

**HORMONAL ANOMALIES PREDICTION AND SOLUTIONS WITH DATA
MINING**

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Requirements for the Degree of Bachelor of Science in
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APPROVAL

This Project/internship titled “**Hormonal Anomalies Prediction And Solutions With Data Mining**”, submitted by Nusrat Jahan, ID No: 161-15-6880 & Jannatul Ferdousi Trisha, ID No: 161-15-6718 to the Department of Computer Science and Engineering, Daffodil International University has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of B.Sc. in Computer Science and Engineering and approved as to its style and contents. The presentation has been held on 06-12-19.

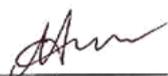
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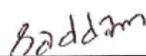
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We hereby declare that this research has been done by us under the supervision of **Saiful Islam Senior Lecturer** and co-supervision of **Nusrat Jahan Lecturer**, Department of CSE, Daffodil International University. We also declare that neither this research nor any part of this research has been submitted elsewhere for the award of any degree.

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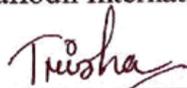


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ABSTRACT

Hormones are special chemical messengers in the body. For controlling body functions these messengers are mostly used, from simple needs in our body systems like hunger to any critical process of the body. It is also responsible for controlling emotions and mood. An important organ is responsible for the hormonal discharge. The glands secretly carry a special chemical which is called hormone and this one is very important for the human body. If any people have a lack of this chemical he will become sick and it causes the human disorder. So this is most important for us and if anyone faces this imbalance he should take the necessary steps to recover from this problem. If people get treatment at the right time they can cure this problem and can help others to raise awareness. In our study will help to know the ratio of affected people and also help the medical for giving this data. We hope this study helps many people to get aware of hormonal imbalance and help other people be concerned about this problem to be healthy forever. Our objectives of this research are raising awareness and get statistical data about the people who have the idea of this problem and the ratio of affected people.

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CHAPTER 1

Introduction

1.1 Introduction

Hormones are exceptional compound dispatchers in the body. Some significant organs are liable for hormones. It plays an important role in our body. If any people face hormonal problem this will cause a serious effect on their body. There are some significant organs that are responsible for creating a hormone that controls significant works in our body. The primary hormone-creating organs are given below:

- ❖ **Hypothalamus:** The nerve center is responsible for internal heat level, yearning, dispositions and the arrival of hormones from different organs; and furthermore controls thirst, rest and sex drive [1].
- ❖ **Parathyroid:** This organ controls the measure of calcium in the body.
- ❖ **Thymus:** This organ assumes a job in the capacity of the versatile safe framework and produces T-cells.
- ❖ **Pancreas:** This organ produces insulin that assists control with bleeding sugar levels.
- ❖ **Thyroid:** The thyroid produces hormones related to calorie consumption and pulse.
- ❖ **Adrenal:** The hormones produced by Adrenal organs that control sex drive and cortisol.
- ❖ **Pituitary:** Considered the "ace control organ," the pituitary organ controls different organs and makes the hormones that trigger development.
- ❖ **Pineal:** This organ otherwise called the thalamus, this organ produces, which influences rest.
- ❖ **Ovaries:** This organ just exists in ladies, the ovaries discharge estrogen, testosterone, and progesterone.
- ❖ **Testes:** Just in men, the testicles produce the male sex hormone, testosterone, and produce sperm.

Hormones are significant for managing most major real procedures, so a hormonal unevenness can influence a wide scope of real capacities.

When there is excessively or too little of a hormone in the circulation system then hormonal imbalance occurs. In light of their fundamental job in the body, even a little hormonal awkward nature can cause symptoms all through the body [2].

Hormonal imbalance is divided into two types. One is visible and the other is feel able. When anyone faced hormonal imbalance some syndromes have occurred. Many people in our country cannot aware of this problem. They also ignore hormonal imbalance but when it becomes serious the problem is not cured.

There are many types of hormones but we will describe the main 7 types of hormones. For lacking each hormone people face so many problems. Now we are portraying for which absence of hormone individuals face which issue:

1. Cortisol problem: Cortisol is a steroid hormone that manages a wide scope of crucial procedures all through the body, including digestion and the safe reaction [3].

Syndromes:

- ★ Slow to begin in the first part of the day
- ★ Longings for salty or sugary nourishment
- ★ Low sex drive
- ★ You're exhausted toward the evening yet get a "revitalizing surge of energy" at night
- ★ Can't stay unconscious
- ★ Dizziness when standing up rapidly
- ★ Evening cerebral pains
- ★ Glucose issues
- ★ Ceaseless irritate
- ★ Nails are powerless

2. Thyroid problem: The thyroid organ is a butterfly-molded organ situated in the base of our neck. It discharges hormones that control digestion—the manner in which our body utilizes vitality [4].

Syndromes:

- ★ Feeling tired
- ★ Feeling cold in your grasp, feet, or everywhere

- ★ Requiring over the top measures of rest to work appropriately
- ★ Weight increase, even with a low-calorie diet
- ★ Troublesome, rare solid discharges
- ★ Mental languor
- ★ Morning migraines that wear off as the day advances
- ★ The external third of the eyebrow is meager
- ★ Diminishing of hair on the scalp
- ★ Exorbitant hair dropping out

3. Estrogen problem: Estrogen is one of the two principal sex hormones that ladies have. The other one is progesterone. Estrogen is answerable for female physical highlights and proliferation. Men have estrogen, as well, yet in little sums [5].

Syndromes of less Estrogen:

General:

- ★ Vaginal dryness
- ★ Night sweats
- ★ Excruciating sex
- ★ Repetitive bladder contaminate
- ★ Feeling dormant
- ★ Hot flashes
- ★ Discouragement

Men:

- ★ men can cause an abundance of gut fat
- ★ low sexual want

Syndromes of too much Estrogen:

General:

- ★ Feeling puffy and enlarged
- ★ Fast weight gain
- ★ Feeling discouraged or on edge
- ★ Bosom delicacy
- ★ Emotional episodes
- ★ Substantial menstrual dying
- ★ Feeling on edge as well as discouraged

- ★ Headache cerebral pains
- ★ A sleeping disorder
- ★ Cerebrum mist
- ★ Gallbladder

issues Women:

- ★ Weight gain, for the most part in your midsection, hips, and thighs
- ★ Menstrual issues, for example, light or overwhelming dying
- ★ Exacerbating of premenstrual disorder
- ★ Fibrocystic bosoms (non-destructive bosom bumps)
- ★ Fibroids (noncancerous tumors) in the uterus
- ★ Weakness
- ★ Loss of sex drive

Men:

- ★ Developed bosoms (gynecomastia)
- ★ Poor erections
- ★ Barrenness

4. Progesterone problem: Ripeness and monthly cycle are to a great extent constrained by hormones, and one of these hormones is progesterone [6].

Symptoms of low progesterone in men may include:

- ★ Low moxie
- ★ Balding
- ★ Weight gain
- ★ Exhaustion
- ★ Sadness
- ★ Gynecomastia (breast advancement in men)
- ★ Erectile brokenness
- ★ Barrenness
- ★ Bone misfortune
- ★ Muscle misfortune

Symptoms of low progesterone for women who aren't pregnant include:

- ★ Cerebral pains or headaches.
- ★ State of mind changes, including tension or misery.

- ★ Low charisma.
- ★ Hot flashes.
- ★ Unpredictable menstrual cycle.
- ★ Weight gain.

Some symptoms of low progesterone levels in pregnant women include:

- ★ Spotting
- ★ Stomach torment
- ★ Incessant low glucose
- ★ Consistently delicate bosoms
- ★ Consistent exhaustion

5. Testosterone problem:

Testosterone is the key male sex hormone that controls fruitfulness, bulk, fat conveyance, and red platelet creation [7].

Symptoms of Too Much Testosterone:

- ★ Skin break out
- ★ Polycystic ovary disorder (PCOS)
- ★ Unreasonable hair on the face and arms
- ★ Hypoglycemia and additionally flimsy glucose
- ★ Diminishing hair
- ★ Fruitlessness
- ★ Ovarian sores

Symptoms of Low Testosterone:

- ★ Weight gain
- ★ Weakness
- ★ Low sex drive

6. Leptin problem:

Leptin is a hormone that is straightforwardly associated with muscle to fat ratio and weight [8].

Symptoms:

- ★ overweight
- ★ try not to shed pounds effectively
- ★ have consistent nourishment desires

7. Insulin problem: Insulin is a hormone made by the pancreas that enables your body to utilize sugar (glucose) from starches in the nourishment that you eat for vitality or to store glucose for some time later [9].

Symptoms:General:

- ★ Desires for desserts
- ★ Touchiness if dinners are missed
- ★ Reliance on espresso
- ★ Become dazed if dinners are missed
- ★ Feel unsteady, anxious, or having tremors
- ★ Disturbed, effectively furious, or apprehensive
- ★ Poor memory
- ★ Obscured vision
- ★ Weariness after dinners
- ★ Eating desserts doesn't assuage sugar longings
- ★ Expanded thirst and hunger

1.2 Motivation

Hormonal imbalance! By these words, we can understand that this problem is under control of a person. For this reason, some people are used to facing several diseases as well. As we know (remedy is better than resistance.) If a person has adequate knowledge of a problem he or she will be able to keep far away before it happens. There are several people who are suffering from hormonal imbalance. Besides, they do not have much notion of this disease. If we can make them aware of this matter then they will be able to solve this hormonal imbalance before happening and so on.

1.3 Rationale of the study

Nowadays, people are facing several problems because of hormonal imbalance. Many of them have no knowledge about hormonal imbalance even they don't know what is

hormone and how it affects the body. If they have no knowledge about it then how they will be aware of their health? To get a healthy life it's very essential to gain knowledge about hormone. After that, they will be able to know by which lack of hormone they are facing the problem. Any kind of disease prevention is possible if that remains in the primary stage. So if they can realize it then they will take action. But we don't know the exact ratio of the people who know and don't know about hormone. For that reason, we built a prediction system that helps to identify disease name with stage and provides us with the result that he or she has a hormonal problem.

1.4 Research Questions

Hormonal imbalance is a common problem in our country but many people are not aware of this problem. For raising awareness of the hormonal diseases we selected this topic for our thesis and want to find the ratio of the people who have the idea of this and the highest number of statistical positions between males and females. From this, we can get information about the people who are aware of this problem and know the topic in detail. Some people are suffering this imbalance for a long time but they do not even know this problem of him. From the data set, we can find out the number of such affected people. The award people also be selected from the survey and can find out the percentage of those people. Is the number of affected persons is higher for females more than males or males more than females? This answer can be formed from this work. The percentage of educated people and uneducated people can be formed who knows this topic clearly most. It will help to identify the healthy people who have not this kind of problem and they are completely free from the hormonal imbalance.

1.5 Expected Output

To find the statistical ratio of the people who are affected by hormonal imbalance. Trying to give a primary solution for their next steps to do for the curing of the problem. We are trying to implement an algorithm for the prediction of the people if they are in hormonal imbalance or not.

1.6 Report Layout

Chapter 1: In this chapter, we discuss the introduction of our research topic with its motivation, rationale of the study, research questions, expected outcome and also the report layout of this research.

Chapter 2: This chapter will have “Background” demonstrates introduction, related works which was done by others, research summary, the scope of the problem and challenges.

Chapter 3: Here we will discuss Research Methodology. This chapter will start with an introduction then we will discuss our research subject with its instrument which we will use for our completing our research. After that, we will discuss the procedure of our data collection in detail. Then we will show the statistical analysis which we will create by using our dataset. Finally, we will elaborate on our implementation with the requirements.

Chapter 4: In this chapter, we will demonstrate Experimental Results and Discussion. First of all, we will start this chapter with an introduction then we will show our results which we will experiment by using different algorithms through weka. After that, we will describe our analysis and finally, we will give a short summary.

Chapter 5: Last of all we will discuss the summary of our total study, Conclusion, Recommendation, and Implication for the Future.

CHAPTER 2

Background Study

2.1 Introduction

In this chapter, we will discuss the related works, research summary, the scope of the problem and challenges of this research. In the related work section, we will discuss other research papers and their works, their methods, and accuracy which are related to our work. In the research summary section, we will give a summary of our related works. In the scope of the problem section, we will discuss the benefits of our research. In the challenges section, we will discuss the problems which we faced during our research.

2.2 Related Works

The author of the journal discussed with hormone-dependent cancer and they worked with few numbers of young people to fulfill their work [10]. We heard generally that women are faced with breast cancer most of the time. But males can be affected by this problem which is discussed in Juliana Newman's journal. He discussed the reasons behind this and also its treatment [11]. Another researcher proves in their journal that Young coconut juice has estrogen-like characteristic and they worked with four groups of female rats which helped them to prove the instigate hormonal imbalance in the brain [12]. Hormonal imbalance can be reduced by some hormonal herbal composition which contains extract of ginger, rosemary, dong Quai, schizandra berry, chaste tree berry, and black cohosh [13]. From the research of androgen imbalance, we see that androgen deficiency hormonal imbalance is closely connected with the benign and malignant conditions of premenopausal breast disease [14]. An irregular period is caused PCOS which ratio is 86% where hormonal imbalance ratio is 60 %, we can understand this ratio from the journal where the author discussed polycystic ovary syndrome of women [15]. B M Sherman and SG Korenman are researched with the menstrual cycle which helped them to provide a definition of the disorders of follicular maturation because of hormonal changes [16]. From the discussion of the serum trace elements, they gained a result which proves that altered serum trace ingredient is connected with acute ischemic stroke patients whose are suffering from the lack of the function of thyroid hormone [17]. Several issues are responsible for under control hormones. The results demonstrate that a person can get

the release from hormonal imbalance by doing naturopathy as well as yoga especially better care as well [18]. The reproductive and menstrual cycle is dependent on Hormones. Applied a study on 113 infertility women which was cross-sectional. These women ages were between 20 and 35 and were divided into 2 sections which were primary and secondary infertility. However, after research, they got that overweight is responsible for being infertility. For getting reduce this problem, weight loss must be needed [19]. The men who are obese may have estradiol hormonal higher than the exact amount and lower of testosterone which is responsible for the depressive symptoms [20]. By collecting blood samples from the overnight fasting people the authors did their works then they are able to prove that the identical improvement of abnormal glycemic controlled by the body weight and BMI decrement [21]. The response of vagal stimulation is reduced in the SGA group and from this finding of this research will help the growth hormone by enhancing the explanation of the data [22]. By researching human behavior it discussed the reasons behind the obesity and the generic of that. Also, the effects of hormonal imbalance occur because of the obesity of human behavior [23]. Environmental Oestrogen and aging can be the reason for the sexual dangers of men and also predicts environmental erectile dysfunction [24]. During the first 8 weeks of pregnancy, Male and female embryo differ in testosterone fixations which apply changeless impacts on mental health and conduct [25]. In female leniency athletes, energy imbalance is occurred by deflecting of thyroid hormone. The author applied their study on 16 female to research connections in thyroid hormone and ordinarily referred to indications of OT in university Olympic style sports [26]. A high-fiber diet is responsible for decreasing sexual hormones in pre-adult young ladies. By researching the authors found a result that a high-fiber diet essentially diminished the serum levels of testosterone, estradiol, and DHEA contrasted with low fiber diet ($P = 0.0001$) that's why they suggested that high-fiber diet is good for hefty and overweight patients [27]. Per year 1-2 in 1000 individuals are affected by venous thromboembolism which is found in both genders but ladies have a higher rate at more youthful ages, especially during childbearing years. Bergendal, Annica is researched to refine the measures of VTE in women [28]. In obese men, sex hormones are imbalanced because of their depression. Stout men may exhibit generally an abundance of estradiol and insufficiency in testosterone, prompting lopsidedness between these two hormones [29].

2.3 Research summary

We want to do research about hormonal imbalance. In our country, many people are not aware of this problem. Many of them are already carry this problem but they are not aware of that. And in our research, we collect this kind of data that how many people are known about this problem and the number of people who do not have any idea about this problem. To collect this data we did a survey and calculate the ratio of some statistical data to show the ratio. Our target is to give a primary solution for their future works if they are affected by the hormonal imbalance. We have a plan to implement an algorithm to predict this problem is they are carrying this problem or not. We hope that this research will help to raise awareness in people to know about the problem and this statistical data will also be helpful in the medical sector.

2.4 Scope of the Problem

From this thesis, the statistical ratio will help to know the total ration in our country of the hormonal imbalance knowledge of the people and also the affected people's percentage. This data will help in the medical sector also. This work will help people to be aware of this problem and also take care of their health. It can save many people's lives from serious issues of this problem because in hormonal imbalance any people can face death.

2.5 Challenges

Data collection is one of the biggest challenges of getting predicting accuracy. Without data, the prediction is not possible and it can't predict. For data collection, we created a survey form and share it through the internet with others. So during data collecting, we had to face several questions and many of them could not agree to give us their data. Because there were so many sensitive questions on our survey form that's why many of the people couldn't give their data to us. Some people gave us the wrong data with a peculiar answer which made us so disappointed. After that, another challenge is preprocessing. After doing preprocessing our data set has no null value and helps us to get a good prediction. Next, Feature scaling helps to take all feature values into the same scale with respect to value. Therefore, the different algorithm has been applied to the proposed architecture. Finally, the implementation process has been established to get accurately predicted value. There were several challenges

rising according to the working procedure. We are tried to increase and get a better result for this model.

CHAPTER 3

Research Methodology

3.1 Introduction

The research methodology is a technique that is used for collecting data or requirements to need for doing any thesis or research paper [30]. It can be any tools or algorithms which are used for data processing. By this process, we can implement our outputs what we want to do and get the result for our thesis works. In our thesis work, we collected data by doing a survey and preprocess the filter data manually. Then we run the data set in the Weka for checking some algorithms on our data set and see the accuracy.

3.2 Research Subject and Instrumentation

Our research subject is hormonal imbalance and this is medical based thesis work. For collecting the data we used a survey form and spread this form on social sites. Some data is from our person and most of the data is from the students. For filtering the data we use Microsoft excel sheet and in the sheet, we calculate the statistical ratio and draw the chart of the ratio which we formed. We calculated the ratio of male vs. female response, the idea of the problem, the ratio of facing the hormonal imbalance also. For checking the accuracy of the data set we use Weka tool the version of 3.8 and then apply the algorithms on the data.

3.3 Data Collection Procedure

For collecting data we use a survey form. To create this survey we search for research papers on Google scholar and we get many research papers. After that, we collect different types of hormones with the diseases which happened by the lack of each hormone. Then we set many questions which we need to predict our research and then we share it with others through the internet. Here is our data collection survey form [31]. After collecting data we preprocessed our data. Here data set types are in figure 3.3.1, 3.3.2, 3.3.3 and 3.3.4.

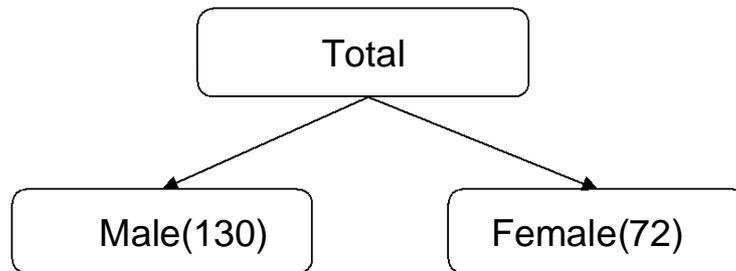


Figure 3.3.1: Data set to type 1.

In figure 3.3.1, we discuss gender in the total person of our dataset. We find out that, 130 people are male and 72 are female out of 202.

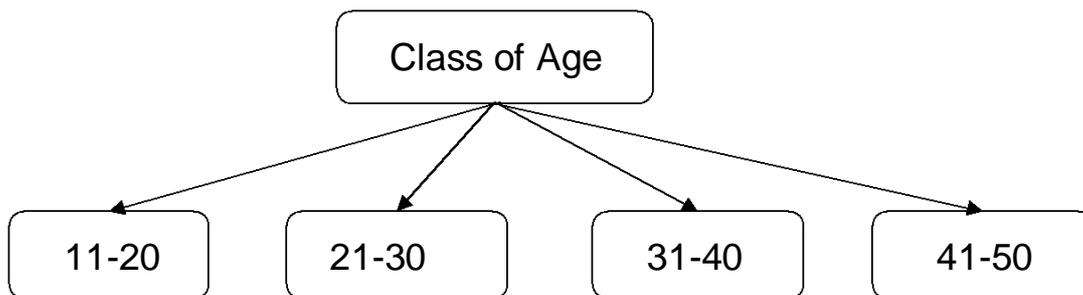


Figure 3.3.2: Data set to type 2.

In figure 3.3.2, we discuss the class of all ages. We have created four classes from all ages to see that people of which ages are more affected by hormonal imbalance.

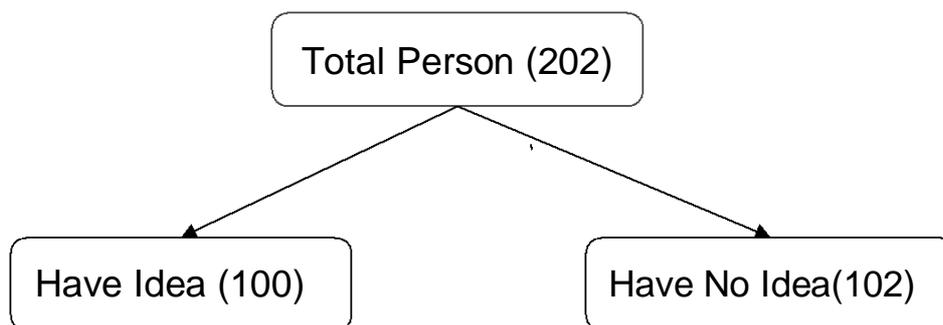


Figure 3.3.3: Data set to type 3.

In figure 3.3.3, we discuss how many people have an idea about hormonal imbalance and how many people don't know about hormone imbalance. Here we find out that, 100 people have knowledge about hormonal imbalance and 102 have no idea.

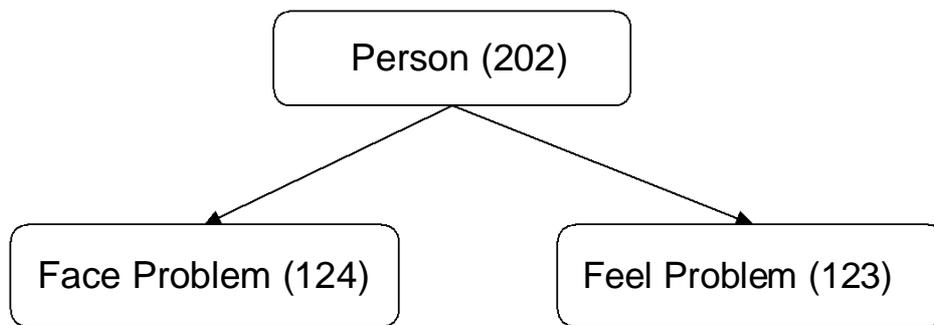


Figure 3.3.4: Data set to type 4.

In figure 3.3.4, we discuss how many people have faced and how many people have felt any problem which happened by any lack of hormone. Here we can see that, 124 people have faced many problems because of hormonal imbalance and 123 people have felt several problems by lack of specific hormone.

3.4 Statistical Analysis

We measured different types of statistics from our dataset which we collected for our research. We have 202 datasets for hormonal imbalance and from this, we get the sex distribution of the respondents where 130 male and 73 female persons. Then we get the age distribution of the respondents where maximum respondents were between 21 to 30 years and all of them maximum contradictors are students. To know the ratio of the people how familiar with this topic we make other statistics where maximum peoples answer was negative. Knowing how many people are facing this problem and how many people are feeling this problem we make different two statistics where we get a positive result that means maximum people are affected by this disease.

3.5 Implementation Requirements

For checking the accuracy we used Weka 3.8 version by using some algorithms on the data. The algorithms are Naive Bayes, IBK, Multilayer Perceptron, SMO, Random forest. Now we are describing in detail about these algorithms.

Naive Bayes: Naive Bayes is one of the most productive and viable inductive learning calculations for AI and data mining. Its aggressive presentation in order is astounding, on the grounds that the contingent freedom suspicion, on which it is based, is seldom valid in certifiable applications [32]. Naive Bayes utilizes a straightforward usage of Bayes Theorem (thus innocent) where the earlier likelihood for each class is

determined from the preparation information and thought to be free of one another (in fact called restrictively autonomous). This is a ridiculous presumption since we anticipate that the factors should associate and be reliant, in spite of the fact that this suspicion makes the probabilities quick and simple to ascertain. Significantly under this unreasonable supposition, Naive Bayes has been demonstrated to be a powerful grouping calculation [33].

Multilayer Perceptron: The multilayer perceptron is the welcome universe of profound learning: a great spot to begin when you are finding out about profound learning.

A multilayer perceptron (MLP) is a profound, fake neural system. It is made out of more than one perceptron. They are made out of an info layer to get the sign, a yield layer that settles on a choice or expectation about the information, and in the middle of those two, a discretionary number of concealed layers that are the genuine computational motor of the MLP. MLPs with one shrouded layer are equipped for approximating any ceaseless capacity. Multilayer Perceptron's are regularly applied to administer learning problems: they train on a lot of information yield matches and figure out how to display the connection (or conditions) between those data sources and yields. Preparing includes modifying the parameters, or the loads and inclinations, of the model so as to limit mistakes. Back propagation is utilized to make that gauge and predisposition change comparative with the blunder, and the mistake itself can be estimated in an assortment of ways, including by root mean squared blunder (RMSE) [34].

SMO: Sequential minimal optimization (SMO) is a calculation for comprehending the quadratic programming (QP) issue that emerges during the preparation of help vector machines (SVM). It was created by John Platt in 1998 at Microsoft Research. SMO is generally utilized for preparing bolster vector machines and is actualized by the prominent LIBSVM tool. The distribution of the SMO calculation in 1998 has produced a great deal of energy in the SVM people group, as already accessible techniques for SVM preparing were substantially more mind-boggling and required costly outsider QP solvers [35].

Random Forest: Random forest is one of the most utilized calculations, in view of its straightforwardness and decent variety (it very well may be utilized for both order and relapse assignments). Random forest is a regulated learning calculation. The "woods" it assembles, is a gathering of choice trees, normally prepared with the "stowing" strategy. The general thought of the stowing technique is that a mix of learning models expands the general outcome. Random forest fabricates various choice trees and combines them to get an increasingly exact and stable expectation. One major bit of leeway of Random forest is that it tends to be utilized for both grouping and relapse issues, which structure most of the current AI frameworks [36].

IBK algorithm: The k-nearest neighbor's algorithm is familiar with the IBK algorithm in the Weka platform. K-NN is instance-based learning which is known as lazy learning also. This algorithm is used classification and regression methods for doing its implementation [37]. In this algorithm, there is no model created by this and it can predict any things in a minute which can occur in the future [38].

We want to apply all the algorithms for accuracy checking. To predict the hormonal imbalance we will try for implementing an algorithm and want to show the prediction of the problem is accurate as possible.

CHAPTER 4

Experimental Results and Discussion

4.1 Introduction

In this chapter, the information on experimental results and survey results exists.

In our data set, there are 202 data from real people about their knowledge of hormonal imbalance and their experience of the problem. From the data set, we find out some statistical data using different formulas and draw some charts on the basis of the data percentage. To measure the accuracy rate of the proposed system in our data set we tested 8 algorithms.

4.2 Experimental Result

For survey data in this thesis, we used some questions among the common people and they give them and to the form which they faced because of the problem. According to the data, we calculated the respondents and their answer to the different questions which we use to collect the data. The number of people is 202 who respond in our surveys. From that data we show some charts, tables in represent the data.

4.3 Descriptive Analysis

We describe our statistical results in this section. We draw some table and chart on the basis of the results are given below:

Table 4.3.1: Gender respondents

	Frequency	Percentage
Male	130	64%
Female	72	36%
total	202	100%

Form Table 4.3.1, we see that the response of male percentage were 64% and female percentage were 36%. This ratio indicates that the majority of respondents are male people.

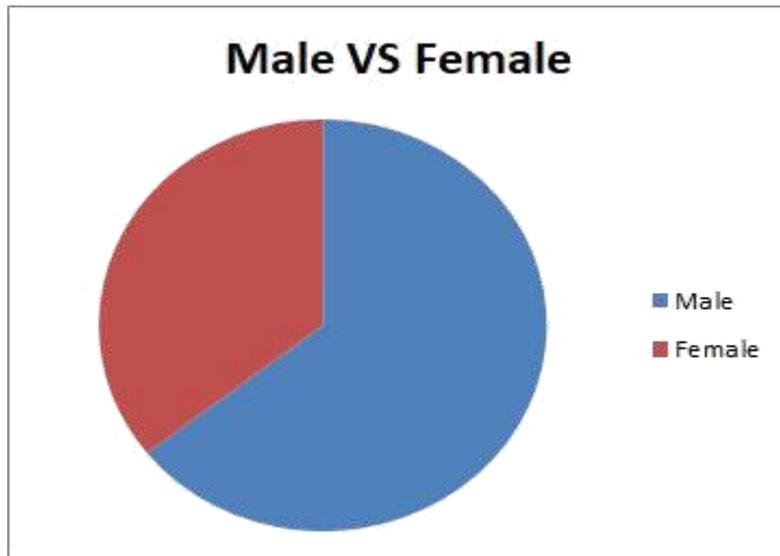


Figure 4.3.1: Response of male vs. female.

In Figure 4.3.1, we draw a pie chart for the response of males and females. From the chart we see that the percentage of male people's responses is more than female.

Age of respondents:

The following table is for the age difference of respondents and the percentage of that.

Table 4.3.2: Age of respondents

	Frequency	Percentage
11-20	34	16%
21-30	152	75%
31-40	12	5%
41-50	4	1%
Total	202	100%

From Table 4.3.2, we see the people's age that were responses in this survey. The ratio of the age range 21-30 is higher than other age range of the people and the respondents were 152 among 202 respondents. The number of people was 152 at the range of 11-20 where the percentage rate is 16%. Another percentage is 5% and 1% in the age range of 31-40 and 41-50 respectively. The following graph is made on the basis of Table 4.2.

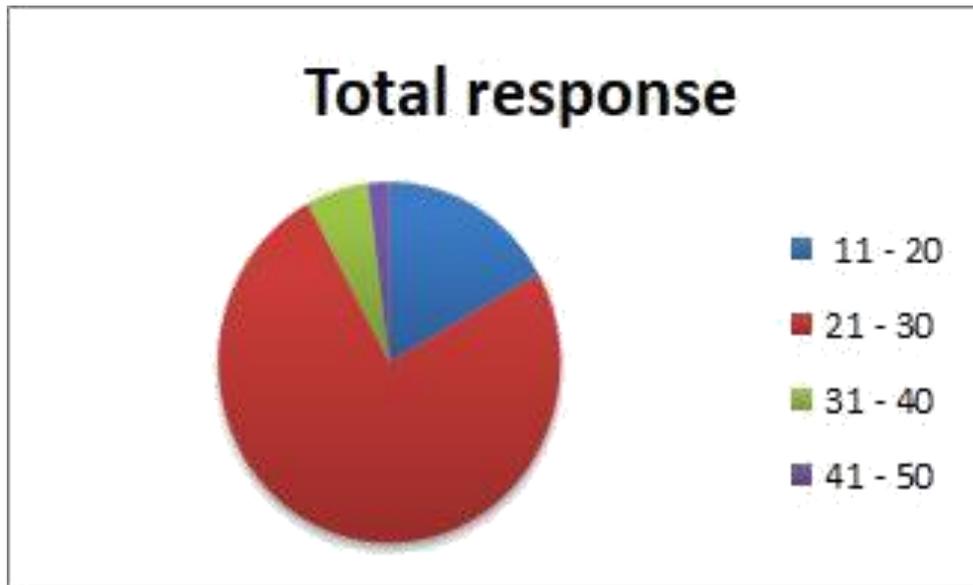


Figure 4.3.2: Responses of different age's people.

In this pie chart, we simulate the responses of different ages of people. There are four categories of aged people.

Education level of respondents:

This following table is providing a survey according to the level of education and the percentage of the responses. There are 3 different levels namely, HSC, BSC as well as Masters.

Table 4.3.3: Educational level of respondents

Level of education	Frequency	Percentage
HSC	3	1%
BSC	173	86%
Masters	26	13%

At the beginning of this table, we can see that tiny fraction pupil who is studying in HSC facing hormone disease which is under balance (1%). Apart from this, the students who are young facing this problem. However, this percentage has reached the apex which is 86%. Moreover, adequate mature students are a troubling hormonal imbalance of near one quarter (13%).

At the end of this information table, we have gotten that adult students are the victim of hormonal imbalance.

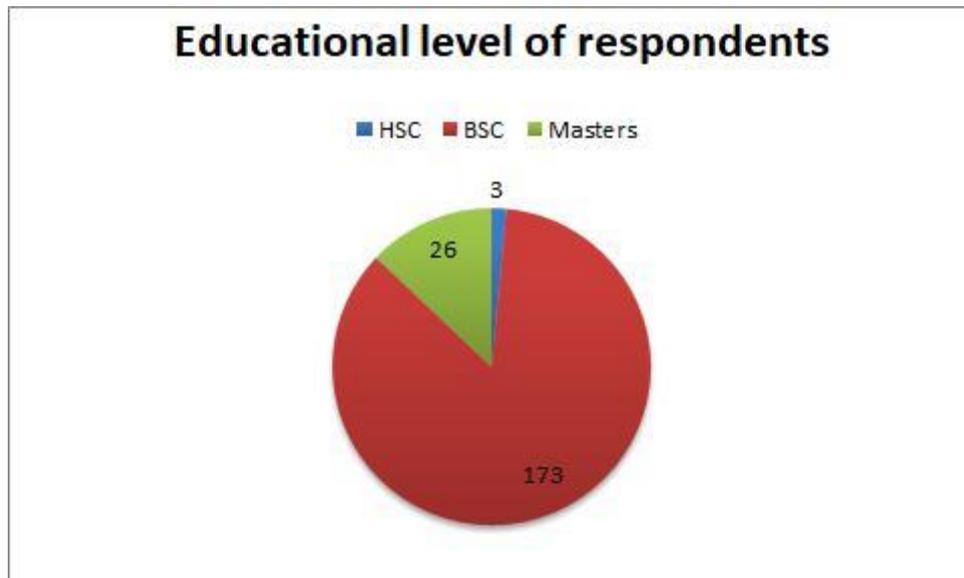


Figure 4.3.3: Chart of the educational level of people.

The pie chart illustrates the number of students who are suffering from hormonal imbalance. According to this chart a number of pupils who are studying in BSC facing hormone problem which is under manage (173) while HSC students (3). Afterward, (26) masters education learners are used to facing the disease of the hormone as well.

Occupation of respondents:

This following table is of different occupation. There are 4 different levels which are student, service, business and other categories.

Table 4.3.4: Occupation of respondents

	Frequency	Percentage
Student	174	86%
Service	16	8%
Business	4	2%
Other	8	4%
Total	202	100%

From the table, we know that the maximum respondents were students which are 86% and 8% were service people. The number of businessmen was 2% and the other categories were 4%.

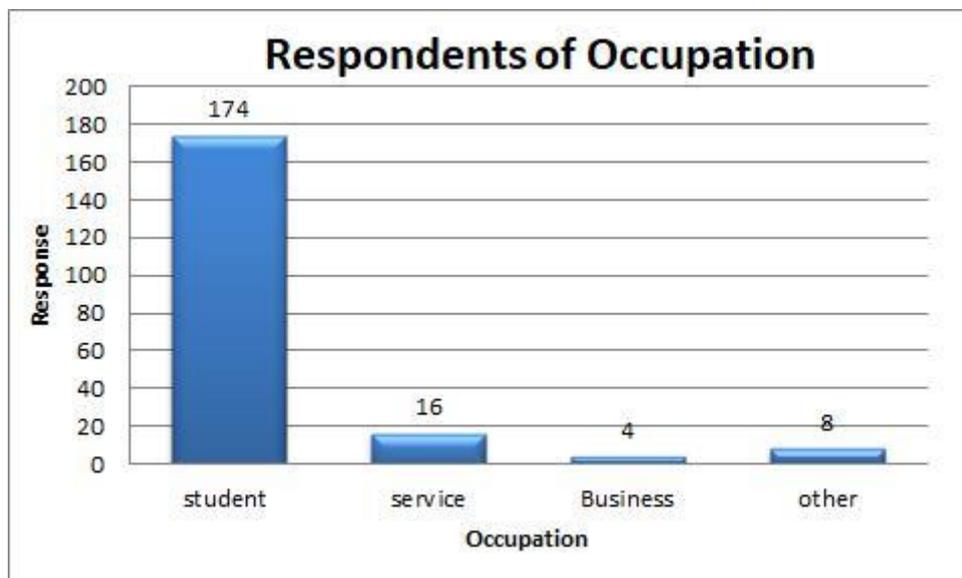


Figure 4.3.4: Bar chart of different occupations of people.

This bar chart is drawing from the table of people's occupations that were filling up the survey form for giving data. And from this, we can see that most of the respondents are students.

Respondents of facing hormonal imbalance:

This table of 4.3.5 is about the data that show the respondents who know about facing hormonal imbalance and demonstrates the percentage of facing hormonal imbalance.

Table 4.3.5: Respondents of facing hormonal imbalance

	Frequency	Percentage
Yes	23	11%
No	99	49%
May be	20	10%
I don't Know	60	30%
Total	202	100%

At the beginning of this table, we can see that a tiny fraction of people faced hormonal imbalance which was 11%. On the other hand, we got interesting information from the survey that 10 percent of people were confused. They don't know whether it would happen with them or not. Apart from this, a large number of people did not face a hormone problem which is under control. Even the percentage climbed at a peak which was almost half (49%). However, at the end of this survey, we can see that several people had no notion of this problem which was a little bit more than one quarter (30%).

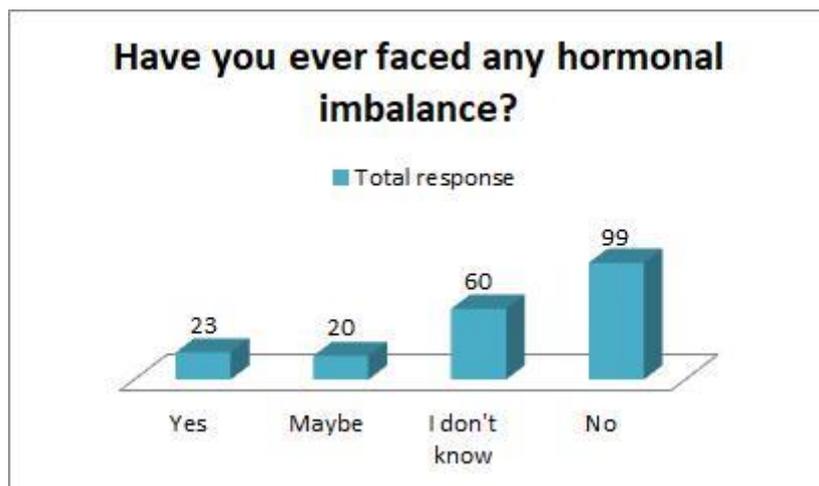


Figure 4.3.5: Bar chart of the people who have the hormonal imbalance

The bar graph illustrates the percentage of hormone which is under control and so on. At the beginning of this graph, we can see that almost one-quarter of people faced hormonal imbalance. On the other hand, a number of people who did not suffer from this disease. However, this amount rocketed to the peak which was 99. Apart from this, a tiny fraction of people do not whether they faced it or not which were 20. However, in this bar graph, more than half percent of people (60) don't know what hormonal imbalance is and how to get a release from this problem as well.

At the end of this survey, we saw that most of the human beings did not meet hormone problem which is out of balance and so on.

Respondents of an idea about hormonal imbalance:

This table of respondents of an idea about hormonal imbalance is demonstrating a survey where people have knowledge about hormone and hormonal imbalance.

Table 4.3.6: Respondents of an idea about hormonal imbalance

	Frequency	Percentage
Yes	100	49.5%
No	102	50.5%

As we can see that exactly half percent of human beings are not aware of this problem (50.5%) while (49.5%) people have idea of this.

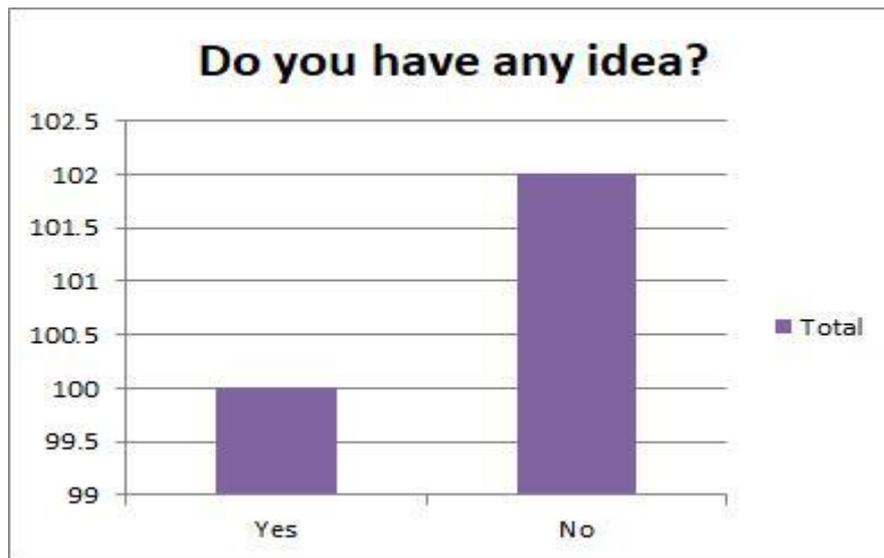


Figure 4.3.6: Bar chart of the people who have any idea of the problem.

The bar chart of having any idea of the hormonal imbalance shows that the unfamiliar people are huge. The knowing person's number is very low than the unknowing person. From this data, we can say that many people in our country are unaware of this problem and have no idea about this.

Respondents of people facing different hormonal imbalance:

The following table is about the affected people of different hormonal imbalance. We have already discussed 7 hormonal imbalance in chapter one. We have been researching on these hormones. The table is carrying who has faced which hormonal disease. At the beginning of this table, we can see that 35.6% of people faced hormone problems in general while 36.6% of humans did not face hormone which is under control. Some people troubled multiple and testosterone hormone disease 5.9% as well as 11.8% respectively.

Table 4.3.7: Respondents of facing hormonal imbalance

Name of problem	frequency	Percentage
General	72	35.6%
Multiple	12	5.9%
Testosterone	24	11.8%
Estrogen	18	8.9%
Insulin	2	0.9%
No problem	74	36.6%
Total	202	100%

Apart from this, an 8.9% estrogen hormone problem. However, the percentage of insulin is the lowest amount than that of others which is 0.9% and so on.

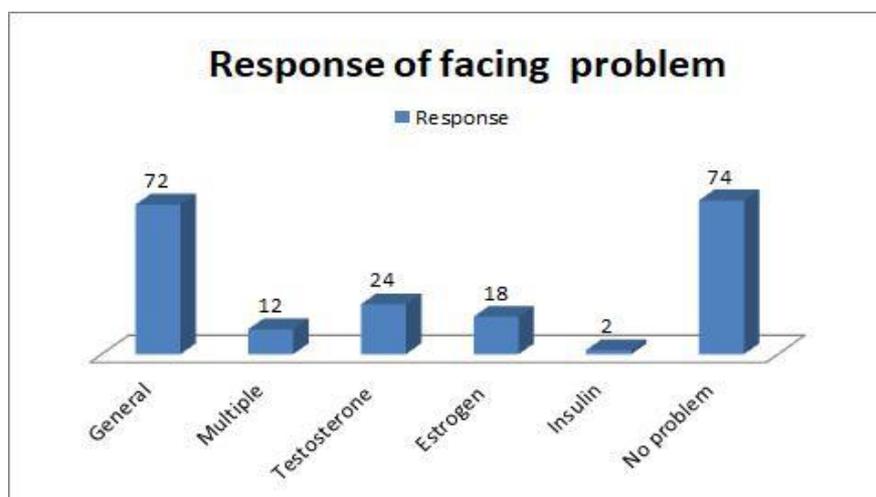


Figure 4.3.7: Bar chart of the people facing the problem.

The bar graph shows the number of people who faced hormonal imbalance. In general, 72 people suffered from hormone disease which is out of balance while two more people stayed at no problem than that of general (74). Then testosterone and estrogen amount were 24 as well as 18 respectively. However, 12 human beings troubled multiple hormone problems where a tiny fraction of people faced insulin hormone which was at 2.

Table 4.3.8: Respondents of feeling a hormonal imbalance

Name of problem	frequency	Percentage
General	33	66.3%
Multiple	29	14.3%
Testosterone & progesterone	2	0.9%
Estrogen	5	2.5%
Insulin	29	14.3%
Leptin	6	2.9%
Thyroid	2	0.9%
Cortisol	21	10.4%
No problem	75	37.1%
Total	202	100%

We separated victims into 2 parts such as face and feel. We decided about the patients who faced hormonal problems in the previous table. In this table, we would like to discuss those victims who have felt various hormonal problems. Here we can see that the maximum people do not feel any problem which percentage is 37.1%. On the other hand, 66.3% of people have felt a general problem. The percentage of multiple problems is 14.3%. 2.5% of people have felt estrogen hormonal problems. 14.3% of people are under insulin problems. Apart from this, 2.9% are leptin problems. At the end of this table, we can see that the lowest number of people have felt a thyroid problem which is 0.9%.

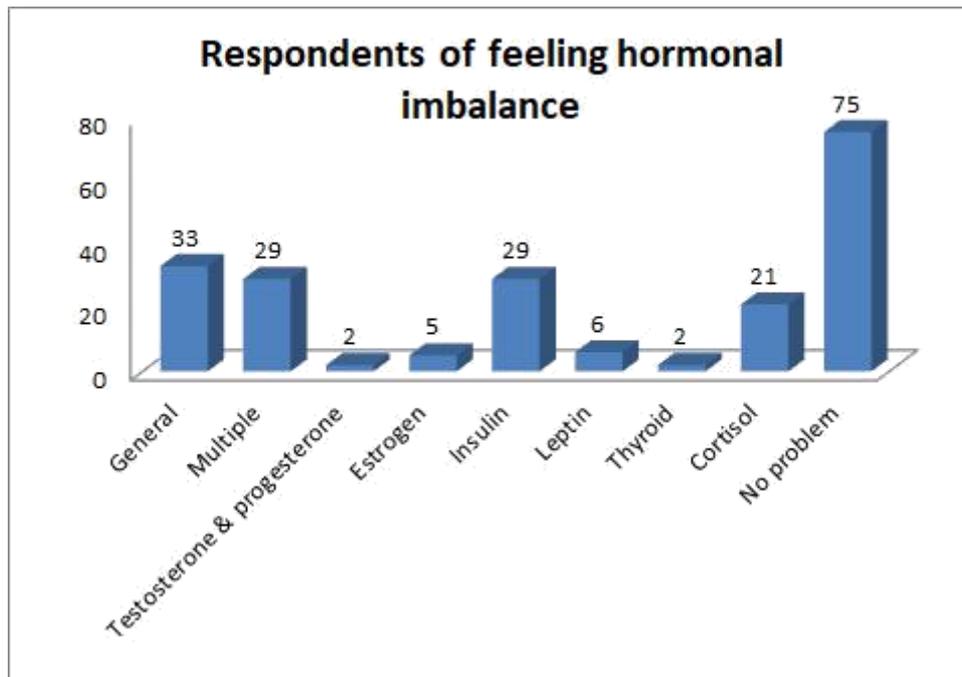


Figure 4.3.8: Bar chart of the people who feel the problem.

From the figure of 4.3.8, the number of people who feel the hormonal imbalance is higher. In hormonal imbalance, there have 2 categories and the first one is visible and the second one is feeling able. In feel able, people can feel some problem which is connected with hormonal imbalance.

For checking our data set we implement a C-language code for primary prediction. After that, we upload the data set in the Weka tool for checking accuracy with different algorithms. We applied five algorithms in our model data for checking the accuracy and we draw a bar chart of the accuracy rate.

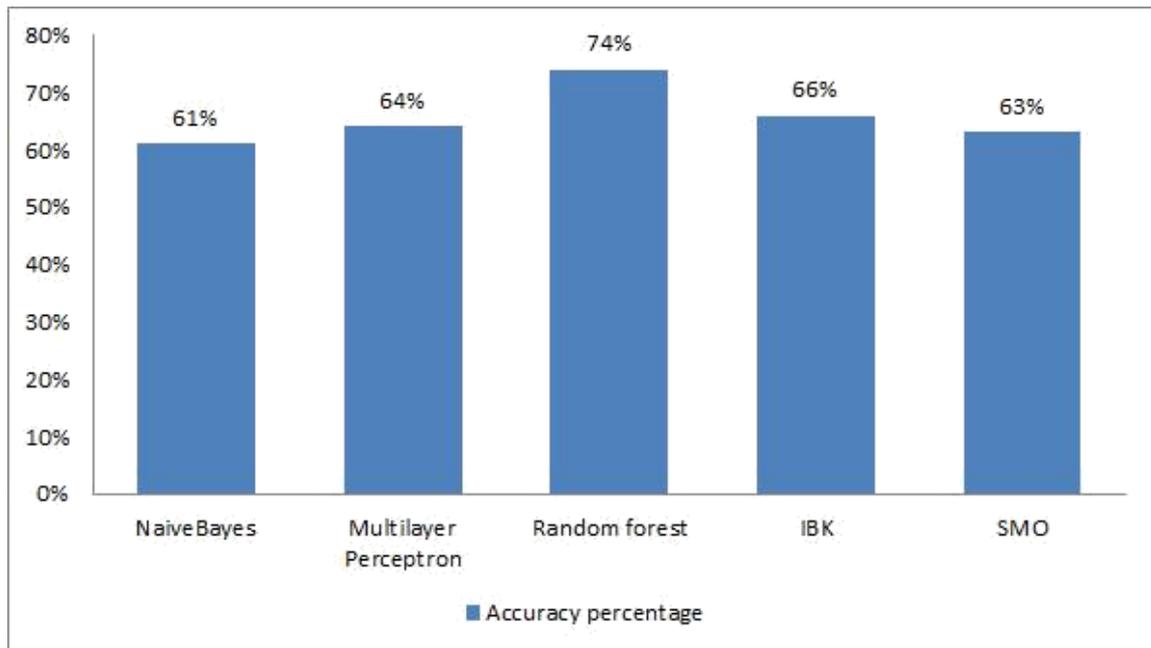


Figure 4.3.9: Bar chart of the accuracy rate in the applied algorithm in our proposed model.

From the chart, we can see that our highest accuracy is calculated from the Random Forest algorithm where we see the percentage of accuracy is 74%. The accuracy of IBK is also good range from other algorithms.

4.4 Summary

In this chapter, we discussed the survey results and make tables on the basis of the data and also draw a graph for describing the strategies elaborately. We got good responses from the people and their personal information about what they faced which helped us to collect the information for helping us to fulfill this thesis and collect the strategies. The respondent's people are given all the answers for our survey form that helps us to get a good output of the descriptive and frequency analysis of the research. From the result, we get the ratio of male and female respondents and the age difference also. We use multiple checkboxes for getting the problems that they face and feel of hormonal imbalance. We get some multiple answers to the hormonal imbalance which proves that they exactly suffering from multiple imbalances and for future actions, they should consult with the doctor for getting the exact reason and for proper treatment.

CHAPTER 5

Summary, Conclusion, Recommendation, and Implication for Future Research

5.1 Summary of the Study

In this chapter, we discuss the summary of our research topic and our objectives to select this type of subject. In our country many of us suffering from little problems but actually the problem is not so simple it creates a critical situation in our life. But lack of awareness we are not able to understand this problem and for that reason I hope this research will increase the awareness among the common people and they will be able to take proper treatment at the right time to save our life. From the questions of answers, we have to focus on some important topics.

5.1.1: Do you have any idea about hormonal imbalance?

From this question, we get the answer to people which is not enough pleasurable to us. The ratio of the people is 50.5% who don't have any idea of this problem. And the ratio is 49.5% of the respondents who have the knowledge of this problem.

5.1.2: Have you ever faced any hormonal imbalance?

The answer to this question was very confusing for many people. The people who have no idea about imbalance are not able to give the answer of this question appropriately. So we give 4 options for these questions answer. And from the collection of data, we reach a strategy which shows that the percentage is 11% who know that they are suffering from this problem. The confused people are 10% who don't know if they suffer or not. The percentage of people who don't know about this is 30% and the people who are not affected by this problem are 49%.

5.2 Conclusion

There are many people who are suffering hormonally imbalanced but they have no knowledge about this problem. This study will help to raise awareness among this kind of people. And the worst thing is that the respondent's people are educated people but they have no knowledge about this imbalance.

From the summary of this research, we reached a decision that many people are affected with general problems of hormonal imbalance and the category of the imbalance problem is higher of insulin hormone. The ratio of testosterone and estrogen are also a medium level. Generally, this problem is being noticed among females. The respondents are most of them are male and from this research, we can say that women are always hiding their problems because of shyness and it proves again.

5.3 Recommendations

From the study of hormonal imbalance, we think we should solve this problem. And for solving this problem we should arrange a seminar and take the necessary steps to raise awareness among the people and all medical teams need to do work about solving this problem and raising awareness. The authority of our country can discuss this in the textbook for every student. From that lesson, all students can gain knowledge about this and also help others to understand this topic.

I hope these steps will solve many problems and people will be aware of this.

5.4 Implication for Further Study

The collection of data we want to increase in the future. And the accuracy of the percentage wants to lower for unknown people. We want to implement an algorithm for prediction of this imbalance if any people are suffering from this problem or not. Another is that we will try to give the exact solution for recovering this problem.

Appendix

Appendices A

The questions of our survey form:

Form link: <https://forms.gle/tbLLg3JFpbZ25bNB8>

Q1. What is your Gender?

- Male
- Female

Q2. What is your Date of Birth?

Q3. What is your Occupation?

- Service
- Business
- Student
- Other

- Yes
- No

- Yes
- No
- Maybe
- I don't know

- unexplained or excessive sweating /unexplained weight gain or weight loss/ Puffy face/ a bulge in the neck /don't lose weight easily
- very dry skin or skin rashes / thinning, brittle hair /Nails are weak/Migraine headaches
- breast tenderness / Heavy menstrual bleeding / Gallbladder problems /Brain fog / Fibrocystic breasts (non-cancerous breast lumps) / Fibroids (noncancerous tumors) in the uterus
- Acne / Polycystic ovary syndrome (PCOS) / Excessive hair on the face and arms/ Ovarian cysts / Erectile dysfunction / Breast enlargement

- Waist girth is equal or larger than hip girth / Frequent urination
- Infertility /Enlarged breasts (gynecomastia)/Poor erections / men can cause excess belly fat
- Recurrent bladder infections & Dryness and thinning of the vagina / Outer third of eyebrow is thin & Excessive hair falling out
- No one

- difficulty sleeping / changes in blood sugar concentration / Dizziness when standing up quickly / Chronic inflammation / Often moody / Afternoon headaches
- changes in sensitivity to cold and heat / changes in blood pressure / changes in heart rate/ unexplained and long-term fatigue / brittle or weak bones / depression / headaches/ bloating / deepening of the voice in females /reduced sex drive / infertility
- increased thirst and changes in appetite/ needing to go to the bathroom more or less than usual / blurred vision/ Cravings for sweets / Dependence on coffee / Become lightheaded if meals are missed/ Feel shaky, jittery, or having tremors / Agitated, easily upset, or nervous / Poor memory
- Mid-cycle pain/cramping /irritability and anxiety / Hot flashes
- have constant food cravings / You're stressed out
- Mood swings / Weepy and emotional / Painful sex / Feeling lethargic
- Feeling cold in your hands, feet, or all over / Difficult, infrequent bowel movements / Requiring excessive amounts of sleep to function properly / Mental sluggishness/ Morning headaches that wear off as the day progresses
- No one

Appendices B

PCOS - Polycystic Ovary Disorder

MLP - Multilayer Perceptron

RMSE - Root Mean Squared Blunder

SMO - Sequential minimal optimization

QP - Quadratic Programming

SVM - Support Vector Machine

LIBSVM - Library for Support Vector Machines

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