

Competitive Landscape of Insulin Market in India

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How to cite this paper: Prabhsimran Singh | Prof. (Dr.) Harvinder Popli "Competitive Landscape of Insulin Market in India" Published in International Journal of Trend in Scientific Research and Development (ijtsrd), ISSN: 2456-6470, Volume-3 | Issue-4, June 2019, pp.983-990, URL: <https://www.ijtsrd.com/papers/ijtsrd24018.pdf>



IJTSRD24018

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ABSTRACT

Diabetes in India is reaching epidemic proportions. Prevalence of diabetes have heightened because of rapid cultural changes such as increased urbanization, modified diet patterns and sedentary lifestyles among the young generation. In 2013, 30 million people were in the Prediabetes group whereas 61.5 million people suffered from diabetes in India. The medication for the diabetic population such as OHA and Insulins is the need of the hour since the disease is adding significantly to the mortality rate of India.

The Indian insulin market has seen a growth of 13.9% CAGR between financial year 2008 and 2013. Indian insulin market is witnessing tremendous development and is yet to mature. With a huge base of diabetic patients, it is estimated that only 25% of this population is receiving the treatment. Unawareness about diabetes backed by low affordability has left the major proportion of the diabetic populace to remain untreated. However, In India the disposable income is increasing which is leading to better accessibility of healthcare services and enhanced diagnostics which will further broaden the patient base, create opportunities for insulin companies operating in the coming years.

Human insulin is being solely used in comparison to the analog insulin in the Indian diabetic population due to the fact that it's cheaper. The revenue from human insulin registered a CAGR of 10.5% during Financial year 2008-2013. Although the share of human insulin has been more since financial year 2008, but the market captured by analog insulin has been growing rapidly with a CAGR of 20.4% during financial year 2008-2013. Seeing the growth of Indian diabetic market, it has become a very lucrative market for insulin multinationals. Companies including Novo Nordisk, Eli Lilly and Sanofi dominate the landscape and had a share of more than 85% in the Indian insulin market in financial year 2013. With a superior product portfolios and marketing strategies such as alliances, the 3 companies have gained a monopoly over the market. Domestic enterprises including Biocon, Lupin and Wockhardt therefore face stiff competition from the foreign counterparts.

INTRODUCTION Competition

has potential to lower prices, improve quality and spur innovation. It is widely acknowledged that competition benefits both the consumers and the enterprises. Enterprises have desire to acquire monopoly position or substantial market power, even if for a brief period for which Enterprises opt for various strategies such as alliances. This desire leads to expansion of business, either through the organic growth or inorganic growth. As for the later, while most Merger and Acquisitions bring about efficiency and are thus beneficial, some can have anti-competitive effects through unilateral or coordinated effects. If the combining enterprises come to wield the market power, they can reduce outputs or raise prices or do both without bothering competitors and consumers. Sometimes a combination of enterprises can transform the market structure completely

to facilitate concerted or collusive action. The former results in unilateral effect and later in coordinated effect.

Competition Law –

Initially there was proliferation of competition laws in countries across the globe and, as of now, there are 106 competition laws. Almost all the laws have merger control provisions. Such a large number of laws demonstrates the necessity of having the law, including the provision of merger control. Experiences shows that 85% of the merger and acquisitions do not raise competitive concerns and are generally approved in 30-60 days. The Indian Competition law prescribes a maximum of 210 days for determining the combination which includes mergers, acquisitions, amalgamations etc.

Competition in Indian Pharma Insulin Market –

More than 20,000 registered pharmaceutical companies are fragmented across the country however the Indian insulin market is dominated by multinationals such as Novo Nordisk, Eli Lilly and Sanofi whereas Indian Pharmaceutical companies such as Lupin, Wockhardt, Cipla and Biocon has earned a great share of market by focusing on cheaper regular/conventional insulins with the support of their field force.

Diabetes mellitus

is becoming a common metabolic disorder which has a serious threat to public health in the world. Diabetes mellitus is a group of chronic endocrine disorders, characterized by hyperglycemia due to insufficient levels of insulin, a hormone responsible for regulating blood sugar. Diabetes occurs particularly when the body cannot use sugar properly due to impaired insulin production or utilization. Glucose blood levels are maintained by insulin which is a hormone released from the pancreas. When these level increases, insulin is produced by the pancreas and maintained the level of glucose. In diabetic patients, the production of insulin is absent or less which causes hyperglycemia. Patients with diabetes often experience symptoms such as polyuria (frequent urination), polydipsia (increased thirst) and polyphagia (increased hunger). Diabetes can also lead to serious health complications including blindness, kidney failure, heart disease and lower-extremity amputations. Prevalence of diabetes is increasing throughout the world, due to increased obesity - which can lead to metabolic syndrome or pre-diabetes leading to higher incidences of type 2 diabetes. The goal of people with diabetes is to manage their blood glucose levels to stay healthy.

The most common kind of diabetes are type 1, type 2, and gestational diabetes.

Type 1 Diabetes mellitus

is also known as insulin dependent diabetes mellitus which is due to total loss of function of β cell of islets of Langerhans which are present in pancreas. The body does not produce insulin in this type of diabetes. This type of diabetes is also referred to as insulin-dependent diabetes, juvenile diabetes or early-onset diabetes. Cases of Type 1 diabetes is comparatively lesser in reference to Type 2 diabetes of around 10%. Type 1 diabetes usually develops in early adulthood or teenage. Type 1 Diabetes always requires insulin treatment and an insulin pump or daily injections will be a lifelong requirement to keep blood sugar levels under control. Patients on Type 1 diabetes also ensure proper blood-glucose levels by carrying out regular blood tests and following a special diet. Between 2001 and 2009, the prevalence of type 1 diabetes among the young in the USA rose 23%, according to SEARCH for Diabetes in Youth data issued by the Centers for Disease Control and Prevention.

Type 2 Diabetes mellitus

is known as insulin non dependent diabetes mellitus which is temporary loss of β cell mass and it is due to genetic predisposition and mostly occurs in obese persons and associated with high blood pressure and high cholesterol levels. The aim of treatment of type 2 diabetes mellitus is decreases the insulin resistance and increases insulin secretion. In Type 2 Diabetes, the body does not produce enough insulin or the cells in the body display insulin resistance. The symptoms of type 2 diabetes can be

controlled by following a healthy diet, losing weight, doing plenty of exercise, and monitoring their blood glucose levels. All the cases of type 2 diabetes across the world accounts for approximately 90%. However, type 2 Diabetes is a progressive disorder as it gradually gets worse and the patient will probably end up having to take the insulin. Reasons such as Being overweight, physically inactive and eating the wrong foods all contribute to our risk of developing type 2 diabetes. With the increase of age, risk of developing type 2 diabetes also increases. Men with low testosterone levels have been found to have a higher risk of developing type 2 diabetes. Researchers from the University of Edinburgh, Scotland, say that insulin resistance is linked with the low testosterone levels.

Gestational diabetes

is a type of diabetes which present with hyperglycemia in pregnant women. High levels of glucose and cells not able to produce enough insulin to transport all of the glucose, results in progressively rising levels of glucose. It usually appears in 3-20% of pregnancies in 2nd or 3rd trimester, depending on their risk factors. Having gestational diabetes may increase the risk of developing diabetes for both mother and child. Exercise and diet helps to control the diabetes of majority of the patients however undiagnosed or uncontrolled gestational diabetes can raise the risk of complications during the childbirth. The complications which may be faced includes the baby to be bigger than he/she should be. Scientists from the National Institutes of Health and Harvard University has found that women taking diet high in cholesterol and animal fat had a higher risk for gestational diabetes. compared to their counterparts whose diets were low in animal fats and cholesterol.

There is another type of diabetes become prevalent nowadays i.e. Pre-Diabetes.

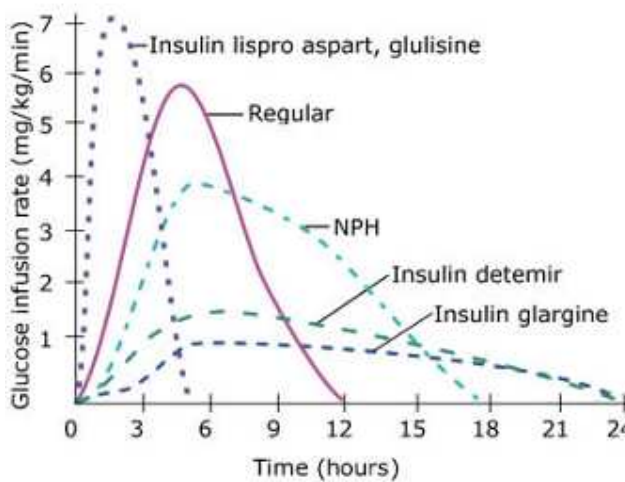
Pre-diabetes means that your blood sugar level is higher than normal but not yet high enough to be type 2 Diabetes. Pre-diabetes is followed by type 2 diabetes in majority of the patients. Patients on type 2 diabetes had their blood glucose levels higher than normal, but they were not high enough to merit a diabetes diagnosis. In such patients the cells in the body starts becoming insulin resistant. By incorporating physical activity, maintaining a healthy weight and eating healthy foods can help bring blood sugar level back to normal. Pre-diabetes can affect adults as well as children. The blood sugar levels of children can come back to normal by following the same lifestyle changes that can help prevent progression to diabetes in adults.

Diabetes symptoms vary by type but some symptoms which are common with most forms of diabetes are:

- Extreme Thirst
- Fatigue
- Excessive urination
- Wounds which heal slowly
- Blurring of vision
- Weight loss
- Increased Hunger



Activity Profiles of Different Types of Insulin



Inside the pancreas, the hormone insulin is made in the beta cells, which are part of the Islets of Langerhans. Islet of Langerhans also have alpha cells, which make glucagon, as well as delta cells. Beta cells release insulin to help the body use or store the blood glucose during the meal.

In the beta cells, insulin which is an anabolic hormone is created first as a big molecule called "proinsulin." Proinsulin is broken into two pieces: insulin and C-peptide. The amount of insulin produced by patient's body can be estimated by C-peptide. The higher C-peptide a person has, the more amount of insulin their body is making. C-peptide estimation helps doctor to determine how much insulin to prescribe. In people with Type 1 diabetes, the insulin is no longer produced by the pancreas. The beta cells have been destroyed and thereby the body needs insulin shots to store the glucose.

Whereas the people with type 2 diabetes make insulin, but their bodies don't respond well to it as they develop resistance against it. Some people with type 2 diabetes are on OHA or Insulins to help their bodies store glucose.

Insulin is broken down by the body if taken by oral route thereby it cannot be taken as a pill. Insulin is given through subcutaneous route. Insulin may lead to allergic reaction at the injection site in some rare cases.

Insulin secretion during the fasting state is known as Basal Insulin Secretion. Insulin is secreted in response to elevated levels of glucose. When blood glucose levels decrease below 80 mg/dL (4.4mmol/l) insulin secretion decreases. Insulin level never goes to "Zero" unless Type 1 diabetes is present. The presence of insulin is vitality important because of insulin's effect on fat metabolism.

Insulin secretion is Biphasic which occurs in two phases, first phase lasts for 3-10 minutes post meal which results from secretory granules of beta cells. Later second phase results from newly synthesized insulin.

Functions of insulin are:

- Insulin enables glucose to be transported into cells for energy for the body as glucose is the preferred fuel of the body cells and the only fuel that the brain can use.
- It converts glucose to glycogen to be stored in muscles and the liver (Promotes Glycogenesis)
- It facilitates conversion of excess glucose to fat
- Insulin also prevents the breakdown of body protein for energy and thus promotes protein synthesis and growth

Types of Insulin

- **Rapid-acting insulin**, begins to work about 15 minutes after the injection because of what they are also known as meal time insulins, peaks in about 1 hour, and continues to work for 2-4 hours. *Types: Insulin glulisine (Apidra), insulin lispro (Humalog), and insulin aspart (Fiasp, NovoLog)*
- **Regular or Short-acting insulin** reaches bloodstream within 30 minutes after the injection, peaks anywhere from 2 to 3 hours, and continues to work for approximately 3 to 6 hours. *Types: Human Regular (Velosulin R, Humulin R, Lupisulin,)*
- **Intermediate-acting insulin** reaches the bloodstream in 2-4 hours after injection, peaks 4 -12 hours later, and lasts for about 12 to 18 hours. *Types: NPH (Humulin N, Novolin N)*
- **Long-acting insulin** reaches the bloodstream several hours after injection and long acting insulins lower glucose levels up to 24-hours or longer. *Types: degludec (Tresiba), detemir (Levemir), and glargine (Basaglar, Lantus)*
- **Ultra Long-Acting** reaches the blood stream in 6 hours, peak is absent, and lasts for about 36 hours. *Types: glargine u-300 (Toujeo)*
- Insulin has 3 characteristics:
- **Onset** is defined as the length of time before insulin reaches the bloodstream and begins the function of lowering blood glucose.
- **Peaktime** is defined as the time during which insulin is at maximum strength of lowering blood glucose.
- **Duration** is defined as how long insulin continues to lower the blood glucose.

Insulin Analogs

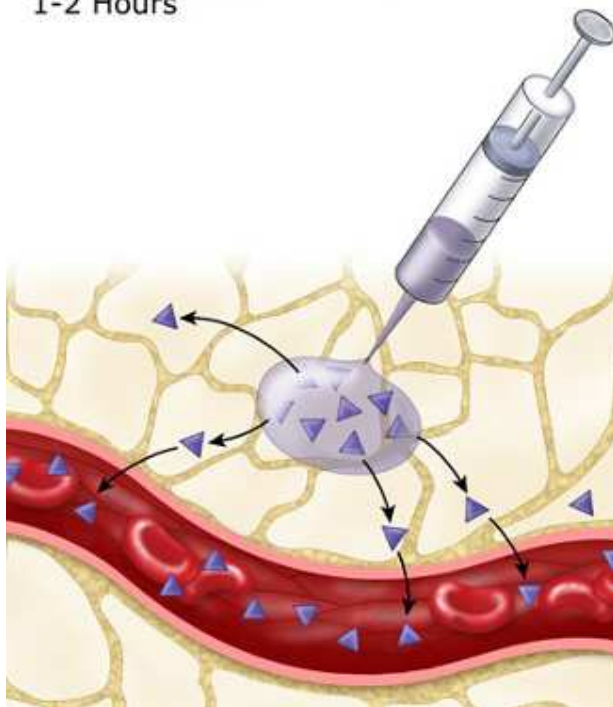
Analogs stand for being something that's analogous or similar to something else. Therefore, "insulin" analogs are analogs which are designed to mimic the body's natural pattern of insulin secretion. Thereby the synthetic-made insulins are called analogs. However, they are not entirely same as human insulins instead they have minor structural or amino acid changes that give them special characteristics when injected under the skin such as faster action or delayed

action. Once absorbed, they act on cells similar to the human insulin, but are absorbed from fatty tissue more predictably thereby offering precise and predictable glycemic control. Insulin Analogs can be broadly classified into two types i.e. Rapid Acting and Long Acting insulin analogs.

Rapid-acting injected insulin analog

The fast working insulins are referred to as rapid-acting insulin. However in the market there are Ultra rapid acting Analogs as well which has even shorter onset of action. Rapid acting injected insulin analog includes Aspart, Glulisine and Lispro. Insulin analogs enter the bloodstream within minutes, thereby it is advisable to inject analogs within 15 minutes of consuming meal. Analogs have a peak at around 60-120 minutes, and fade completely after about 4-5 hours. Higher doses of the analog insulins may last slightly longer, but they do not last more than 5-6 hours. Rapid acting insulin and Ultra rapid acting analogs are ideal for bolus insulin replacement. They are generally given at mealtimes i.e. 15 minutes prior to meal and for high blood sugar correction.

Rapid Analog (monomer) Peak Time:
1-2 Hours

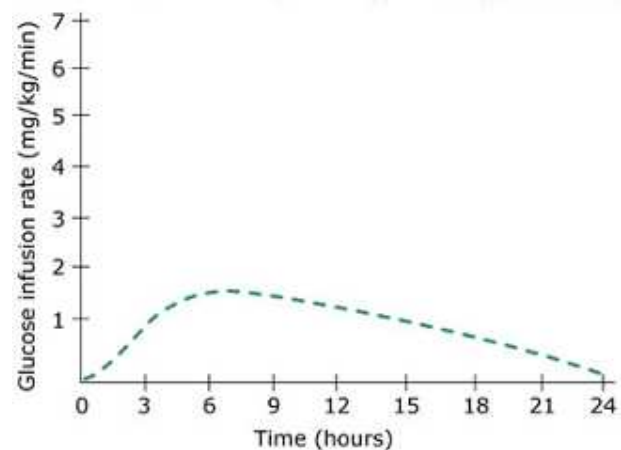
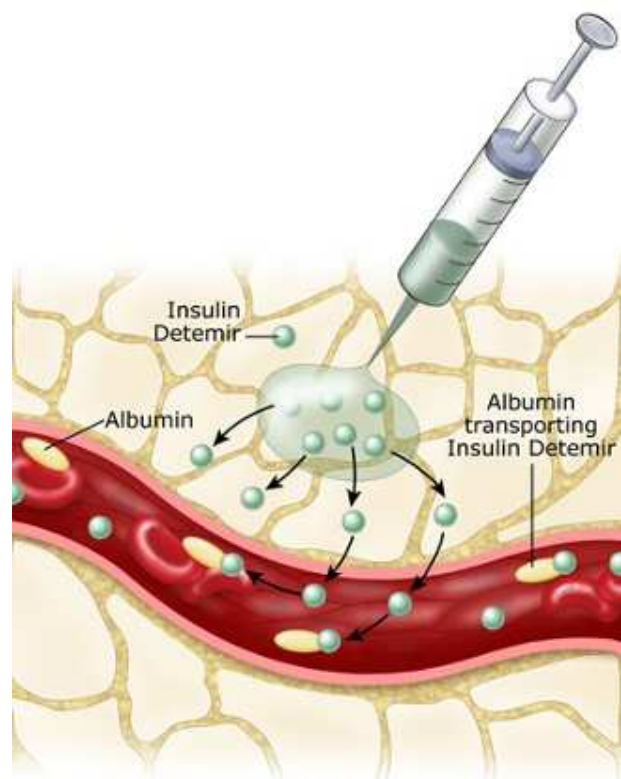


Rapid-acting insulins are the preferred type of insulins when used in insulin pumps, also known as continuous subcutaneous insulin infusion (CSII) devices. When the insulin is delivered through a CSII pump, the rapid-acting insulins provide the basal bolus insulin replacement, as well as the mealtime and high blood sugar correction insulin replacement.

Long-acting injected insulin analogs

Long acting insulins work for the longer period of time in reference to other insulins. They provide relatively constant insulin levels that plateau for many hours after injection which is particularly useful to control elevated FPG levels. Sometimes these insulins are also called “peakless” insulins because they do not have a peak however, they have an onset of action between 60-90 minutes and maximum action in around 5 hours that gradually decreases over in 12-24 hours.

Insulin Detemir



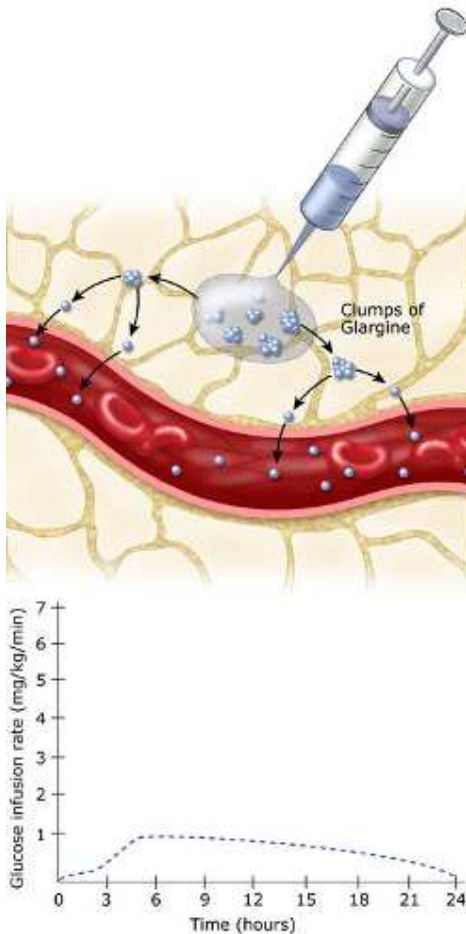
Long acting insulin includes:

- Insulin Detemir (Levemir)
Insulin Detemir is usually injected twice a day.
- Insulin glargine (Lantus)
Insulin Glargine is usually injected once daily, but may be given twice daily if needed in rare cases.

The long acting insulin analogs are used for background or basal insulin replacement. It is advisable to take insulin detemir and glargine at the same time(s) every day to maintain the most predictable levels of basal insulin. Limitation of long-acting insulins is that it cannot be mixed with any other type of insulin in the same syringe as this could change how the insulin works.

Mechanism of action involves formation of clusters when it is injected under the skin. As the individual insulin units detach from the cluster, the insulin analog can be absorbed into the blood stream from the subcutaneous tissue. Long action of Insulin glargine is because of the slow break-up of clusters.

Insulin Glargine



Whereas Insulin detemir (Levemir) mechanism is different as it is absorbed into the blood stream, however it becomes attached to a blood protein namely albumin. It slowly detaches from the albumin in 12 to 24 hours. The low levels of detached detemir creates the insulin effect.

Human Insulin

Synthetic human insulin is similar in structure to the natural insulin found in human body however when it is injected under the skin of the patient it doesn't work as well as natural insulin. This is because injected human insulin takes a long time to get absorbed as it clumps together. The synchronization of the synthetic human insulin is not according to the body needs. Regular fast acting injected insulin and long acting human NPH insulin are the two types of human insulin.

Fast-acting injected insulin

In reference to the rapid-acting insulin analogs, Regular human insulin has certain undesirable features, such as variable peak, duration of action and delayed onset of action when it is injected under the skin. Patient has to inject the insulin and wait before eating for around 30 minutes due to the delayed onset of action. Whereas hypoglycaemia is caused due to the variable duration of action after the meal is over.

Intermediate-acting injected insulin

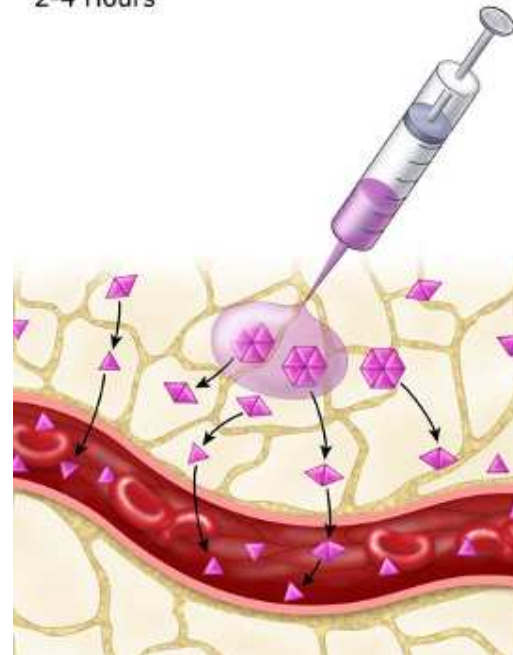
NPH also known as Neutral Protamine Hagedorn is an intermediate-acting human insulin which is used to cover blood glucose level between meals, and to satisfy the insulin

requirements during night if any. Protamine is a fish protein that has been added to the Regular human insulin that helps to delay its absorption. Before each injection the cloudy suspension of long acting insulin needs to be remixed thoroughly. NPH has very unpredictable absorption rate and action because it is a suspension of different sized crystal. Thereby NPH leads to more frequent low and high blood sugars. With the availability of other insulins such as long acting insulin analogs such as insulin glargine and insulin detemir the use of NPH.

Premixed Insulins

Premixed insulin involves rapid-acting insulin analogs or fast-acting human Regular insulin mixed with the NPH insulin. These mixtures include various combinations:

Regular Human Insulin Peak Time:
2-4 Hours



- Rapid-acting insulin, Lispro (Humalog) is mixed with NPH in a proportion of 50:50 also known as Humalog Mix 50 (50% Insulin Lispro and 50% NPH) and 25:75 also known as Humalog Mix 25 (75% Insulin Lispro and 75% NPH).
- Insulin/Aspart (Novo Rapid) combinations also are available as 70:30 mixtures also known as Novomix 30 (70% NPH, 30% insulin aspart) and 50:50 mixtures also known as Novomix 50 (50% Insulin Aspart, 50% NPH).
- The traditional NPH ratio of Regular pre-mixed insulin 70:30 (70% NPH, 30% Regular) is also available. These insulins are available as vials, and as insulin pens.

The benefit of pre-mixed insulin is that the fast- and long-acting insulin is combined. No mixing of the insulin is necessary, and there is only one injection.

The disadvantage is that NPH, which has a relatively unpredictable action, is the only long-acting insulin that can be used. Also, when the doses in a mixture is increased or decreased, the amount both of the short acting insulin and long-acting insulin changes, which increases the risk of both high and low blood sugars. Mixtures also don't allow a separate correction to be made for high blood sugars. Premixed insulins are usually prescribed for patients needing a simple insulin treatment plan, and sliding scale therapy.

Price comparison of insulins available in Indian Market

Product Name	Type	Composition	MRP/Unit
ELI LILLY			
HUMALOG U200	Disposable Pen	INSULIN LISPRO	1271
HUMAOG RAPID 100IU	Cartridge	INSULIN LISPRO	678
HUMALOG KWIKPEN 100IU	Disposable Pen	INSULIN LISPRO	774
HUMALOG MIX25	Cartridge	LISPRO(25%)+INSULIN LISPRO PROTAMINE(75%)	678
HUMALOG MIX25 KWIKPEN	Disposable Pen	LISPRO(25%)+INSULIN LISPRO PROTAMINE(75%)	774
HUMALOG MIX50	Cartridge	LISPRO(50%)+INSULIN LISPRO PROTAMINE(50%)	678
HUMALOG MIX50 KWIKPEN	Disposable Pen	LISPRO(50%)+INSULIN LISPRO PROTAMINE(50%)	774
TRULICITY	Disposable Pen	DULAGLUTIDE	2499
WOCKHARDT			
WOSULIN R 100IU	Cartridge	REGULAR HUMAN INSULIN	240
WOSULIN R 100IU	Disposable Pen	REGULAR HUMAN INSULIN	327
WOSULIN R 100IU	Vial	REGULAR HUMAN INSULIN	240
WOSULIN R 40IU	Vial	REGULAR HUMAN INSULIN	148.36
WOSULIN N 100IU	Cartridge	NPH/BASIC ISOPHANE INSULIN	180.5
WOSULIN N 100IU	Disposable Pen	NPH/BASIC ISOPHANE INSULIN	234.25
WOSULIN N 100IU	Vial	NPH/BASIC ISOPHANE INSULIN	218.5
WOSULIN N 40IU	Vial	NPH/BASIC ISOPHANE INSULIN	148.36
WOSULIN 30/70 100IU	Cartridge	REGULAR HUMAN INSULIN (30%) + NPH (70%)	218.5
WOSULIN 30/70 40IU	Vial	REGULAR HUMAN INSULIN (30%) + NPH (70%)	148.36
WOSULIN 30/70 100IU	Vial	REGULAR HUMAN INSULIN (30%) + NPH (70%)	239.5
WOSULIN 30/70 100IU	Disposable Pen	REGULAR HUMAN INSULIN (30%) + NPH (70%)	329.5
WOSULIN 50/50 100IU	Cartridge	REGULAR HUMAN INSULIN (50%) + NPH (50%)	217
WOSULIN 50/50 40IU	Vial	REGULAR HUMAN INSULIN (50%) + NPH (50%)	157.5
WOSULIN 50/50 100IU	Disposable Pen	REGULAR HUMAN INSULIN (50%) + NPH (50%)	361.5
SANOFI AVENTIS			
INSUMAN RAPID 100IU	Cartridge	REGULAR HUMAN INSULIN	275.88
INSUMAN RAPID 40IU	Vial	REGULAR HUMAN INSULIN	141.3
INSUMAN BASAL 40IU	Vial	NPH/BASIC ISOPHANE INSULIN	141.3
INSUMAN COMB 25	Cartridge	REGULAR HUMAN INSULIN (25%) + NPH (75%)	275.88
INSUMAN COMB 25	Vial	REGULAR HUMAN INSULIN (25%) + NPH (75%)	250.79
INSUMAN COMB 50	Cartridge	REGULAR HUMAN INSULIN (50%) + NPH (50%)	250.8
LANTUS 100IU	Vial	INSULIN GLARGINE	2983.01
LANTUS 100IU	Cartridge	INSULIN GLARGINE	656.92
LANTUS SOLOSTAR 100IU	Disposable Pen	INSULIN GLARGINE	1017.69
TOUJEO SOLOSTAR 300IU	Disposable Pen	INSULIN GLARGINE	1665
APIDRA 100IU	Vial	INSULIN GLULISINE	1048.17
APIDRA 100IU	Cartridge	INSULIN GLULISINE	572.27
APIDRA SOLOSTAR 100IU	Disposable Pen	INSULIN GLULISINE	727.59
NOVO-NORDISK			
ACTRAPID HM PENFILL	Cartridge	REGULAR HUMAN INSULIN	290
ACTRAPID FLEXPEN 100IU	Disposable Pen	REGULAR HUMAN INSULIN	471.8
ACTRAPID 100IU	Vial	REGULAR HUMAN INSULIN	390
ACTRAPID 40IU	Vial	REGULAR HUMAN INSULIN	148.36
MIXTARD 30 100IU	Disposable Pen	REGULAR HUMAN INSULIN (30%) + NPH (70%)	429
MIXTARD 30 100IU	Cartridge	REGULAR HUMAN INSULIN (30%) + NPH (70%)	265
MIXTARD 30 40IU	Vial	REGULAR HUMAN INSULIN (50%) + NPH (50%)	148.36
MIXTARD 30 100IU	Vial	REGULAR HUMAN INSULIN (50%) + NPH (50%)	410
MIXTARD 50 100IU NOVOLET PEN	Disposable Pen	REGULAR HUMAN INSULIN (50%) + NPH (50%)	217.55

MIXTARD 50 100IU	Cartridge	REGULAR HUMAN INSULIN (50%) + NPH (50%)	290
MIXTARD 50 40IU	Vial	REGULAR HUMAN INSULIN (50%) + NPH (50%)	165
NOVORAPID 100IU	Disposable Pen	INSULIN ASPART	720
NOVORAPID 100IU	Cartridge	INSULIN ASPART	583
NOVORAPID 100IU	Vial	INSULIN ASPART	1925
NOVOMIX30	Disposable Pen	ASPART(30%)+INSULIN ASPART PROTAMINE(70%)	720
NOVOMIX30	Cartridge	ASPART(30%)+INSULIN ASPART PROTAMINE(70%)	583
NOVOMIX50	Disposable Pen	ASPART(50%)+INSULIN ASPART PROTAMINE(50%)	819.4
NOVOMIX50	Cartridge	ASPART(50%)+INSULIN ASPART PROTAMINE(50%)	665.4
FIASP FLEXTOUCH	Disposable Pen	ULTRA SHORT ACTING ASPART	756
FIASP PENFILL	Cartridge	ULTRA SHORT ACTING ASPART	612.15
FIASP 100IU	Vial	ULTRA SHORT ACTING ASPART	1837.5
TRESIBA FLEXTOUCH	Disposable Pen	DEGLUDEC	1850
TRESIBA PENFILL	Cartridge	DEGLUDEC	1440
RYZODEG FLEXTOUCH	Disposable Pen	ASPART(1.05mg) + DEGLUDEC(2.56mg)	1700
RYZODEG PENFILL	Cartridge	ASPART(1.05mg) + DEGLUDEC(2.56mg)	1360
VICTOZA 6mg/ml	Disposable Pen	LIRAGLUTIDE	5324
BIOCON			
INSUGEN R 40IU	Vial	REGULAR HUMAN INSULIN	147.7
INSUGEN R 100IU	Cartridge	REGULAR HUMAN INSULIN	195.2
INSUGEN R 100IU	Vial	REGULAR HUMAN INSULIN	429.37
INSUGEN N 40IU	Vial	NPH/BASIC ISOPHANE INSULIN	147.7
INSUGEN N 100IU	Cartridge	NPH/BASIC ISOPHANE INSULIN	195.18
INSUGEN N 100IU	Vial	NPH/BASIC ISOPHANE INSULIN	390.7
INSUGEN 30/70	Cartridge	REGULAR HUMAN INSULIN (30%) + NPH (70%)	195.18
INSUGEN 30/70 40IU	Vial	REGULAR HUMAN INSULIN (30%) + NPH (70%)	147.7
INSUGEN 50/50	Cartridge	REGULAR HUMAN INSULIN (50%) + NPH (50%)	195.18
INSUGEN 50/50 40IU	Vial	REGULAR HUMAN INSULIN (50%) + NPH (50%)	165.8
BASALOG 100IU	Vial	INSULIN GLARGINE	564.55
BASALOG 100IU	Vial	INSULIN GLARGINE	712.59
BASALOG 100IU	Cartridge	INSULIN GLARGINE	555.54
BASALOG 100IU	Disposable Pen	INSULIN GLARGINE	823.1
LUPIN			
LUPISULIN R 40IU	Vial	REGULAR HUMAN INSULIN	147.9
LUPISULIN R 100IU	Vial	REGULAR HUMAN INSULIN	421
LUPISULIN R 100IU	Cartridge	REGULAR HUMAN INSULIN	239.95
LUPISULIN N 40IU	Vial	REGULAR HUMAN INSULIN	147.9
LUPISULIN N 100IU	Cartridge	REGULAR HUMAN INSULIN	199
EGLUCENT RAPID 100IU	Cartridge	INSULIN LISPRO	678
EGLUCENT KWIKPEN 100IU	Disposable Pen	INSULIN LISPRO	774
EGLUCENT MIX25	Cartridge	LISPRO(25%)+INSULIN LISPRO PROTAMINE(75%)	678
EGLUCENT MIX25 KWIKPEN	Disposable Pen	LISPRO(25%)+INSULIN LISPRO PROTAMINE(75%)	774
EGLUCENT MIX50	Cartridge	LISPRO(50%)+INSULIN LISPRO PROTAMINE(50%)	678
EGLUCENT MIX50 KWIKPEN	Disposable Pen	LISPRO(50%)+INSULIN LISPRO PROTAMINE(50%)	774
APLEVANT	Disposable Pen	DULAGLUTIDE	2499

Conclusion:

Primary and secondary research highlights that as an Initiation Insulin, Insulin Glargine has more popularity in the Indian market because of convenience whereas Basal Plus, Basal Bolus and Premixes are preferred for Intensification of insulin therapy because it offers better FPG and PPG control however in reference to international market, Leader of Indian insulin market is Regular or conventional insulins

because of overall lower cost of the therapy. The paradigm is shifting from regular/conventional insulin therapy to analog insulins with higher number of patients on analogs in urban areas. Co-formulations (Ryzodeg) are also taking significant space of the market however the pricing remains the concern. Manufacturers are coming with insulins with higher strength such as 600 units in a single disposable pen to

target end users who has high insulin consumption per day. New formulations such as GLP-1 RA i.e. dulaglutide and liraglutide has took a fraction of insulin space in the Indian market. Human insulin is being solely used in comparison to the analog insulin in the Indian diabetic population due to the fact that it's cheaper. Seeing the growth of Indian diabetic market, it has become a very lucrative market for insulin multinationals. Companies including Novo Nordisk, Eli Lilly and Sanofi dominate the landscape and had a share of more than 85% in the Indian insulin market in financial year 2013. With a superior product portfolios and marketing strategies such as alliances, the 3 companies have gained a monopoly over the market. Domestic enterprises include Biocon, Lupin and Wockhardt which offers insulins at a competitive price to multinationals.

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