LEARNING OBJECTIVES
1. Know the history of the Pareto principle
2. Know how the Pareto chart is used for quality improvement
3. Create a Pareto chart

THE PARETO PRINCIPLE AND CONCEPT
Quality is always a hot topic in healthcare, and the ultimate goals are to maintain a high level of patient satisfaction and improve the financial aspects. These two goals are rapidly changing, and they could be affected by many of the surrounding factors. When a healthcare organization faces a problem in achieving these two goals, it is important to understand the causes and immediately start the appropriate interventions. One principle of quality improvement in healthcare is to do it right the first time, so it is important to do the right intervention promptly by targeting the most vital contributing factors that led to the problem at hand. By nature, healthcare organizations are complicated, also have been described as a complex adaptive system, which is one of the most difficult systems to understand and manage because one problem could be linked to many contributing factors at the same time.

The concept of the Pareto principle was developed in the 19th century by the economist Vilfredo Pareto, who noticed that 80% of the land in Italy was owned by just 20% of the population. Moreover, he found that 80% of production usually came from only 20% of the companies. This led him to a general hypothesis that 80% of the results are originated from 20% of the factors or causes that influence the results. The Pareto principle, which is also known as the rule of 20/80, has become an important quality tool, recognized by the American Society for Quality (ASQ) as one of seven basic quality tools for process improvement.

HOW IS A PARETO CHART USED FOR QUALITY IMPROVEMENT?
A Pareto chart enables a quality improvement specialist to make informed decisions and prioritize the appropriate interventions to achieve the desired goal. The main concept behind the Pareto chart is that the weights or effects of the contributing factors that lead to specific outcomes are not equal, so identifying the highly weighted factors and working on them first will shorten the time needed to reach the desired outcome, thus saving effort and unnecessary costs. In 1937, the 80/20 concept was crystallized by Joseph M. Juran, a pioneer in the field of quality improvement, who added the cumulative line at the top of the chart to make it easier to judge the impact that each factor has on the desired outcome. He also came up with the terms “vital few” and “trivial many,” which are used to categorize the factors based on their weight. Figure 1 shows an example of a Pareto chart that was used to identify causes of medication errors.

When planning a quality improvement project, the Pareto chart is mainly used in the phase of problem identification, but a Pareto chart is also helpful in the data analysis and outcome evaluation phase, after conducting a specific intervention. Pareto chart presents the data in a visual manner, which may be suitable for communicating information about the problem to upper management when seeking their support or action. Vice versa, if there is a desirable outcome that needs to be maintained, a Pareto chart could be used to identify the so-called vital few contributing factors that must be maintained to sustain the desired outcome.

A Pareto chart is a bar graph with frequency on the left side (y-axis), percentage on the right side (z axis), and contributing factors are arranged in descending order by frequency on the x-axis. The line that reflects the cumulative percentage of the factors is a key component of the Pareto chart; when the line reaches ≥ 80%, this
means that all of the previously added up factors represent 20% of the causes (i.e., the vital few). If you focus on these causes, then you will be able to reach the desired outcome most efficiently. After that, you can direct your effort toward the remaining factors (i.e., the trivial many). Keep in mind that the 80/20 rule is a rough guide about typical distributions based on the Pareto principle, so the numbers are not exact and the total may not add up to 100%. The Pareto chart effectively highlights that the weights or effects of the contributing factors that lead to specific outcome are not equal.

A PRACTICAL GUIDE TO CREATE A PARETO CHART

A great way to understand the Pareto principle is by making your Pareto chart. Start by identifying the problem or situation that needs to be improved. Then, identify the factors that contribute to the problem and their respective frequency. Enter the data in a spreadsheet (e.g., Microsoft Excel) and create your own Pareto chart as follows.

1. In the first column on the spreadsheet, list the identified factors that contribute to the problem.
2. In the second column of the spreadsheet, write the frequency for each factor next to it.
3. Arrange the contributing factors in descending order based on their frequency.
4. In the third column, calculate the cumulative frequency as a number of incidents for each factor.
5. In the fourth column, calculate the cumulative percentage.
6. In the fifth column, add the fixed cut-off value, 80%, for all factors.
7. Highlight all columns and click to insert a bar chart.
8. In the bar chart, click on the bars that reflect the cumulative percentage and change series chart type to be a line chart. Then double click the line in the graph, and in the pop-up window select secondary access.
9. In the bar chart, click on the bars that reflect the 80% cut-off value and change the series chart type to be a line chart. Then double click the line in the graph, and in the pop-up window select secondary access.

Now you have Pareto chart ready, and it should be similar to Figure 1.

CONCLUSION

In conclusion, a Pareto chart is a useful tool that could be used in many phases of quality improvement projects, serving many functions. Applying the Pareto concept to quality improvement projects in a healthcare setting will reduce time, costs, and efforts.

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