

Market Assessment of Natural Surfactant (Alveofact)
in Ahmedabad, Surat, Gandhinagar, Baroda in
(Gujarat)

By

Aditya Kumar Rai

*Dissertation submitted for the partial fulfillment of the
MBA Pharmaceutical Management*

Academic year, 2017-2019



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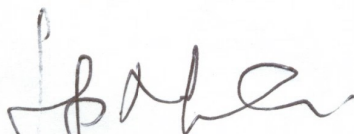
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This is to certify that **Mr. Aditya Kumar Rai**, student of MBA Pharmaceutical Management from The IIHMR University, Jaipur has undergone internship training at **Bharat Serums and Vaccines Limited** from **18th Feb 2019 to 12th May 2019**.

The Candidate has successfully carried out the study on **Market Assessment of Natural Surfactant (Alveofact), Ahmedabad** assigned to him during internship training and his approach to the study has been sincere, scientific and analytical.

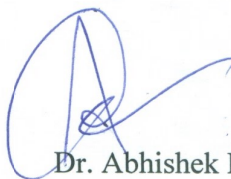
The Internship is in fulfillment of the course requirements.

I wish him all success in all his future endeavors.

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Date 12th May 2019

Bharat Serums and Vaccines Pvt. Ltd.

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

We wish him all the best for future endeavors.

For Bharat Serums and Vaccines Limited,

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This is to certify that the dissertation titled **“Market Assessment of Natural Surfactant (Alveofact) in Ahmedabad, Surat, Gandhinagar, Baroda in (Gujarat)”** and submitted by **Aditya Kumar Rai** Enrollment No. **0091** under the supervision of **Dr. Abhishek Dadhich** for award of MBA in Pharmaceutical Management of the University carried out during the period from **18th Feb 2019 to 12th May 2019** 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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The Candidate has successfully carried out the study assigned to him during dissertation training and his approach to the study has been sincere, scientific and analytical.

The dissertation is in fulfillment of the course requirements.

I wish him all success in all his future endeavors.

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Signature

ACKNOWLEDGMENT:

I humbly owe the completion of this dissertation work to the almighty and my family whose love and blessing will be with me in every movement of my life.

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ADITYA KUMAR RAI

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Abbreviation:

BLES	Bovine Lipid Extract Surfactant
CMEs	Continuing Medical Educations
DPPC	Dipalmitoyl phosphatidyl choline
ELF	Epithelial lining fluid
HMD	Hyaline membrane disease
NRDS	Neonatal Respiratory Distress Syndrome
PC	Phosphatidyl choline
PIE	Pulmonary interstitial emphysema
PG	Phosphatidyl Glycerol
RDS	Respiratory Distress Syndrome
RTMs	Round Table Meeting
SP-B	Surface Protein-B

Executive Summary:

Due to an increase in competition within the market, everybody needs to understand their existence within the market against alternative competitors that are within the same trade. So, it's terribly essential to understand the contestant market potential of a selected product like (Natural surfactant) and once then it's vital to understand the opposite chance to focus on the potential market consistent with their want, assess all the selling strategic by seeing past relevant information of alternative contestant product like (Survanta) in this targeted market and so accompany some purpose of distinction in their own product to capture that competitor target market.

The aim of the study is “Market Assessment of Natural Surfactant (Alveofact) in Ahmedabad, Gandhinagar, Surat, & Baroda (Gujarat)”. I have done a research work on Alveofact for treatment of Neonate respiratory distress syndrome (NRDS). From doctors to distributor to retailers each of them has a role to play. Just by focusing on the Neonatologist doctors to prescribe a product won't help. as even retailers and distributors should have that product to sell it to the patient and hospitals respectively. The study was carried out in Selected Cities of Gujarat, with respect to the survey with Neonatologist & Pediatricians doctors, stockiest and hospital pharmacies.

The project was started on 18th February 2019 after getting all the information regarding the project. I have collected two types of data viz, primary and secondary data. Primary data was collected through questionnaire and secondary data was collected by browsing on internet and various articles. The data was collected from the survey with the help of questionnaire by visiting the doctors and chemist stores. Result and finding was carried out to draw conclusion. The project was completed on 12th May 2019.

From the study it was found that Survanta is majorly prescribed Natural surfactant for the treatment of Neonate respiratory distress syndrome (NRDS) because of ease to use, and well establish brand in market.

INTRODUCTION:

❖ List of breathing disorders.

Asbestosis, Asthma, Bronchiectasis, Bronchitis, Chronic Cough, Chronic Obstructive Pulmonary Disease (COPD), Common Cold, Croup, Cystic Fibrosis, Hantavirus, Idiopathic Pulmonary Fibrosis, Influenza, Lung Cancer, Pandemic Flu, Pertussis, Pleurisy, Pneumonia, **Hyaline Membrane Disease**, Pulmonary Embolism, Pulmonary Hypertension, Respiratory syncytial Virus (RSV), Sarcoidosis, Sleep Apnea, Spirometry, Sudden Infant Death Syndrome (SIDS), Tuberculosis, Work-Related Asthma.

❖ Prevalence Rate of NRDS:

The Prevalence of NRDS was 47.5% out of the 703 Newborns studied. Acute fetal distress, elective caesarean delivery, APGAR score < 7 at the 1st minute, prematurity, male gender and macrosomia were independent predictors of NRD. The main etiologies were neonatal infections (31%) and transient tachypnea of the newborn (25%). Its neonatal mortality rate was 24.5%, mainly associated with neonatal sepsis and hyaline membrane disease.

1. NEONATAL RESPIRATORY DISTRESS SYNDROME:

❖ DEFINITION:

Neonatal respiratory distress syndrome (NRDS), also known as hyaline membrane disease (HMD), is a condition of increasing respiratory distress, commencing at or shortly after birth and increasing in severity until progressive resolution occurs among the survivors, usually between the second and fourth day. About 1% of all newborn infants are affected with this condition. It is due, at least in part, to insufficiency of pulmonary surfactant and is mainly confined to preterm infants.

❖ DIAGNOSIS:

NRDS is manifested by respiratory distress (cyanosis, tachypnoea, grunting, and recession) and respiratory failure is diagnosed by blood gas analysis. Oedema is frequently seen on the second day due to fluid retention and capillary leak. The diagnosis can be confirmed by an X-ray showing ground glass appearance and air bronchograms, although these radiological features are not pathognomonic of NRDS.

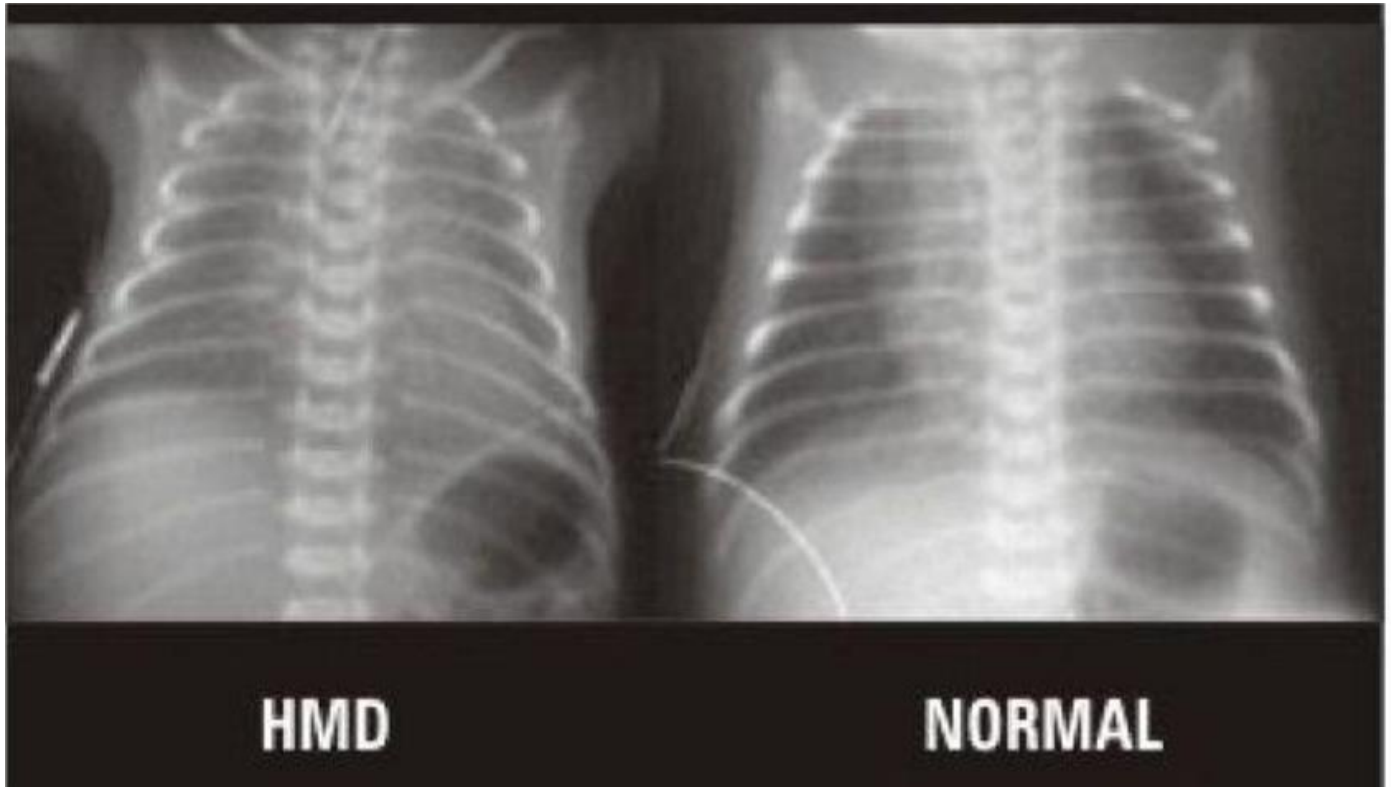


Fig. 1: Chest Radiograph of a neonate with Hyaline Membrane Diseases.

❖ AETIOLOGY:

Surfactant deficiency at birth is the main precipitating factor for RDS. Endogenous surfactant produced in the lungs reduces the surface tension in these microscopic air sacs, preventing their collapse. The foetus does not start to produce surfactant until 22-23 weeks gestation. By 32-33 weeks, most babies have enough endogenous surfactant. Babies born prematurely, with insufficient endogenous surfactant are at risk of developing NRDS as they try to breathe. Damage to lung tissue produces HMD. Subsequent reduction of oxygen in the blood, or the application of high-pressure ventilation may produce other complications. Antenatal steroids can accelerate lung development and hence surfactant production but cannot prevent all NRDS. Multiple other developmental and physiological maladaptive factors interact with the surfactant-deficient lung to produce the clinical syndrome of RDS. Successful adaptation of the fluid-filled foetal lungs at birth depends on the transpulmonary pressure gradient generated by the respiratory muscles, the physical properties of the foetal lung fluid, the structure of the air-blood barrier, and the perfusion of the lungs.

❖ PATHOGENESIS AND PATHOLOGY:

1. High surface tension of foetal lung fluid, self-deflating chest cage, and poor respiratory drive lead to failure in aeration of the lungs.
2. Furthermore, structural immaturity of the lungs causes a leakage of plasma proteins into airspaces and susceptibility to rupture of the lungs.
3. Abnormal perfusion of the pulmonary vasculature and maldistribution of ventilation and perfusion with frequent extrapulmonary shunting of the blood further deteriorates the gas exchange.
4. As a result of lung immaturity and the intensive therapy aimed at improving lung function, a multitude of factors increase the susceptibility of the lungs to injury. These includes immaturity of the host defence systems, infections, barotraumas, and hyperoxia.
5. Pathological hallmarks of NRDS include poor and frequently uneven aeration of the alveoli and airspaces, and hyaline membranes composed of serum-derived proteins (notably fibrin), cell debris, and inactivated surfactant.

❖ PREVENTION AND TREATMENT:

NRDS is a self-limiting developmental disease that is preventable when premature delivery is postponed or when acceleration of foetal lung maturity is achieved by maternal therapies (e.g. glucocorticoids). Unfortunately, therapies aimed at prevention of NRDS are frequently not effective. But, supplementary oxygen, ventilation with continuous distending pressure and surfactant supplementation are single therapies that have advanced the treatment of NRDS remarkably during the past 30 years.

2. SURFACTANT THERAPY:

❖ PULMONARY SURFACTANT:

Pulmonary surfactant is a lipid-protein complex that is synthesized and stored in type II alveolar epithelial cells as lamellar bodies. Once secreted into the epithelial lining fluid (ELF), a small fraction of surfactant is rapidly adsorbed in the space between the alveolar air and the surface of the ELF. This reduces surface forces during end-expiration and maintains variably low surface tension during the respiratory cycle. After birth, premature neonates born with immature lungs may develop NRDS. This is mainly because an inadequate amount of surfactant is secreted into the ELF as a result of the immaturity of the type 2 alveolar cells.

❖ ACTION OF SURFACTANT:

Surfactant prevents atelectasis and oedema, by decreasing interfacial surface tension. Thus, its role is instrumental in maintaining gas exchange and decreasing the work of breathing. Furthermore, surfactant serves as a lubricant in protecting the airways and promoting mucociliary transport.

The need for supplementary oxygen and mechanical ventilation decreases in patients receiving surfactant. Furthermore, the incidence of pneumothorax and pulmonary interstitial emphysema (PIE) is decreased by 50-80%. Analysis of all randomised trials indicates that surfactant supplementation decreases neonatal mortality by about 33% and increases survival without chronic lung disease by about 17%. Surfactant therapy has become a routine treatment for neonates with severe NRDS. Some clinicians advocate prophylactic surfactant at birth for small neonates born at less than 30 weeks of gestation, who are at high risk of developing NRDS.

❖ MECHANISM OF ACTION:

Surfactant reduces surface tension at the interface between the alveolar air and the membrane. Surfactant molecules are amphipathic. They have a hydrophilic head (water loving) and a hydrophobic (water-hating) tail. The most energetically favourable conformation for them is to lie with the hydrophilic head immersed in water and the hydrophobic tails safely removed from water, exposed to air. Surfactant molecules adsorb at the air-fluid interface and reduce the surface tension. Thus, surfactant prevents atelectasis and oedema, improves gas exchange and decreases the work of breathing.

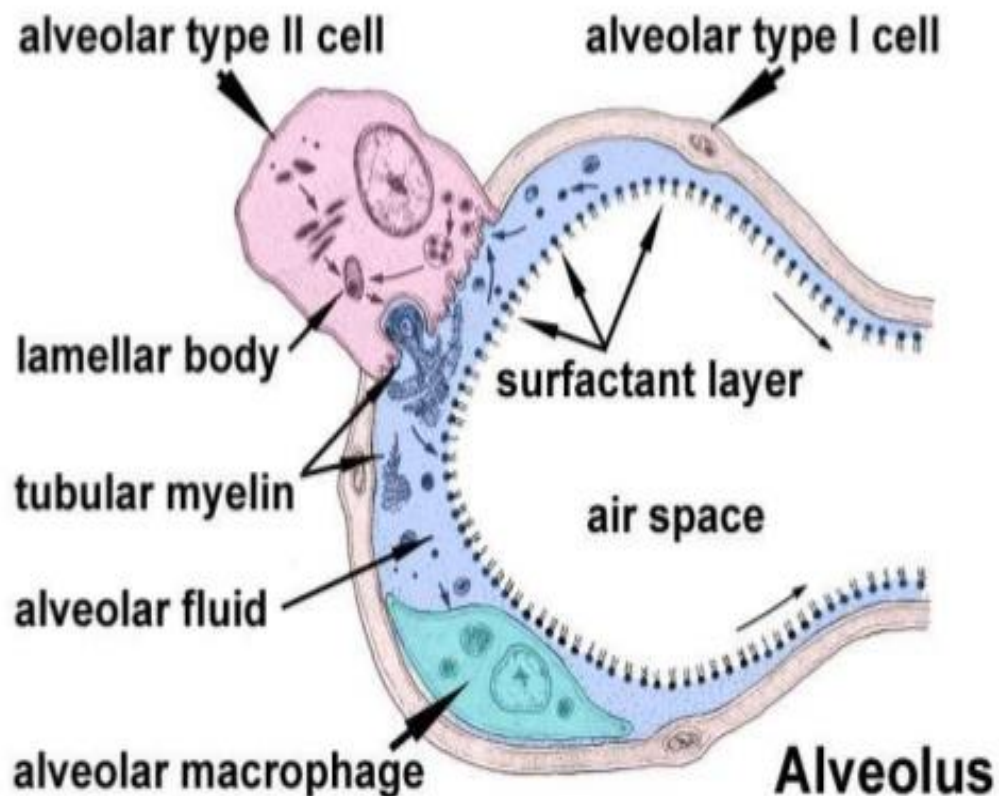


Fig. 2: Alveolus lined with surfactant

❖ COMPONENTS OF SURFACTANT:

It consists of phospholipids and proteins.

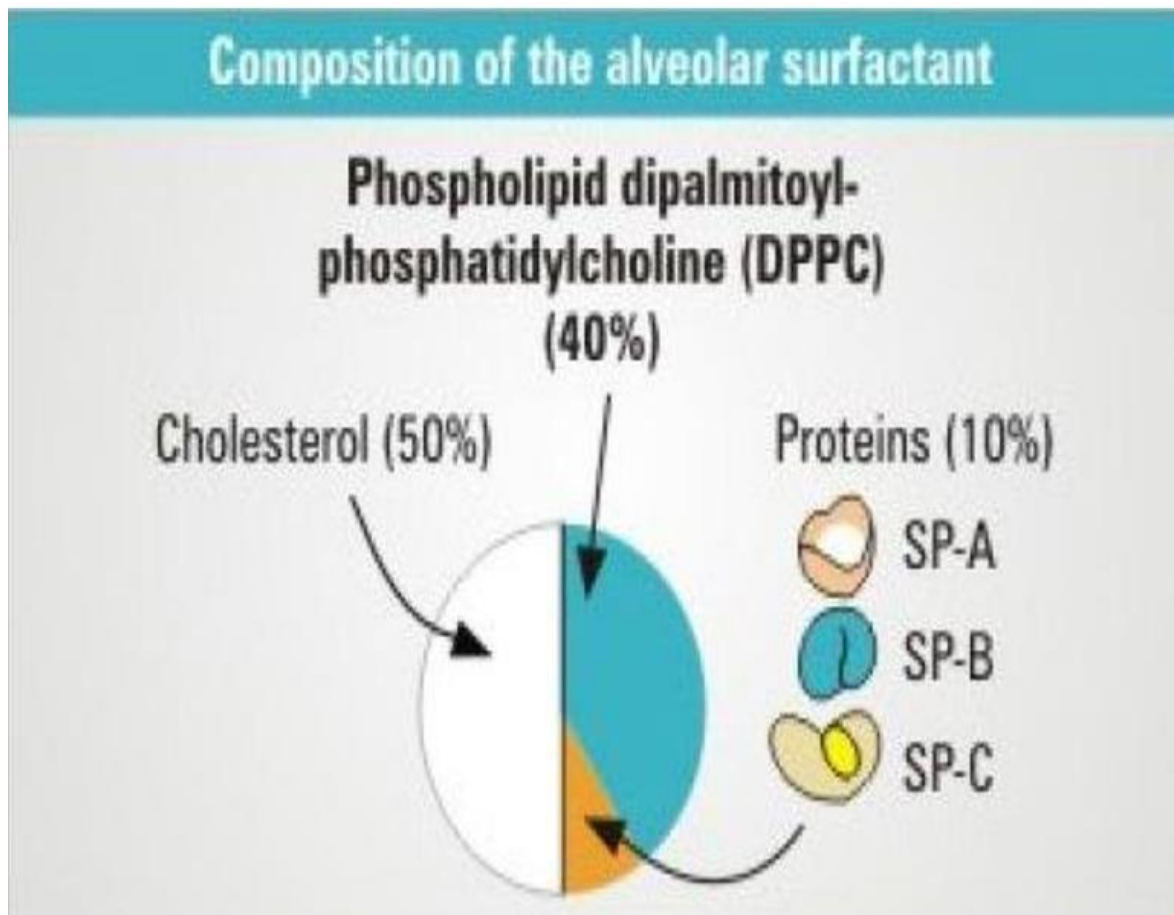


Fig 3: Components of alveolar Surfactant.

❖ EXOGENOUS SURFACTANTS:

In case of surfactant deficiency as seen in neonates, particularly those born prematurely, surfactant supplementation becomes necessary. The desirable properties of any exogenous surfactant are efficacy and safety. Others include minimal immunogenicity, minimal batch to batch variability, good resistance against biodegradation and availability at reasonable cost.

❖ TYPES OF EXOGENOUS SURFACTANTS:

- Natural Surfactant: Animal-derived lung lipid extracts or lung lavage extracts from porcine or bovine lungs are naturally occurring surfactants.
- Modified natural surfactants: These are essentially lung lipid extracts supplemented with phospholipid or other components.
- Human surfactant: This is isolated from amniotic fluid from full-term foetuses.
- Synthetic Surfactant: These do not contain proteins. Synthetic surfactants containing recombinant proteins or synthetic peptides are yet to be evaluated clinically.

❖ PHARMACOKINETIC PROFILE:

Endogenous and exogenous surfactants have similar clearance and catabolic pathways in the ELF. Within the ELF, the surfactant undergoes transition from a large aggregate form (lamellar bodies and tubular myelin) to a smaller vesicular form that has no surface activity and that is cleared from the ELF. Type 2 alveolar cells are a major site for the clearance and catabolism of surfactant. Only small quantities of exogenous and endogenous surfactant (3-7%) are cleared by the airways and some surfactant (10-30%) is taken up by alveolar macrophages. In type 2 cells, some exogenous surfactant is incorporated in lamellar bodies and secreted back to the ELF as intact molecules (recycling). Administration of surfactant into the airways is associated with the following phenomena.

First, there is rapid distribution of exogenous surfactant throughout patent airways and airspaces. During the next 1 to 2 hours, the amount of exogenous surfactant that can be lavage from the airways decreases rapidly, because the surfactant complex is associated with lung parenchyma. Thereafter, surfactant flux from the ELF to the lung parenchyma continues at a rapid rate. However, the epithelial uptake of surfactant is balanced by surfactant secretion into the ELF.

Components of surfactant may be quantified based on a reference compound, such as sphingomyelin or protein. The most often used index is the saturated phosphatidylcholine to sphingomyelin (L/S) ratio.

❖ Surfactant Synthesis and Secretion:

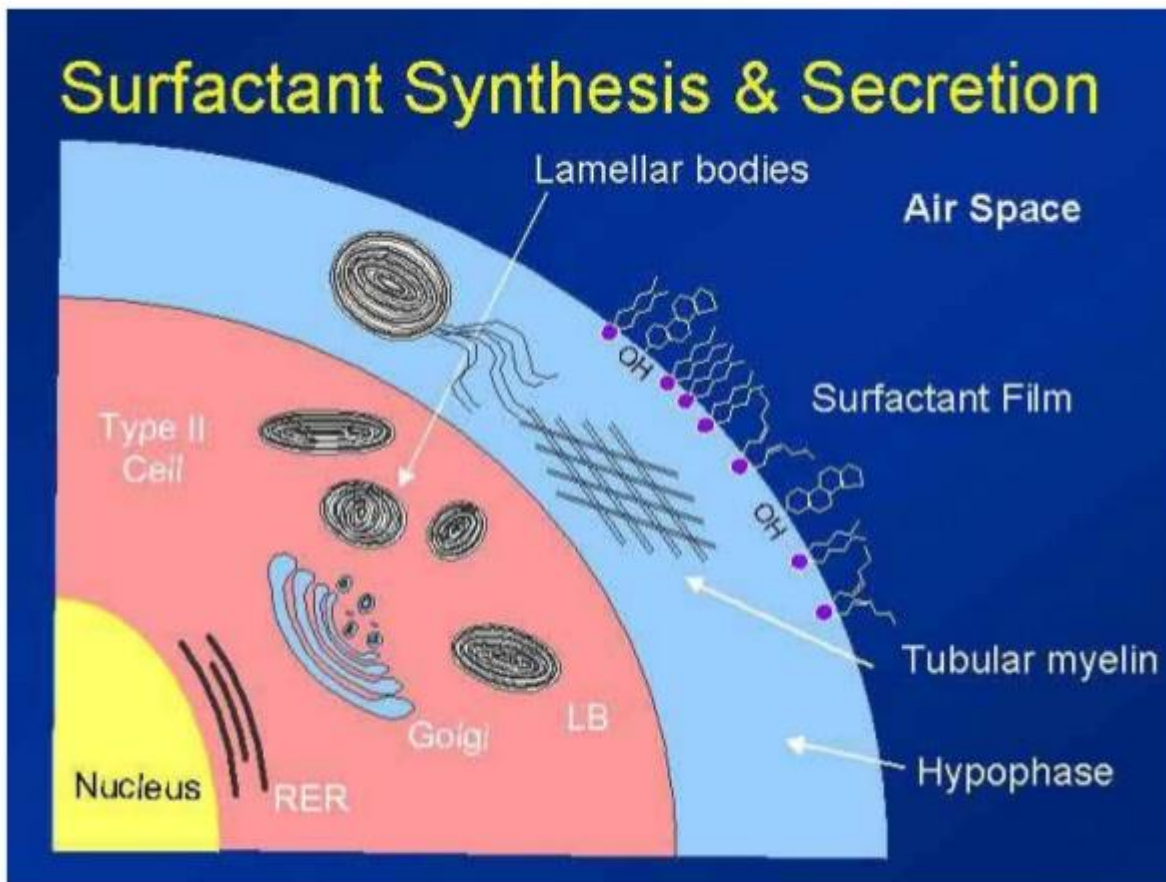


Fig. 4: Synthesis and secretion of Surfactant

3. ALVEOFACT :

❖ INTRODUCTION:

❖ BRIEF HISTORY:

Alveofact is a natural surfactant developed in Lyomark Pharma, Germany . It is known as BLES (Bovine Lipid Extract Surfactant).

It is a natural surfactant derived from bovine lungs by lavage extraction. It contains numerous phospholipids with dipalmitoyl phosphatidyl choline (DPPC) being most abundant. It also includes hydrophobic surfactant associated proteins, SP-B and SP-C, which facilitate dispersion of phospholipids. When administered intratracheally, Alveofact is rapidly adsorbed forming an active phospholipid monolayer at air-fluid interface.

Original formulation of BLES was with 45 mg of phospholipids/ml. At the time of Phase III trial with BLES (Alveofact). The safety and efficacy of Alveofact is supported by this comparative phase III trial. The dose of 50 mg/kg of phospholipids can cover the entire lung surface.

But there is evidence to suggest that there is dose dependent improvement in response to surfactant therapy. Also, a generous dose aids not only in making up for the deficit in preterm neonate's lung but also compensates for uneven distribution and inactivation by plasma proteins in alveolar space. It also aids in stimulate metabolic pathways for recycling.

The current formulation of BLES (45mg/ml) when compared to original formulation (45 mg/ml) was shown to pose no greater risk of adverse events than original formulation.

❖ **MANUFACTURING & QUALITY CONTROL:**

The manufacturing process can be divided into 2 phases:

- Collection of bovine lung surfactant.
- Purification by solvent extraction.

❖ **COLLECTION OF BOVINE LUNG SURFACTANT:**

Bovine lung lavage with saline solution is performed and surfactant foam is collected. The cows are of Germany origin.

❖ **PURIFICATION BY SOLVENT EXTRACTION:**

Purification process involves successive extraction with solvents in order to remove unwanted components of lung lavage. After series of cycles of solvent extraction using solvents like chloroform, methanol, KCL, ethanol and acetone, final solvent removal is performed overnight in vacuum system to get the drug substance, i.e. Bovine lipid extract surfactant (Alveofact).

❖ **QUALITY CONTROL:**

Sample is drawn prior to final dry-down of drug substance and in-process tests for phospholipids and appearance are performed.

After drug substance is compounded to finished product, other QC tests that reflect the quality of drug substance like tests for total protein content, total phospholipid content, phospholipid composition and residual organic solvents performed. Biophysical activity of the drug is measured using pulsating bubble surfactometry.

Cellular contaminants present in the source are removed during steps to precipitate and remove hydrophilic proteins. Protection of product, environmental control of air and use of aseptic technique minimize potential for contamination of product during processing. The product is then terminally sterilized.

❖ **DIFFERENTIALS:**

1. Alveofact is a natural surfactant obtained by lung lavage and has a composition of phospholipids like endogenous surfactant. The other commercially available surfactants (Bovine minced lung extract surfactant and Porcine minced lung extract surfactant) are obtained by mincing.
2. Mincing adds to cellular components to extract thus, making it more viscous and reduces concentration of SP-B&SP-C.
3. Alveofact contains higher concentration of surfactant protein SP-B &SP-C. Surfactant proteins SP-B and SP-C aid in rapid adsorption of surfactant to alveolar surface thereby promoting rapid action. Also, they resist inactivation of surfactant in alveolar space by plasma proteins.
4. Availability in vials of 1.2ml, makes Alveofact a cost-effective choice.
5. Alveofact is 8 times less viscous than Bovine minced lung extract surfactant aiding in rapid peripheral distribution.
6. Alveofact is now available all over India even in remote areas.

❖ **Research Problem:**

- Respiratory Distress Syndrome (RDS) is observed in premature infants (<37weeks). Surfactants production is insufficient due to the immature development of type II Pneumocytes, which begin to be produced Surfactant at approximately 22-23 weeks gestation. Insufficient surfactant leads to reduced pulmonary compliance and increased surface tension. It is due, to insufficiency of pulmonary surfactant and is mainly confined to preterm infants. Poor Oxygen supply to the body due to damage of Lungs (Alveoli).
- Which result to increase the Mortality rate, Infections and Permanent Neurodevelopment Handicap. So, with the help of this study we can find out the market potential of Natural surfactant in selected cities of Gujarat.

❖ **Objectives:**

- To find out most selling Natural surfactant brands in selected Cities, Gujarat.
- To know the competitive scenario of Alveofact in selected Cities, Gujarat.
- To know the Doctors attitude towards Natural Surfactant in selected cities, Gujarat.

❖ **Research Methodology:**

- Study Design: Descriptive Study.
- Sampling: Non-Probability.
- Target Respondent: From various Govt. & Private hospitals, Neonatologists and Paediatrician's.
- Sample area: Ahmedabad, Surat, Gandhinagar, Baroda in (Gujarat)
- Tools Used for Data Collection: Direct Questionnaire method.
- Type of Questionnaire: Semi-Structured.
- Type of Questions: closed and open ended.

❖ Research Plan:

- Data Source: - Primary data (Through Questionnaires and meeting with respondents and Secondary data (Through Company website, various research articles and publications). Data was triangulated using both Primary and Secondary approach.
- Sample size:
 - ✓ No. of Doctors:100.
 - ✓ No of Chemists:100.
- Duration of Study: - 3 months.
- Data Analysis Techniques: - The findings and the information's collected and compiled, analysed on Microsoft Excel.

Data Processing, Analysis and Interpretation:

Q1. Number of doctors visited?

Specialization	No. of Dr.
Neonatologists	91
Pediatricians	9
Other	
Total	100

Table 1: Specialization.

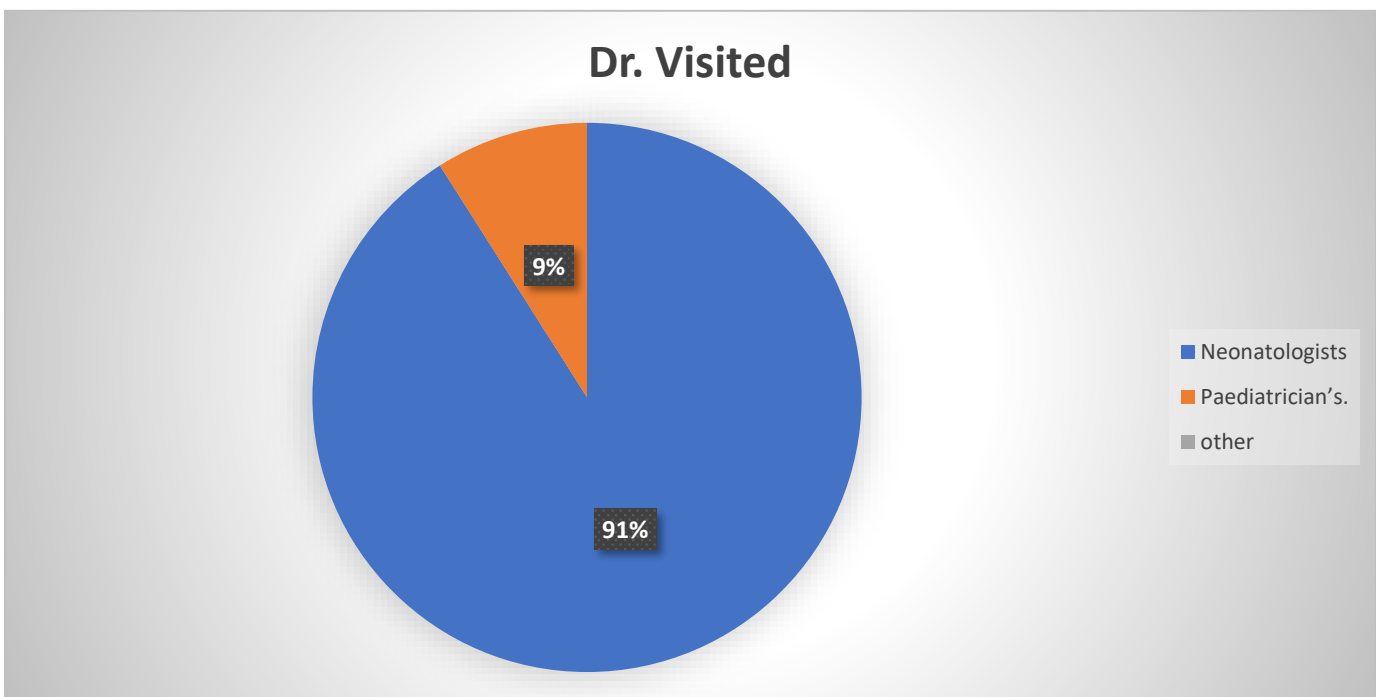


Figure 5: Specialization

INTERPRETATION:

It is observed that total number of doctors visited were 100 in which the maximum doctors are covered were neonatologist i.e 91% and 9% paediatrician were covered.

Q2. Type of hospitals covered?

Hospital	No. of Hospital
Private	92
Govt.	8
Total	100

Table 2: Indications.

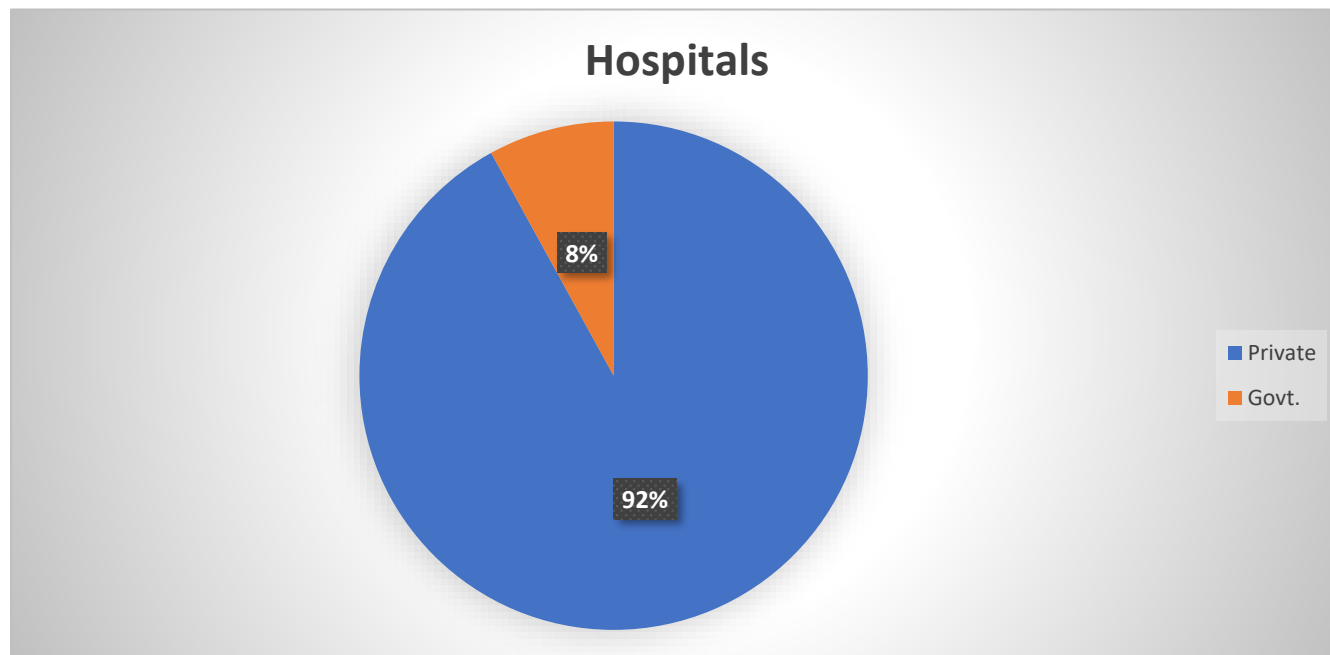


Figure 6: Indications.

INTERPRETATION:

It is observed that total number of hospitals visited were 100 in which the maximum hospitals are covered were private i.e 92% and 8% Govt. were covered.

Q3. Doctor in which indication do you preferred Natural surfactant?

INDICATIONS	NO. OF RESPONSES
Air leak	8
Bronchopulmonary dysplasia	
Pulmonary Haemorrhage	
RDS	73
Lung infection	9
Breathing problem	10
Total	100

Table 3: Indications.

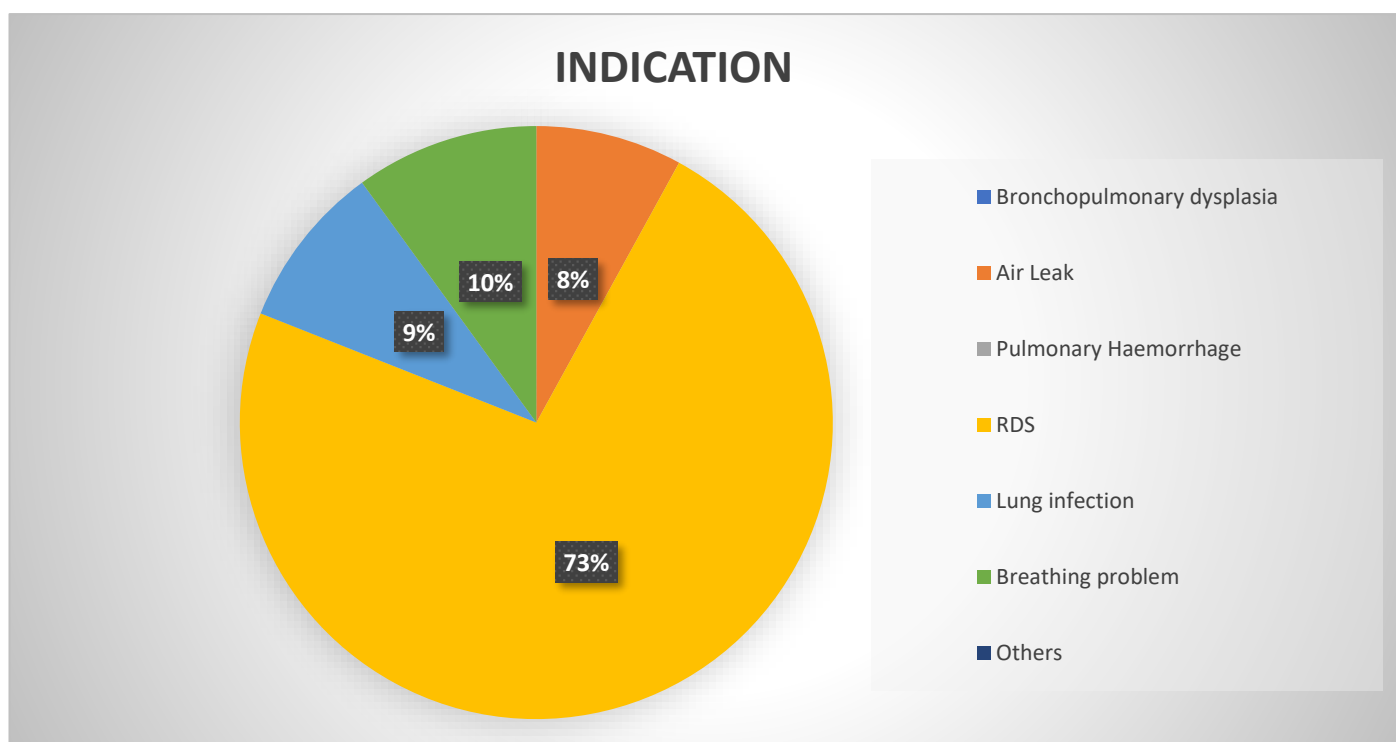


Figure 7: Indications.

INTERPRETATION:

It was found out that 73 % of the doctors prescribe surfactant to treat the RDS. 10 % of the doctors prescribe surfactant to treat the Breathing problem. 9 % of the doctors prescribe surfactant to treat the lung infection. 8 % of the doctors prescribe surfactant to treat the air leak.

Q4. Doctor what is the preferred dosage for 1kg baby in RDS case?

DOSAGE	NO. OF RESPONSES
1.2ml	22
1.5ml	32
4ml	38
5ml	8
Total	100

Table 4: Dosage Required per Kg.

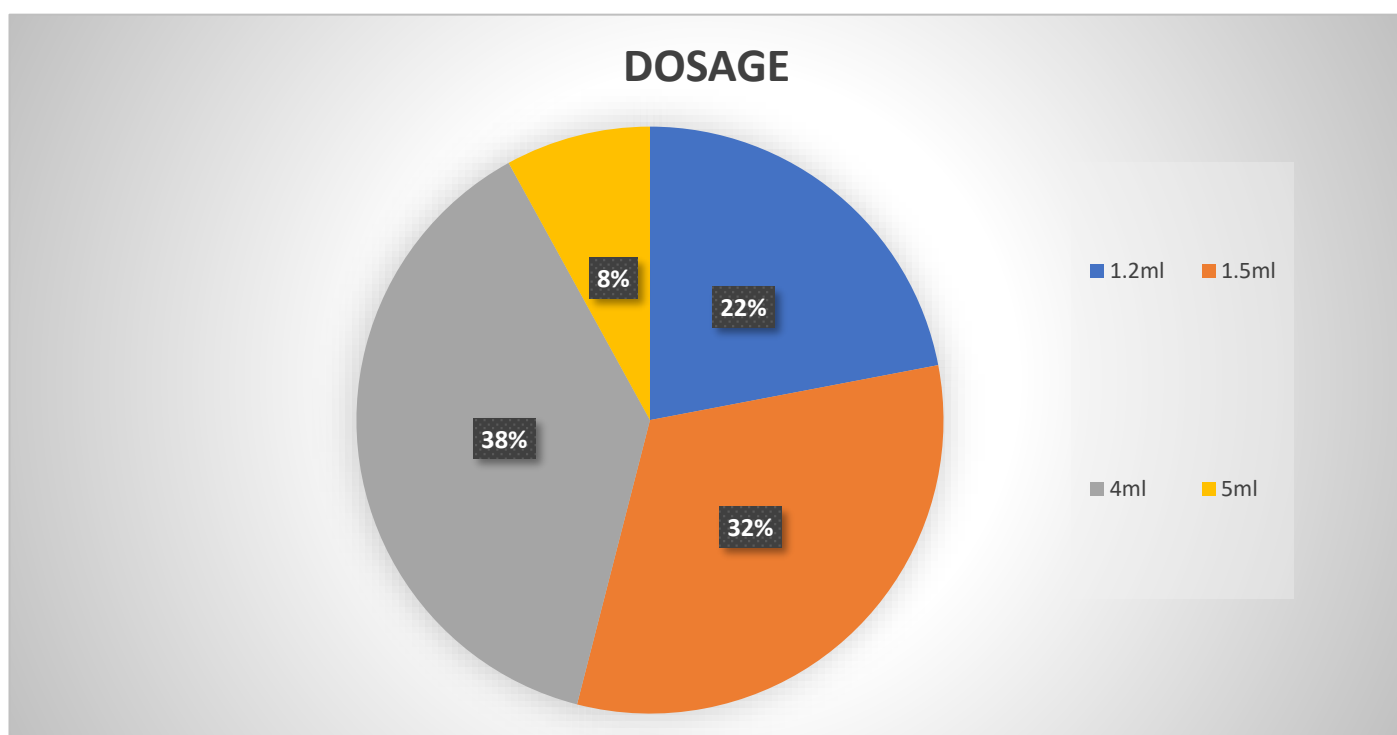


Figure 8: Dosage Required per Kg.

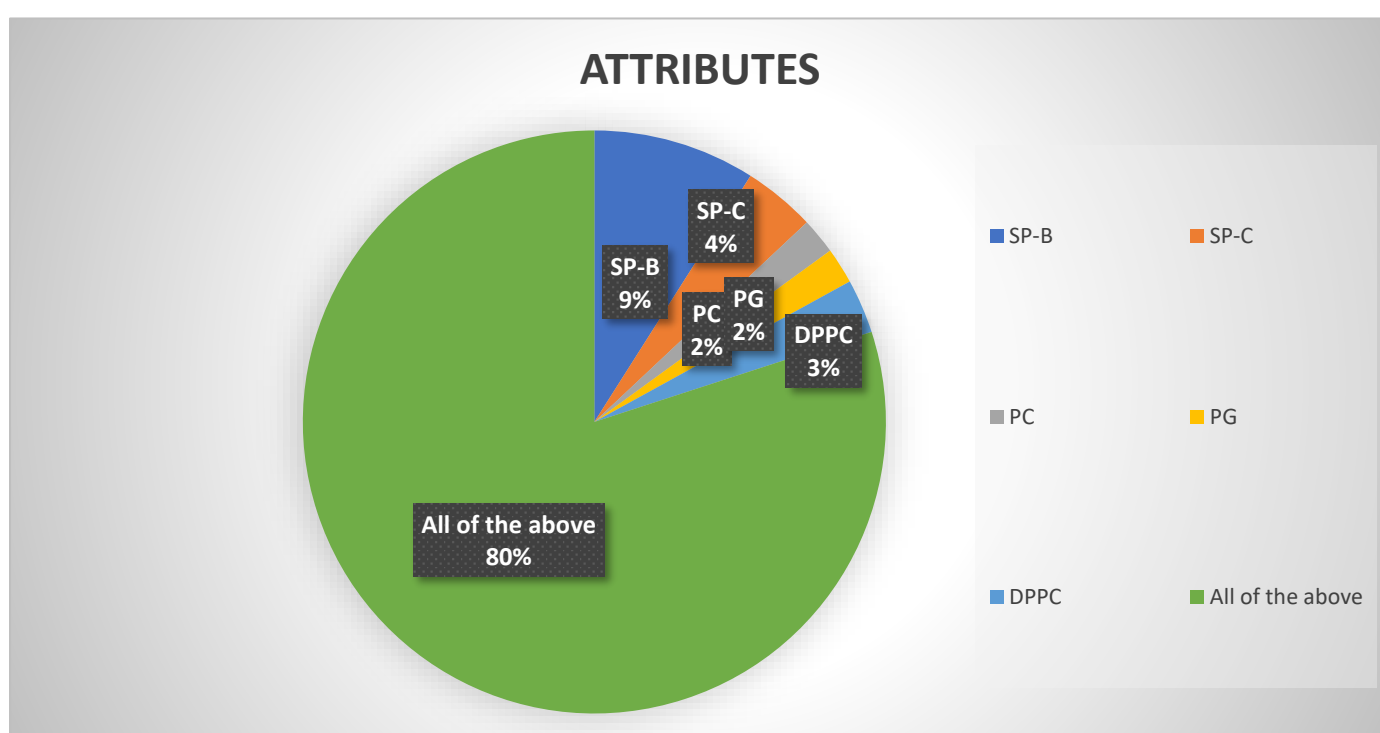
INTERPRETATION:

It was found out that 38 % of the doctors prefer 4ml per kg of dose for the treatment of RDS. 32 % of the doctors prefer 1.5ml per kg of dose for the treatment of RDS. 8 % of the doctors prefer 5ml per kg of dose for the treatment of RDS. 22 % of the doctors prefer 1.2ml per kg of dose for the treatment of the RDS.

Q5. Doctor according to you, what are the attributes of ideal Natural surfactant?

Ideal Attributes	No. of Responses
SP-B	9
SP-C	4
PC	2
PG	2
DPPC	3
All the above	80
Total	100

Table 5: Ideal Attributes of Natural Surfactant.



Figures 9: Ideal Attributes of Natural Surfactant.

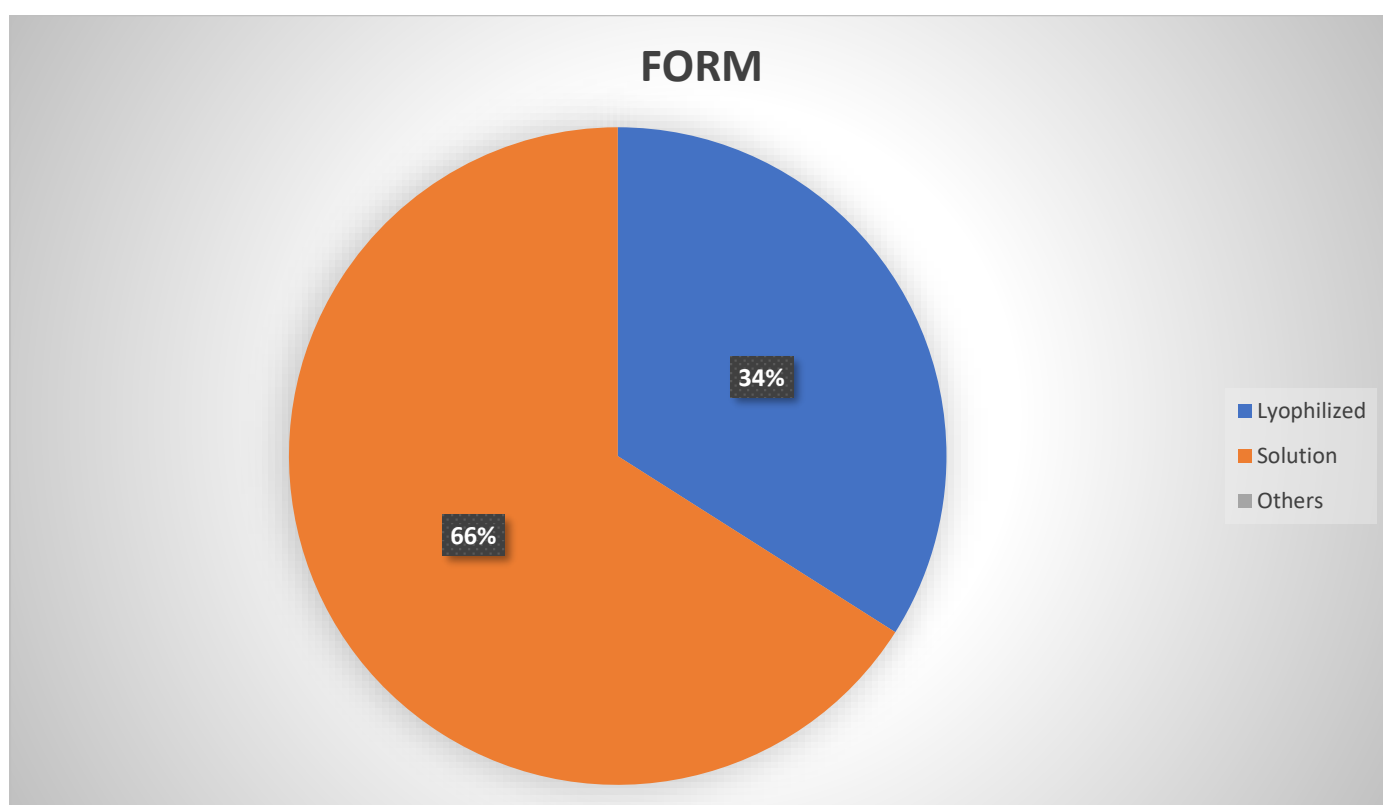
INTERPRETATION:

It was found out that 80 % of the doctors preferred all the attributes of the natural surfactant, which is mentioned i.e. SP-B, SP-C, PC, PG, DPPC. Only 20 % of the doctors preferred SP-B, SP-C, PC, PG, DPPC options.

Q6. Doctor which is the most accepted form of administration by patients?

Dose Forms	No. of Responses
Lyophilized	34
Solution	66
Total	100

Table 6: Dose Forms.



Figures 10: Dose Administration Forms.

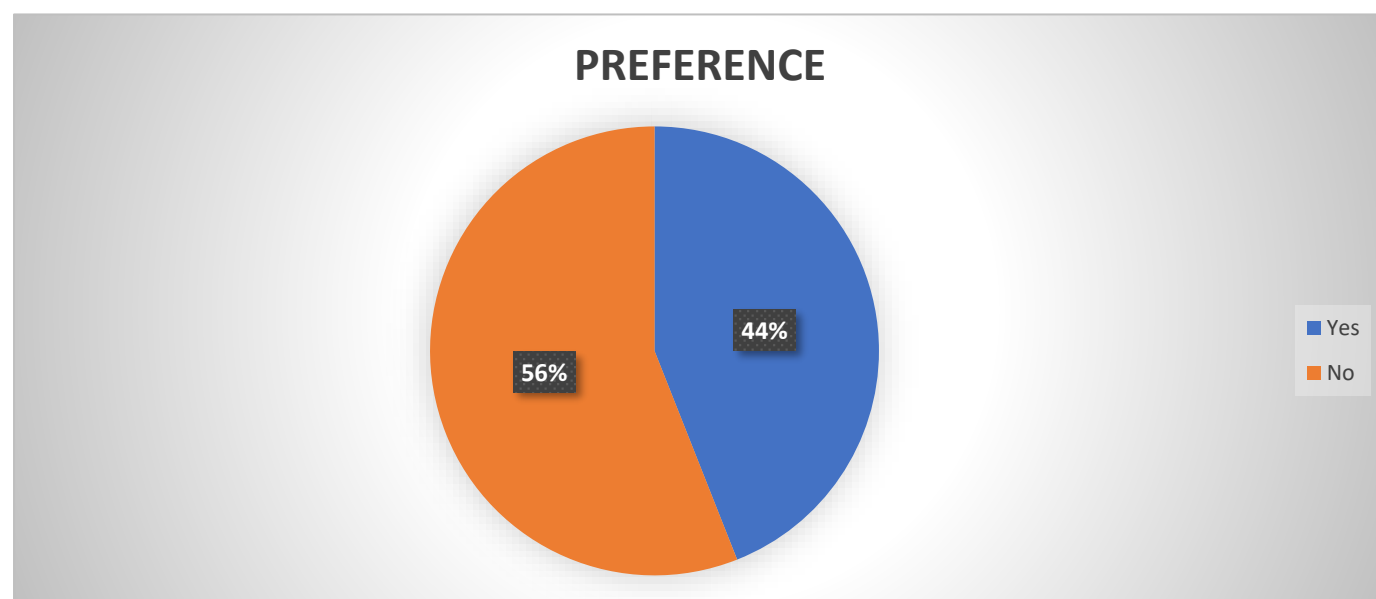
INTERPRETATION:

It was found out that for administration of the surfactant in patients, 34% of the doctors shown response on lyophilized form and 66% of the doctors shown response on solution form .

Q7. Doctor do you think bovine based Natural surfactant is an effective than bovine based?

Effective Source	No. of Responses
Yes	44%
No	56%
Total	100

Table 7: Effective source Preference.



Figures 11: Effective source Preference.

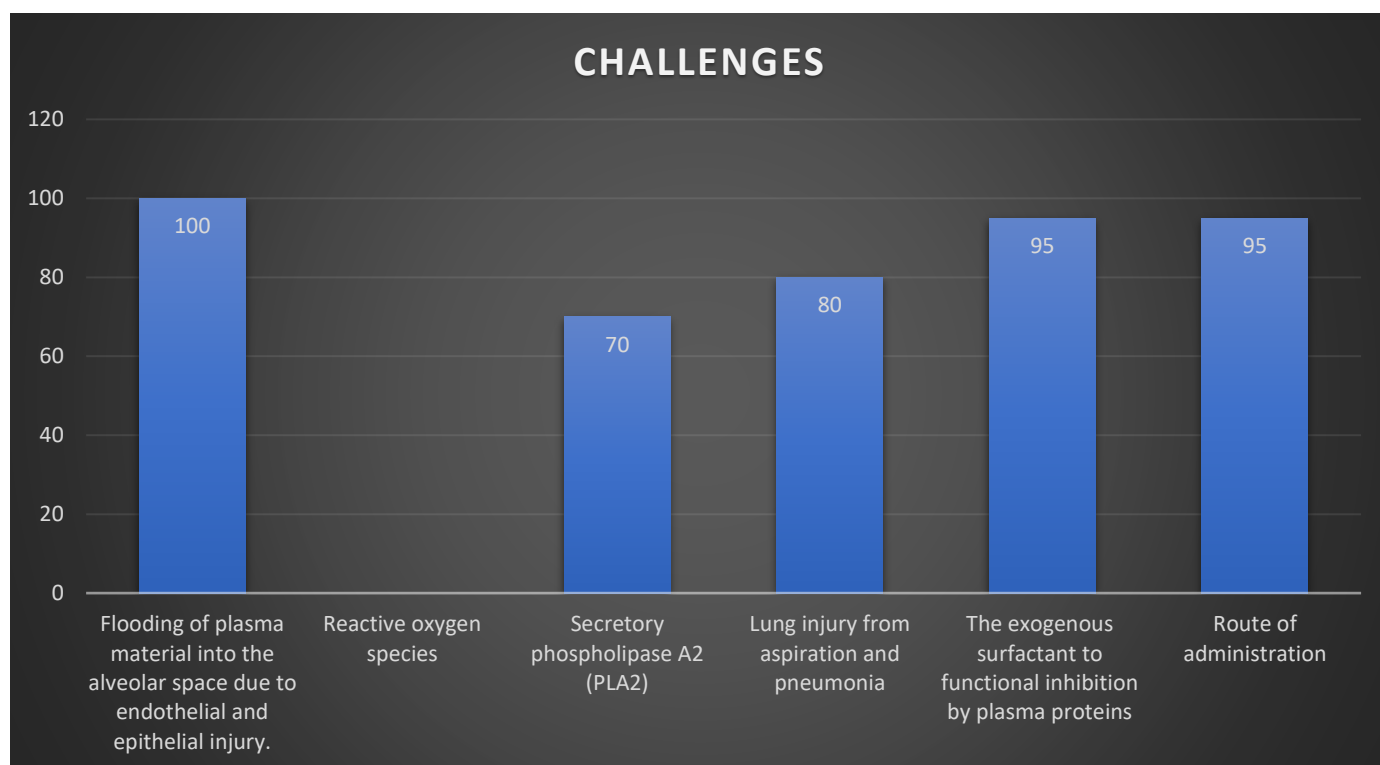
INTERPRETATION:

It was found out that 56 % of the doctors agreed that bovine natural surfactant is an effective than porcine based. 44 % of the doctors agreed that porcine based natural surfactant is an effective than bovine based.

Q8. Doctor what are the challenges you face in treatment of RDS at patient level?

Major Challenges	Major Challenges No. of Responses
Flooding of plasma material into the alveolar space due to endothelial and epithelial injury.	100
Reactive oxygen species	
Secretory phospholipase A ₂ (PLA ₂)	70
Lung injury from aspiration and pneumonia	80
The exogenous surfactant to functional inhibition by plasma proteins	95
Route of administration	95
Total	100 Dr.

Table 8: Major Challenges



Figures 12: Major Challenges.

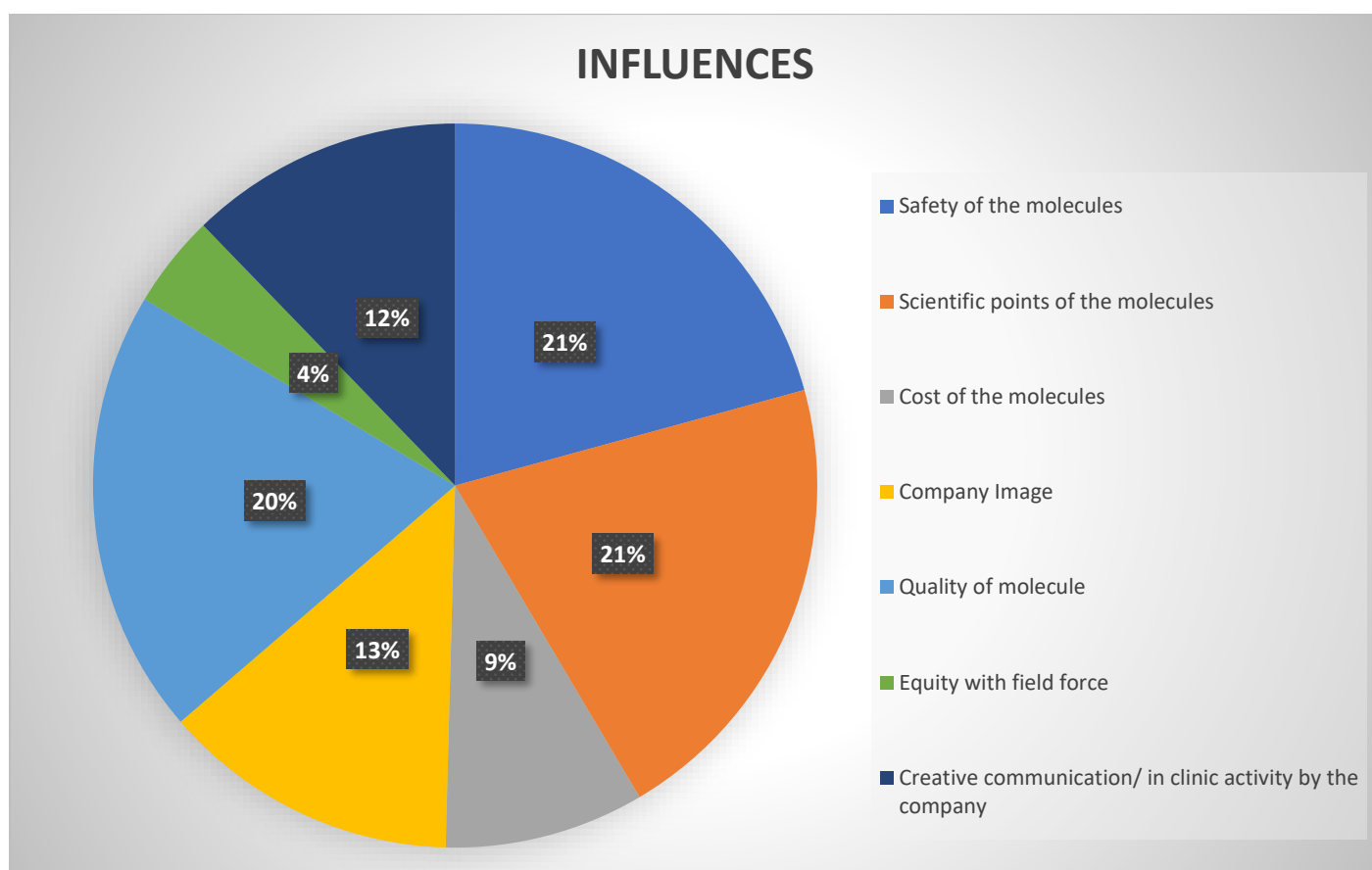
INTERPRETATION:

It was found out that First challenges (100%) is flooding of plasma material into the alveolar space due to endothelial and epithelial injury is faced by doctor's in treatment of RDS at patient level. Second challenges (95%) is route of administration, faced by doctors in the treatment of RDS at patient level. Third challenges (80%) is lung injury from aspiration and pneumonia. 70% of the doctor's response is secretory phospholipase A₂ (PLA₂) is the major challenge faced by doctors in treatment of RDS.

Q9. Doctor which of the following attributes influences your Rx?

Influences Attributes	No. of Responses
Safety of the molecules	100
Scientific points of the molecules	100
Cost of the molecules	43
Company Image	64
Quality of molecule	96
Equity with field force	20
Creative communication/ in clinic activity by the company	59
Total	100 Dr.

Table 9: Attributes influences for prescription.



Figures 13: Attributes influences for prescriptions.

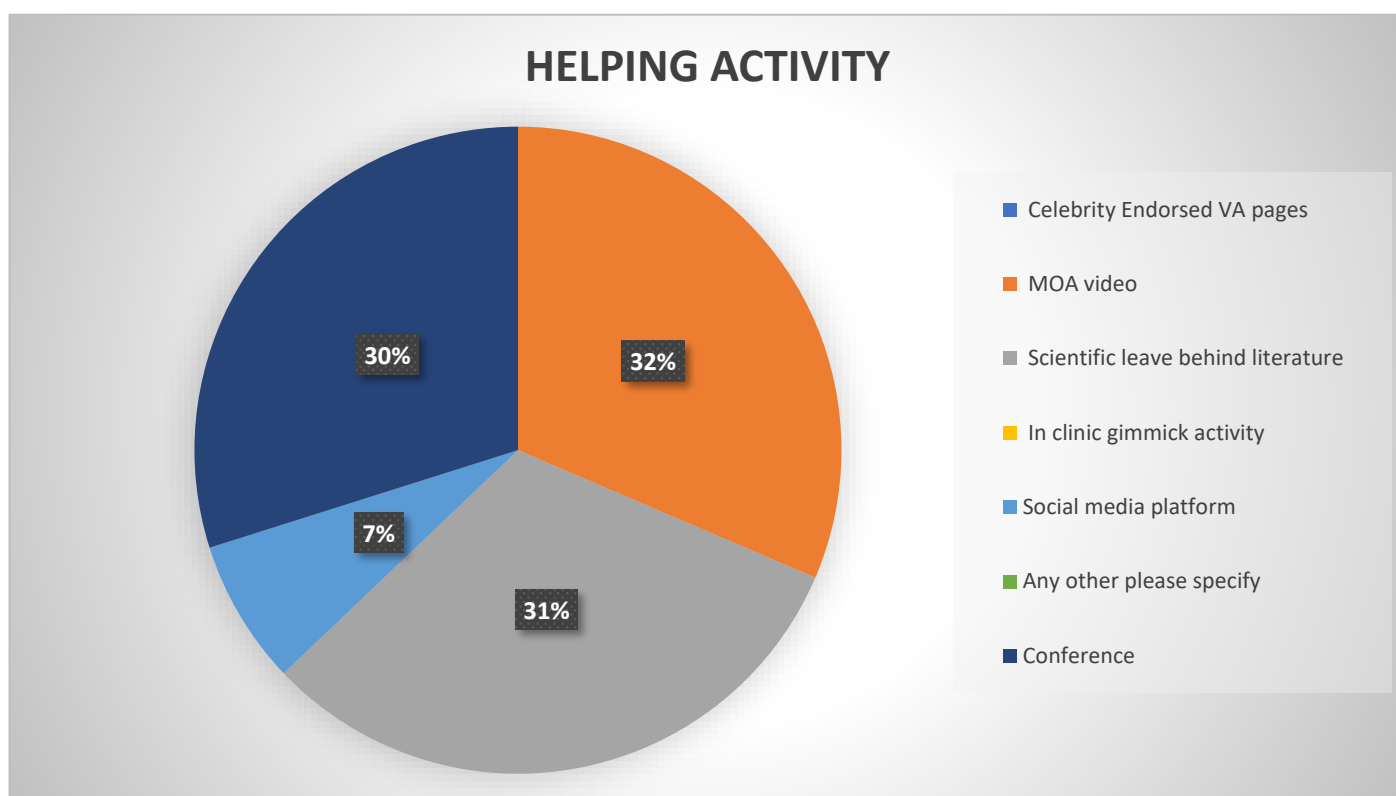
INTERPRETATION:

It was found out that 96 % of the doctor's prescription influence by cost of the molecules, scientific points of the molecules, safety of the molecules, quality of molecule, creative communication or in clinic activity by the company. Only 4 % of the doctors shown their preference is equity with field force.

Q10. Doctor which of the following activities will help you in prescribing the Natural surfactant?

Prescribing Activity	No. of Responses
Celebrity Endorsed VA pages	
MOA video	100
Scientific leave behind literature	100
In clinic gimmick activity	
Social media platform	82
Conference	95
Total	100 Dr.

Table 10: Activities helps in prescribing.



Figures 14: Activities helps in prescribing.

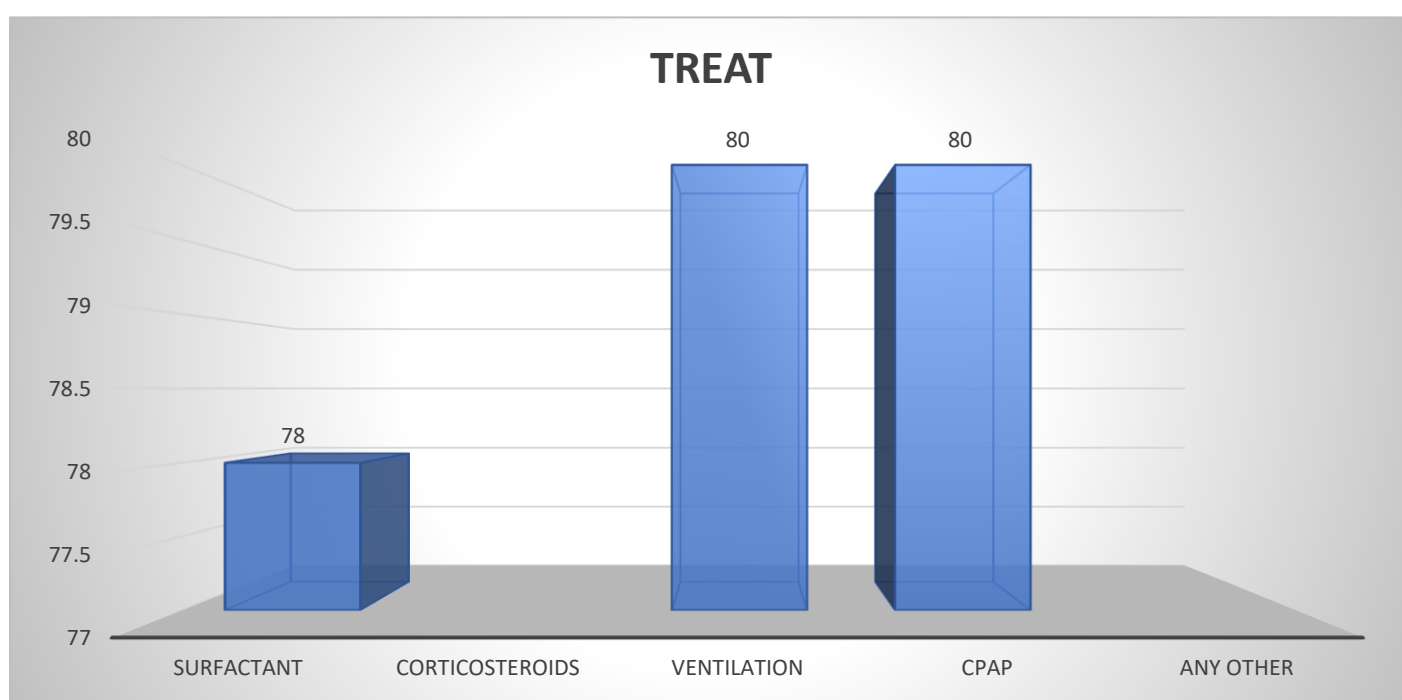
INTERPRETATION:

It was found out that 93% of the doctors given a response on MOA video, and scientific leave behind literature, Conferences. Only 7% of the doctors given a response on social media platform.

Q11. How do you treat RDS Patients mostly?

Treatment Methods	No. of Responses
Surfactant	78
Corticosteroids	
Ventilation	80
CPAP	80
Any other	
Total	100 Dr.

Table 11: Treatment Methods



Figures 15: Treatment Methods

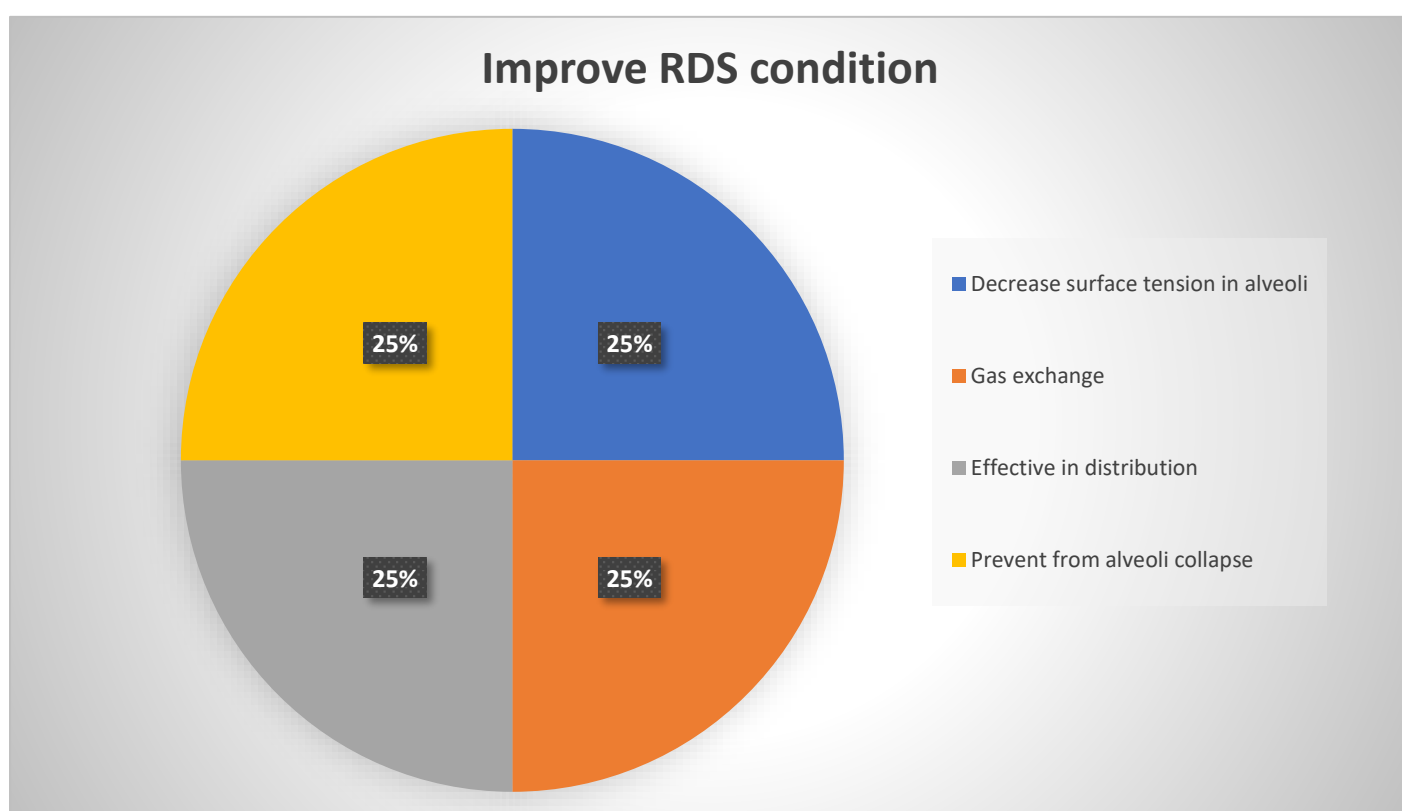
INTERPRETATION:

It was found out that 78% of the doctors go with surfactant but 80% of the doctors preferred CPAP and 80% of the doctors preferred ventilation for RDS patients. As in the case of emergency, the doctors go for CPAP and ventilation.

Q12. How does the use of surfactant help in treating the RDS conditions?

Treating Conditions	No. of Responses
Decrease surface tension in alveoli	100
Gas exchange	100
Effective in distribution	100
Prevent from alveoli collapse	100
Any other	
Total	100 Dr.

Table 12: Treating of RDS Conditions.



Figures 16: Treating of RDS Conditions.

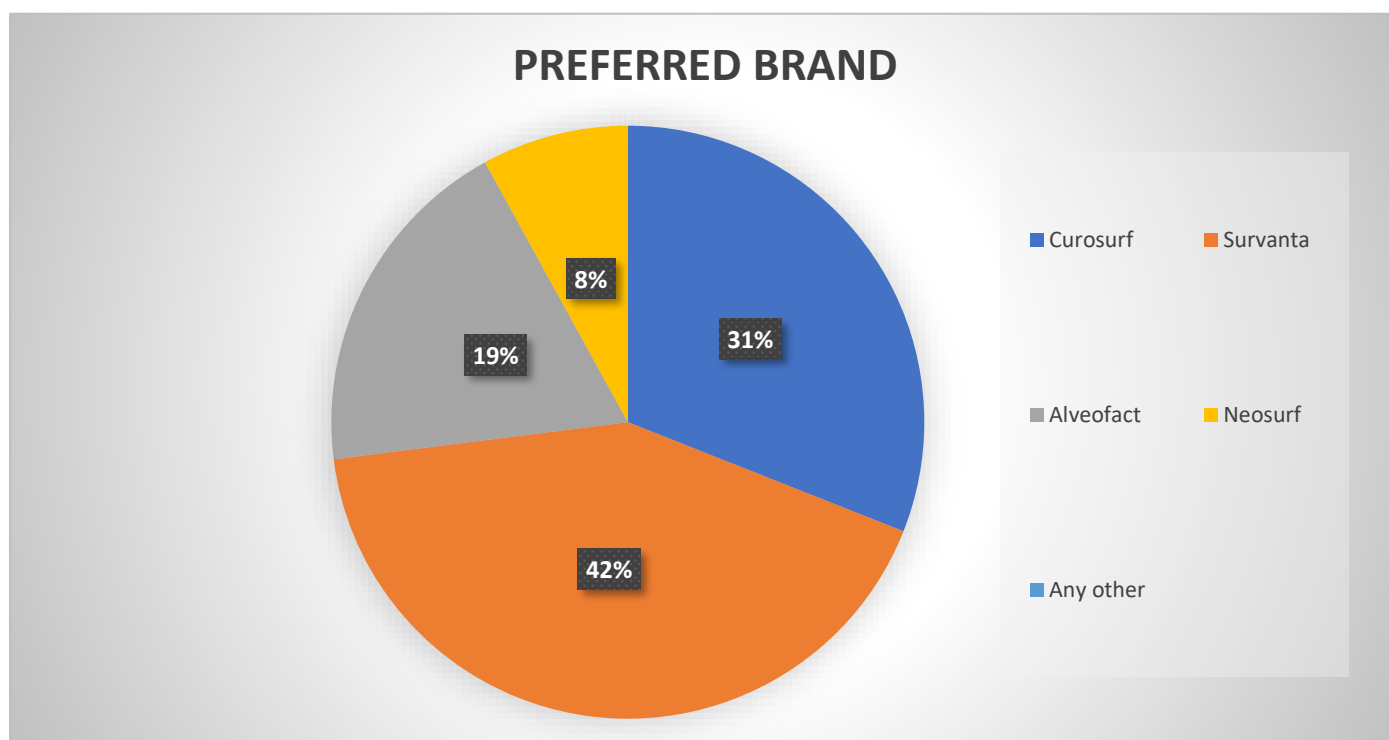
INTERPRETATION:

It was found out that All the doctors were agreed that the used of surfactant help in to treat the RDS conditions by decrease surface tension in alveoli, gas exchange, effective in distribution of phospholipids, and prevent from alveoli collapse.

Q13. Which brand do you preferred to prescribe Natural surfactant?

Most Preferred Brands	No. of Responses
Curosurf	31
Survanta	42
Alveofact	19
Neosurf	8
Any other	
Total	100

Table 13: Most Preferred Brands.



Figures 17: Most Preferred Brands.

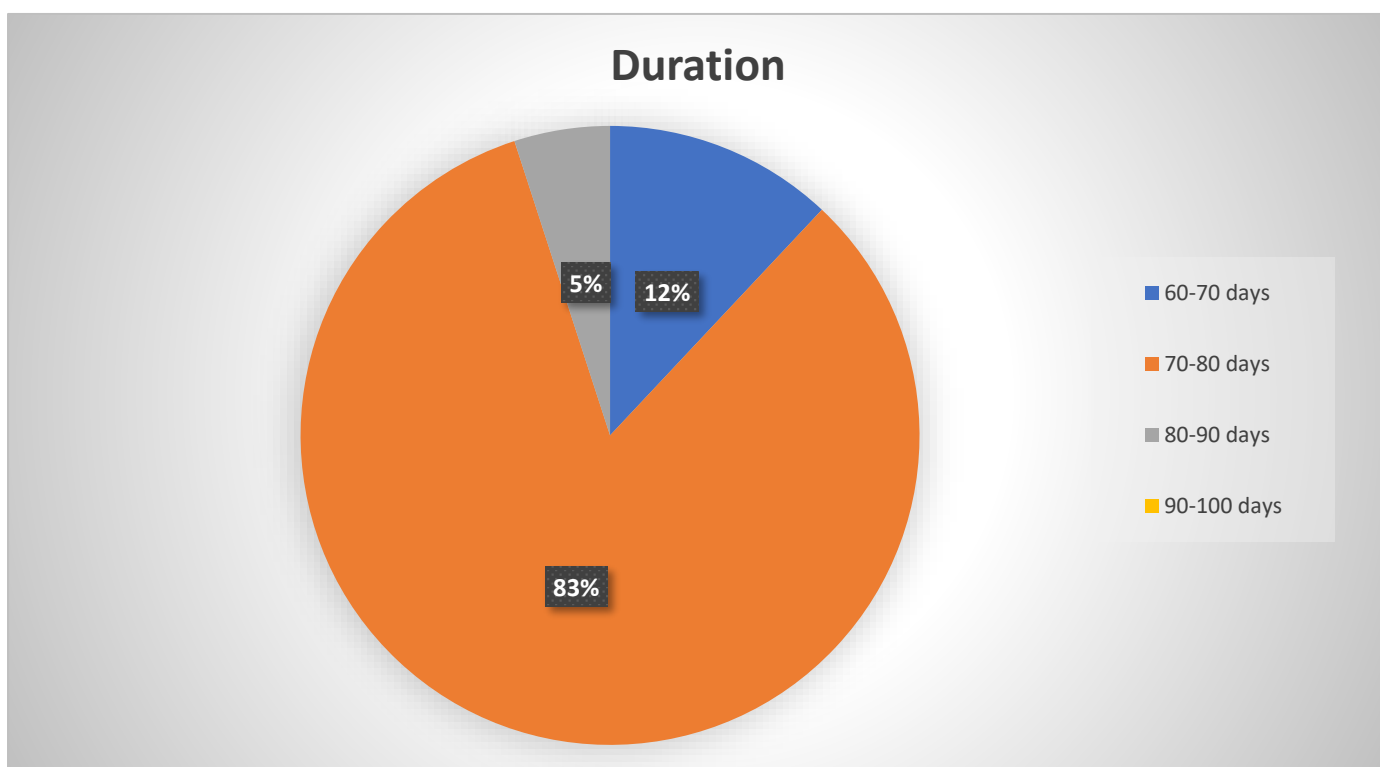
INTERPRETATION:

It was found out that 42% of the doctors go with Survanta for treating the RDS patients. 31% of the doctors go with Curosurf for treating the RDS patients. 8% of the doctors go with Neosurf for treating the NRDS patients and only 19% of the doctors go with Alveofact for treating the NRDS patients.

Q14. How long do you use surfactant to your RDS patient's?

Duration	No. of Responses
60-70 days	12
70-80 days	83
80-90 days	5
90-100 days	
Total	100

Table 14: Durations of Use.



Figures 18: Durations of Use.

INTERPRETATION:

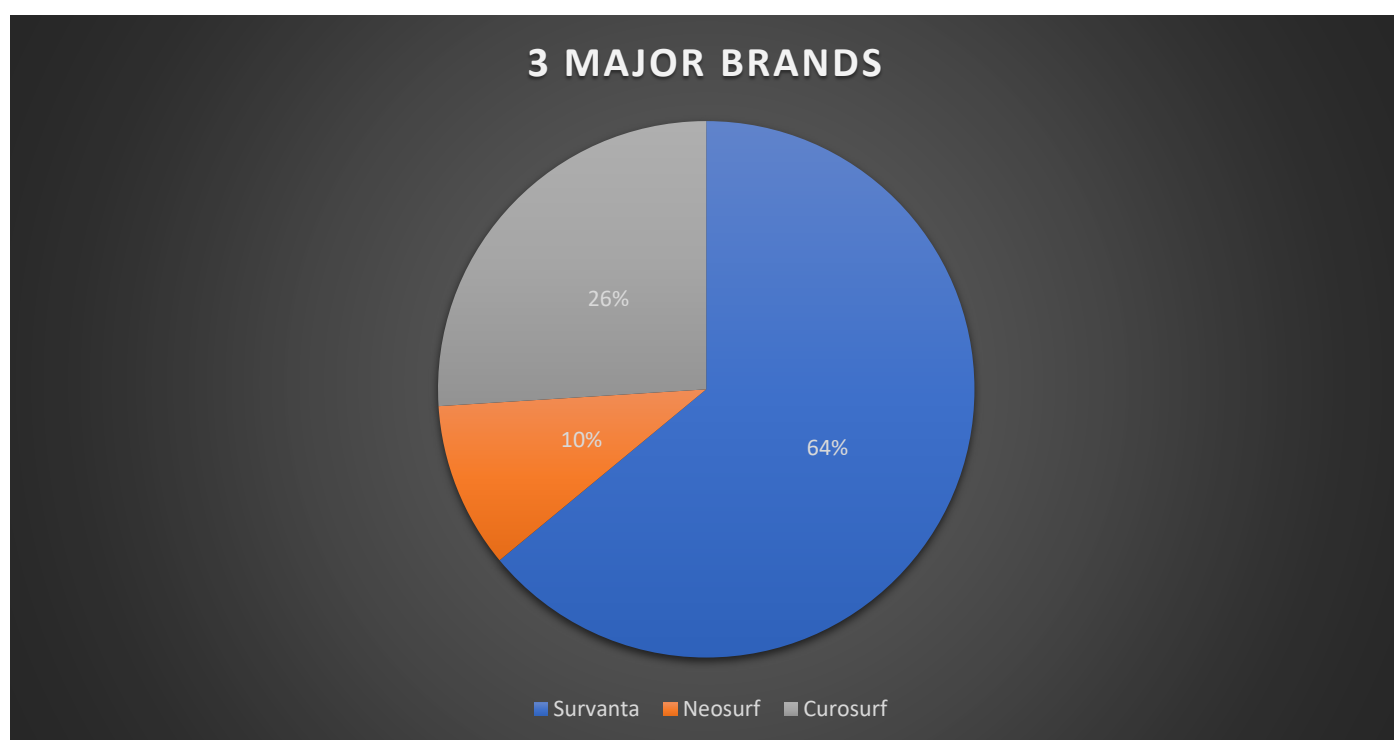
It was found out that 83% of the doctors said that 70 to 80 days of hospitalization is required for treating the RDS patients and 12% of the doctors said that 60 to 70 days of hospitalization is required for treating the RDS patients. Only 5% of the doctors preferred 80 to 90days of hospitalization is required for treating the RDS patients

RETAIL CHEMIST PRESCRIPTION AUDIT {Natural Surfactant (ALVEOFACT)}

Q1. Which are the 3 major brands of surfactant selling most on your counter?

Major Brands	No. of Responses
Survanta	64
Neosurf	10
Curosurf	26
Total	100

Table 15: Top 3 major brands.



Figures 19: Top 3 major brands.

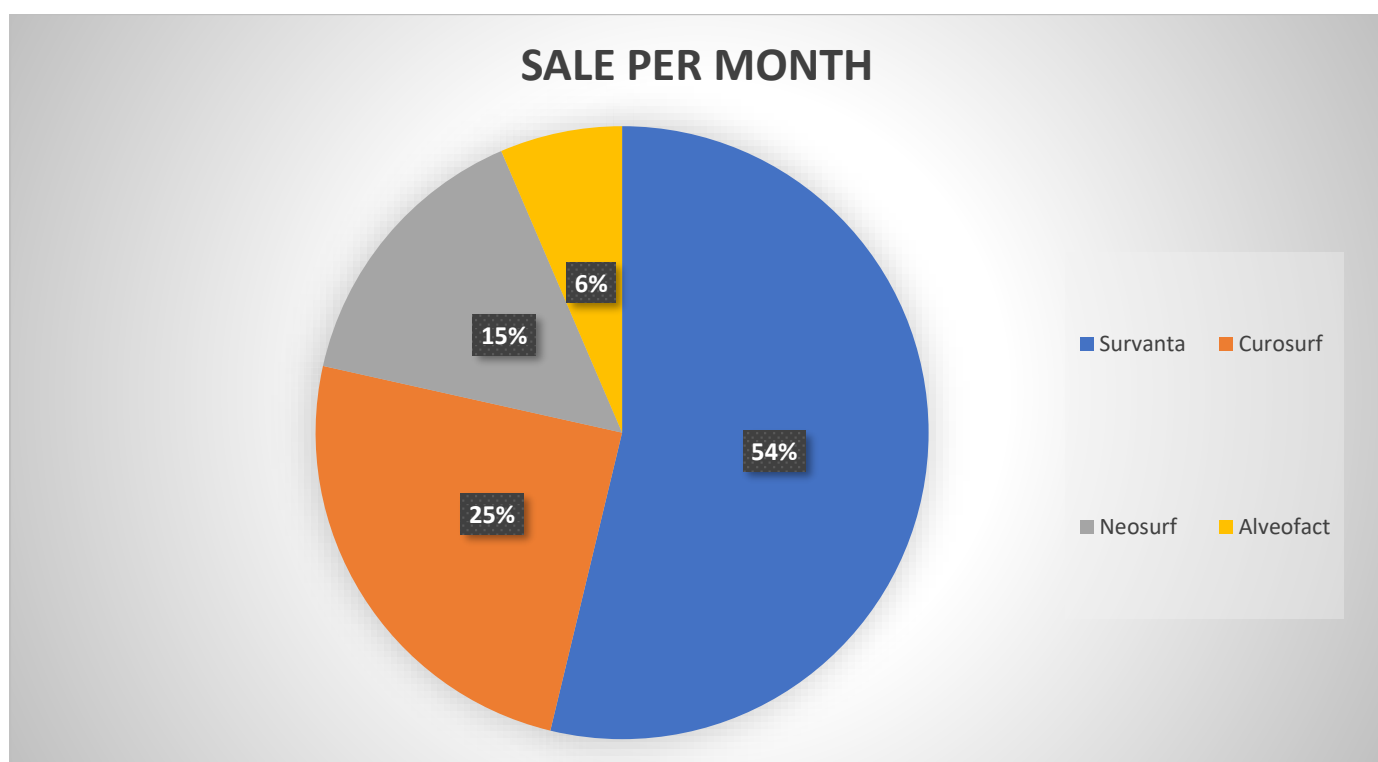
INTERPRETATION:

It was found out that 64% of the retailers sell Survanta most on the counter, 10% of the retailers sell Neosurf most on their counter, and 26% of the retailers sell Curosurf most on their counter. So as per the above data Survanta is the highly selling brand in the selected cities of Gujarat.

Q2. How much do you sell per month?

Brand Names	Sales/Month
Survanta	250
Curosurf	115
Neosurf	70
Alveofact	30
Total	100 Dr.

Table 16: Sales Per Month



Figures 20: Sales Per Month.

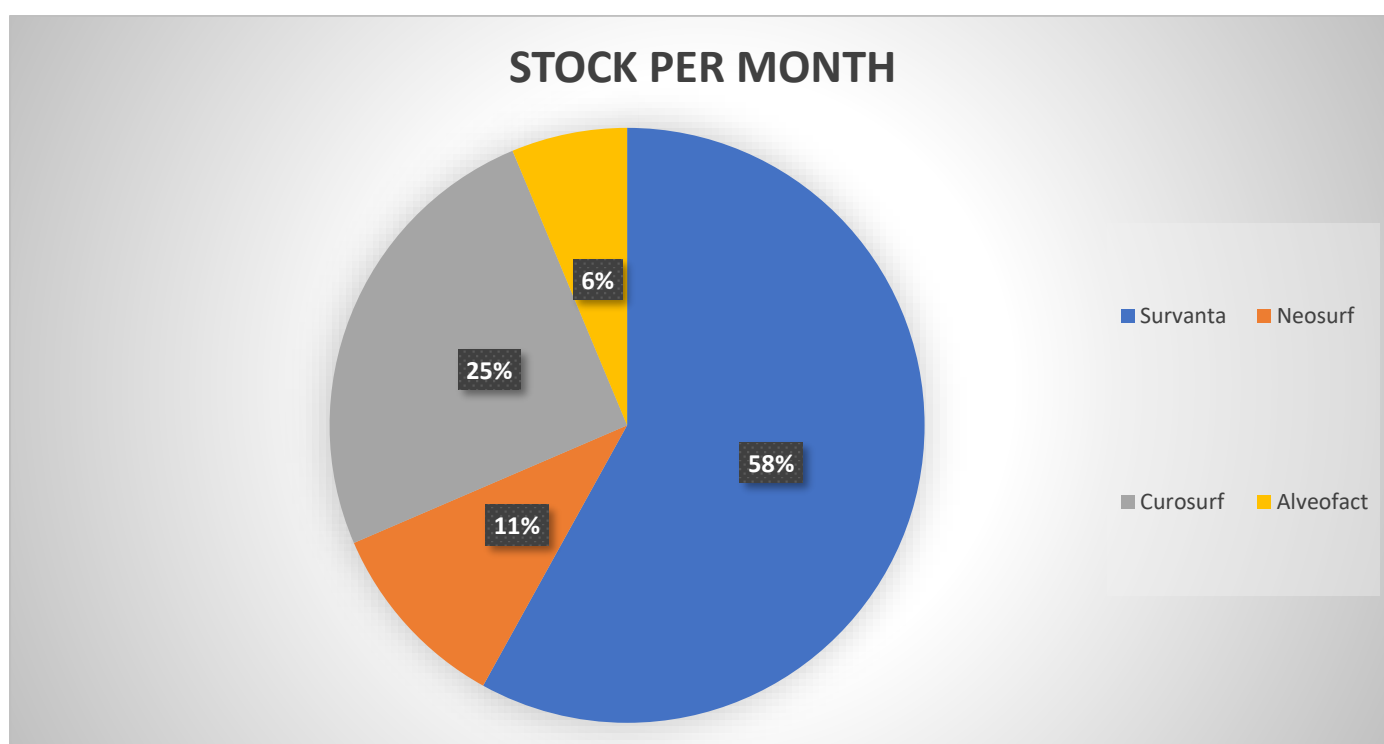
INTERPRETATION:

It was observed that according to the total respondent 54% of retailers said 250 vials Survanta sold per month, 25% of retailers said 115 vials of Curosurf sold per month, 15% of retailers said 70 vials of Neosurf per month, and 6% of the retailers said 30 vials Alveofact sold per month. So as per above data Survanta is the highly selling Natural Surfactant per month in the selected cities of Gujarat.

Q3. How much stocks do you have now?

Brand Name	Stocks Available
Survanta	83
Neosurf	15
Curosurf	36
Alveofact	9
Total	100

Table 17: Stocks available.



Figures 21: Stocks available.

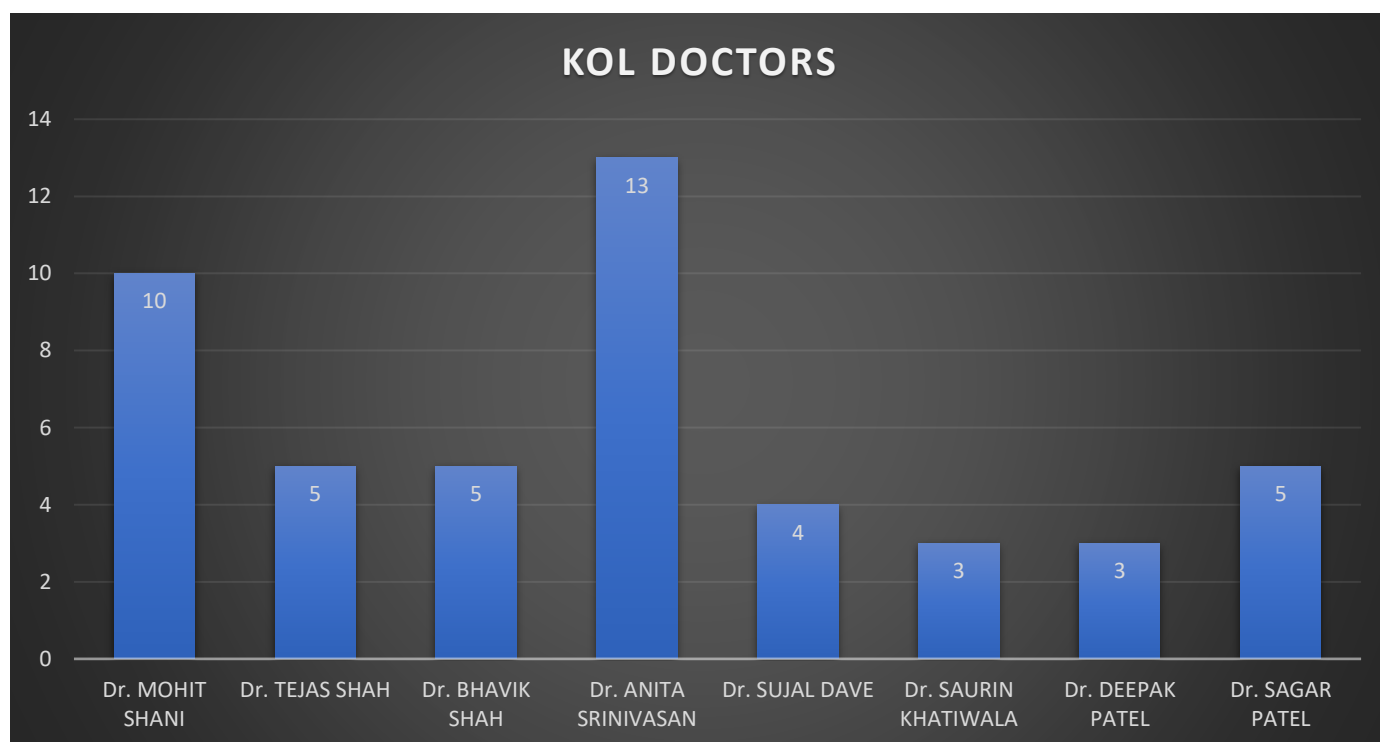
INTERPRETATION:

It was found that 58% of the retailers have 83 vials stock of Survanta, 11% of the retailers have 15 vials stock of Neosurf, 25% of the retailers have 36 vials stock of Curosurf, and 6% of retailers have 9 vials stock of Alveofact. So as per above data Survanta is highly available stocks of Natural Surfactant in the selected cities of Gujarat.

Q4. Who are the top prescribers of Natural Surfactant brands and how much doctors prescribes?

Doctors Name	No. of Prescriptions.
Dr. MOHIT SHANI	10
Dr. TEJAS SHAH	5
Dr. BHAVIK SHAH	5
Dr. ANITA SRINIVASAN	13
Dr. SUJAL DAVE	4
Dr. SAURIN KHATIWALA	3
Dr. DEEPAK PATEL	3
Dr. SAGAR PATEL	5

Table 18: Top Prescribers.



Figures 22: Top 3 Prescribers

INTERPRETATION
It was observed that the top three potential prescribers of Natural Surfactant are.
Dr. ANITA SRINIVASAN
Dr. MOHIT SHANI
Dr. TEJAS SHAH

Competitive Analysis:

Parameter	Alveofact	Survanta	Curosurf	Neosurf
Origin	Bovine Lungs	Bovine Lungs	Porcine Lungs	Bovine Lungs
Method	Lavage	Minced	Minced	Lavage
Dose per Kg	50 mg	100 mg	200 mg	135 mg
Volume per Kg	1.2 ml	4 ml	1.5 ml	5 ml
Active phospholipid conc. per ml	45 mg	25 mg	80 mg	27 mg
Warming required	Not required	Yes	Yes	Yes
Storage temperature	Stable upto 30°C	2-8°C	2-8°C	2-8°C
Phospholipid %	90%	84%	99%	DPPE (40%)
Viscosity	8 times less viscous	High	High	8 times less viscous
SP B protein concentration	SP B: 5.2 SP C: 12.9	SP B: 1.3 SP C: 16.5	SP B: 3.2 SP C: 10.1	Not defined
Stability	36 months	15 months	15 months	36 months
Loss of activity through plasma proteins	Low	High	High	Low
Infants requiring one dose only	78.10%	51%	73%	
Price	7,030	13,178	12,280	8,897

Conclusions:

Almost all the neonatologist preferred surfactant for treating the NRDS patients. Natural surfactant has shown to have a better prognosis than synthetic surfactants. The intraventricular haemorrhage, pneumothorax and rate of bronchopulmonary dysplasia were similar among patients treated with Alveofact, Curosurf and Survanta. The doctors preferred brand for the treatment of neonatal respiratory distress in preterm baby is Survanta (Abbott) because of well-established surfactant brand for the treatment of NRDS patients and high margin on Survanta in hospital pharmacy. There is another reason of doctors to prefer Survanta because Survanta is in prefilled suspension form therefore no need to make suspension as in Alveofact before injecting to baby.

As from the analysis of molecular species of phosphatidylcholine (PC) showed a significant difference between these different types of commercial surfactants (Alveofact, Survanta, and Curosurf) and from literature article Alveofact compared to Survanta and Curosurf showed significantly fewer days for mechanical ventilation as well as fewer days on supplemental oxygen therapy and reduced length of stay in the hospital.

However, from chemist it is easy to know the competitor of Alveofact and which surfactant is selling more in their area, and from my survey data Survanta is top selling surfactant in Gujarat.

Recommendations:

- There is need of conference with the help of neonatologist KOL doctors and in that conference to address the other doctors regarding the surfactant compositions, attributes of ideal surfactant, dosage form and Alveofact. of conference with neonatologist doctors regarding surfactant compositions in treatment of RDS.
- Medical representatives should properly have trained on detailing method before going to field.
- Some retailers complained that some stockist doesn't have any stocks of Alveofact when required. To boost sales of Alveofact it is necessary that stocks should be available in the market around the clock for 12 months.
- Gifts like diaries, pen, or calendar can be given to doctors and hospital pharmacist for prolong relationship with the company and as a reminder for doctors.
- Do some promotional activity of Alveofact in children's hospital.
- Many hospital retailers said that they don't get any scheme from stockist, so they don't order it.

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