

# Data Visualization Report on Infographic

By  
Yogesh Maruti Patil  
x17169828  
MSc Data Analytics  
Cohort A

## 1. Background of the datasets

The datasets selected for the infographic are taken mainly from Statista.

The first dataset from Statista provided the percentage of adults in the United States with lower back pain from 2000 and 2016, according to age group<sup>1</sup>. Here the data was being collected using a survey in which the respondents were questioned if they had encountered pain in the lower back during a period of past three months. Here the people were told to tell about the pain that had persisted for a whole day or more. This survey was carried on different age groups: 18-44 years, 45-64 years, and 65 years and above. For this infographic, we have selected only two age groups that are 18-44 years and 65 years and over.

The second dataset from Statista revealed the percentage of adults in the United States with low back pain from 1997 to 2016, according to gender<sup>2</sup>. Here also the information was being accumulated using a survey in which the respondents were questioned if they had encountered pain in the lower back during a period of past three months. Here again the people were told to tell about the pain that had persisted for a whole day or more

The third dataset from Statista provided the percentage of United States respondents that went for selected medical providers to treat lower back pain as of 2017, by age<sup>3</sup>. This survey was conducted among 3002 respondents and the question asked was “What kind of medical specialist did you seek treatment from?” if one was experiencing back pain in the past twelve months.

Apart from the above-mentioned datasets, some additional facts and figures were being taken from various sources like American Chiropractor Association<sup>4</sup> that included the back pain facts and statistics, Michigan Medicine<sup>5</sup> that included women back pain facts and recovery and recurrences statistics, facts from WebMD<sup>6</sup> and revealing statistics on back pain that will surprise you<sup>7</sup>.

## 2. Process Outline for developing infographic

There are different formats designed for data visualization and infographics namely static, motion and interactive. Previously in the printed media only one type of format was being used i.e. static version. Static versions of visualization of the data and the infographics are said to be in a stable form and the person who is taking a look at it is considered to be the viewer unlike in interactive formats where the person is an active user also. [1] In static infographics, the information is to be printed and this project aims at developing static infographic.

Following are the steps in which the infographic has been developed:

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<sup>1</sup> <https://www.statista.com/statistics/188862/adults-in-the-us-with-low-back-pain-by-age/>

<sup>2</sup> <https://www.statista.com/statistics/749834/medical-care-providers-sought-by-us-residents-for-back-pain-by-age/>

<sup>3</sup> <https://www.statista.com/statistics/188858/adults-in-the-us-with-low-back-pain-by-gender-since-1997/>

<sup>4</sup> <https://www.acatoday.org/Patients/Health-Wellness-Information/Back-Pain-Facts-and-Statistics>

<sup>5</sup> <http://med.umich.edu/1info/FHP/practiceguides/back/back.pdf>

<sup>6</sup> <https://www.webmd.com/back-pain/features/12-back-pain-tips#1>

<sup>7</sup> <https://www.tensunits.com/blog/2018/07/06/back-pain-statistics/>

## 2.1. Data collection and pre-processing

The data from the Statista was being downloaded in the CSV formats and thereafter the cleaning was done in order to remove the rows and columns which were not required. The data from Statista consisted of an Overview sheet which was removed and the extra text on the second sheet was also removed. The data from the other websites were entered into excel and processed accordingly wherever required.

## 2.2. Data analysis and visualization

Once the data was cleaned the next step was to visualize the data. The online tool Venngage had the option to analyze and plot the graphs and charts accordingly. Hereby selecting the particular graph the data needs to be entered and the desired graph was ready to use. In this infographic, we have used a column chart, pie chart, half pie chart, and donut chart. Also, in order to visualize the facts custom icons were created and some icons from the third party were imported.

## 2.3. Infographic designing

The infographic was created using an online tool Venngage which is very easy to use. The blank page was formatted to fit into the dimensions of an A3 page (11.7 x 16.5 inches). Venngage provided a very easy to use options to design and arrange all the objects suitably. Some default icons as well and some images, icons downloaded from the noun project were being used in order to make the infographic more interactive. Though the font size differed, the font remained the same. This text provided support for the images or facts that were being displayed on infographics.

# 3. Story behind the infographic

The infographic has been split into four sections. The first segment discusses several unexpected and surprising statistics related to back pain as well as facts from the conclusive researches conducted in recent years in order to properly understand how back pain affects society. It starts with the fact revealing that nearly 8 out of every 10 Americans will undergo back pain at some point during their lifetime<sup>8</sup>. Also, an American spends approximately 50 billion dollars on back pain treatments<sup>9</sup>. It is also viewed as the preeminent reason for disability amongst developed nations. It is also found that 64 % of those suffering from back pain feel twenty-one years older.

The second section shows the major trends in the back pain over the years. The comparison clearly shows that there has been an increase in the cases of back pain from 2000 to 2016, with a major increase in the age group 65 years and above. The pie chart shows that back pain is more frequent among women than men. A large portion of the population accounting to 69.7% suffering from back pain in America seek help from medical doctors and only 14.1% seek help from a chiropractor.

One of the most common ways to treat back problems is to get some medications to control or reduce the pain. These medications can be in both forms i.e. from the counter or by using prescription of drugs. The third section shows the rising trend of medicines only from 1999 to 2010 which grew up to 29.1 %. It also states that nearly fifty percent of all expecting women will have notable complaints of back pain, according to the analysis done in the University of Michigan. The third chart shows that regardless of the type of treatment taken 90 % of the back pain cases get resolved with the six weeks of time. Once the problem of back pain is being reported there are 60 percent chances that the pain may recur within 2 years of time. Chronic back pain is characterized by persisting pain for longer than a period of three months. It has been seen that only 7 percent of the patients encountered the development of persistent pain into chronic pain.

Fourth sections show some pictorial description of some of the most common causes of back injuries and also their preventive measure in order to avoid and reduce the pain.

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<sup>8</sup> <https://www.tensunits.com/blog/2018/07/06/back-pain-statistics/>

<sup>9</sup> <https://www.acatoday.org/Patients/Health-Wellness-Information/Back-Pain-Facts-and-Statistics>

## 4. Justification

### 4.1. Techniques

In order to visualize the data different types of graphs can be used. Selecting the right kind of graph is very critical. It totally depends on the type of data chosen that is if the data is qualitative or quantitative. In order to show the distribution of data pie charts and bar charts are used, here the data can be in form of ordinal or nominal form. In order to show the information which is present in the form of a ratio, time plots are used.[2]

Below are the types of charts used in the infographic:

- **Pie Chart:** This chart is used in order to show the percentage or proportional data of how common is back pain among male and female.
- **Column chart:** This chart is oriented vertically and the length of the bar is proportional to the values it's showing. In order to show the rise in the back pain between two years 2000 and 2016 Column chart is being used.
- **Half Pie Chart:** Half pie shows the composition of a whole and here it shows the percentage of people who seek help for their pain be it chiropractor, medical doctors or others.
- **Donut Chart:** This chart can be used in order to show some additional information like the percentage of cases resolved in this case at the middle of the chart. Three donut charts are being shown that shows the percentage of recovery and recurrence of back pain.

### 4.2. Layout

The key to achieving an attractive informative infographic is to have ample whitespaces and well-arranged layout. Also, at first a good headline grabs the viewers' attention and in this infographic, it is short enough and easy to understand right at the top. In order to portray a story, the infographic has been divided into four sections. This will ensure nice readability and the infographic will be able to convey the message in a proper manner. The first segment tells about a few of the very unexpected and surprising back pain statistics and facts. The second section talks about the statistics in regards to who has the highest back pain issues according to various types. Third sections show a trend in the usage of medicines over the years. Fourth sections show some pictorial description of some of the primary reasons for back injuries and also the strain and also some causes and suggest some tips in order to prevent back pain. So there is a drill-down approach in the infographic which makes it easy to understand and easy to view. Also, each section is being divided by two lines with some facts written in-between.

### 4.3. Style

The main motive of an infographic is to present the information in an interactive manner which can be done with the help of charts, visuals etc. The infographic followed a Roboto condensed font with some variations amongst the font size. It's very necessary to guide the readers through the infographic and for these customized icons are being added to it to make it easy to understand along with the text. Also in the column chart for usage of medicine, a crafted data visualization is being portrayed by the use of tablets signifying the increase in medicines usage. Some line arts are also used in order to portray the facts in an attractive manner.

### 4.4. Colors

In this project in order to select a color palette, the rule of three was being used. Here three primary colors were being selected namely Baltic Sea, Cerise red and Alto. Of the three, Alto being the lightest amongst the three was being selected to be the background. Cerise red was usually used to show the increasing trend, higher percentages in the graphs and charts. These palettes were chosen to make sure that the reader's eye easily flows down the page. The colors chosen had sufficient contrast in them be it for comparative graphics or any other icon. Regarding the text color, it was managed accordingly by the contrast, for example, white color on Baltic Sea color.

## 5. Technologies used in developing the infographic

- **Venngage:** It is a website<sup>10</sup> used to create enhanced designed content for websites, presentation, infographics etc. For this project, we have designed an infographic with the use of templates present in it and customizing it according to ones requirements. It has a vast collection of icons available which any one can use according to their usage. Here the charts were also developed by inserting the values into the charts options.
- **Noun Project:** This website<sup>11</sup> has a huge collection of symbols and icons uploaded by designers from all over the world. For this infographic we have used icons from here itself.
- **Microsoft excel:** Excel was used in order to clean and arrange the data in the datasets.
- **LunaPic**<sup>12</sup>: It is a free online image editor which was used to change the color of the icons and make an images transparent.
- **ColorPick Eyedropper:** This tool was used to select the color values from different websites with ease. It provides hex values for the colors.
- **Paint 3D:** It is provided by Microsoft and it was used in order to crop an image and also change the color of the icons and images.

## 6. Short reflection

While designing the infographic there were different challenges faced. Below mentioned are some of the advantages and limitations that we came across.

### Advantages:

1. With the help of the Venngage tool it was easy to import, analyze and visualize the data.
2. What made the job even easier was the freedom to choose from various graphs and charts.
3. While arranging the layout snapping to grid view proved to be helpful and the arrangement of various elements was done with ease.

### Limitations:

1. Due to the space constraints, every attribute couldn't be visualized in a proper way, so the data had to be omitted accordingly.
2. There were certain difficulties in visualizing the textual data and only numeric data could be visualized. The textual data were been displayed as facts in the infographic.
3. Usage of elements and layouts in the available templates could not be achieved and for this infographic a new layout has been designed.

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<sup>10</sup> <https://venngage.com/>

<sup>11</sup> <https://thenounproject.com/>

<sup>12</sup> <https://www142.lunapic.com/editor/>

## References

- [1] B. U. Dur, "Data Visualization and Infographics in Visual Communication Design Education at the Age of Information," *J. Arts Humanit.*, vol. 3, no. 5, pp. 39–50, 2014.
- [2] L. L. Cooper and F. S. Shore, "The effects of data and graph type on concepts and visualizations of variability," *J. Stat. Educ.*, vol. 18, no. 2, pp. 1–16, 2010.