

```

> summary (QualityofLife)
> library(readxl)
> library(ggplot2)
> library(dplyr)
> df <- read_excel("QualityofLife.xlsx", sheet = "Sheet1")
> print(colnames(df))
> df_regions <- df %>% filter(!is.na(Region))
> df_regions$Region <- as.factor(df_regions$Region)
> df <- df %>% mutate(country = as.character(country))
> df <- df %>%
+   mutate(Region = case_when(
+     country %in% c("Afghanistan", "Iran", "Pakistan") ~ "Region 1",
+     country %in% c("Bangladesh", "Bhutan", "Nepal") ~ "Region 2",
+     country %in% c("Saudi Arabia", "Libya", "Egypt") ~ "Region 3",
+     TRUE ~ NA_character_
+   ))
> df_regions <- df %>% filter(!is.na(Region))
> df_regions <- df_regions %>% mutate(Region = as.factor(Region))
> summary_stats <- df_regions %>%
+   group_by(Region) %>%
+   summarise(
+     Mean_Purchasing_Power = mean(`Purchasing Power Value`, na.rm = TRUE),
+     Median_Purchasing_Power = median(`Purchasing Power Value`, na.rm = TRUE),
+     Min_Purchasing_Power = min(`Purchasing Power Value`, na.rm = TRUE),
+     Max_Purchasing_Power = max(`Purchasing Power Value`, na.rm = TRUE),
+
+     Mean_Safety_Value = mean(`Safety Value`, na.rm = TRUE),
+     Median_Safety_Value = median(`Safety Value`, na.rm = TRUE),
+     Min_Safety_Value = min(`Safety Value`, na.rm = TRUE),
+     Max_Safety_Value = max(`Safety Value`, na.rm = TRUE),
+
+     Mean_Health_Care = mean(`Health Care Value`, na.rm = TRUE),
+     Median_Health_Care = median(`Health Care Value`, na.rm = TRUE),
+     Min_Health_Care = min(`Health Care Value`, na.rm = TRUE),
+     Max_Health_Care = max(`Health Care Value`, na.rm = TRUE)
+   )
> print(summary_stats)

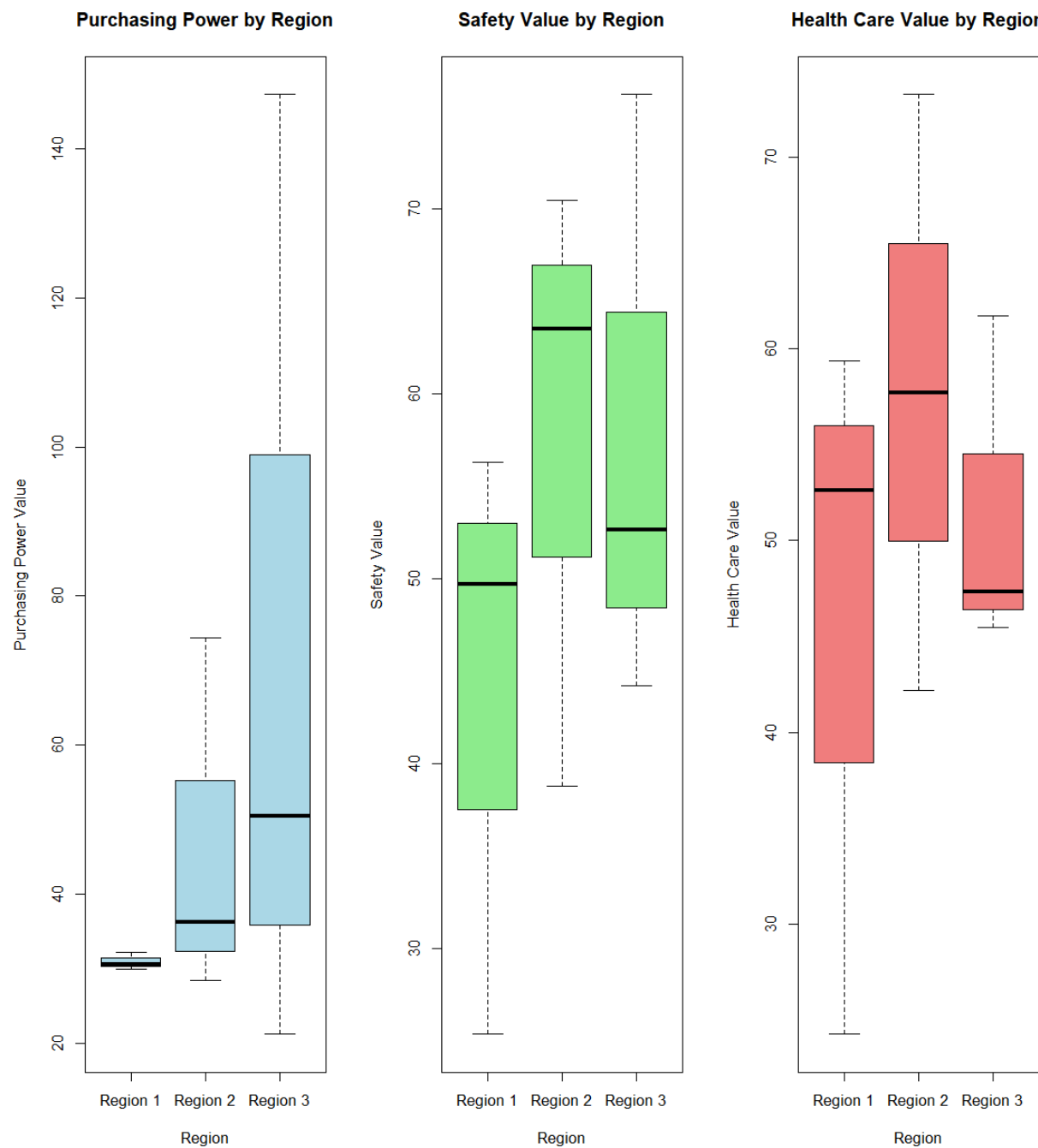
```

A tibble: 3 × 13

	Region	Mean_Purchasing_Power	Median_Purchasing_Power	Min_Purchasing_Power	Max_Purchasing_Power
	Mean_Safety_Value				
	<fct>	<dbl>	<dbl>	<dbl>	<dbl>
<dbl>					
1	Region 1	30.9	30.6	29.9	32.2
43.8					
2	Region 2	46.3	36.2	28.4	74.4
57.6					
3	Region 3	73.0	50.5	21.2	147.
57.7					

```
# i 7 more variables: Median_Safety_Value <dbl>, Min_Safety_Value <dbl>, Max_Safety_Value <dbl>,  
Mean_Health_Care <dbl>,  
#   Median_Health_Care <dbl>, Min_Health_Care <dbl>, Max_Health_Care <dbl>
```

```
> par(mfrow = c(1, 3)) # Set layout for three plots in a row  
>  
> boxplot(`Purchasing Power Value` ~ Region, data = df_regions, main =  
"Purchasing Power by Region",  
+         xlab = "Region", ylab = "Purchasing Power Value", col = "lightblue")  
>  
> boxplot(`Safety Value` ~ Region, data = df_regions, main = "Safety Value by  
Region",  
+         xlab = "Region", ylab = "Safety Value", col = "lightgreen")  
>  
> boxplot(`Health Care Value` ~ Region, data = df_regions, main = "Health Care  
Value by Region",  
+         xlab = "Region", ylab = "Health Care Value", col = "lightcoral")
```



Analysis of the Boxplots by Region:

1. Purchasing Power Value by Region:
 - Region 3 has the highest purchasing power value, with a wide distribution and a significantly higher median than the other regions.
 - Region 2 has a moderate purchasing power value, with a larger spread.
 - Region 1 has the lowest purchasing power value, with minimal variation, indicating economic challenges.
2. Safety Value by Region:
 - Region 2 has the highest median safety value, showing a more stable and safer environment.
 - Region 3 also has relatively high safety values but exhibits more variability.
 - Region 1 has the lowest safety values, with a broader distribution indicating a less safe environment.
3. Health Care Value by Region:
 - Region 2 has the highest health care value, with a high median and a wide range.
 - Region 3 follows closely behind with a slightly lower median.
 - Region 1 has the lowest health care value, suggesting weaker healthcare infrastructure and accessibility.

Conclusion:

- Region 3 (Saudi Arabia, Libya, Egypt) has the strongest economy (highest purchasing power) but shows variation in safety and healthcare.
- Region 2 (Bangladesh, Bhutan, Nepal) excels in safety and healthcare but has moderate purchasing power.
- Region 1 (Afghanistan, Iran, Pakistan) struggles in all three metrics, with low purchasing power, safety, and healthcare.

```
> library(gridExtra)

> df_regions <- df %>% filter(!is.na(Region))

> df_regions$Region <- as.factor(df_regions$Region)

> plot_hist_density <- function(data, var, title, xlab) {

+   ggplot(data, aes_string(x = paste0("`", var, "`"), fill = "Region")) +

+     geom_histogram(aes(y = ..density..), alpha = 0.6, position = "identity",
+       bins = 20) +

+     geom_density(alpha = 0.7) +

+     labs(title = title, x = xlab, y = "Density") +

+     theme_minimal() +

+     theme(legend.position = "top")

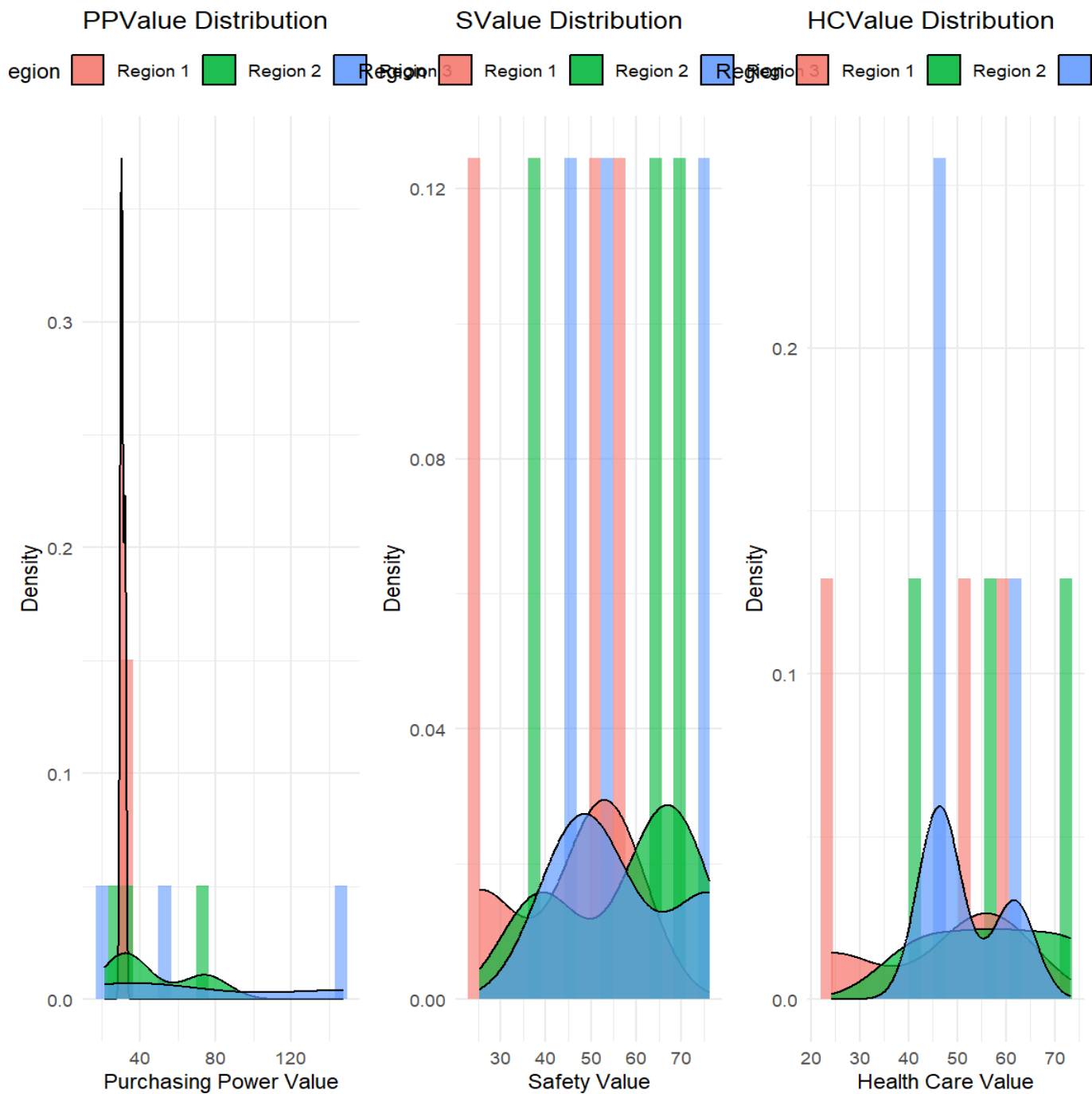
+ }

> p1 <- plot_hist_density(df_regions, "Purchasing Power Value", "Purchasing
Power Value Distribution by Region", "Purchasing Power Value")

> p2 <- plot_hist_density(df_regions, "Safety Value", "Safety Value
Distribution by Region", "Safety Value")

> p3 <- plot_hist_density(df_regions, "Health Care Value", "Health Care Value
Distribution by Region", "Health Care Value")

> grid.arrange(p1, p2, p3, nrow = 1)
```



Analysis of the Histograms with Density Plots by Region:

1. Purchasing Power Value Distribution:

- Region 3 (Green) has a wider distribution, indicating a greater variance in purchasing power values.
- Region 2 (Blue) shows a relatively more compact spread with peaks at higher values.
- Region 1 (Red) has purchasing power values concentrated at the lower end, indicating weaker economic conditions.

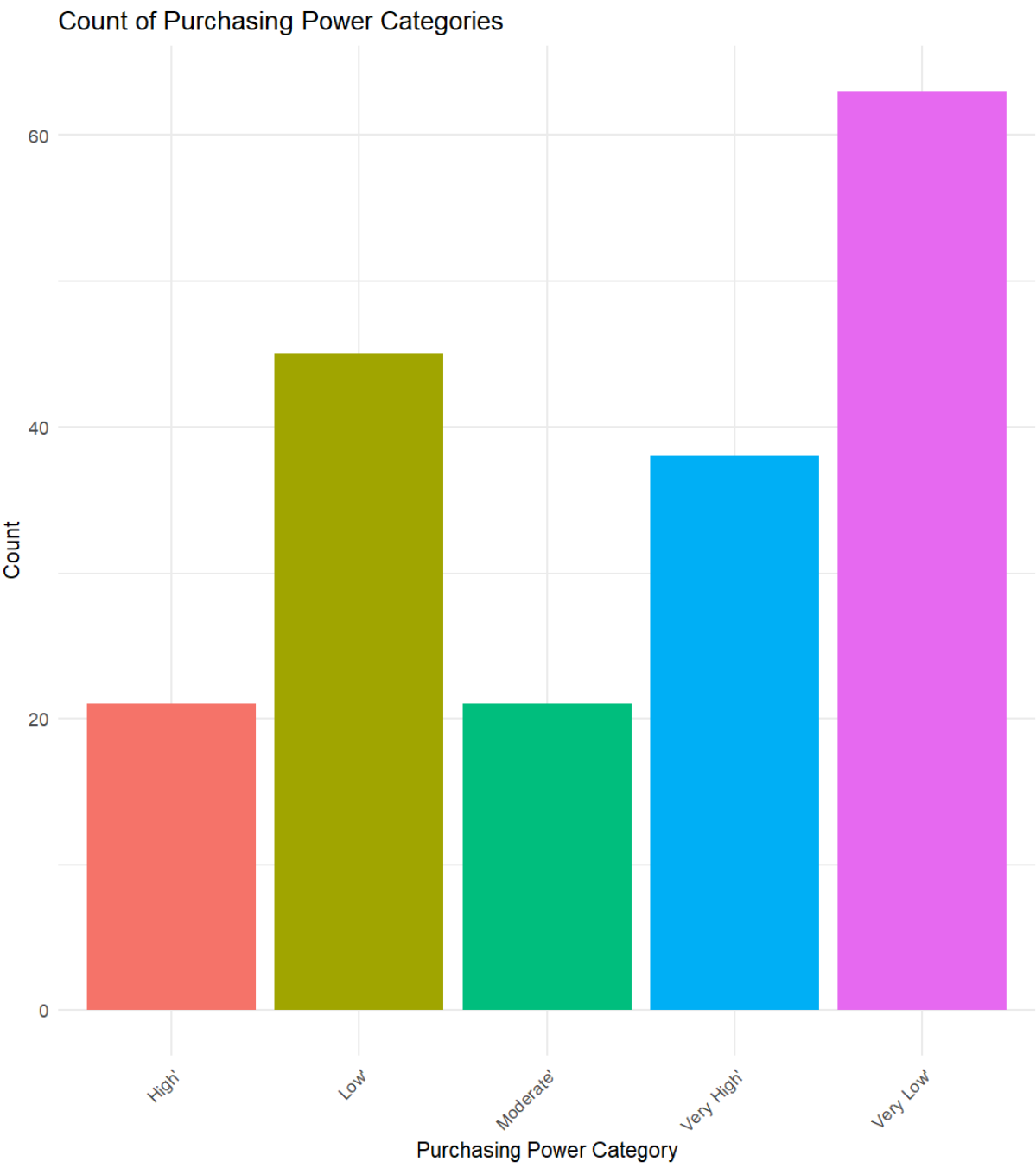
2. Safety Value Distribution:

- Region 2 (Blue) and Region 3 (Green) have safety values distributed across a broader range, suggesting a mix of high and low safety levels.
- Region 1 (Red) has a distinct peak at the lower end, indicating overall lower safety compared to the other two regions.
- The density plot reveals some overlap in values between Region 2 and Region 3, suggesting similarities in safety conditions.

3. Health Care Value Distribution:

- Region 3 (Green) has a higher density of health care values at the upper end, showing better healthcare availability.
- Region 2 (Blue) displays a moderate distribution, with a peak around middle-range values.
- Region 1 (Red) has a concentration of lower values, suggesting weaker healthcare infrastructure in comparison to other regions.

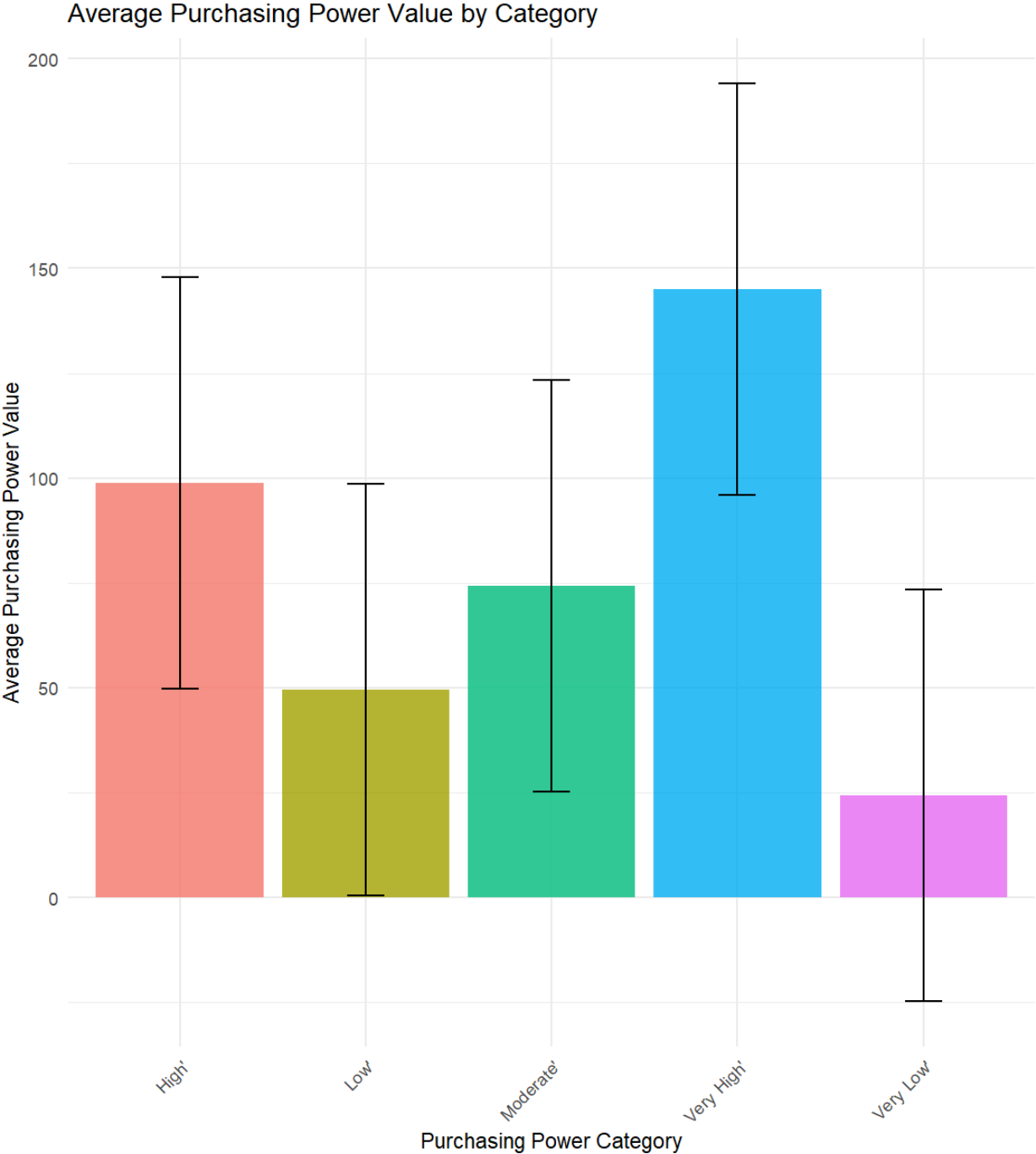
```
> df$`Purchasing Power Category` <- as.factor(df$`Purchasing Power  
Category`)  
> ggplot(df, aes(x = `Purchasing Power Category`, fill = `Purchasing Power  
Category`)) +  
+   geom_bar() +  
+   labs(title = "Count of Purchasing Power Categories", x = "Purchasing  
Power Category", y = "Count") +  
+   theme_minimal() +  
+   theme(legend.position = "none", axis.text.x = element_text(angle = 45,  
hjust = 1))
```

Analysis of the Bar Plot (Purchasing Power Categories Count):

- The "Very Low" purchasing power category has the highest count, indicating that a significant number of countries in the dataset have low purchasing power.
- The "Low" and "Very High" categories also have substantial counts, showing economic disparity across regions.
- The "Moderate" and "High" purchasing power categories have the lowest counts, suggesting fewer countries fall into these middle economic tiers.
- The distribution suggests a polarization, where most countries are either at the lower end (Very Low, Low) or upper end (Very High) of purchasing power, with fewer in the moderate range.

```
> ggplot(df_summary, aes(x = `Purchasing Power Category`, y =  
Average_Purchasing_Power, fill = `Purchasing Power Category`)) +  
  
+ geom_bar(stat = "identity", alpha = 0.8) +  
  
+ geom_errorbar(aes(ymin = Average_Purchasing_Power - sd(df$`Purchasing Power  
Value`, na.rm = TRUE),  
  
+ ymax = Average_Purchasing_Power + sd(df$`Purchasing Power  
Value`, na.rm = TRUE)), width = 0.2) +  
  
+ labs(title = "Average Purchasing Power Value by Category", x = "Purchasing  
Power Category", y = "Average Purchasing Power Value") +  
  
+ theme_minimal() +  
  
+ theme(legend.position = "none", axis.text.x = element_text(angle = 45,  
hjust = 1))
```



Analysis of the Bar Plot (Average Purchasing Power Value by Category):

1. Variation Across Categories:

- The "Very High" purchasing power category has the highest average value, indicating that countries in this category enjoy the strongest economic purchasing power.
- The "Very Low" category has the lowest average purchasing power value, reflecting significant economic struggles.

2. Error Bars Indicating Variability:

- The large error bars in each category show high variability within purchasing power values.
- Categories like "Very High" and "High" have substantial standard deviations, meaning countries within these groups have a wide range of purchasing power values.
- The "Very Low" category also has a large spread, suggesting some countries in this group have even lower purchasing power than the average.

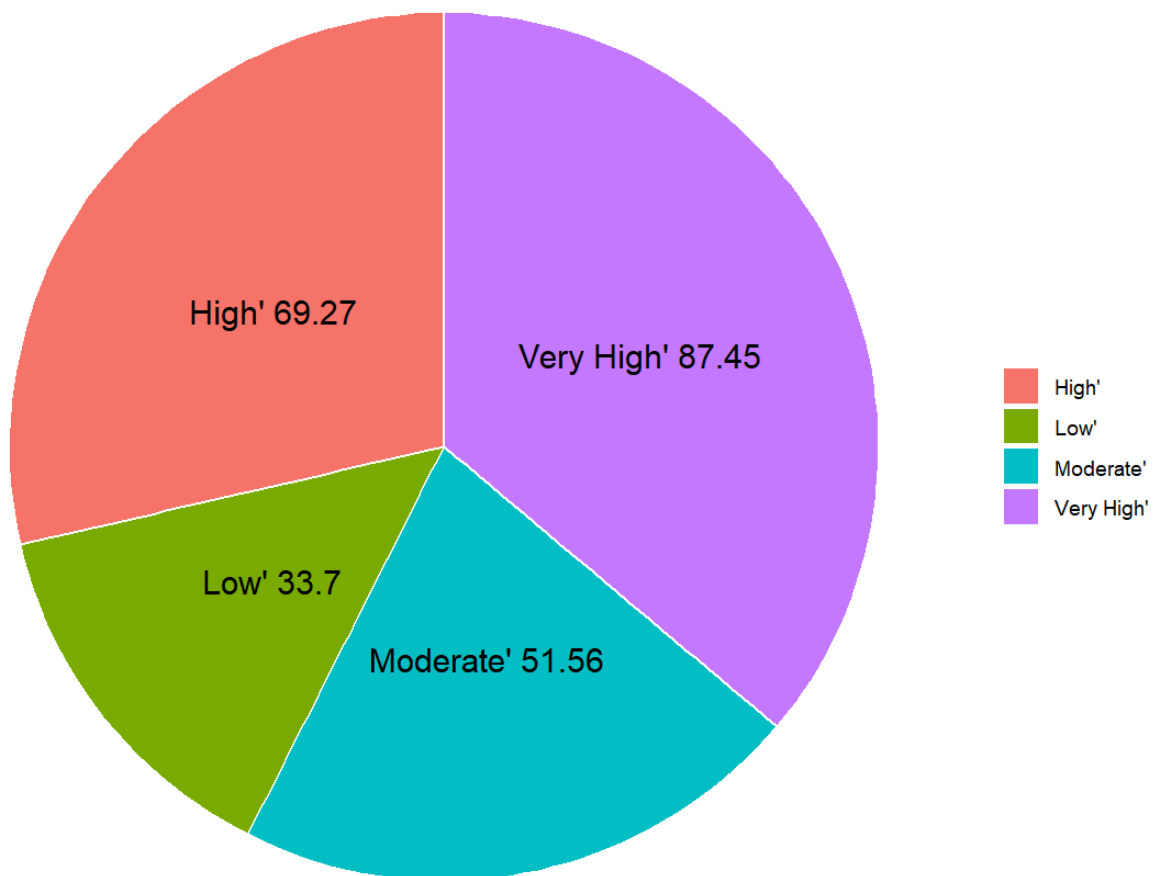
3. Comparisons Between Categories:

- "Moderate" and "Low" categories have similar purchasing power values, indicating a smoother transition between these economic levels.
- The gap between "Very High" and the rest is quite large, reinforcing economic disparity between wealthy and less affluent nations.

```
+ group_by(`Health Care Category`) %>%
+ summarise(Average_Health_Care = mean(`Health Care Value`, na.rm = TRUE))
> df_summary$labels <- paste(df_summary$`Health Care Category`,
round(df_summary$Average_Health_Care, 2))
> ggplot(df_summary, aes(x = "", y = Average_Health_Care, fill = `Health Care
Category`)) +
+ geom_bar(stat = "identity", width = 1, color = "white") +
```

```
+ coord_polar("y", start = 0) +  
+ labs(title = "Average Health Care Value by Category") +  
+ theme_void() +  
+ theme(legend.title = element_blank(), legend.position = "right") +  
+ geom_text(aes(label = labels), position = position_stack(vjust = 0.5), size  
= 5)
```

Average Health Care Value by Category



Analysis of the Pie Chart (Average Health Care Value by Category):

1. "Very High" Category Has the Highest Average (87.45)
 - This indicates that countries classified under "Very High" healthcare have the best healthcare quality and infrastructure.
 - This could be due to advanced medical facilities, well-funded healthcare systems, and efficient healthcare policies.
2. "High" Category Follows (69.27)
 - Countries in the "High" category also have strong healthcare systems but slightly lower than the "Very High" group.
 - The difference suggests that while these countries provide good medical services, they might lack top-tier medical advancements or universal healthcare coverage.
3. "Moderate" Category Has an Average Value of 51.56
 - This indicates a middle level of healthcare quality, where medical services are available but may have limitations in accessibility, funding, or infrastructure.
 - There is room for improvement to move towards the "High" category.
4. "Low" Category Has the Lowest Average (33.7)
 - Countries in this category struggle with poor healthcare systems, likely facing challenges such as limited access to healthcare, low doctor-to-patient ratios, lack of medical supplies, and funding issues.
 - This highlights a critical need for investment in healthcare infrastructure in these nations.

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