Hlt362v exercise 27

Science, Statistics

Due: EXERCISE 27 Questions to be graded What are the independent and dependent variables in Figures 2, A, B, and C?

SOLUTION

i) Fig 2 A

Dependent variable is Systolic Blood Pressure (SBP)

Independent variable is postnatal age in hours

ii) Fig 2 B

Dependent variable is Diastolic Blood Pressure (DBP)

Independent variable is postnatal age in hours

iii) Fig 2 C

Dependent variable is Mean Blood Pressure (MBP)

Independent variable is postnatal age in hours

How would you describe the relationship between the variables in Figures 2, A, B, and C?

SOLUTION

Fig. 2A

Postnatal age hours (x) which is the independent variable is positively related to the Systolic Blood Pressure (SBP) i. e. as the postnatal age hour increases so is SBP. This can be observed also from the graph, the graph for Figure 2 A has a positive slope since the line extends from the lower left corner to the upper right corner and shows a positive relationship. This line shows that the increase in x (independent variable) is also associated with an increase in y (dependent variable). Thus, the independent variable postnatal age is used to predict the dependent variable of Systolic Blood Pressure (SBP). As the hours of postnatal increase, the Systolic Blood

Pressure also increases, which is a positive relationship.

Fig. 2B

Postnatal age hours (x) which is the independent variable is positively related to the Diastolic Blood Pressure (DBP) i. e. as the postnatal age hour increases so is SBP. This can be observed also from the graph, the graph for Figure 2 B has a positive slope since the line extends from the lower left corner to the upper right corner and shows a positive relationship. This line shows that the increase in x (independent variable) is also associated with an increase in y (dependent variable). Thus, the independent variable postnatal age is used to predict the dependent variable of Diastolic Blood Pressure (DBP). As the hours of postnatal increase, the Systolic Blood Pressure also increases, which is a positive relationship.

Fig. 2C

Postnatal age hours (x) which is the independent variable is positively related to the Mean Blood Pressure (MBP) i. e. as the postnatal age hour increases so is MBP. This can be observed also from the graph; the graph for Figure 2 C has a positive slope since the line extends from the lower left corner to the upper right corner and shows a positive relationship. This line shows that the increase in x (independent variable) is also associated with an increase in y (dependent variable). Thus, the independent variable postnatal age is used to predict the dependent variable of Mean Blood Pressure (MBP). As the hours of postnatal increase, the Systolic Blood Pressure also increases, which is a positive relationship.

2. What are the independent and dependent variables in Figures 3, A, B, and C?

SOLUTION

iv) Fig 3A

Dependent variable is Systolic Blood Pressure (SBP)

Independent variable is postnatal age in hours

v) Fig 3B

Dependent variable is Diastolic Blood Pressure (DBP)

Independent variable is postnatal age in hours

vi) Fig 3C

Dependent variable is Mean Blood Pressure (MBP)

Independent variable is postnatal age in hours

How would you describe the relationship between the variables in Figures 3, A, B, and C?

SOLUTION

Fig. 3A

Postnatal age hours (x) which is the independent variable is positively related to the Systolic Blood Pressure (SBP) i. e. as the postnatal age hour increases so is SBP. This can be observed also from the graph; the graph for Figure 3A has a positive slope since the line extends from the lower left corner to the upper right corner and shows a positive relationship. This line shows that the increase in x (independent variable) is also associated with an increase in y (dependent variable). Thus, the independent variable postnatal age is used to predict the dependent variable of Systolic Blood Pressure (SBP). As the hours of postnatal increase, the Systolic Blood Pressure also increases, which is a positive relationship.

Fig. 3B

Postnatal age hours (x) which is the independent variable is positively related to the Diastolic Blood Pressure (DBP) i. e. as the postnatal age hour increases so is SBP. This can be observed also from the graph, the graph for Figure 3B has a positive slope since the line extends from the lower left corner to the upper right corner and shows a positive relationship. This line shows that the increase in x (independent variable) is also associated with an increase in y (dependent variable). Thus, the independent variable postnatal age is used to predict the dependent variable of Diastolic Blood Pressure (DBP). As the hours of postnatal increase, the Systolic Blood Pressure also increases, which is a positive relationship.

Fig. 3C

Postnatal age hours (x) which is the independent variable is positively related to the Mean Blood Pressure (MBP) i. e. as the postnatal age hour increases so is MBP. This can be observed also from the graph; the graph for Figure 3C has a positive slope since the line extends from the lower left corner to the upper right corner and shows a positive relationship. This line shows that the increase in x (independent variable) is also associated with an increase in y (dependent variable). Thus, the independent variable postnatal age is used to predict the dependent variable of Mean Blood Pressure (MBP). As the hours of postnatal increase, the Systolic Blood Pressure also increases, which is a positive relationship.

3. Was there a significant difference in the y intercept for the lines of best fit in Figure 2 from the y intercept for the lines of best fit in Figure 3? Provide a rationale for your answer.

SOLUTION

Yes there was a significant difference in the y intercept for the lines of best fit in Figure 2 from the y intercept for the lines of best fit in Figure 3. The values of the y-intercept in Figure 3 are higher than those in Figure 2. This difference would result to a difference in the estimates of the dependent variable (Ŷ) for all values of independent variable (x) i. e. the Ŷ estimates in Figure 3 would be higher than those in Figure 2.

4. Ŷ represents the predicted value of y calculated using the equation Ŷ = a + bx. In Figure 2, the formula for SBP is Ŷ = 43. 2 + 0. 17x. Identify the y intercept and the slope in this formula. What does x represent in this formula?

SOLUTION

y-intercept= 43. 2

Slope= 0. 17

x is the slope of the line of best fit. The slope of the line indicates the amount of change in y for each one unit of change in x. x is also called the regression coefficient.

5. In the legend beneath Figure 2, the authors give an equation indicating that systolic blood pressure is SBP = 43. 2 + 0. 17x. If the value of x is postnatal age of 30 hours, what is the value for Ŷ or SBP for neonates ≤1, 000 grams? Show your calculations.

SOLUTION

Ŷ (SBP) = 43. 2 + . 17(30) = 43. 2 + 5. 1= 48. 3 neonates

6. In the legend beneath Figure 2, the authors give an equation indicating that systolic blood pressure is SBP = 50. 3 + 0. 12x. If the value of x is postnatal age of 30 hours, what is the value for Ŷ or SBP for neonates 1, 001–

1, 500 grams? Show your calculations.

SOLUTION

Ŷ (SBP) = 50. 3 + . 12(30) = 50. 3 + 3. 6= 53. 9 neonates

7. Compare the SBP readings you found in Questions 5 and 6. Explain the difference in these two readings.

SOLUTION

Despite having equal values of x, the SBP in question 6 is higher than that of in question 5. This difference could be as a result of difference in the initial values (y-intercept), in qst6; the y-intercept (initial value) is much higher than that in qst5 hence a much higher value of SBP in qst6 than in qst5.

8. In the legend beneath Figure 2, the authors give an equation indicating that diastolic blood pressure is DBP = 25. 8 + 0. 13x. If the value of x is postnatal age of 30 hours, what is the value for Ŷ for neonates ≤ 1, 000 grams? Show your calculations.

SOLUTION

Ŷ (DBP) = 25. 8 + . 13(30) = 25. 8 + 3. 9= 29. 7 neonates

9. In the legend beneath Figure 3, the authors give an equation indicating that diastolic blood pressure is DBP = 30. 4 + 0. 11x. If the value of x is postnatal age of 30 hours, what is the value for Ŷ for neonates 1, 001–1, 500 grams? Show your calculations.

SOLUTION

Ŷ (DBP) = 30. 4 + . 11(30) = 30. 4 + 3. 3= 33. 7 neonates

10. In the legend beneath Figure 3, the authors give an equation indicating that diastolic blood pressure is DBP = 30. 4 + 0. 11x. How different is the DBP when the value of x is postnatal age of 60 hours versus the 30 hours

examined in Question 9?

SOLUTION

Ŷ (DBP) = 30. 4 + . 11(60) = 30. 4 + 6. 6= 37. 0 neonates

The value of DBP is higher when the value of x= 60 as compared to when x= 30. It has to be understood that x, (independent variable) shows the change in the value of Ŷ for every unit change in x (independent variable) and so is the difference.

References

Grove, Susan K.. Statistics for Health Care Research: A Practical Workbook. W. B. Saunders Company, 022007. .