Market Assessment of Natural Surfactant (Alveofact) in Mumbai

By

Pathak Gaurav Trivaninath

Dissertation submitted for the partial fulfillment of the

MBA Pharmaceutical Management

Academic year, 2017-2019

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IIHMR UNIVERSITY

TO WHOMSOEVER MAY CONCERN

This is to certify that **Mr. Pathak Gaurav Trivaninath**, 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), Mumbai** 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.

Dr. Sandeep Narula
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Date: 14th May, 2019

The certificate is awarded to

Mr. Pathak Gaurav Triveninath

In recognition of having successfully completed his Internship/dissertation in the department of

Bharat Serums and Vaccines Pvt. Ltd.
(Celero Division)

and has successfully completed his Project on

"Market Assessment of Natural Surfactant (Alveofact) in Mumbai, (Maharashtra)"

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,

Akhilesh Mishra
Senior Vice President- Human Resources

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CERTIFICATE BY SCHOLAR

This is to certify that the dissertation titled **"Market Assessment of Natural Surfactant (Alveofact) in Mumbai"** and submitted by **Pathak Gaurav Trivaninath**. Enrollment No. **0107** under the supervision of **Dr. Ashok Peepliwal** 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

Pathak Gaurav Trivaninath

Acknowledgements

As a part of dissertation project, I was required to complete a project report on “Market Assessment of Natural Surfactant (Alveofact) in Mumbai” based on collection of primary and secondary data. This project is a great opportunity to express my healthy thanks to all those people who timely supported me a long way in completion of my project report.

I am very thankful to my organizational mentor Mr. Rakesh Shrivastava (General Manager), he assigned me to respective medical representatives in Mumbai city, lastly all the medical representatives of Mumbai city for giving insights on detailing with doctors.

I am thankful to Mr. Ashok Peepliwal (Associate Professor) for always guiding throughout the project and for keeping track on my work details.

Finally, sincere thanks to my parents and friends who have always been moral support and strong pillars at all walks of my life and at every stage with a cheer enthusiasm.

Table of Contents

Abbreviations

BLES	Bovine Lipid Extract Surfactant
CMEs	Continuing Medical Educations
DPPC	Dipalmitoyl phosphatidyl choline
ELF	Epithelial Lining Fluid
HMD	Hyaline Membrane Disease
KCL	Potassium Chloride
PC	Phosphatidyl Choline
PE	Phosphatidyl Ethanolamine
PG	Phosphatidyl Glycerol
PI	Phosphatidyl Inositol
PIE	Pulmonary Interstitial Emphysema
QC	Quality Control
NRDS	Neonate Respiratory Distress Syndrome
RTMs	Round Table Meeting
SP-B	Surfactant Protein-B
SP-C	Surfactant Protein-C

Abstract

Background

The aim of the study is "Market Assessment of Natural Surfactant (Alveofact) in Mumbai". The research work on Alveofact for treatment of neonatal respiratory distress syndrome (NRDS) was carried out in Mumbai city with respect to the survey with neonatologist doctors, stockists and hospital pharmacies. In terms of availability, and market awareness of surfactants, the result obtained from various surfactant brand have different market strength.

Objective

- To know the most selling natural surfactant brands in Mumbai
- To know the competitive scenario of Alveofact.
- To know the doctors' attitude towards surfactant.

Methodology

1. **Study Design**

   Descriptive Study was performed to get market insights.

2. **Sample size**

   100 doctors and 100 chemists in Mumbai city

3. **Sampling Method**

   Non-probability sampling

4. **Method of data collection**

   Based on nature of study, 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.

5. **Duration of Study**

   18th Feb to 12th May 2019

Result

From the data analysis most of the doctors given a response on MOA video, and scientific leave behind literature in prescribing the natural surfactant. Doctors preferred lyophilized prefilled syring form (Survanta) to Alveofact. By retailer survey data, most of the selling surfactant in Mumbai is Survanta.

Conclusion

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.

Key words

NRDS, Surfactant, Alveofact, Survanta, Curosurf, BSV, PC, PE, PG, PIE, ELF, DPPC, HMD

Summary

Due to increase of competition in market, everyone wants to know their existence in market against other competitor which are in the same industry. So, it is very essential to know the competitor market potential of a particular product (like surfactant) and after then it is important to know the other opportunity to target the potential market according to their need, evaluate all the marketing strategic by seeing past relevant data of other competitor product (like Survanta) in that targeted market and then go with some point of difference in their own product to capture that competitor target market.

The aim of the study is "Market Assessment of Natural Surfactant (Alveofact) in Mumbai". I have done a research work on Alveofact for treatment of neonatal 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 Mumbai city with respect to the survey with neonatologist doctors, stockists and hospital pharmacies.

The project was started on 18th February 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 were carried out to draw conclusion. The project was completed on 12th May.

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

INTRODUCTION

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 new-born 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. 0edema 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.

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 star 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.

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 and a hydrophobic 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.

COMPONENTS OF SURFACTANT

It consists of phospholipids and proteins. To help keep the lungs inflated and prevents them from collapsing, many companies are trying to promote surfactant which contains PG, PC, PE, PI, Phosphatidylserine, and Sphingomyelin along with SP-B and SP-C.

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. 0thers 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.

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 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.

Mincing adds to cellular components to extract thus, making it more viscous and reduces concentration of SP-B & SP-C.

2. 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.

3. Availability in vials of 1.2ml, makes Alveofact a cost-effective choice.

4. Alveofact is 8 times less viscous than Bovine minced lung extract surfactant aiding in rapid peripheral distribution.

5. Alveofact is now available all over India even in remote areas.

Literature Review

1. According to author **Coen HMP Willems**, **Florian Urlichs, Silvia Seidenspinner, Steffen Kunzmann, Christian P Speer, Boris W Kramer** state that**,** the porcine extracted lung surfactant (poractant alfa) enriched the phagocytosis of apoptotic neutrophils by alveolar macrophages which leads to anti-inflammatory properties.
2. According to author **WOLFGANG BERNHARD**, **JASMIN MOTTAGHIAN**, **ANDREAS GEBERT**, **GUNNAR A. RAU**, **HORST von der HARDT and CHRISTIAN F. POETS,** the surface tension lowering properties of natural surfactants (Curosurf, Alveofact) is equivalent to native surfactant whereas the semisynthetic surfactants (Survanta, Exosurf) were unqualified to indicate surface tension lowering property as compared to native surfactant.

3. According to author **Mirhadi Mussavi, Keyvan Mirnia, and Khairollah Asadollahi,** in the Alveofact group, the new cases of pneumothorax was impressively higher, the mean hospital-stay length, mean ventilation time and the new cases of PDA were also impressively higher in the Alveofact group.

4. According to author **HansProquitte, Thekla Dushe,Hannes Hammer,Mario Rudiger,Gerd Schmalisch,Roland Wauer,** there is no significant difference between Alveofact and Curosurf for treating the NRDS patients.

5. According to author **Seeger, C. Grube*, A. Günther, R. Schmidt,** the surface tension lowering properties of the natural surfactant Curosurf and Alveofact meet mainly accepted standard of satisfying surfactant function.

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 Mumbai.

Objectives

- To know the most selling natural surfactant brands in Mumbai
- To know the competitive scenario of Alveofact.
- To know the doctors' attitude towards surfactant.

Research Methodology

1. **Study Design**

   Descriptive Study was performed to get market insights.

2. **Sample size**

   100 doctors and 100 chemists in Mumbai city

3. **Sampling Method**

   Nonprobability sampling

4. **Method of data collection**

   Based on nature of study, 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.

5. **Duration of Study**

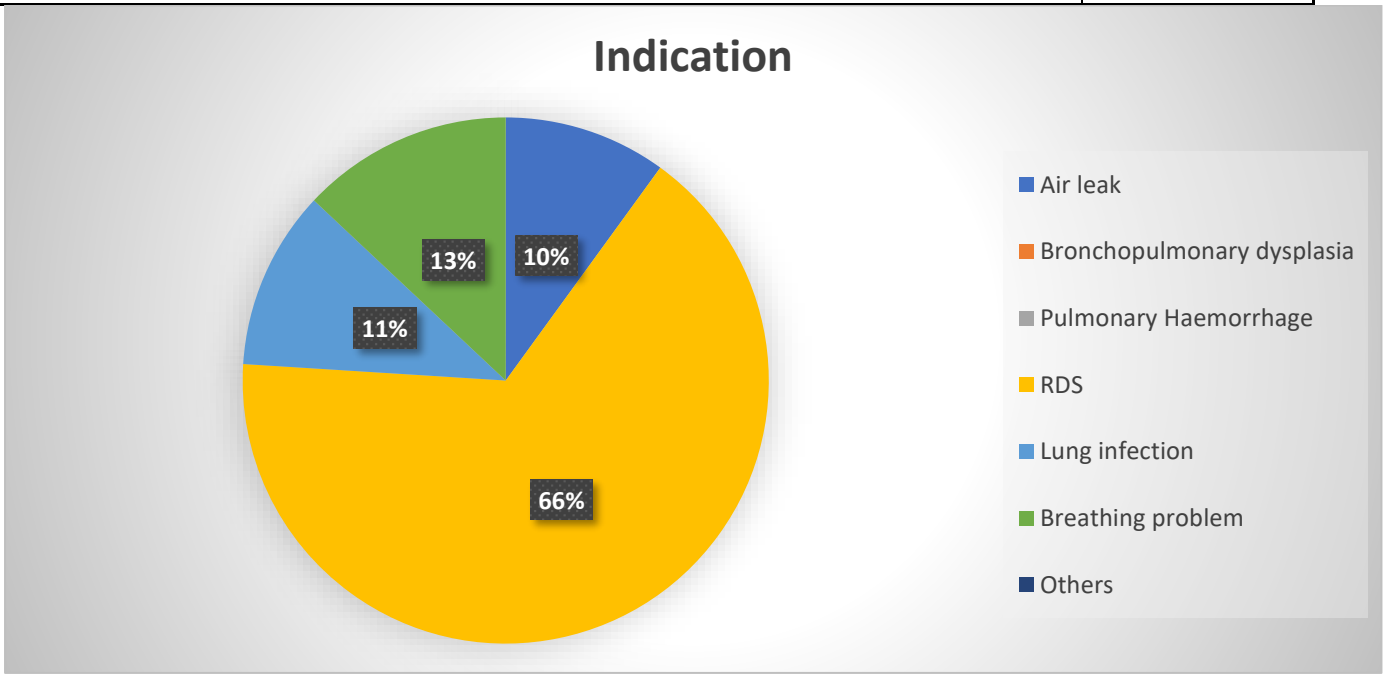
   18th Feb to 12th May 2019

Data Processing, Analysis and Interpretation:

Doctors Survey

Q1. Doctor in which indication do you preferred Natural surfactant?

Air leak	10
Bronchopulmonary dysplasia	0
Pulmonary Haemorrhage	0
RDS	66
Lung infection	11
Breathing problem	13
Others	0

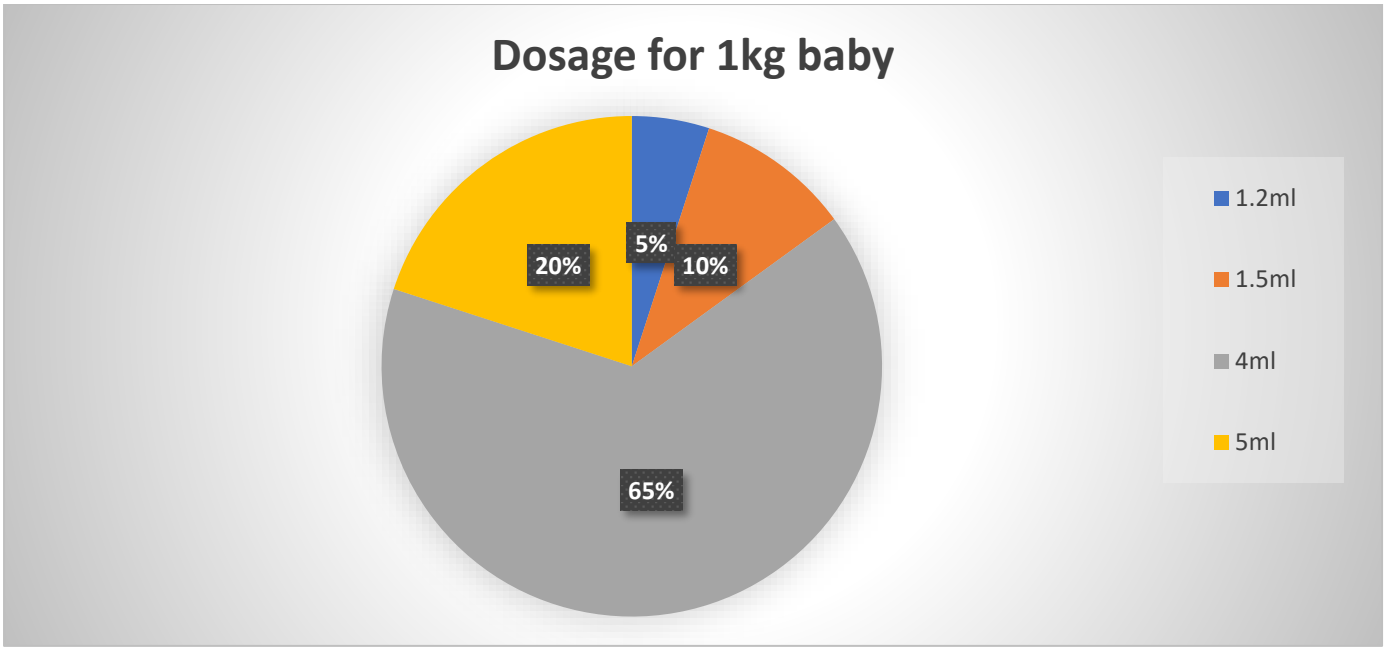


Interpretation

Most of the doctors (66%) prescribe surfactant to treat RDS as compared to other doctors.

Q2. Doctor what is the preferred dosage for 1kg baby in RDS case?

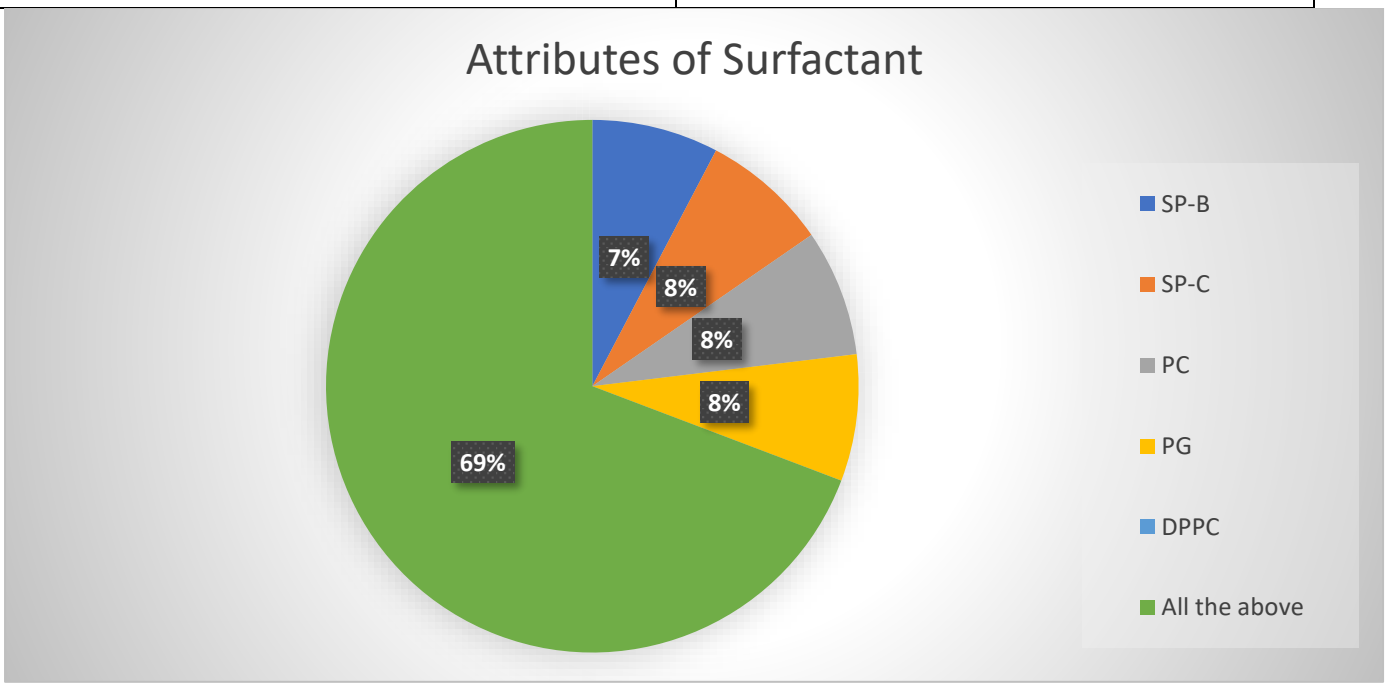
1.2ml	5
1.5ml	10
4ml	65
5ml	20



Interpretation
According, to data 65% of the doctors go for Survanta for the treatment of RDS.

Q3. Doctor according to you, what are the attributes of ideal Natural surfactant?

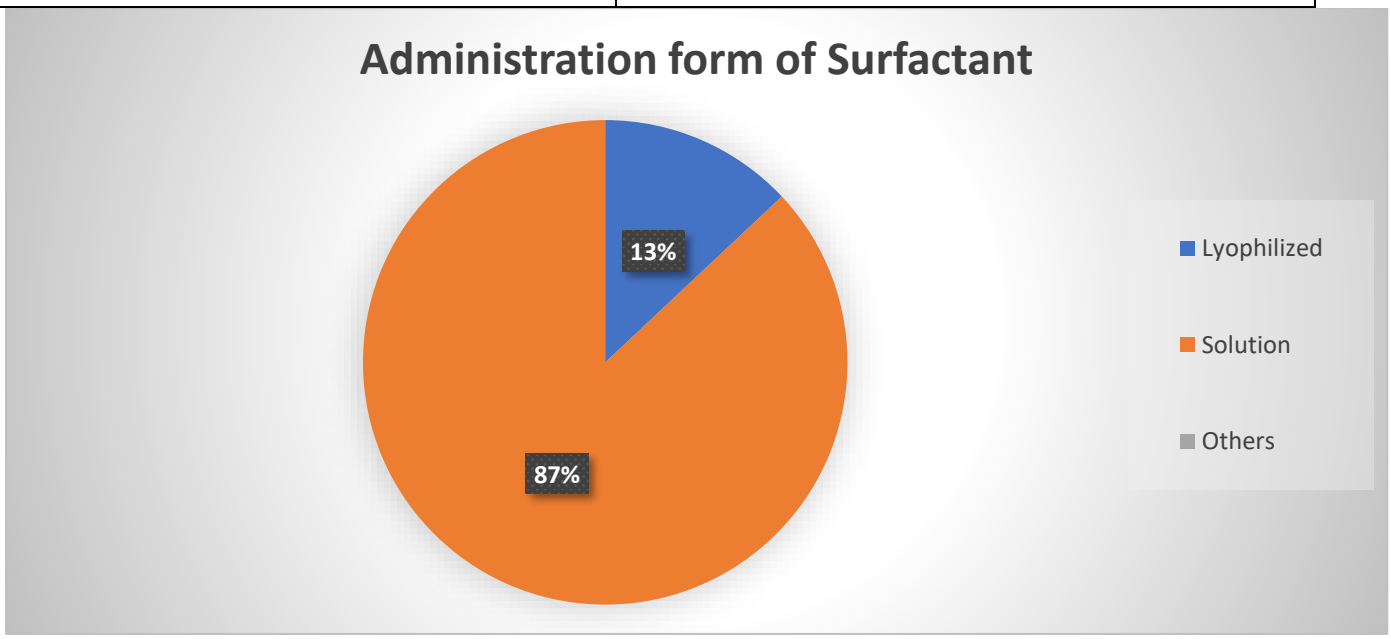
SP-B	10
SP-C	10
PC	10
PG	10
DPPC	0
All the above	90



Interpretation
69% of the doctors preferred all the attributes of the natural surfactant, which is mentioned in question number 3 (i.e. SP-B, SP-C, PC, PG, DPPC)

Q4. Doctor which is the most accepted form of administration by patients?

Lyophilized	13
Solution	87
Others	0

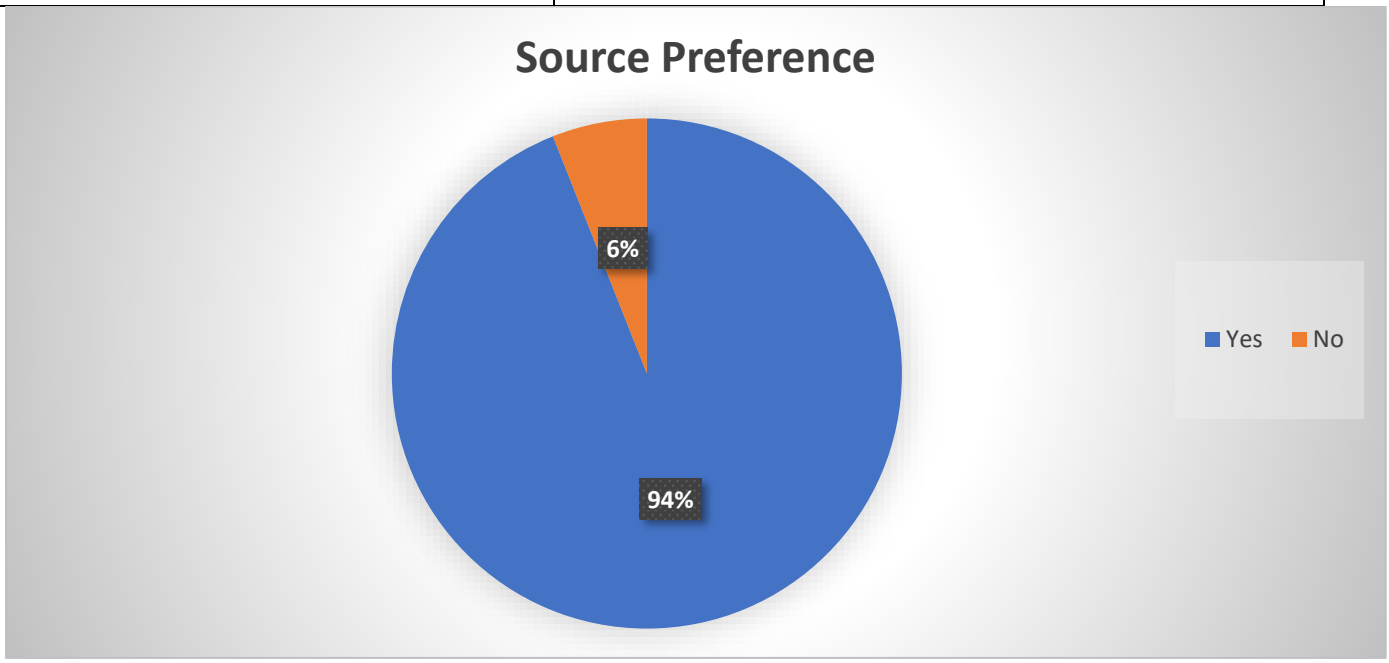


Interpretation

For administration of the surfactant in patients, 87 % of the doctors shown response on lyophilized form and 13% of the doctors shown response on solution form.

Q5. Doctor do you think bovine based Natural surfactant is an effective than bovine based?

Yes	94%
No	6%

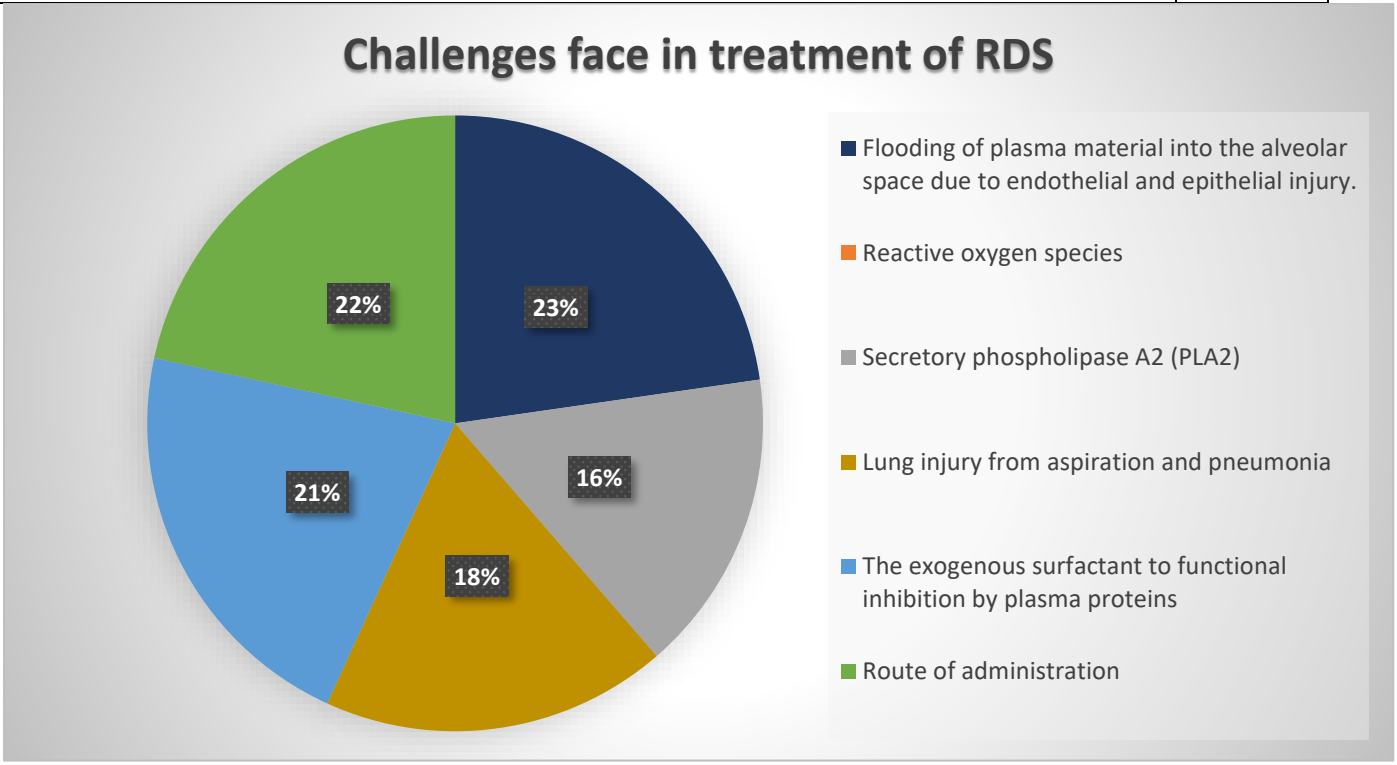


Interpretation

94 % of the doctors agreed that bovine natural surfactant is an effective than porcine based

Q6. Doctor what are the challenges you face in treatment of RDS at patient level?

Flooding of plasma material into the alveolar space due to endothelial and epithelial injury.	100
Reactive oxygen species	0
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



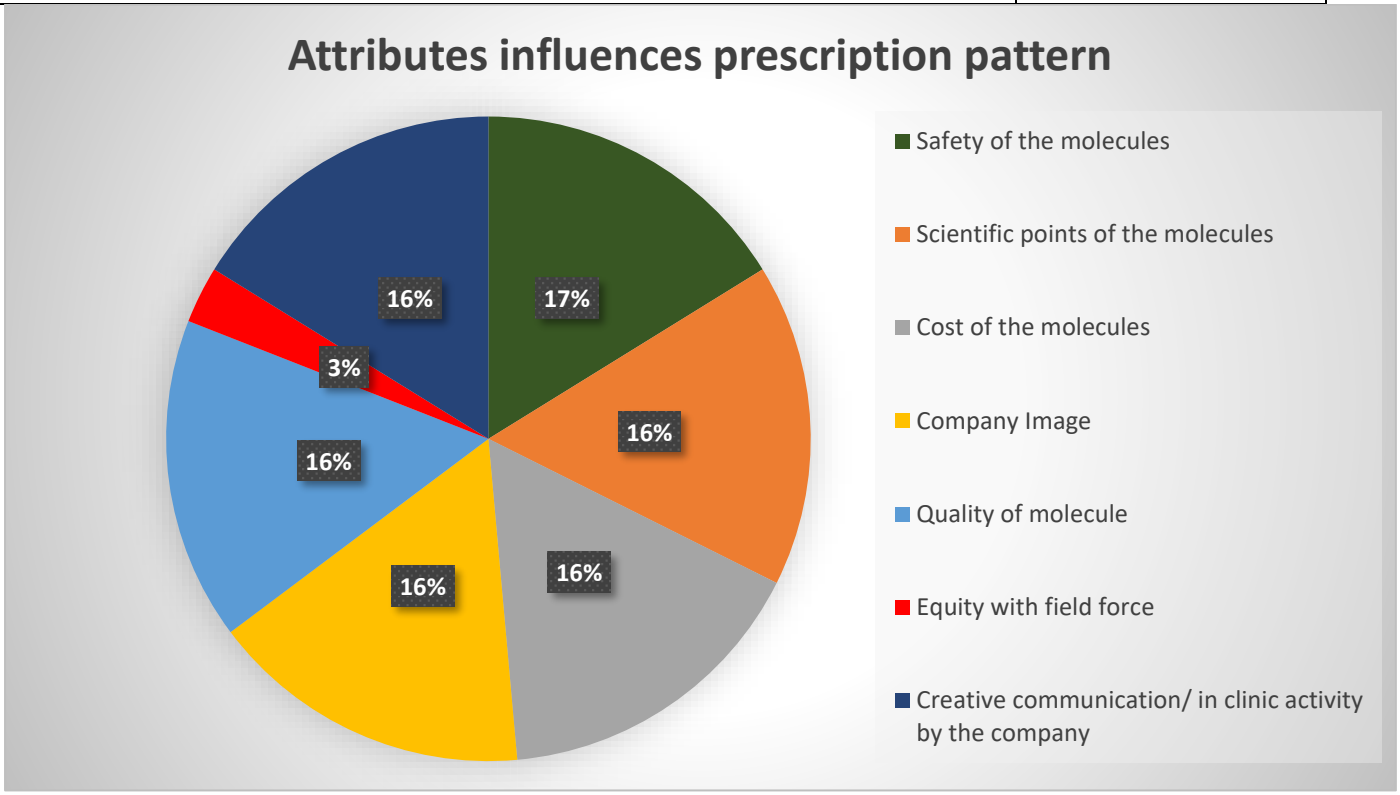
Interpretation

- First challenges (23%) 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 (22%) is route of administration, faced by doctors in the treatment of RDS at patient level.
- Third challenges (18%) is lung injury from aspiration and pneumonia.
- 16% of the doctor's response is secretory phospholipase A_2 (PLA_2) is the major challenge faced by doctors in treatment of RDS

Q7. Doctor which of the following attributes influences your prescription?

Safety of the molecules	85
Scientific points of the molecules	85
Cost of the molecules	85

Company Image	85
Quality of molecule	85
Equity with field force	15
Creative communication/ in clinic activity by the company	85

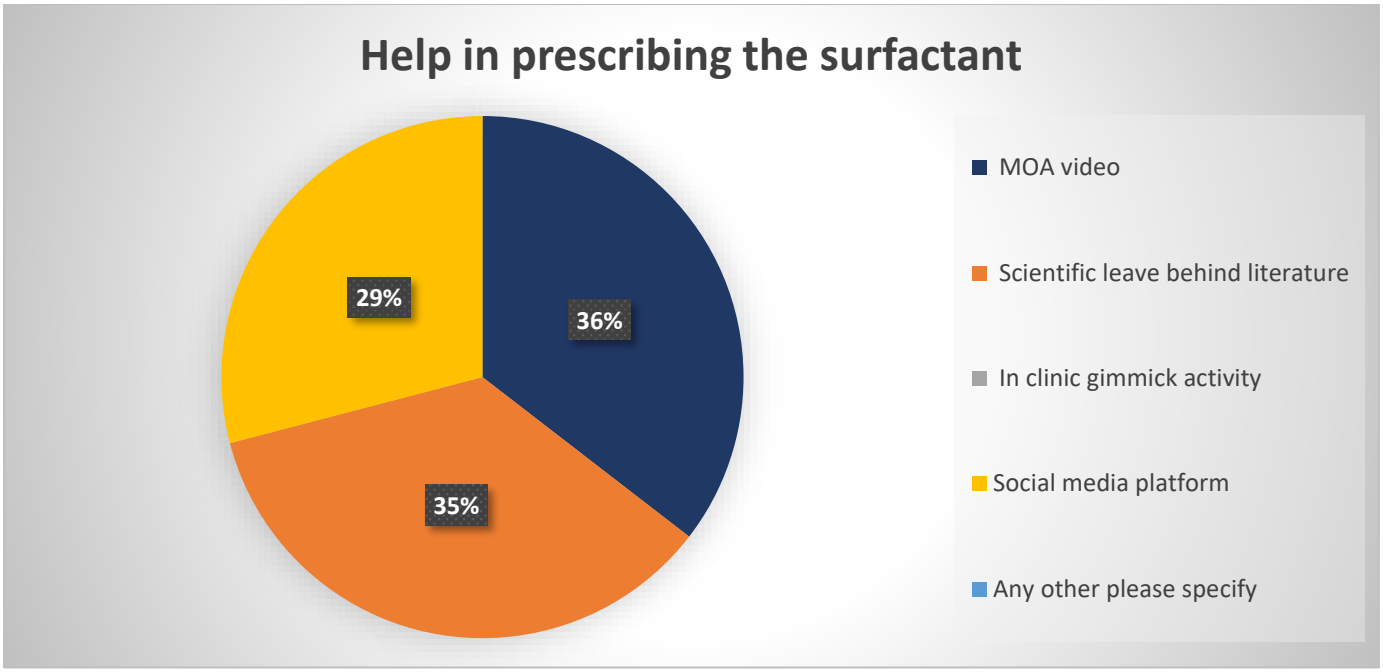


Interpretation

97 % 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.

Q8. Doctor which of the following activities will help you in prescribing the Natural surfactant?

Celebrity Endorsed VA pages	0
MOA video	100
Scientific leave behind literature	100
In clinic gimmick activity	0
Social media platform	82
Any other please specify	0

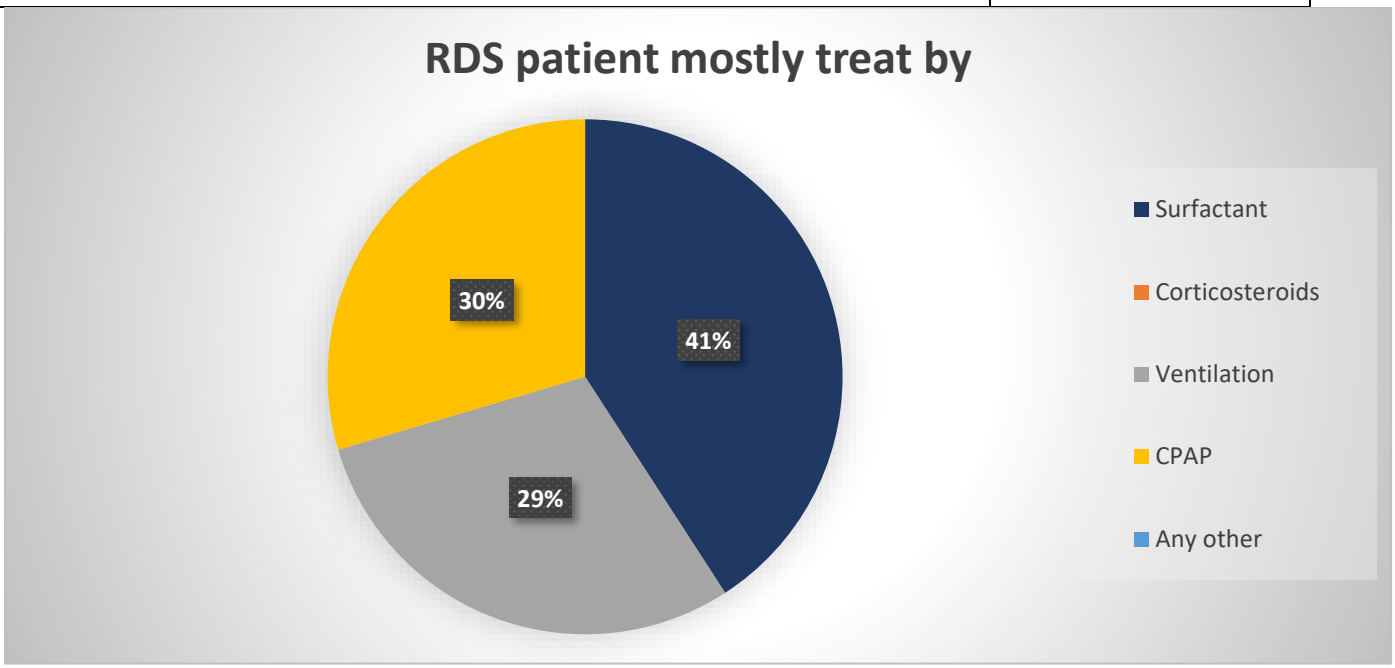


Interpretation

From the data analysis 71% of the doctors given a response on MOA video, and scientific leave behind literature, only 29% of the doctors given a response on social media platform.

Q9. How do you treat RDS Patients mostly?

Surfactant	58
Corticosteroids	0
Ventilation	42
CPAP	42
Any other	0



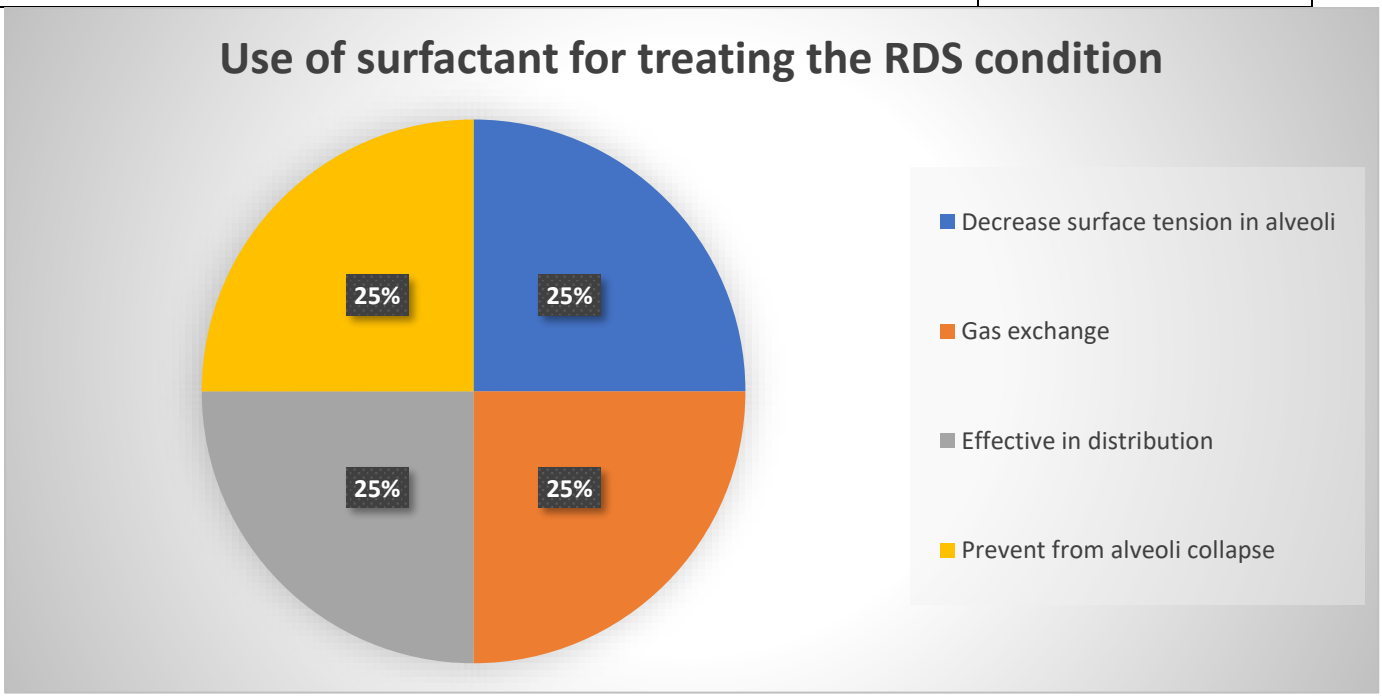
Interpretation

41% of the doctors go with surfactant but 30% of the doctors preferred CPAP and 29% of the doctors preferred ventilation for RDS patients.

As in the case of emergency, the doctors go for CPAP and ventilation

Q10. How does the use of surfactant help in treating the RDS conditions?

Decrease surface tension in alveoli	100
Gas exchange	100
Effective in distribution	100
Prevent from alveoli collapse	100
Any other	0

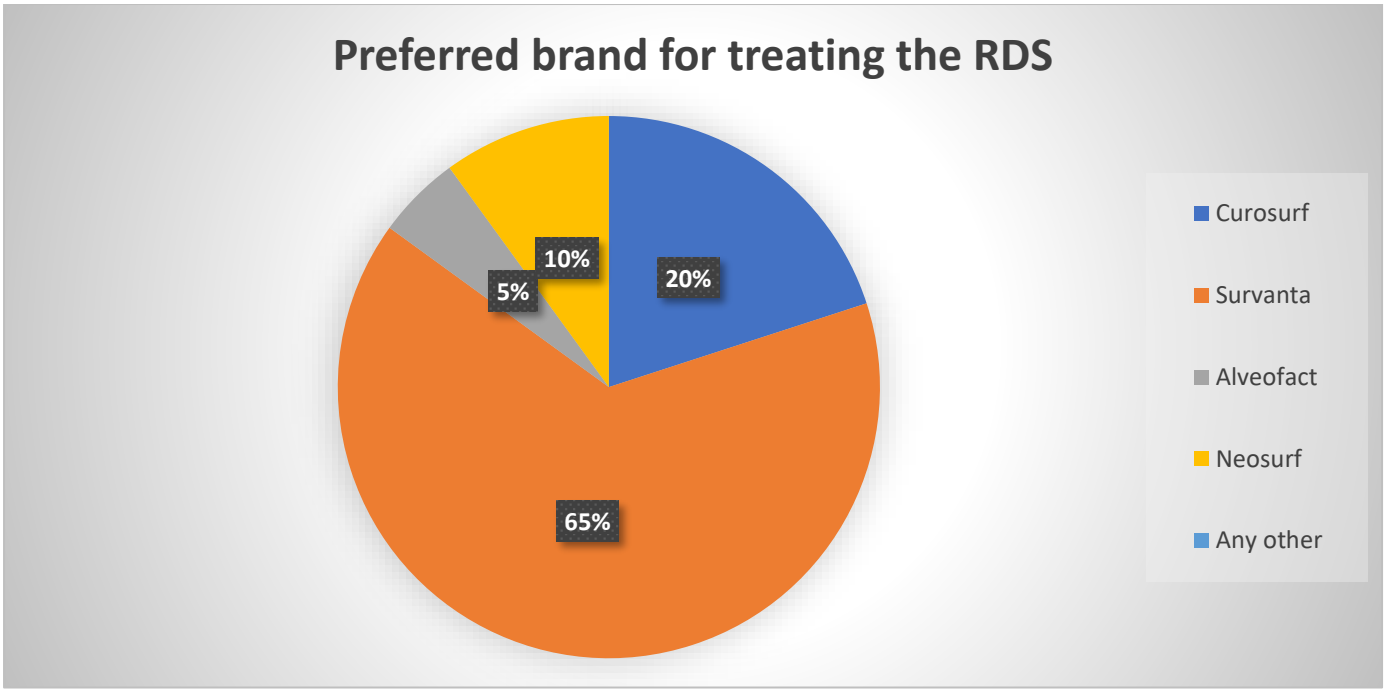


Interpretation

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.

Q11. Which brand do you preferred to prescribe Natural surfactant?

Curosurf	20
Survanta	65
Alveofact	5
Neosurf	10
Any other	0

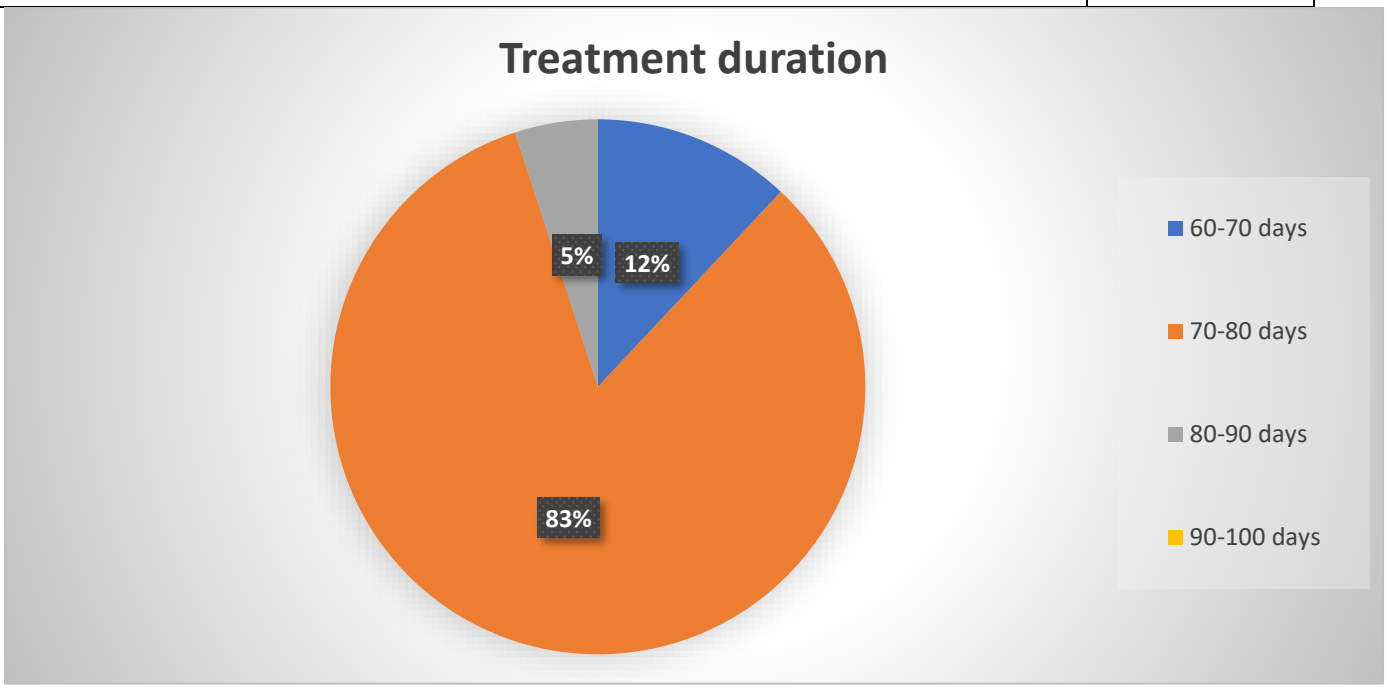


Interpretation

As per survey data 65% of the doctors preferred Survanta for treating the NRDS patients over the other natural surfactant products (Alveofact, Curosurf, and Neosurf).

Q12. How long do you use surfactant to your RDS patient's?

60-70 days	12
70-80 days	83
80-90 days	5
90-100 days	0



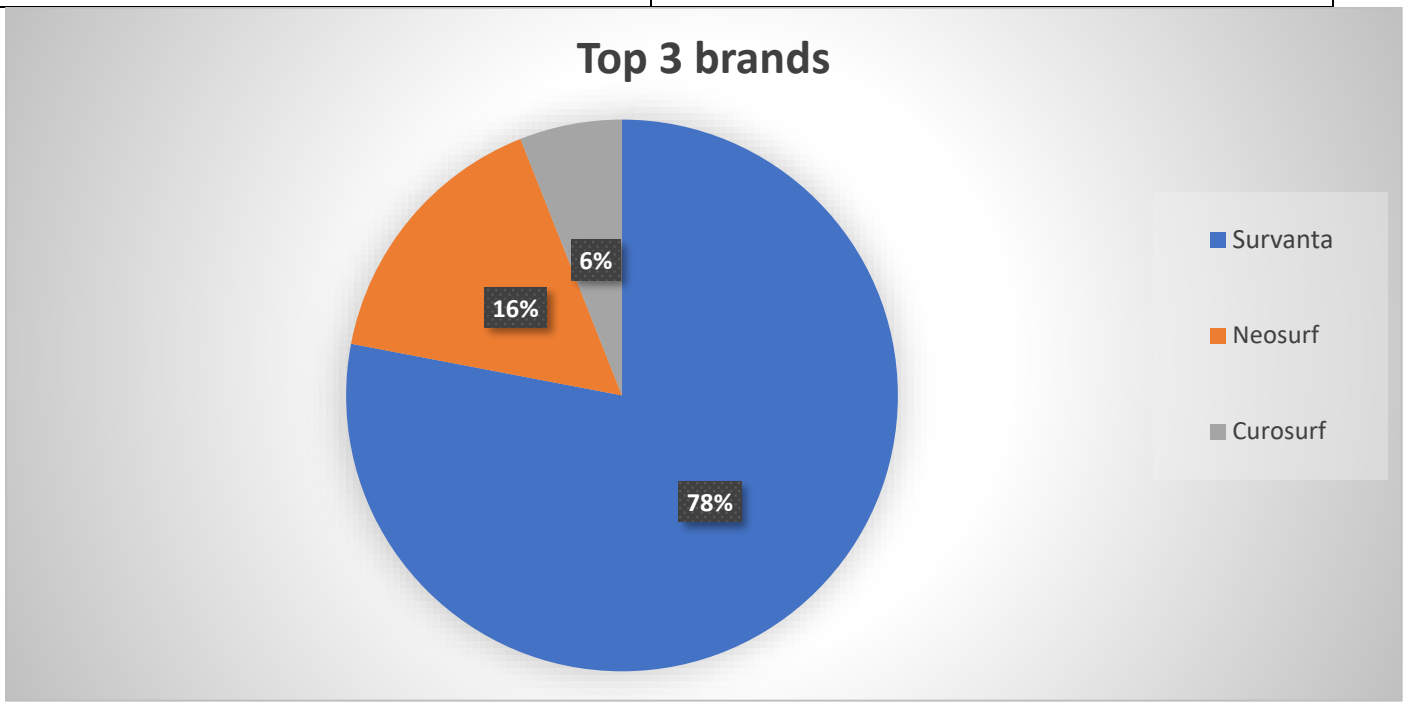
Interpretation

83% of the doctors said that 70 to 80 days of hospitalization is required for treating the NRDS patients.

Chemist Survey

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

Survanta	78
Neosurf	16
Curosurf	6

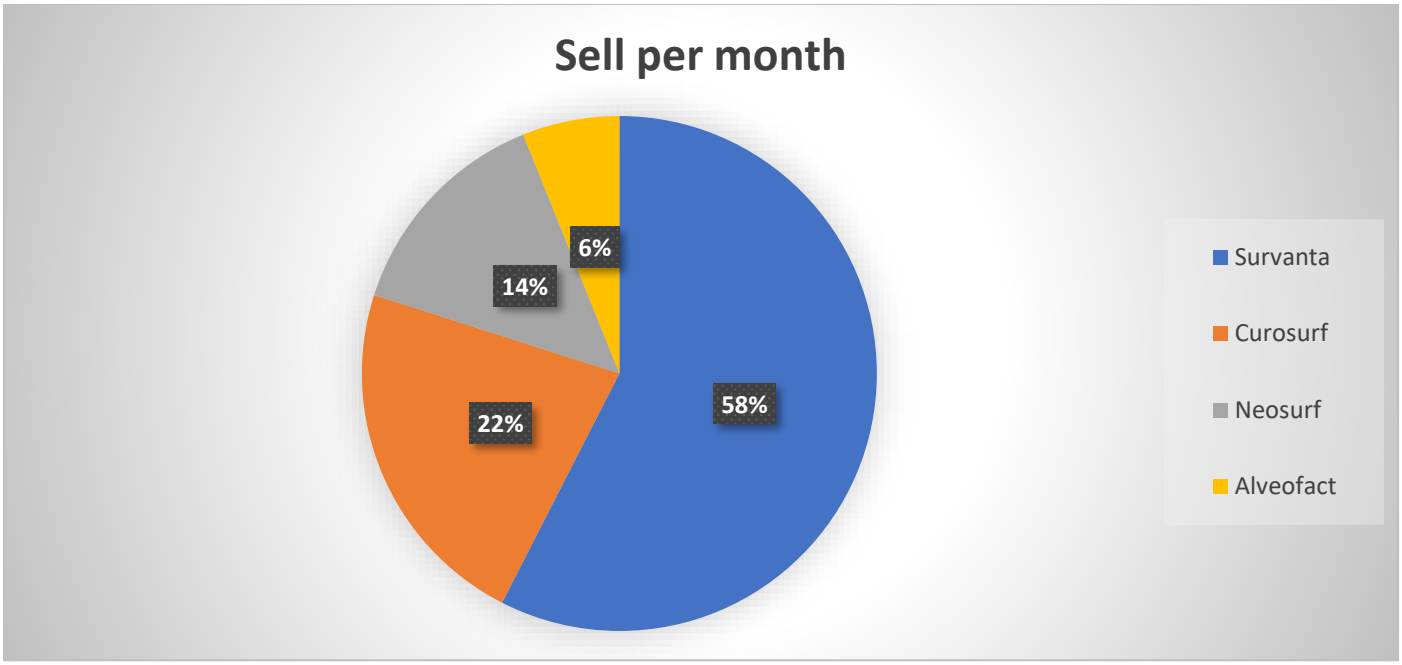


Interpretation

As from the survey data Survanta is highly selling brand in Mumbai i.e. 78% of the retailer sell the Survanta on their counter.

Q2. How much do you sell?

Survanta	321
Curosurf	125
Neosurf	78
Alveofact	34

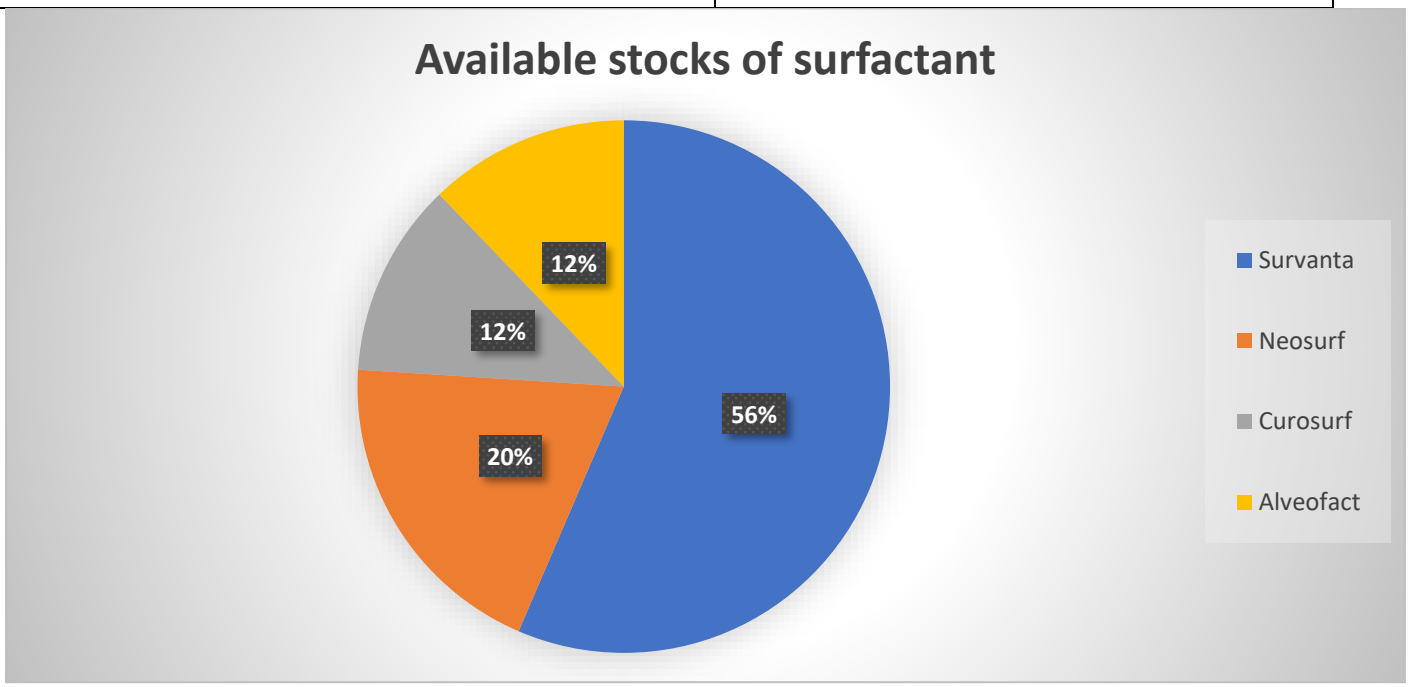


Interpretation

According to total 58% of the retailer's responses, 321 survanta were sold. So as from the data Survanta is highly selling surfactant per month in Mumbai

Q3. How much stocks do you have now?

Survanta	153
Neosurf	53
Curosurf	32
Alveofact	33



Interpretation

After gathering the stocks data from 100 retailer, the total 56% of the retailer have 153 stocks of survanta. So as from data Survanta is highly stock surfactant in Mumbai.

Point of Difference

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^{o}C	2-8^{o}C	2-8^{o}C	2-8^{o}C
Phospholipid %	90%	84%	99%	DPPC (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

Recommendation

- 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. Make small RTMs 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.

Conclusion

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 Mumbai.

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