Acta Scientific Women's Health (ISSN: 2582-3205)

Volume 6 Issue 1 January 2024

Review Article

The Graph Theoretical Model on Maternal Women and Twin Foetus

V Lavanya[1] and S Vaishnavi[2]*

[1]Assistant Professor, Department of Mathematics, Christopher Arts and Science College, Soorangudi, Tirunelveli, Affiliated to Manonmaniam Sundaranar University, Abishekapatti, Tirunelveli, Tamil Nadu, India

[2]Department of Mathematics, Sri Sarada College for Women (Autonomous) Tirunelveli, Affiliated to Manonmaniam Sundaranar University, Abishekapatti, Tirunelveli, Tamil Nadu, India

***Corresponding Author:** S Vaishnavi, Department of Mathematics, Sri Sarada College for Women (Autonomous) Tirunelveli, Affiliated to Manonmaniam Sundaranar University, Abishekapatti, Tirunelveli, Tamil Nadu, India.

Received: December 08, 2023

Published: December 14, 2023

Abstract

The major goal in this paper is about the graphical representation of a maternal women and twin foetus. Here the oxygenated blood from the maternal women goes to the foetus and the deoxygenated blood from the foetus exists through the maternal women. The representation of these circulations is done by using digraphs.

Keywords: Digraph; Twin Babies; Umbilical Cords; Blood Circulations

Introduction

Graph theory is a part of mathematics most particularly in discrete mathematics. Now-a-days, graph theory plays a major role in the image sub-division which is the effective research [1,5]. Since the beginning of research in bio-mathematical sciences, there has been huge progress in its development. In this paper, we have presented the mechanism of blood circulation in maternal women and twin foetus using graph theory. The most important concept is to get the blood flow in the unborn twin baby regarding oxygenated and deoxygenated blood circulation using the graphical representation.

Digraph

A graph in which the element of the edge set are ordered pair of vertices is called directed graph or digraph.

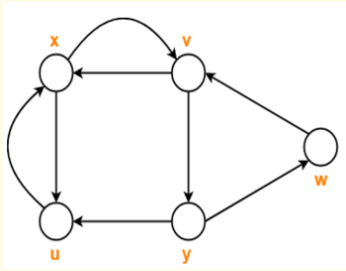

Figure 1

Mathematical model of a maternal women and twin foetus

The twin foetus are may be identical or non-identical. It was depending upon the chorionic and aminiotic acids.

Non-identical

- Dichorionic and Diamniotic with two placenta
- Dichorionic and Diamniotic.

Identical

- Monochorionic and Diamniotic
- Monochorionic and Monoamniotic.

The continuous lines represent the oxygenated blood and the discontinuous lines represents deoxygenated blood in the following graphical figures.

Dichorionic and diamniotic with two placentas

This is dizyotic with two placentas, two umbilical veins, two chorions, two amnions.

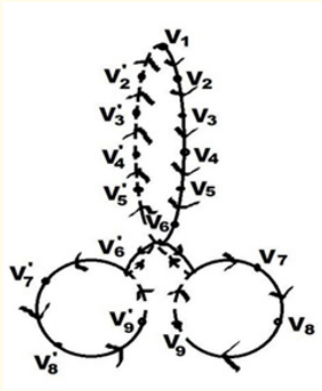

Figure 2

V_1 - Air
V_2&V_2' - Lungs
V_3&V_3' - Heart
V_4&V_4' - Circulations
V_5&V_5' - uterus
V_6&V_6'- placenta
V_7&V_7'- umbilical vein
V_8&V_8'- fetal circulations
V_9&V_9' -umbilical artery

The oxygen from the air is mixed with blood and that oxygenated blood goes to the foetus through the maternal women. Here there is twin babies in one womb. They are separated by two eggs and amniotic acids. The two placentas are separated. The process of blood circulation is done for the two babies simultaneously.

The process of a single baby. Air in the atmosphere is denoted by V_1. The air goes to the lungs (V_2), then the oxygenated blood goes to the heart (V_3). Then the blood circulates all over body of maternal women. At the time of blood circulations, the oxygenated blood goes to the placenta (V_6) through uterus (V_5) of mother. Then the blood goes to umbilical vein of a baby (V_7). Then fetal circulations (V_8) take place. Here the oxygenated blood converted into deoxygenated blood. Then the deoxygenated blood exists from the foetus through umbilical artery (V_9). The same process is repeated for another baby in the womb also. That is denoted by V_6',V_7',V_8', V_9'. The deoxygenated blood from the foetus is returns back to the mother through the same placentas, uterus, heart and lungs (V_6,V_7,V_8,V_9).

Dichorionic and diamniotic

This is dizyotic with two fused placentas, two umbilical veins, two chorions, two amnions.

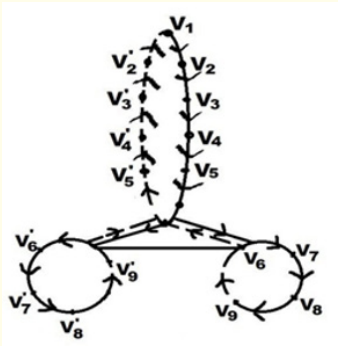

Figure 3

V_1 - Air
V_2& V_2' - Lungs
V_3& V_3' - Heart
V_4& V_4' - Circulations
V_5& V_5' - uterus
V_6 &V_6' - placenta
V_7 &V_7' - umbilical vein
V_8 &V_8'- fetal circulations
V_9 &V_9' - umbilical artery

The oxygen from the air is mixed with blood and that oxygenated blood goes to the foetus through the maternal women. Here there is twin babies in one womb. They are separated by two eggs and amniotic acids. The two placentas are fused together. The process of blood circulation is done for the two babies simultaneously.

The process of a single baby. Air in the atmosphere is denoted by V_1. The air goes to the lungs (V_2), then the oxygenated blood goes to the heart (V_3). Then the blood circulates all over body of maternal women. At the time of blood circulations, the oxygenated blood goes to the placenta (V_6) through uterus (V_5) of mother. Then the blood goes to umbilical vein of a baby (V_7). Then fetal circulations (V_8) take place. Here the oxygenated blood converted into deoxygenated blood. Then the deoxygenated blood exists from the foetus through umbilical artery (V_9). The same process is repeated for another baby in the womb also. That is denoted by V_6', V_7', V_8', V_9'. The deoxygenated blood from the foetus is returns back to the mother through the same placentas, uterus, heart and lungs (V_6,V_7,V_8,V_9).

Monochorionic and diamniotic

This is monozygotic with single placenta, two umbilical veins, one chorion, two amnions.

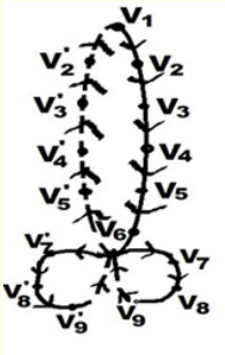

Figure 4

V_1 - Air
V_2&V_2' - Lungs
V_3&V_3' - Heart
V_4&V_4' - Circulations
V_5&V_5' - uterus
V_6 - placenta
V_7&V_7' - umbilical vein
V_8&V_8'- fetal circulations
V_9&V_9' - umbilical artery

The oxygen from the air is mixed with blood and that oxygenated blood goes to the foetus through the maternal women. Here there is twin babies in one womb. They had one placenta only. The process of blood circulation is done for the two babies simultaneously.

The process of a single baby. Air in the atmosphere is denoted by V_1. The air goes to the lungs (V_2), then the oxygenated blood goes to the heart (V_3). Then the blood circulates all over body of maternal women. At the time of blood circulations, the oxygenated blood goes to the placenta (V_6) through uterus (V_5) of mother. Then the blood goes to umbilical vein of a baby (V_7). Then fetal circulations (V_8) take place. Here the oxygenated blood converted into deoxygenated blood. Then the deoxygenated blood exists from the foetus through umbilical artery (V_9). The same process is repeated for another baby in the womb also. That is denoted by V_6',V_7',V_8', V_9'. The deoxygenated blood from the foetus is returns back to the mother through the same placenta, uterus, heart and lungs (V_5,V_4,V_3,V_2,V_1).

Monochorionic and monoamniotic

This is monozygotic with single placenta, two umbilical veins, one chorion, one amnion.

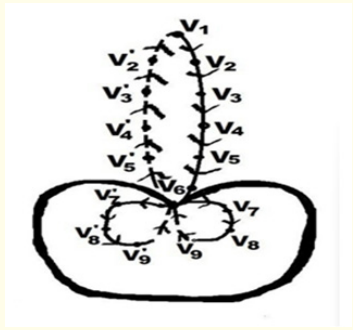

Figure 5

V_1 - Air
V_2&V_2' - Lungs
V_3&V_3' - Heart
V_4&V_4'- Circulations
V_5&V_5' - uterus
V_6 - placenta
V_7&V_7'- umbilical vein
V_8&V_8'- fetal circulations
V_9&V_9' - umbilical artery

The oxygen from the air is mixed with blood and that oxygenated blood goes to the foetus through the maternal women. Here there is twin babies in one womb. They are not separated by two

placentas. They had one placenta only. The process of blood circulation is done for the two babies simultaneously. In this graphical representation, the outer most circle shows that the two babies are together. There is no twochorionic and single amniotic fluids.

The process of a single baby. Air in the atmosphere is denoted by V_1. The air goes to the lungs (V_2), then the oxygenated blood goes to the heart (V_3). Then the blood circulates all over body of maternal women. At the time of blood circulations, the oxygenated blood goes to the placenta (V_6) through uterus (V_5) of mother. Then the blood goes to umbilical vein of a baby (V_7). Then fetal circulations (V_8) take place. Here the oxygenated blood converted into deoxygenated blood. Then the deoxygenated blood exists from the foetus through umbilical artery (V_9). The same process is repeated for another baby in the womb also. That is denoted by V_6',V_7',V_8', V_9'. The deoxygenated blood from the foetus is returns back to the mother through the same placenta, uterus, heart and lungs (V_5,V_4,V_3,V_2,V_1).

Conclusion

Here we conclude that the application of digraph is possible for biological field especially in the blood circulation of maternal women and twin foetus. This will be very helpful for higher secondary students and non-biological students who having the interest in biology and graph theory in understanding ofoxygenated and deoxygenated blood circulations of a maternal women and twin foetus.

Bibliography

1. Basavaprasad B., *et al*. "A graph theoretical network model on human heart" (2020).

2. V Jude Annie Cynthia., *et al*. "Mechanism of the Heart Using Graph Theory".

3. University of Rochester Medical Centre, Blood Circulation in the Fetus and Newborn-Health Encyclopedia.

4. Baran S and K Davis. Mass Communication Theory: Foundations, Ferment and Future. 5th ed. Boston: Wadsworth Publishing (2009).

5. Barker M. "I have seen the future and it is not here yet…; Or, on being ambitious for audience research". *Communication Review* 9 (2006): 123-141.

6. Corner J. "Reappraising Reception: Aims, Concepts and Methods". pp 280-304 in J. Curran and M. Gurevitch (eds) Mass Media and Society, 2nd ed. London: Arnold (1996).

7. Couldry N. "Theorising Media as Practice". *Social Semiotics* 14.2 (2004): 115-132.

8. Gurevich M and P Scannell. Canonization Achieved? Stuart Hall's 'Encoding/Decoding, pp 231-47 in E. Katz, J. D. Peters, T. Liebes & A. Orloff (eds) Canonic Texts in Media Research. Cambridge: Polity Press (2003).