE OF THE STUDY

The primary objective of this paper is to analyze the existing scenario of blood banks and find out the gap between the demand and supply of the Plasma and to determine the availability of surplus Plasma with the Blood Banks of India, specifically focusing on the Jharkhand and Bihar states. The secondary objective is to determine the demand, the consumption pattern, personal preferences and quality & availability of currently available Blood plasma brands in Bihar and Jharkhand and to study the perception of doctors towards plasma products and to know about the supply and demand of the plasma products in India.

It was identified that not only India but the whole SAARC nations are facing the problem of insufficiency of plasma market so some recommendations were given to set more componentisation processes so that more and more plasma can be made available to the

Plasma Fractionation industries to make plasma products to meet the need of the people in India and SAARC nations.

PROBLEM STATEMENT

For an aspiring company to do business in protein therapy, the plasma market is not a very congenial place to do business in since plasma products such as IVIG, Human Albumin, Anti-D, Hepatitis and Tetanus Immunoglobulin all are very expensive, their only source being Human Blood & blood donors have to be paid hefty sums of money for any donation of blood they make. There for availability of blood in our country and fractionation facilities are limited and not sufficient to fulfil nations demand for this entity of medicine.

Another issue, is the lack of awareness since it is new to the market and there is little awareness among doctors & patients alike regarding its uses & implementation.

Some of the other concerns would include :

- Ever rising cost of plasma.
- Government control of pricing.

Since the government does not want the prices of plasma products to jet off beyond the reach of the common man.

- Poor Worldwide harmonization of regulatory issues.
- Import Limitations.

With an in depth market survey on the plasma market it is needed to determine the demand, the consumption pattern, personal preferences and quality & availability of currently available blood & plasma brands in central Region of India which will hopefully come handy when embarking on new business propositions in the plasma market.

MATERIALS AND METHODS

Methodologies used in the paper included review of documents, reports, and other literature and analyses of the organizational structure and process of blood-banking services, specifically Interviews with key officials and the key staff of selected blood-banks was carried out. This project is carried out for assessing the both end of market, from supply of raw material to consumption of product for plasma product preliminary requirement is PLASMA and vital source for plasma is human blood which found in blood banks.

TARGET POPULATION :

In Jharkhand and Bihar the following places were visited for the survey. In Jharkhand it was Ranchi, Dhanbad and Jamshedpur and in Bihar it was Patna , Begusarai, Muzaffarpur and Darbhanga.

DATA COLLECTION :

- Data collection for most of the respondents had been through Questionnaire provided by, PLASMAGEN BIOSCIENCES.
- This questionnaire is data collection tool in market research.
- Data collection carried out by semi structure questionnaire.

TYPE OF RESEARCH DESIGN :

The market survey is Exploratory Research.

TYPE OF SAMPLING :

Judgemental sampling or Probability sampling had been majorly used in selecting samples for market research for blood bank, list constituting the top blood bank in the South eastern region and North Central Region of India. List of blood banks for all cities was provided by organization and few blood banks was visited randomly.

NUMBER OF RESPONSES FOR BLOOD BANKS:

- A total of 37 blood banks were visited, out of which 34 blood banks responded and provided the required information.

NUMBER OF RESPONSES FOR PLASMA PRODUCTS

The total number of responses had been 184.

TABLE NO.2 Number Of Responses For Plasma Products

<u>IVIG</u>	<u>94</u>
<u>Hepatitis B Immunoglobulin</u>	<u>130</u>
<u>Albumin</u>	<u>131</u>
<u>Anti D Immunoglobulin</u>	<u>92</u>
<u>Anti Rabies Immunoglobulin</u>	<u>60</u>
<u>Fibrin Sealant</u>	<u>8</u>
<u>Tetanus Hyper Immunoglobulin</u>	<u>99</u>
<u>FactorVIII</u>	<u>33</u>
<u>FactorVII</u>	<u>18</u>
<u>Fibrinogen</u>	<u>6</u>
<u>Anti thrombin</u>	<u>4</u>
<u>Thrombin</u>	<u>3</u>
<u>ProthrombinComplex Concentrtae</u>	<u>10</u>

STUDY TIME:

- Survey started from 17th April and finished on 4th June .Total 43days for field survey .

ANALYSIS TOOL:

- MS office EXCEL was used as analysis tool.

BLOOD BANKS AND BLOOD TRANSFUSION SERVICE

In India, blood collection, storage and issue of blood for transfusion are done mainly in the blood banks attached to hospitals, run mostly by the state and central governments. Voluntary agencies and private blood banks also carry out significant proportions of blood banking activities. There are a total of 2465 licensed blood banks in India. Out of them, about 55% are from public sector, 25% are from non government organizations (NGO), 8% blood banks are managed by Indian Red Cross Society and rest are from corporate and profit making sector.

Though the voluntary donations are increasing (45% in 2002 to 53% in 2008) this is very common in hospital based government and private blood banks leading to all sort of malpractices. Many blood banks show replacement donations as voluntary donations on record. It is difficult to track later.

In India, the ratio of use of blood components to whole blood is 15:85, while globally it is 90:10. This shows how poorly equipped we are. Many blood banks in India still not equipped to make components. They also try to malign the one those who separate components attaching religious values. Most of the blood banks issue whole blood. Even majority doctors prescribe whole blood, without understanding advancement in transfusion medicine. As a result they contribute to shortage of blood in the country and also overburden the patient unnecessarily causing harm at times. Blood Transfusion reactions are common in whole blood transfusions.

A well organised Blood Transfusion Service (BTS) is a vital component of any health care delivery system. An integrated strategy for Blood Safety is required for elimination of transfusion transmitted infections and for provision of safe and adequate blood transfusion services to the people. The main component of an integrated strategy include collection of blood only from voluntary, non-remunerated blood donors, screening for all transfusion transmitted infections and reduction of unnecessary transfusion.

The Blood Transfusion Service in the country is highly decentralised and lacks many vital resources like manpower, adequate infrastructure and financial base. The main issue, which plagues blood banking system in the country, is fragmented management. The standards vary from State to State, cities to cities and centre to centre in the same city. In spite of hospital based system, many large hospitals and nursing homes do not have their own blood banks and this has led to proliferation of stand-alone private blood banks.

The blood component production/availability and utilisation is extremely limited. There is shortage of trained health-care professionals in the field of transfusion medicine.

For quality, safety and efficacy of blood and blood products, well-equipped blood centres with adequate infrastructure and trained manpower is an essential requirement. For effective clinical use of blood, it is necessary to train clinical staff. To attain maximum safety, the requirements of good manufacturing practices and implementation of quality system moving towards total quality management, have posed a challenge to the organisation and management of blood transfusion service.

Advantages of component therapy are:

- the recipient can be treated with only those blood components that are lacking, reducing the occurrence of adverse transfusion reactions;
- more than one patient can be treated with blood components derived from one donation;
- therapeutic support for patients with special transfusion requirements can be provided, for example, plasma that often is not directly needed for transfusion can be used manufacturing of Factor VIII concentrate for Haemophilia A patients;
- Improved quality and functional capacity of each component.

PLASMA PRODUCTS THERAPY

The project undertaken is a market research on the demand, consumption pattern & personal preferences of doctors while prescribing Plasma products for medication. As plasma products such as IVIG, Human Albumin, Anti-D, Hepatitis and Tetanus Immunoglobulin are all very expensive in the market because their only source is Human Blood & blood donors charge a hefty sum for any donation of blood they make. Despite the fact that all Plasma products are lifesaving drugs & the last line of defence for many doctors, many patients

refrain from buying it as their price are well beyond the reach of many poor people which form a large percentage of our population. Also because of the fact that plasma products are new in the market, there is not much of awareness among doctors & patients regarding its uses & implementation. Therefore the plasma market is not a very favourable place to do business in, since the option of minimization of production costs doesn't hold over here.

However the purpose of this market research was to determine what the obstacles are and to draw a perfect reflection of the current plasma market. Throughout the market survey on doctors of reputed hospitals and in clinics in Ranchi, Jamshedpur, Dhanbad, Patna, Begusarai, Muzaffarpur and Darbhanga the demand and consumption pattern, personal preferences and quality & availability of currently available blood & plasma brands in the this region of India were determined.

From all the responses collected from the doctors it was evident that availability and quality of plasma products are not very satisfactory in the Jharkhand and Bihar region. A clear majority of the doctors found that the current prices of plasma products are very expensive. Doctors have unanimously said that awareness is required for both patients and themselves regarding plasma products. Consumption rate is very less for plasma products since one in fifty or hundred need to be prescribed with plasma products. And choosing their favorite brand has been done purely on the basis of availability, quality of the product and price.

MISSION:

To propagate the blood component therapy for optimum use of each drop of blood donated and, uses surplus unutilized plasma for preparation of plasma products in India and SAARC regions.

VISION:

To advance Plasma therapy in India and SAARC countries.

FINANCIALS:

Its estimated sales for 2010-11 is approximately 5.3 million US \$ which would most likely to go upto 24 million US \$ by 2011-12 & 30 million US \$ by 2015.

STRATEGY:

Plasmagen is focused on bridging the gap between demand and supply of plasma products. Under this study they would like to evaluate the present scene, the challenges and making India sufficient in the field of blood plasma. The study in this new area will add significant depth to the existing scenario and overcome the major challenges faced by Nation. Company is trying to focus on delivering world-class plasma products at affordable prices.

HOSPITALS VISITED:

RANCHI	9
JAMSHEDPUR	3
DHANBAD	4

PATNA	6
BEGUSARAI	1
MUZAFFARPUR	2
DARBHANGA	1

Rajendra Institute of Medical Sciences, Guru Nanak Hospital and Research Centre, Ispat Hospital, CCI hospital, Kidney Hospital and Research Centre, Seventh Day Adventis hospital, Plant Hospital, Nagarmal Seva Sadan, Abdul Razzaque Ansari Memorial Weaver's Hospital(Apollo Hospitals Group), Patliputra Medical College,Central Hospital,Dwarikadas Jalan Memorial Hospital,K.M.Memorial Hospital ,MGM Medical College Hospital,Tinplate Hospital, Tata Memorial Hospital , Indira Gandhi Institute of Medical Sciences, Patna Medical College, Palm View Hospital, Lions Mahaveer Cancer Hospital, Kurji Holy Family Hospital, Sadar Hospital Begusarai, SadarHospital Muzaffarpur, Sri Krishna Medical College Hospital,Darbhang Medical College.

Table.1 Status of blood-banking in Jharkhand and Bihar 2012

Indicator	Jharkhand	Bihar
Population 2011 (million)	32.96	82.99
Number of blood-banks	43	67
Government	25	37
Private	18	30
Annual blood requirement(units)	270000	850000
Total blood collection (units)	66549	39927
Voluntary Blood Collection(units)	22900	11765
Voluntary blood collection (%)	34.40	29.50
Total blood banks visited	20	17
% of increase in voluntary donation	1.16lac units during 2010-2011	10-20%from last five year

Prevalence of major infections in total collected blood units in both states in the major cities which were covered during the study.

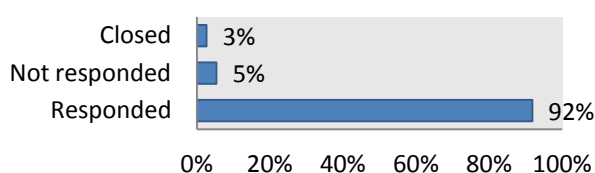
YEAR	2011	2012
HIV+	295	14
HBs Ag+	1744	8
HCV+	289	106
Syphilis	229	5
Malaria	216	35

ANALYSIS OF BLOOD BANKS

A. GRAPH REPRESENTING RESPONSES OF BLOOD BANK VISITED :

In Jharkhand and Bihar a total of 37 blood banks were visited, out of which 34 blood banks shared their information and limitation whereas 2 blood banks didn't share their information and one of the blood bank was closed as their licence got expired.

FIGURE NO.1:- Responses of Blood Banks.

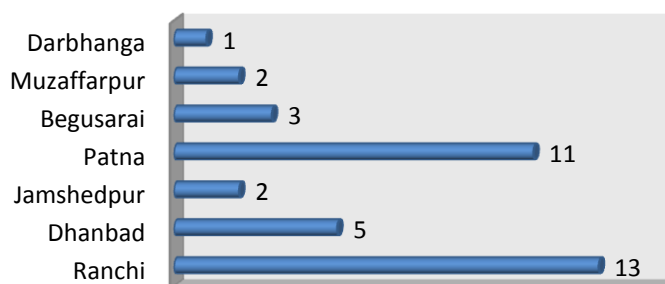


92% of Blood banks surveyed responded and shared their information, 5% did not respond and the remaining 3% of the blood bank was closed.

B. GRAPH REPRESENTS NO OF BLOOD BANKS COVERED IN DIFFERENT CITIES.

A total of seven territories were visited, In which 13 blood banks were visited in Ranchi out of which only 2 Blood Banks were involved in the componentisation process. In Jamshedpur there was only one blood bank who was dealing with the plasma separation. And it was found that it was the largest among all the Blood banks visited and they are already giving their surplus plasma to plasma fractionation companies.

FIGURE NO 2:-Number Of Blood Bank Situated In Various Cities.

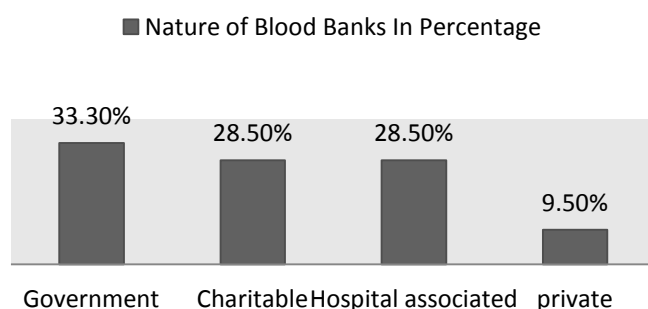


The survey was done in different cities according to the allotted territories, 11 blood bank visited in Ranchi, 5 in Dhanbad, 2 in Jamshedpur, 10 in Patna and 3 in Begusarai, 2 in Muzaffarpur and 1 in Darbhanga.

C. NATURE OF BLOOD BANK.

In Bihar ,there are a total of 67 blood banks out of which 37 blood banks are Government blood banks and 30 blood banks are private blood banks.and in Jharkhand there are 25 blood banks which are Government in nature and 18 blood banks which are private in nature out of the total of 43 blood banks.The figure 3 shows the nature of blood banks in different regions of Bihar and Jharkhand.

FIGURE NO.3:- Graph shows Nature of Blood Banks.

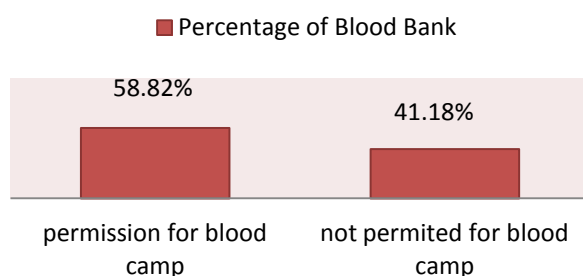


During the survey it was found that 33.30% of Blood banks surveyed are government blood banks, 28.50% are charitable blood banks, 28.50% of blood banks are hospital associated & 9.50% blood banks are private blood banks.

conduct Blood Collection Camps. It was found that 58.82% of the Blood

Banks have the permission to

FIGURE NO 4:- Graph On Number Of Respondents For Having Permission For Blood Camp.



conduct blood collection camps while 41.18% of the Blood banks do not have the permission to conduct blood collection camps.

E. TOTAL BLOOD COLLECTION PER YEAR OF BLOOD BANK.

FIGURE NO.5:- Graph For Total Blood Collection Per Year Of Blood Bank.

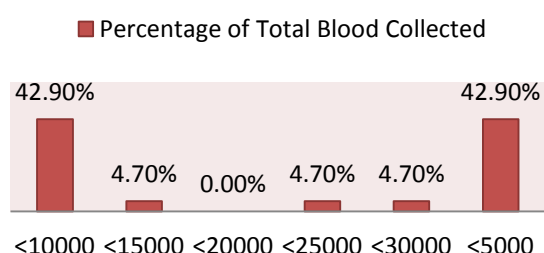


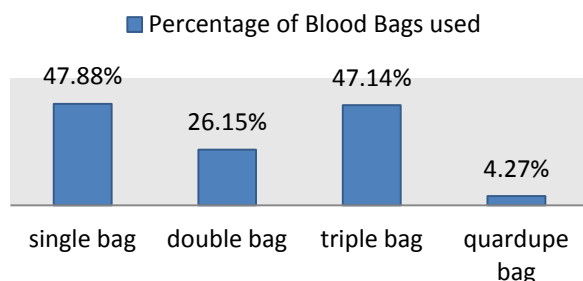
Figure number 5 shows the total blood collection per year of the Blood banks. It was found that: There are 42.90% blood banks which are having less than 10000 IU of blood collection whereas only 4.7% of blood banks are having more than 30000 IU of blood collection.

F. TOTAL BLOOD COLLECTION IN DIFFERENT CAPACITY BLOOD BAGS.

In the Blood Banks different types of the blood banks are used. It includes single, double triple and quadruple bags. Single bags are mostly used to collect the whole blood and the other types of the bags are used in the componentisation. There is one or two satellite bags with the single blood bag in case of double , triple and quadruple bags. Figure no.6 shows

the percentage of different blood bags used for blood and its component collection by different blood banks. Figure 6 shows the percentage of mostly used blood bags.

FIGURE No.6:-Percentage of mostly used blood bags for blood collection.

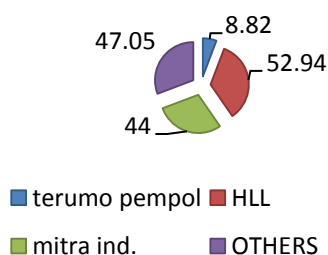


About 47.88% OF BLOOD BANKS are using only single bag for blood collection which also signifies that this much percentage of blood banks does not have licence to prepare components while 47.14% of blood banks are using triple bags and 26.15% of the blood banks are using double bag.

G. BLOOD BAG USED FOR BLOOD COLLECTION:-

Different Blood Banks use different companies blood bags. All the government blood banks are using only those blood bags which are being supplied by NACO.

FIGURE NO7:-percentage of mostly used blood bags company for blood collection.



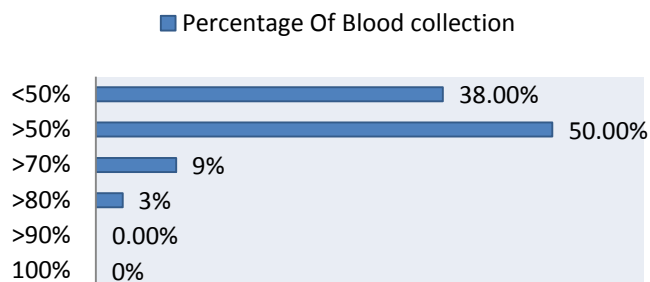
52.94% of blood banks surveyed are using HLL blood bag, 44% of blood bank are using Mitra, 8.82% using Terumo Pempol while only 47.05% of blood banks are using other companies blood bags like Medikit, Medicare etc.

H. PERCENTAGE OF VOLUNTARY BLOOD COLLECTION.

The percentage of voluntary blood collection in Bihar and Jharkhand is between 25% to 40%. hence Bihar and Jharkhand are considered as poor performing states for blood safety. But in Bihar the increase in voluntary blood collection is reported to be 1.16 lacks units during 2010-2011. And in Jharkhand there is 10-20% increase in voluntary blood collection from the last five years. Figure 8 shows the number of responses for percentage of voluntary blood collection.

FIGURE NO8:-Graph Represents No. of Responses for Percentage Voluntary Blood Collection.

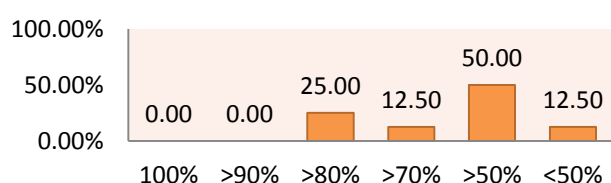
50% of blood banks surveyed reports more than 50% of voluntary blood collection while only 38% of blood banks show less than 50% of voluntary blood collection.



I. PERCENTAGE OF BLOOD COMPONENTIZATION IN BLOOD BANKS.

Out of the 34 Blood Banks only 8 blood banks are having the componentisation facilities. There is need of some more blood banks which should be involved in the componentisation process so that more and more plasma can be made available. 24% of blood banks have componentization facility, 76% blood bank deals with whole blood.

FIGURE NO9:-Graph Represents No. Of Responses for Blood Componentization Percentage

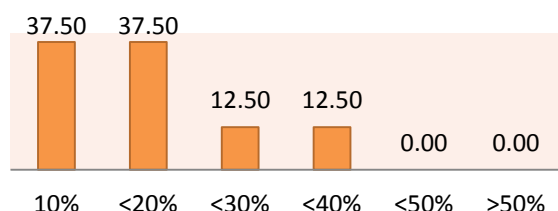


50% of blood banks surveyed reports more than 50% of blood componentization while 12.50% of blood banks show less than 50% of blood componentization.

J. PERCENTAGE OF ISSUANCE OF PLASMA COMPONENT TO PATIENTS.

It is very important to issue plasma to the needful patient. But the problem is there is not enough plasma available at the blood banks. Therefore the percentage of issuance of plasma to the patients is very low. Figure 10 shows the issuance of plasma to the patients by different blood banks.

FIGURE NO10:- Graph Represents Percentage Issuance Of Plasma to Patients.

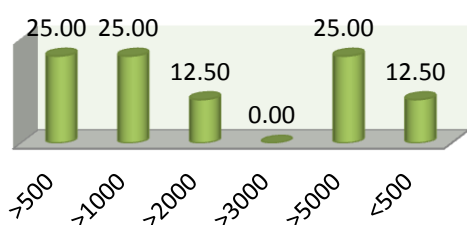


37.50% of blood banks surveyed are issuing 10% of plasma to patients, 37.50% of the Blood banks are issuing less than 20% of the plasma to the patients while 12.50% blood banks issue less than 30% of plasma to patients.

K. MAXIMUM CAPACITY FOR STORAGE OF PLASMA AT BLOOD BANK.

All the blood banks have different storage capacities for the preparation and storage of plasma. The Jamshedpur blood bank was found to be the largest among all the blood banks for preparing and storage of the plasma. They have a storage capacity of 6000 units of plasma.

FIGURE NO11: Graph Represents Plasma Storage Capacity Of Blood Centre.

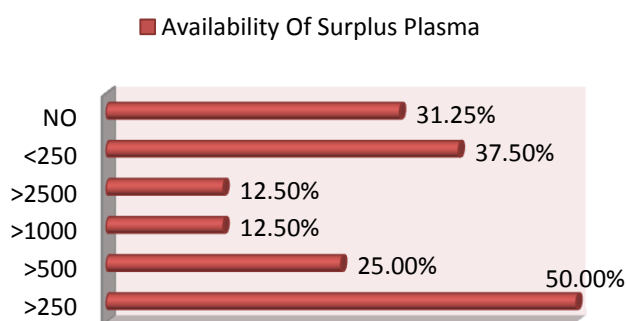


25% of blood banks have more than 500 plasma units of storing capacity of plasma units, 25% of blood banks have more than 1000 units of storing capacity, 25% of the blood banks have more than 5000 units of storing capacity only 12.50% of the blood banks have less than 500 units of storing capacity.

L. AVERAGE AVAILABILITY OF SURPLUS PLASMA UNIT:

Availability of surplus plasma is very important. If there would be more surplus plasma available it would be good for the plasma fractionation companies. In India most of the plasma remains useless until any plasma fractionation company approach them for plasma. Figure 12 shows the average availability of the surplus plasma in blood banks.

FIGURE NO12: Graph Represents Average Surplus Plasma In Blood Banks.



50% of blood banks surveyed are having less than 250 units of surplus plasma and only 12.50% of the blood banks have more 2500 units of surplus plasma.

- ❖ 87.5% of blood bank having freezer for storing and preparing plasma, 12.5% of the blood bank having cold room, 13% of the blood bank having blast freezer for storing and preparing plasma.
- ❖ Only 62.5% blood banks have produce cryoprecipitate and 37.5% blood banks do not produce cryoprecipitate.

CONCLUSION

After the market research survey, it is found that most of blood banks share their information about their functioning and limitations. Most of the government medical college hospitals in the South eastern region and Middle East region have set their

Ph.No.....Mobile.....

Email:

.....

1. How long you have been using ?
 a. Less than 3 yr, b. 3-7 yr, c. More than 7 yr.
2. Availability of product has been...
 a. Excellent, b. Good, c. Poor.
3. Any specific brand you prefer

4. Is it because of
 a. Better Product b. Availability c. Pricing d. Other ()
5. What is general consumption pattern?
 a. Less than 10, b. 10- 20, c. More than 20.
6. Indications you use it for

7. Because it is a biologic “made out of human plasma”; would you consider source of plasma important criterion in selection of the product?
 a. Very critical, b. Critical, c. Not critical.
8. Any safety issues for these products?

9. Your opinion on the quality of currently available brands?
 a. Highly satisfied b. Satisfied c. Not satisfied d. Need improvement

10. Pricing of currently available brands?
 a. Expensive, b. Affordable, c. Not Affordable.

11. Does any awareness program about blood/ plasma products is required for patients / doctors / paramedical staff?
 a. Yes b. No.

12. How do you trust a brand of blood plasma product ?
 a. Product itself b. Company’s image / safety record
 c. Long term relationship d. Any other factor ()

13. What are the major issues in prescribing plasma products to the patients.

- 14 Any references, if you would like to give

ANALYSIS & FINDINGS OF PLASMA PRODUCTS

All the responses gathered using the above questionnaire has been recorded below in the form of compound graphs & tables. Hopefully a graphical representation will bring out a better comparison and help to draw a desirable conclusion from it.

1. IVIG

- **Usage of IVIG.**

IVIG is one of the most important plasma product used by a number of specialist and it mostly used in indications such as Primary Immunodeficiency (PID), Kawasaki disease, Chronic lymphocytic leukaemia, Myasthenia Gravis and many more and it was found that 77% of the total respondents have been using IVIG for more than 7 years, 13% are using it for less than 3 yr and 10% have been using it for 3-7 years.

Figure13.Usage of IVIG

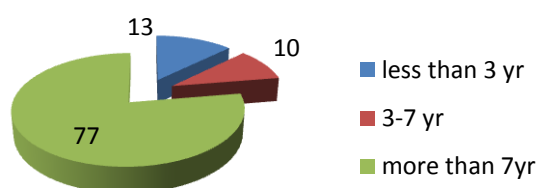


Figure13 shows the percentage of doctors based on the year of their experience to prescribe the IVIG brands during the treatment of their patients. It was found that most of the doctors prescribing IVIG brands have more than 7 years of experience.

- **Availability of IVIG.**

Figure14. Availability of IVIG.



Figure 14 shows the availability of IVIG is of major concern, because there is always some gap between the demand and supply of IVIG. But it was indeed surprising that 90% of the doctors said that the availability was good. And the interns who were interviewed told that the availability was poor. Some of the doctors also told to make them available brands of IVIG in 0.5gm. Important is that only 7% of the doctors told that the availability of the IVIG is excellent and 3% of the doctors told that the availability of IVIG is Poor.

- **Specific Brand Preference:**

Most of the doctors prefer Bharat Serum around 23%, 7% doctors prefer Reliance and other doctors (70%) don't prefer any particular brand.

Figure 15:- .Brand Preferences.

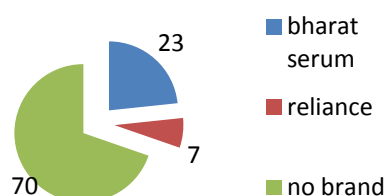


Figure 15 shows that when it came to choose any particular brand while prescribing IVIG, 70% of the doctors do not prefer any particular brand as IVIG products are not easily available and they just prescribe any brand which is available. But Bharat serum is the major player in the market as it occupies 23% of the doctors preference to be given in case of its use, followed by Reliance .7% of the doctors prefer Reliance as a brand to prescribe IVIG.

- **Reason For Brand Preference.**

Figure 16:-Reason for brand preference.

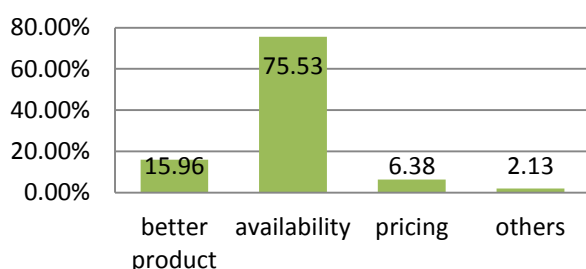


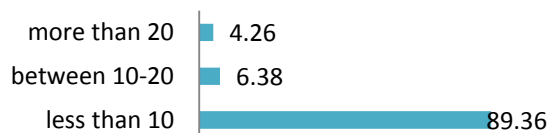
Figure 16 shows the percentage of doctors who prefer any particular brand of IVIG because of the availability, better product, pricing and some other factors. It was found that almost 75.33% of the doctors prefer any IVIG Brands because of the availability. 15.96% of the respondents think that they prefer it because of the better product, 6.38% of the doctors thinks that pricing is important for preferring a brand and rest 2.13% thinks that there are some other factors which are considered while preferring a brand.

- **Consumption Pattern Per Month:**

Out of total respondents, 89.36% of respondents prescribe less than 10 vials per month on an average, followed by 6.38% of respondents who prescribe 10 to 20 vials per month. Only 4.26% of the respondents prescribe more than 20 vials per month per patients.

Figure 17:-Consumption of IVIG.

Figure17 shows the consumption pattern of IVIG per month. It was found that the consumption of IVIG is very less i.e. majority of the respondents (89.36%) use less than 10 vials of IVIG per patient per month but important is that only 4.26% of the doctors prescribe more than 10 vials per month per



2.ALBUMIN:

The maximum number of the respondents were for Albumin. Albumin is the most frequently used Plasma Products.

• Usage of Albumin

Figure 18:-Usage of Albumin.

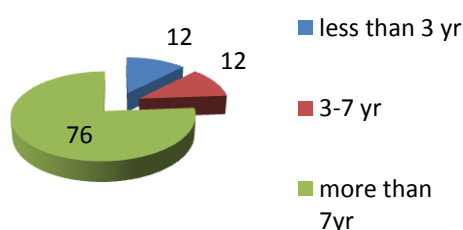


Figure 18 shows the usage of Albumin. In case of albumin out of the total respondents 76% of the respondents have been using Albumin for more than 7 years, 12% are using it for less than 3 yr and 12% of the doctors have been using it for 3 to 7 years. For prescribing Albumin, it was found that it is mostly prescribed by those doctors who are of higher age group and have more working experience.

• Availability of Albumin

Figure 19:-Availability of Albumin.

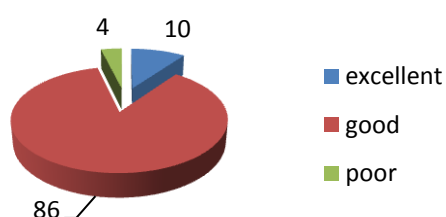
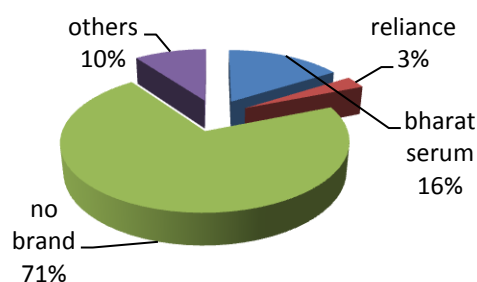


Figure 19 shows the availability of Albumin. The availability of Albumin has been good for 86% of the total respondents, while 10% of respondents reported it excellent and only 4% reported that the availability of the product was poor.

• Specific Brand Preference:

Figure 20:-Brand preference

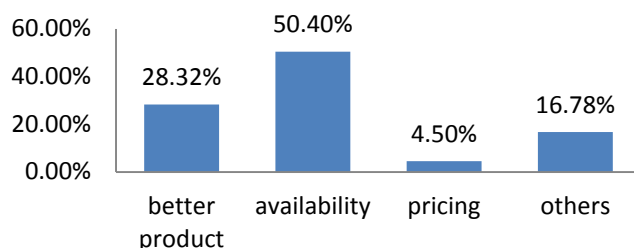


In figure 20, the specific Albumin brand preferences have been shown. It is clear that 71% of the total doctors do not prefer any particular brand of Albumin. They use it according to the availability of the brand. In case of Albumin also Bharat Serum is the market leader, 16% of the total respondent use Bharat Serum, followed by Reliance used by 3% of the total doctors. And the rest 10% of the doctors prefer other Brands or combination of Bharat Serum and Reliance with Intas according to the availability.

• Reason For Brand Preference.

Figure 21:- Reason for Brand preference.

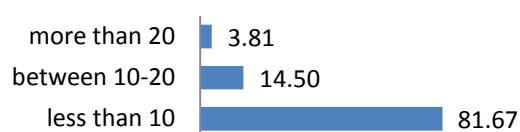
Figure 21 shows the reasons for the brand preferences by the doctors. 50% of the total doctors prefer it because of the Availability of the Albumin Product. 25% of the respondents prefer it because of the better product. While the remaining 30% of the doctors prefer it because of the pricing and other factors.



- **Consumption Pattern Per Month:**

Figure 22 shows the general consumption pattern of Albumin per month per patient in percentage. It is found that the consumption pattern of Albumin is not good since majority of the respondents use less than 10 vials of Albumin per month per patient.

Figure 22:- Consumption Pattern of Albumin.



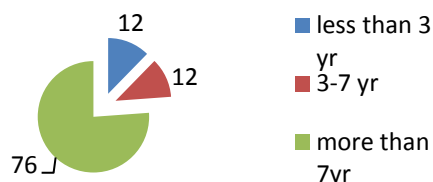
Out of total respondents, 81.67% of respondents prescribe less than 10 vials of albumin per month on an average, followed by 14.50% of respondents who prescribe 10 to 20 vials per month. Only 3.81% of the respondents prescribe more than 20 vials per month per patients.

3.HEPATITIS B IMMUNOGLOBULIN

- **Usage of Hepatitis B Immunoglobulin**

Figure 23 shows usage of Hepatitis B Immunoglobulin in percentage based on the year of experience of the doctors.

Figure 23:- Usage of Hepatitis B Immunoglobulin.

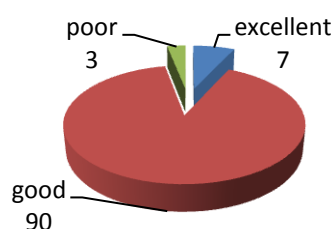


Out of the total respondents 76% of the respondents have been using Hepatitis B Immunoglobulin for more than 7 years, 12% are using it for less than 3 yr and 12% have been using it for 3-7 years.

- **Availability of Hepatitis B Immunoglobulin**

Figure 24 shows the availability of the Hepatitis B Immunoglobulin Brand in percentage. Hep.B Immunoglobulin is most important plasma product at present since the number of cases of Hepatitis B is very high. In the market survey of the Blood Banks it was found that the number of the cases due to transfusion transmission infection was highest in all the blood banks. And it becomes very important as there is no treatment for Hepatitis B Immunoglobulin.

Figure 24:- Availability of Hepatitis B Immunoglobulin.



The availability of Hepatitis B Immunoglobulin has been good for majority of the doctors (90%), but important is that only 7% of the respondents said that the availability of Hepatitis B Immunoglobulin is excellent and only 3% reported that the availability

- **Specific Brand Preference:**

Most of the doctors prefer Bharat Serum around 22%, 5% doctors prefer Reliance and other doctors (73%) don't prefer any particular brand.

Figure 25:-Specific Brand Preference of Hepatitis B Immunoglobulin.

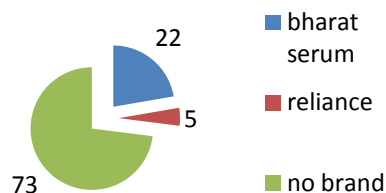
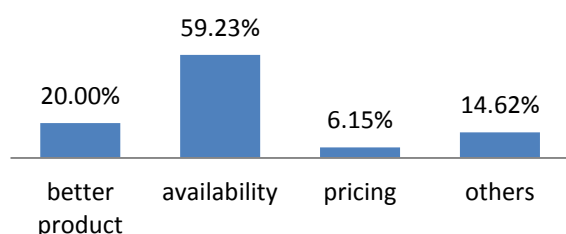


Figure 25 shows the percentage of specific brand preference of Hepatitis B Immunoglobulin. Bharat serum is enjoying the major market share as 23% of the respondents prefer it, followed by reliance and other brands.

- **Reason For Brand Preference.**

Figure 26 shows the reason for preferring any particular brand of Hepatitis B Immunoglobulin in percentage.

Figure 26:-Reason for Brand Preference of Hepatitis B Immunoglobulin.



The reason for preferring any Hep. B Immunoglobulin is the availability of the products (59.23%), followed by better product in 20% of the cases. 6.15% of the respondents think that pricing is important for brand preferences.

- **Consumption Pattern Per Month:**

Figure 27 shows the general consumption pattern of Hepatitis B Immunoglobulin in percentage.

Figure 27:-General consumption pattern of Hepatitis B Immunoglobulin.

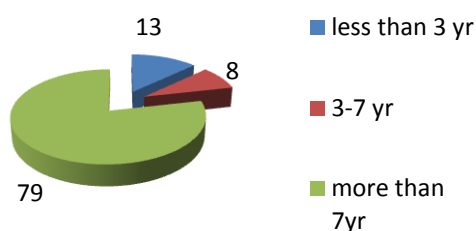


Out of total respondents, 86.92% of respondents prescribe less than 10 Hepatitis B Immunoglobulin vials per month on an average, followed by 10% of respondents who prescribe 10 to 20 Hepatitis B Immunoglobulin vials per month per patient. Only 3.08% of the respondents prescribe more than 20 vials per month per patients.

Immunoglobulin

Figure 28 shows the usage of Anti D Immunoglobulin in percentage according to the year of experience of the doctors.

Figure 28:-Usage of Anti D Immunoglobulin.

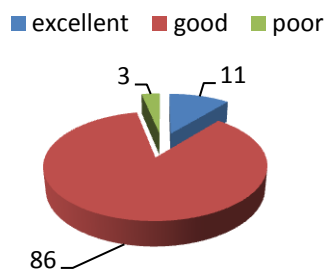


Out of the total respondents 79% have been using Anti D Immunoglobulin for more than 7 years, 13% are using it for less than 3 Years and 8% have been using it for 3-7 years. Most of the respondents were female gynaecologist having more than 7 years of working experience.

- **Availability of Anti D Immunoglobulin**

Figure 29 shows the availability of Anti D Immunoglobulin in percentage as reported by the respondents.

Figure 29: Availability of Anti D Immunoglobulin

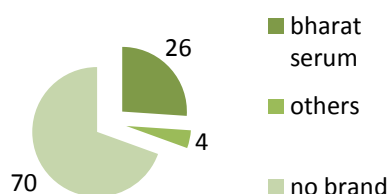


According to the 86% of gynaecologists the availability of Anti D Immunoglobulin has been good; while 11% of respondents reported it excellent and only 3% think that the availability of the product was poor.

- **Specific Brand Preference:**

Figure 30 shows the percentage of preference of the brand of Anti D Immunoglobulin. Most of the doctors do not prefer any particular brand of Anti D Immunoglobulin.

Figure 30: Brand Preference of Anti D Immunoglobulin

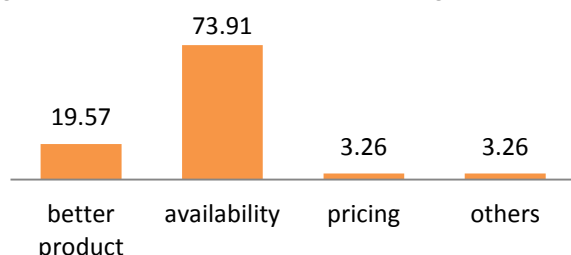


Most of the doctors prefer Bharat Serum around 26%, 4% doctors prefer other brands apart from Bharat Serum and they use these brand according to the availability i.e. sometimes they are using Reliance and sometimes they are using Intas. But other doctors (70%) don't prefer any particular brand. They just prescribe whatever brand is present should be used.

- **Reason For Brand Preference.**

Figure 31 shows reason for the brand preference of Anti D Immunoglobulin in percentage.

Figure 31: Brand Preference of Anti D Immunoglobulin.

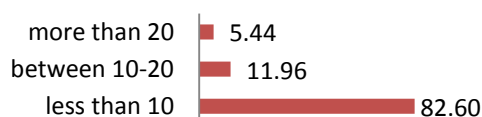


Most of the Anti D Immunoglobulin is preferred because of its availability (73.91%). and 19.57% of the doctors prefers it because of the better product. Least number of the respondents prefers it because of the pricing of the product (3.26%). and the rest 3.26% of the doctors prefer it because of the other factors.

- **Consumption Pattern Per Month:**

Figure 32 indicates the general consumption pattern of the Anti D Immunoglobulin in percentage. The consumption of Anti D Immunoglobulin is not good since majority of the doctors are using less than 10 vials per month per patients. Secondly Anti d Immunoglobulin is used in only RH positive mothers and the cases are very less.

Figure 32: Consumption pattern of Anti D Immunoglobulin



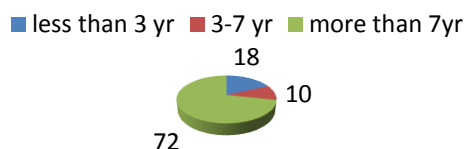
Out of total respondents, 82.60% of respondents prescribe less than 10 vials per month per patient on an average, followed by 11.96% of respondents who prescribe 10 to 20 vials per month per patients. Only 5.44% of the respondents prescribe more than 20 vials per month per patients.

5.TETANUS HYPER IMMUNOGLOBULIN

• Usage of Tetanus Hyper Immunoglobulin

Figure 33 shows the percentage of usage of Tetanus Hyper Immunoglobulin by doctors of different years of experience.

Figure 33: Usage of Tetanus Hyper Immunoglobulin.

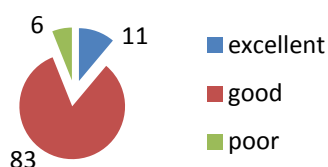


Out of the total respondents 72% of the respondents have been using Tetanus Hyper Immunoglobulin for more than 7 years, 18% are using it for less than 3 years and 10% have been using it for 3-7 years.

• Availability of Tetanus Hyper Immunoglobulin

Figure 34 shows the percentage of availability of the Tetanus Hyper Immunoglobulin. This Product is used frequently in emergency cases, and its availability was found to be good.

Figure 34: Availability of Tetanus Hyper Immunoglobulin.

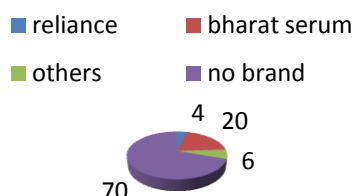


The availability of Tetanus Hyper Immunoglobulin has been good for 83% of the total respondents, while 11% of the respondents said that the availability was excellent and 6% of them told that the availability was poor.

• Specific Brand Preference:

Figure 35 shows the percentage of the respondents who prefer any particular brand of Tetanus Hyper Immunoglobulin for the treatment..

Figure 35: Brand Preferences of Tetanus Hyper Immunoglobulin.

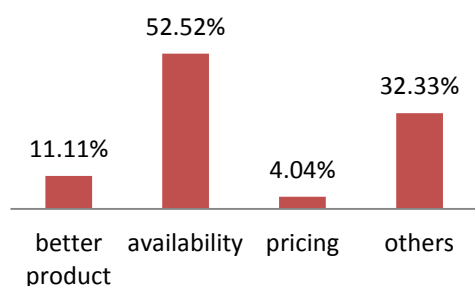


Majority of the respondents (70%) do not prefer any particular brand for treatment, they use it according to the availability of the product. They just prescribe it randomly whichever brand is available should be used. but for those who prefer brand 20% of the total respondents prefer Bharat Serum, followed by 4% of the reliance users and 6% of them use reliance and Bharat Serum both and sometimes also prefer Intas as their Brand of choice.

• Reason For Brand Preference.

Figure 36 shows the reason for preference of Tetanus Hyper Immunoglobulin in percentage.

Figure 36: Brand Preferences of Tetanus Hyper Immunoglobulin

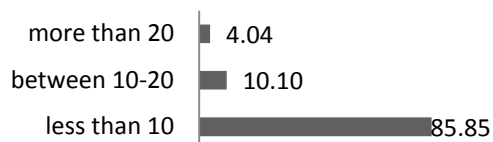


It was found that any of the above said brands are preferred because of some factors. The most important factor was the availability of the product as 52.52% of the respondents prefer it because of the availability. In case of this tetanus hyper immunoglobulin 32.33% of the total respondents said that they prefer the brands because of the other factors. 11.11% of the respondents think that better product is important for its use and rest 4.04% reported pricing as the factor for preferring a brand.

- **Consumption Pattern Per Month:**

Figure 37 shows the general consumption pattern of Tetanus Hyper Immunoglobulin in percentage. Although it is most frequently used product but still the consumption of the Tetanus Hyper immunoglobulin is not good since the majority of the users uses less than 10 vials per month per patient.

Figure 37: Consumption of Tetanus Hyper Immunoglobulin



Out of total respondents, 85.85% of respondents prescribe less than 10 vials per month on an average, followed by 10.10% of respondents who prescribe 10 to 20 vials per month per patient. Only 4.04% of the respondents prescribe more than 20 vials per month per patients.

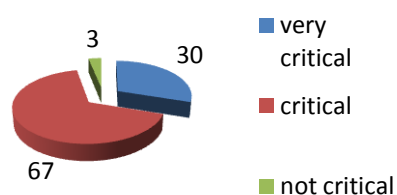
For the other products like Fibrin sealant, Fibrinogen, Factor VII, Factor VIII, Thrombin, Anti-Thrombin, Prothrombin Complex Concentrate etc. The number of respondents were very less as these products are very rarely used. Factor VII is very expensive and some Pediatricians told that these products are very rarely used. A single vial of Factor VII cost between 70,000 to 1,30,000 rupees. So the number of respondents for these products is very less. That is why the Analysis of these product are not done.

Common Analysis for all Plasma Products:-

1) Importance of Source of Plasma

Figure 38 shows the criteria for the selection of plasma as critical, very critical and not critical in percentage. Since Plasma Product is a biologic made of human Plasma and Plasma comes only from the Blood collected. So the source of Plasma itself becomes very important.

Figure 38: Importance of source of Plasma.

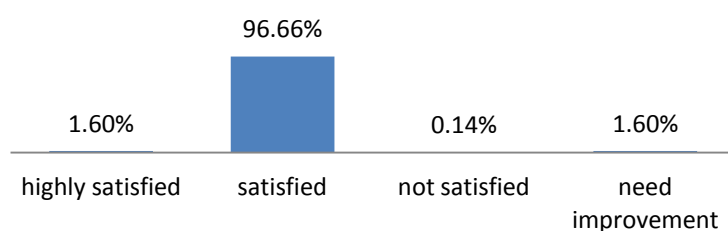


And when asked, 67% of the respondents consider it critical while 30% of the total respondents consider source of plasma as a very critical factor in the selection of Plasma Product, and only 3% of the respondents think that it is not critical.

2) Satisfaction on the Quality of Currently Available Brands.

Figure 39 shows the degree of Satisfaction on the quality of the currently available brands in percentage. There were very few respondents who reported that the quality of the currently available brands of the Plasma products need improvement.

Figure 39: Degree of satisfaction on the Quality of the currently available brands

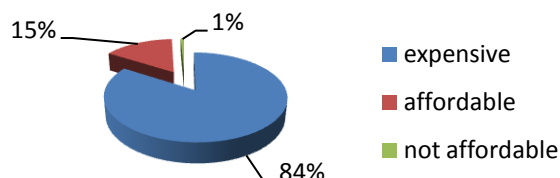


96.66% of respondents were satisfied with the quality of currently available brands, only 1.6% of the total respondents were highly satisfied, 0.14% were not satisfied with the quality of the product and only 1.6% of the respondents think that it need improvement.

3) Pricing of the Currently Available Products

Figure 40 shows the response of the doctors in percentage regarding the pricing of the currently available Plasma Products.

Figure 40: Pricing of the currently available brands



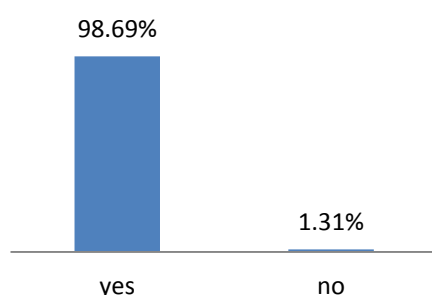
Majority i.e. 84% of the respondents opinion is that the products are expensive, 15% of the respondent think its affordable and only 1% of the respondents thinks that it's not affordable.

4) Need for Awareness Program

Figure 41 shows the percentage of the respondents who thinks that any awareness program is needed for the doctors, patients and paramedical staffs regarding the use of Plasma products.

There is very less awareness among the doctors and patients regarding the use of the Plasma Products and these are used only when it is needed, the indications are very clear. So during the survey it was asked whether any awareness program is needed or not.

Figure 41: Need for Awareness Program.



Out of total respondents 98.69% of the respondents feel there is a need of awareness program for patients, doctors and paramedical staff. Only 1.31% of the doctors think that there is no need of any awareness program.

CONCLUSION:

The plasma product market is still an untapped one and has a lot of scope of improvement and awareness. There is presence of few market competitors. Therefore companies should put some more efforts to develop their research and development strategies and also to make people aware of the use of plasma product and its emerging uses in today's world. Availability and pricing is major factor to get market's grip. Absence of good cold chain and quality is demand of market for these products. Government hospitals and privet hospitals have different prospective for product preferences. Plasma product therapy has wide range of specialty division for implication of plasma product.

RECOMMENDATIONS

1. As Availability of few Plasma Products is not found to be very good, and majority of plasma products are used mainly on the basis of availability, the company should try to make this product readily available in the market.
2. The companies should follow competitive pricing, as has been found by the analysis, these products are expensive but the major concern for doctors is quality and availability.
3. The doctors want the Plasma product to be of high quality, so that the reactions caused due to their administration is minimum, therefore the company can highlight on the quality, purification and safety record part, which could add to their benefit.
4. The doctors are not very well aware about the usage of these products, therefore the company should also focus on increasing the awareness about the usage of these products by incorporating awareness programs on these plasma products.
5. Many of the doctors visited were not aware of any brand from PlasmaGen Biosciences, So the company should try to increase their products awareness by increasing their sales team and by making frequent visits to the doctors.