

Preliminary Investigation of Electromagnetic Radiation (EMR) Between Adults and Children

Ros Shilawani S Abdul Kadir, Aziati Husna Awang*, Muhamad Azizularif Mohamad Azizan, Suzi Seroja Sarnin, Suhaila Subahir, Roshakimah Mohd Isa

Universiti Teknologi MARA (UiTM) Shah Alam, 40450 Shah Alam, Selangor, Malaysia.

E-mail: ros885@uitm.edu.my, aziatihusna@uitm.edu.my*, azizularif97@yahoo.com, suzis045@uitm.edu.my, suhailas@uitm.edu.my, roshakimah@uitm.edu.my

Abstract

This research is concerned with the initial investigation of electromagnetic radiation (EMR) between adults and children which involved 30 participants from the adult group and 32 participants from the children group. The range of age of the children group is set at 3-12 years old and for adult group is set at ages of 20-25 years old. The EMR is created by an electrical current within the human body and it vibrates on its own characteristics radiation of frequency around the body. A frequency detector was used to measure the EMR frequencies (in MHz) around 16 points of the human body. The obtained data were assessed by examining the pattern and behavior of captured frequencies, as well as comparing the frequencies of adults and children. Microsoft Excel was used to analyze the data by generating graphs and charts. The collected data were also converted into color code hence; physical health condition was obtained. From the data analysis, adults have higher frequencies of reading in all body points as compared to children. Consequently, adults and children also have different frequency patterns, color-coded and health scores in right-left comparison and segmentation comparison. The analysis also showed that children have better health scores as compared to adults. In conclusion, the EMR emitted from adults and children are significantly different in frequency and have their own characterized frequency patterns and children have better health scores compared to adults.

Keywords: Electromagnetic Radiation (EMR), Adults, Children, Frequency Detector

1. Introduction

Adults and children are different physically and psychologically. A child is a person who is in the developmental stage between infancy and puberty. Researchers often refer to two further stages of development that occur between infancy and adolescence: early childhood and middle childhood. Early childhood is defined as the period between the ages of two and five years. Middle childhood is commonly defined as the years between the ages of six and twelve [1]. This research concerns children from early and middle childhood.

The development from childhood to adulthood takes place on several levels: biological, cognitive, social, emotional, and behavioral. Internal variables such as heredity drive development, whereas extrinsic factors such as nutrition and culture shape it [1]. Then, children transition into adolescence and then transition to adulthood depending on the culture's definition of adults. Adolescence to adulthood is called emerging adulthood, which it's an important time for very important development in the brain especially in terms of strengthening interconnections across brain structures [2] where it is involved in high-level thinking which affects the whole body.

Theoretically and scientifically, each person has an EMR vibration in their body, and this vibration can reveal information on a variety of aspects of a person's physical health, and emotional and psychological status [3]. Right

now, the world is moving faster than ever before causing most adults to experience a continuous stream of pressure to keep up, stress to do well, and fatigue in their body [4][5][6]. These negative thoughts and negative energy within an adult's body have caused the EMR of the human body to become unstable [7]. These findings prompted the initial investigation of EMR using a frequency detector, with the aim of determining if there are differences in EMR frequency between children and adults. Hence, the main target of this research is to analyze, compare, and characterize the pattern of EMR between adults and children in 16 points of the left-right side of the human body.

2. Literature Review

2.1. Human Electromagnetic Radiation

The concept of energy fields has a long history in Eastern cultures, where health, healing, self-defense, and life are all characterized in terms of energy flow [8]. In the Western world, it is thought that every living creature has its own radiation, which radiates into space surrounding the body in an oval form and is represented as endogenous energy fields created by and contained inside the body [9]. Human electromagnetic radiation varies depending on the health and activity of the body as a biological system [10] [11]. Furthermore, earlier research has demonstrated that the human body has varied electromagnetic radiation characteristics depending on gender [9] [10] [11]. This occurs because of small electrical currents, or bioelectricity, which is a

component of the electrochemical energy system that exists because of chemical reactions that occur naturally in the human body [12] [13]. As a result, the electromagnetic field that surrounds the body is generated by an electrical current within the human body, and it vibrates on its own characteristics radiation of frequency around the body [14]. The human body is divided into several sections in biomechanics research, including the head, neck, upper torso, lower torso, upper arm, forearm, hand, thigh, calf, and foot [15].

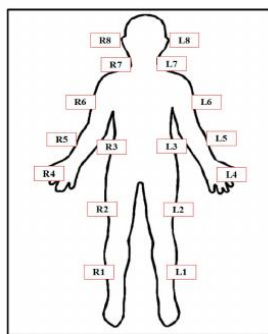


Fig. 1. 16 points surround the body [14].

This EMR could be captured using various detector instruments like BEO GDV (Gas Discharge Visualization) [16], Dipole Antenna, Lecher Antenna, Frequency Wave Detector, Biopulsar Reflexograph, Aura Color Space Visualizer algorithm, Quantum resonance magnetic analyzer [17], Biophoton detector [18] and Kirlian photography [19]. In this research, the human body consists of 16 points surrounding the body, namely the left side and right side with 8 points representing each part [19], particularly R1-R8 and L1-L8 as shown in Fig. 1.

2.2. Adult

An adult is a biologically human being that has reached maturity in puberty for women, having menstruation and blossoming breasts while for men, it growth of facial hair, and deep voice, and the development of pubic hair in both genders [2]. Physical strength, coordination, and dexterity peak in both genders in their late twenties and early thirties, then gradually decline throughout life, even if they continue an active lifestyle [2]. Sensory acuity is likewise at its best in the early 20s, while visual acuity stays high until middle age when people tend to become farsighted and require reading glasses [2]. Hearing begins to deteriorate slightly by the late twenties, particularly for high-pitched tones [2].

Males and females differed greatly in much research, particularly in terms of the human physical body and emotions. It was discovered that gender disparities in emotions and self-control were evident as early as the infancy stage [20]. Males and females have various frequency radiation properties, and frequency radiation analysis of the human body, particularly the thoracic

region, can be utilized to classify and categorize human gender [21]. It was also discovered that due to differences in brain structure and activity, males and females emit distinct frequencies of EMR in the upper body region, where neuroendocrine mechanisms that are engaged in the combination of genes and hormones broadcast various frequencies of EM [20]. Previous studies also reveal that humans have various frequency radiation characteristics depending on gender and that it is possible to identify humans based on frequency radiation analysis of the human body, notably in the arm segment [22].

2.3. Children

In terms of biology, a group of children are considered human beings that progress from stages of birth and head to the stages of puberty. The development of children is divided into three sections, which are early childhood development, middle childhood development, and adolescent development. The growth pattern of middle childhood children in the age of 7 – 10 years old, is gaining in weight and increasing in height. During this development period, boys and girls have similarities in physical like gaining height and weight as is accompanied by an increase in muscular strength. The relative proportion of muscle and fat tissue are the same for both genders, but this will begin to change in age about 11 years old where boys generally develop more muscle tissue and girls develop more fatty tissue. Throughout this middle childhood, boys and girls perform similarly in most activities related to motor skills. The boys show a slightly greater difference in overall strength especially in forearm strength than girls. Girls, on the other hand, have slightly better limb coordination and general body flexibility, which is advantageous in dance, balancing, and gymnastics [1].

The child's energy field is entirely open and exposed to his surroundings. The energy environment has a constant influence on the child, and the child is always reacting to it. This idea, since infants are born with open and susceptible human energy fields, suggests that children have more physical and psychological energy and are healthier. In the study's preliminary findings, it was discovered that younger children's energy fields were less dense and had more translucency than older children's energy fields. The energy field was also narrower or shorter in these younger children, with more frequent square openings, more observed rings, and a more dynamic field overall. The discovery that the EMR of the youngest children is smaller, less dense, and more dynamic is interesting because it supports the notion of children's fields being more fully open but also more vulnerable [8].

Another study found differences in movement coordination between children with attention-deficit/hyperactivity disorder (ADHD) and healthy children when doing simple and complex tasks. This is because children with ADHD have poor coordination and perform poorly in both simple and complicated tasks.

However, there is no difference in reaction time between children with ADHD and children without ADHD, indicating that there is no substantial difference in the speed of visual-motor integration between the two groups, implying that some components of cognitive processing may be the same [23].

Consequently, there has been research on dyslexia and normal children based on writing words on paper, and it has been found that the frequency spectrum pattern and frequency ranges of dyslexic and normal children in relax and writing are different based on EEG signals. During relaxing or writing activities, dyslexic children produce a higher frequency of EEG signal than normal children [24]. Another study discovered that dyslexic children spend more energy, especially if they have autism and respond improperly while writing. Even if they write correctly, dyslexic children's log energy entropy of EEG data suggests that they are still impaired because they consume more energy in the right hemisphere of the brain [25].

2.4. Frequency Detector

Since the human radiation wave is invisible and highly defined, it is difficult to measure and record the readings. Fig. 2 shows an antenna-equipped hand-held detector that provides a realistic, real-time readout of EMR frequencies in natural states at the time of testing. This detector additionally incorporates an ultrasensitive detector and filter module for determining the relative field strength of electromagnetic waves that interact with antennas. [3]. This system recognizes and defines 15 distinctive colors of the visual spectrum to define 15 distinct electromagnetic fields in various parts and distances from the body [4].



Fig. 2. Frequency Detector [13].

In previous research, it was demonstrated that the Frequency Detector may be used as an acceptable instrument for measuring stress, with Heart Rate Variability (HRV) and Galvanic Skin Response (GSR) as references [4] [5]. It's also can be used to detect fatigue in human body differentiate the frequencies of the human body before and after exercise on the subjects [6].

Another study showed that the Frequency Detector may be used to distinguish between post-stroke patients and non-stroke participants by comparing frequency acquired from the left and right sides, as well as chakra points. Non-stroke individuals had higher EMR for left

and right-side frequency but lower EMR for chakra than post-stroke patients [19].

3. Methodology

3.1 Flowchart of Research

Fig. 3 shows the flowchart of this research. The first step is to find a group of volunteers from adults and children. Then, a record of volunteers' demographic data will be collected such as name, age, and health condition. In order to avoid any interruptions, the participants were told to remain calm and steady during the EMR measurement. Data was collected on the EMR from 8 points on the left and right sides of the body, respectively. Lastly, the EMR data will be analyzed to conclude the results of the research.

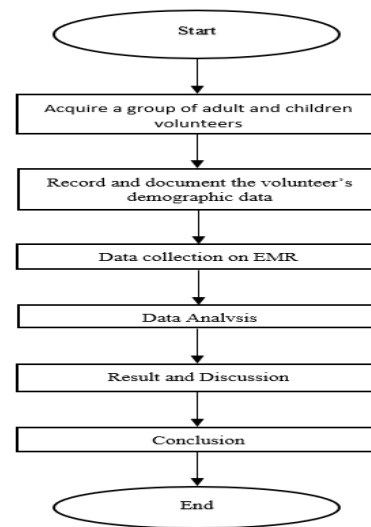


Fig. 3. Flowchart of the research

3.1. Data Collection and Data Analysis

30 healthy adults (20-25 years old) and 32 healthy children (3-12 years old) consisting of both genders participated in this study. The study was conducted in a room or space that comfortable and free of any electronic signal that may interrupt the measurement. The data was analyzed using a right-left comparison of adults and children, as well as body segmentation of the upper, middle, and lower body, as shown in Fig. 4, Fig. 5, and Fig. 6. Microsoft Excel was utilized for data analysis, and the data was categorized into 15 color variants of bioenergy, as shown in Fig. 7. This color variation will be converted into the score presented in Table 1 and used to determine a participant's health score category in Table 2.

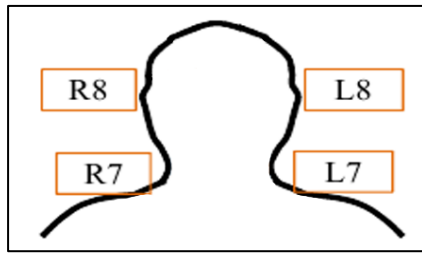


Fig. 4. Upper Segment Points [21]

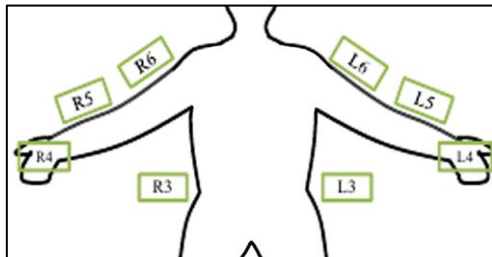


Fig. 5. Middle Segment Points [20][22]

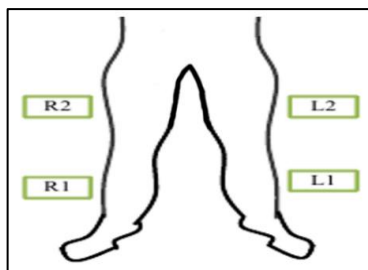


Fig. 6. Lower Segment Points [15]

Colour	MHz	Colour	MHz	Colour	MHz	Colour	MHz
Gold	4.0-4.1	Gold	15.7-16.5	Gold	62.5-65.0	Gold	249.8-264.2
Yellow	4.2-4.3	Yellow	16.6-17.4	Yellow	66.1-69.9	Yellow	264.3-279.7
Green	4.4-4.6	Green	17.5-18.5	Green	70.0-74.1	Green	279.8-296.7
Cyan	4.7	Cyan	18.6-18.7	Cyan	74.2-74.9	Cyan	296.8-299.7
Gray/Black	4.8	Gray/Black	18.8-19.3	Gray/Black	75.0-77.5	Gray/Black	299.8-310.2
Cyan	4.9	Cyan	19.4-19.6	Cyan	77.6-78.5	Cyan	310.3-314.2
Blue	5.0-5.1	Blue	19.7-20.7	Blue	78.6-83.1	Blue	314.3-332.7
Navy	5.2-5.5	Navy	20.8-22.0	Navy	83.2-88.1	Navy	332.8-352.7
Purple	5.6-5.8	Purple	22.1-23.3	Purple	88.2-93.4	Purple	352.8-373.7
Orchid	5.9-6.1	Orchid	23.4-24.6	Orchid	93.5-98.6	Orchid	373.8-394.7
Silver	6.2	Silver	24.7-25.0	Silver	98.7-100.0	Silver	394.8-400.2
White	6.3	White	25.1-25.3	White	100.1-101.1	White	400.3-404.9
Burgundy	6.4-6.5	Burgundy	25.4-26.2	Burgundy	101.2-104.8	Burgundy	405.0-419.4
Red	6.6-6.9	Red	26.3-27.7	Red	104.9-111.1	Red	419.5-444.5
Rose	7.0-7.3	Rose	27.8-29.4	Rose	111.2-117.8	Rose	444.6-471.4
Orange	7.4-7.8	Orange	29.5-31.2	Orange	117.9-124.8	Orange	471.5-499.4
Gold	7.9-8.2	Gold	31.3-33.0	Gold	124.9-132.1	Gold	499.5-528.5
Yellow	8.3-8.7	Yellow	33.1-34.9	Yellow	132.2-139.8	Yellow	528.6-559.4
Green	8.8-9.2	Green	35.0-37.0	Green	139.9-148.3	Green	559.5-593.4
Cyan	9.3	Cyan	37.1-37.4	Cyan	148.4-149.8	Cyan	593.5-598.4
Gray/Black	9.4-9.6	Gray/Black	37.5-38.7	Gray/Black	149.9-155.1	Gray/Black	599.5-628.5
Cyan	9.7-9.8	Cyan	38.8-39.2	Cyan	155.2-157.1	Cyan	628.6-628.5
Blue	9.9-10.3	Blue	39.3-41.5	Blue	157.2-166.3	Blue	628.6-665.4
Navy	10.4-11.0	Navy	41.6-44.0	Navy	166.4-176.3	Navy	665.5-705.4
Purple	11.1-11.6	Purple	44.1-46.7	Purple	176.4-186.6	Purple	705.5-747.4
Orchid	11.7-12.3	Orchid	46.8-49.3	Orchid	186.9-197.3	Orchid	747.5-789.4
Silver	12.4-12.5	Silver	49.4-50.0	Silver	197.4-200.1	Silver	789.5-800.5
White	12.6	White	50.1-50.6	White	200.2-202.4	White	800.6-809.9
Burgundy	12.7-13.1	Burgundy	50.7-52.4	Burgundy	202.5-209.7	Burgundy	810.0-836.9
Red	13.2-13.8	Red	52.5-55.5	Red	209.8-222.2	Red	839.0-889.1
Rose	13.9-14.7	Rose	55.6-58.9	Rose	222.3-235.7	Rose	889.1-942.0
Orange	14.8-15.6	Orange	59.0-62.4	Orange	235.8-249.7	Orange	942.0-1000

Fig. 7. Human Body Radiation Detector Identifies by Colors and Frequencies [26]

Table 1. Total range score [11]

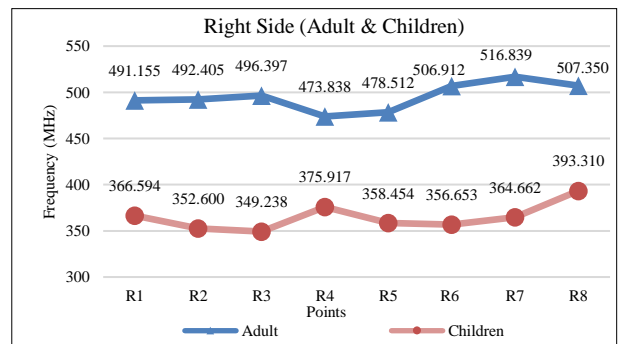
Category	Color	Score
Excellent	Gold, Silver	5
Good	White, Orchid, Cyan	4
Moderate	Rose, Blue, Purple	3
	Orange, Yellow, Navy, Gray, Green	2
Poor	Burgundy	1
	Red	0

Table 2. Physical Health Score [11]

Range of Total Score (%)	Category
>75	Excellent
56 - 75	Good
31 - 55	Moderate
15 - 30	Poor
0 - 14	Bad

4. Results and Discussions

4.1. Right & Left Side Comparison Between Adults and Children



points (Adults & Children)

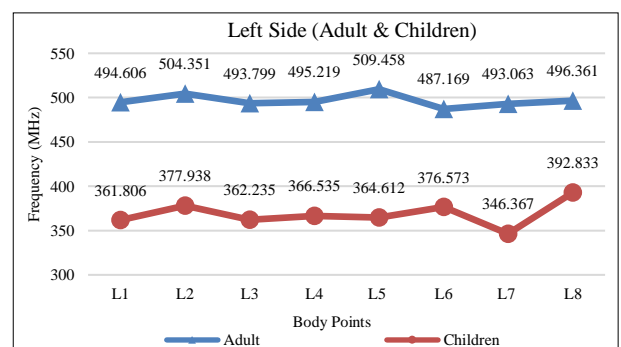


Fig. 9. Left side of body points (Adults & Children)

Fig. 8 and Fig. 9 show that the frequencies on both sides of adults and children are considerably different, with adults having a higher average frequency across all points. This might be because adults' bodies are considerably larger and more mass than children's bodies, which are still in the growing phase [27]. In Fig. 8, there are noticeable patterns in adult and children graphs. The

adults' graph shows that there was a slight rise from R1 to R3 and then a significant fall occurred at R4, where it rose again until R7 and then declined again. For the children's graph, the average frequency dropped from R1 to R3, then surged up at R4, after which it gradually declined until R6, and then increased until R8. It seems that the Right-side frequency pattern of adults and children seems to be almost mirroring each other based on Fig. 8.

As seen in Fig. 9, both graphs exhibit nearly identical trend patterns from L1 to L4, where they fluctuate similarly. The graph for adults shows an increase from L4 to L5, but then declines at L6 and gradually climbs after that. The children's graph has a different pattern than the adults' graph where after L4, it drops slightly in L5 and after L5, it fluctuates drastically until L8.

Table 3. Right Side Color Analysis

Group	R1	R2	R3	R4	R5	R6	R7	R8
Adults	491. 155	492. 405	496. 397	473. 838	478. 512	506. 912	516. 839	507. 350
Children	366. 594	352. 600	349. 238	375. 917	358. 454	356. 653	364. 662	393. 310

Table 4. Left Side Color Analysis

Group	L1	L2	L3	L4	L5	L6	L7	L8
Adults	494. 606	504. 351	493. 799	495. 219	509. 458	487. 169	493. 063	496. 361
Children	361. 806	377. 938	362. 235	366. 535	364. 612	376. 573	346. 367	392. 833

Table 5. Right Side Physical Health Score

Group	Score	Full Score	%	Category
Adults	25	40	62.5%	Good
Children	24	40	60%	Good

Table 6. Left Side Physical Health Score

Group	Score	Full Score	%	Category
Adults	22	40	55	Moderate
Children	26	40	65	Good

All frequencies in Fig. 8 and Fig. 9 are color-coded according to Fig. 7 and tabulated in Table 3 and Table 4. These tables show that adults and children have distinct and scarcely comparable color codes, with adults having more orange and gold color codes than children, who have purple, navy, and pink color codes on both sides. Hence, all of these colors are translated into scores based on Table 1, and the scores are tabulated in Table 5 and Table 6.

In Table 5, it appears that on the right-hand side, adults have a slightly better score than children in health physical score, with a difference of 2.5%. With those scores, both groups are put into the "Good" category in health physical analysis. In Table 6, however, the adult group has a lower score than the children on the left side. With a physical health score that is 10% lower than that of children, adults are classified as "Moderate," while children are classified as "Good." Table 7 combines the scores from Table 5 and Table 6, giving adults a score of

47 and children a score of 50. Adults had a 3.75% lower health score than children, but both groups are categorized as "Good".

Table 7. Total Score & Category of Adults and Children in Health Score

Group	Score	Full Score	%	Category
Adults	47	80	58.75%	Good
Children	50	80	62.50%	Good

4.2. Analysis of Body Segmentation of Upper, Middle, and Lower part

This section of analysis of human EMR was analyzed in different segmentations of the upper, middle, and lower segments. Then, in each segment, the adult's and children's average frequencies were compared and classified into color as in Table 1 and scored by following Table 2 classification and Table 3 categorization.

4.2.1 Analysis of Upper Segment

Fig. 10 illustrates that the upper segment of adults has a higher frequency than children. It is also observed that the frequency values on both sides of the adults are almost equal, resulting in a practically identical flat line on the line chart. Meanwhile, the children's line graph has a distinct pattern from the adults, where it seemed to have high and low points in comparison to the previous points.

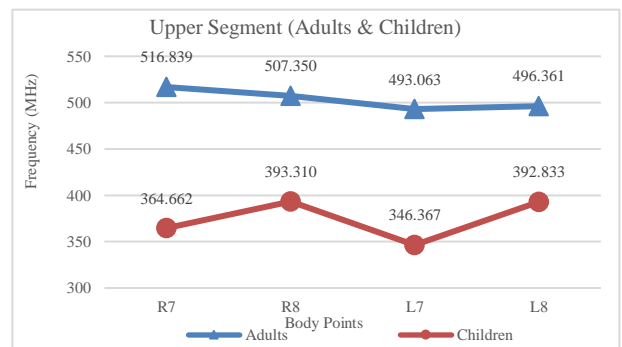


Fig. 10. Upper Segment Frequencies

Table 8. Upper Segment Color Analysis

Group	R7	R8	L7	L8
Adults	516.839	507.350	493.063	496.361
Children	364.662	393.310	346.367	392.833

Table 9. Upper Segment Physical Health Score

Group	Score	Full Score	%	Category
Adults	14	20	70	Good
Children	13	20	65	Good

In Table 8, the frequencies in the upper segment of adults and children are color-coded. As a result, those colors were transformed into scores, which can be shown

in Table 9, where adults have a 5% greater score than children. Even though adults have a greater score than youngsters, both groups are in the "Good" category.

4.2.2 Analysis of Middle Segment

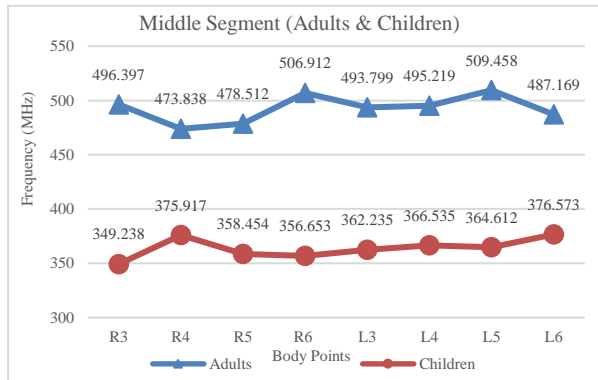


Fig. 11. Middle Segment Frequencies

Table 10. Middle Segment Color Analysis (Right)

Group	R3	R4	R5	R6
Adults	496.397	473.838	478.512	506.912
Children	349.238	375.917	358.454	356.653

Table 11. Middle Segment Color Analysis (Left)

Group	L3	L4	L5	L6
Adults	493.799	495.219	509.458	487.169
Children	362.235	366.535	364.612	376.573

Table 12. Middle Segment Color Analysis

Group	Score	Full Score	Percentage	Category
Adults	22	40	55%	Moderate
Children	25	40	62.5%	Good

The graphs shown in Fig. 11, show that the adults have higher frequencies than the children in all body points of the middle segment. The children's line graph appeared to be flat on its Left Side while the Right side had drastic differences in frequency values at R3 and R4. For the adults, the line graph is shifting and inconsistent throughout all body points in the middle segment. In Table 10 and Table 11, the average frequencies of the middle segment of children and adults are interpreted into color. In Table 12, children have a better score than adults with 7.5% higher which put the children in the "Good" category while the adult put into the "Moderate" category. Thus, children are better than adults in physical health.

4.2.3 Analysis of Lower Segment

Fig. 12 shows that adults have greater frequency values for the lower segment than children. The adults' line graph demonstrates an increasing trend with a small increment. The children's line graph shows a decreasing trend in the beginning and afterward, rise slowly. Table 13 shows that adults have three oranges and one gold

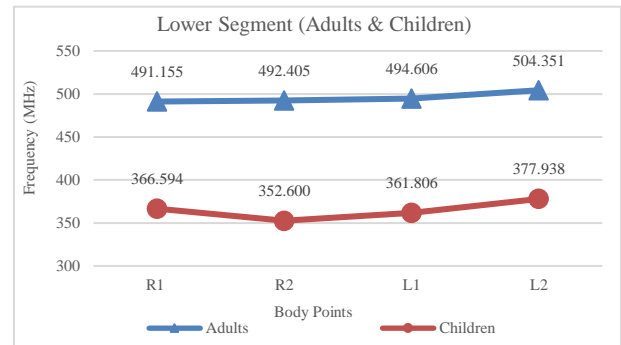


Fig. 12. Lower Segment Frequencies

Table 13. Lower Segment Colour Analysis

Group	R1	R2	L1	L2
Adults	491.155	492.405	494.606	504.351
Children	366.594	352.600	361.806	377.938

Table 14. Lower Segment Physical Health Score

Group	Score	Full Score	%	Category
Adults	11	20	55%	Moderate
Children	12	20	60%	Good

color, whereas children have two purple, one navy, and one pink color. When these colors were turned into a score, it revealed that adults had a 5% lower score than children, as seen in Table 14. Therefore, the children were placed in the "Good" group, while the adults were placed in the "Moderate" category in terms of physical health. Overall, the children have better physical health scores even though they have lower frequency values compared to adults.

5. Conclusion

Finally, in conclusion, this study demonstrated that children and adults differ in terms of EMR frequency and frequency pattern whereas adults have higher average frequency in all points. It also shows that children and adults have unique frequency patterns on both sides. In terms of physical health scores, children have better physical health scores compared to adults overall even in segmentation. Thus, making children healthier than adults [28].

Acknowledgment

The authors would like to thank members School of Electrical Engineering, College of Engineering, Universiti Teknologi MARA, Shah Alam, Malaysia for their guidance and support during this project.

References

1. S. Rathus, *Childhood and Adolescence: Voyages in Development*. Cengage Learning, 2011. <https://tinyurl.com/yktv46sm>
2. R. V Kail and J. C. Cavanaugh, *A Life-Span View*, Cengage Learning, 2019. <https://tinyurl.com/hfdsu425>

3. F. Bin Jumain et al., "Mood assessment using human electromagnetic radiation," Proceedings of the 2017 IEEE International Conference on Signal and Image Processing Applications, ICSIPA 2017, pp. 251–256, 2017.
4. R. Raveendra, M. Regueiro, and K. George, "Acute Stress Detection and Analysis Using Resonant Field Imaging (RFI) Technique," 2018 9th IEEE Annual Ubiquitous Computing, Electronics and Mobile Communication Conference, UEMCON 2018, pp. 1009–1016, 2018.
5. N. I. Abdullah, O. C. Bakar, A. Omar, Z. H. Murat, and M. I. Selamat, "The screening of human psychological stress using Resonant Field Imaging (RFI) frequency counter," RFM 2013 - RFM 2013 - 2013 IEEE International RF and Microwave Conference, Proceedings, pp. 382–386, 2013.
6. N. A. A. Nazari, N. M. Fauzi, N. Farahiyah Rosli, S. N. Zakaria, S. Z. A. Jalil, and N. M. Noor, "Physiological studies of human fatigue using human electromagnetic radiation," Proceedings of the 2017 IEEE International Conference on Signal and Image Processing Applications, ICSIPA 2017, pp. 559–562, 2017. [Retracted Paper]
7. N. I. Abdullah, O. C. Bakar, A. Omar, Z. H. Murat, and M. I. Selamat, "Bioenergy frequency measurement of stressed and non-stressed individuals using Resonant Field Imaging (RFI) frequency counter," IECBES 2014, Conference Proceedings - 2014 IEEE Conference on Biomedical Engineering and Sciences: "Miri, Where Engineering in Medicine and Biology and Humanity Meet" no. December 2014, pp. 667–671, 2014.
8. R. M. Dougherty, "A Comparison Of Human Energy Fields Among Children, Youth, Adults & Dahn Masters," Journal of General Virology, vol. 33, no. 1, pp. 61–70, 1976.
9. S. Z. A. Jalil, M. N. Taib, and H. Abdullah Idris, "Investigation of frequency radiations of the human body," Proceedings of 2010 IEEE EMBS Conference on Biomedical Engineering and Sciences, IECBES 2010, no. December, pp. 377–380, 2010.
10. S. Z. A. Jalil et al., "Investigation of human electromagnetic radiation characteristic for kidney disease patients," International Journal of Engineering and Technology (UAE), vol. 7, no. 4, pp. 40–43, 2018.
11. S. Z. A. Jalil, M. N. Taib, H. Abdullah, and M. M. Yunus, "Frequency radiation characteristic around the human body," International Journal of Simulation: Systems, Science and Technology, vol. 12, no. 1, pp. 34–39, 2011.
12. R. S. S. A. Kadir, Z. H. Murat, and N. S. Bin Johari, "Electromagnetic radiation of human body before and after intense exercise," Indonesian Journal of Electrical Engineering and Computer Science, vol. 17, no. 1, pp. 141–147, 2019.
13. R. S. S. A. Kadir, Z. H. Murat, M. N. Taib, and F. A. Hanapih, "The initial investigation of electromagnetics radiation for the right hemisphere stroke patient," 2014 2nd International Conference on Electrical, Electronics and System Engineering, no. November, pp. 108–113, 2014.
14. R. S. S. A. Kadir, Z. H. Murat, M. N. Taib, and F. A. Hanapih, "The preliminary investigation of electromagnetics radiation for the left hemisphere stroke," 2014 2nd International Conference on Electrical, Electronics and System Engineering, no. November, pp. 108–113, 2014.
15. S. Z. A. Jalil, S. A. Mohd Aris, N. A. Bani, M. N. Muhtazaruddin, and S. Usman, "Segmentation of the human body based on frequency of human electromagnetic radiation," Indonesian Journal of Electrical Engineering and Computer Science vol. 18, no. 1, pp. 268–275, 2020.
16. H. C. Lee, P. W. Khong, and D. N. Ghista, "Bioenergy based medical diagnostic application based on gas discharge visualization," Annual International Conference of the IEEE Engineering in Medicine and Biology - Proceedings, vol. 7 VOLS, pp. 1533–1536, 2005
17. A. Dutta, S. Kour, and P. Jain, "Justifying Biofield (Aura) Studies as Complementary and Alternative Medicine (Cam)", Annals of the Romanian Society for Cell Biology Journal, vol. 25, no. 4, 2021.
18. I. Ignatov, O. Mosin, and C. Stoyanov, "Biophysical Fields. Color Coronal Spectral Analysis. Registration with Water Spectral Analysis. Biophoton Emission," An Open Access Journal, vol. 6, pp. 1–23, 2014.
19. R. S. S. A. Kadir, Z. H. Murat, M. N. Taib, and S. Z. A. Jalil, "Investigation of electromagnetics radiation for stroke patients and non-stroke participants," Proceedings - 2015 6th IEEE Control and System Graduate Research Colloquium, ICSGRC 2015, pp. 130–134, 2016.
20. S. Z. A. Jalil, M. N. Taib, H. Abdullah, and M. Mohd Yunus, "A study of frequency radiation of human torso for gender classification," 2012 International Conference on Biomedical Engineering, no. February, pp. 342–346, 2012.
21. S. Z. A. Jalil, M. N. Taib, H. A. Idris, and M. M. Yunus, "Classification of human radiation wave on the Upper body segment," Proceedings - 2013 IEEE 3rd International Conference on System Engineering and Technology, pp. 73–77, 2013.
22. S. Z. A. Jalil, M. N. Taib, H. Abdullah, and M. M. Yunus, "Characteristic of human arm frequency radiation," Progress in Electromagnetics Research Symposium, no. January, pp. 250–254, 2012.
23. J. Liu, G. Yang, F. Xu, and M. Zhou, "The Differences In Coordination Between Children With ADHD And Healthy Children Based On Two-Way ANOVA Analysis," 2012 2nd International Conference on Consumer Electronics, Communications and Networks, CECNet 2012 - Proceedings, pp. 2972–2975, 2012.
24. C. W. N. F. Che Wan Fadzal, W. Mansor, Y. K. Lee, S. Mohamad, N. Mohamad, and S. Amirin, "Comparison between characteristics of EEG signal generated from dyslexic and normal children," 2012 IEEE-EMBS Conference on Biomedical Engineering and Sciences, IECBES 2012, pp. 843–846, 2012.
25. N. Fuad, W. Mansor, and K. Y. Lee, "Wavelet packet analysis of EEG signals from dyslexic children with writing disability," Proceedings of the Annual International Conference of the IEEE Engineering in Medicine and Biology Society, EMBS, pp. 2890–2893, 2013.
26. M. Rosdi, R. S. S. Ros Shilawani, Z. Hj. Murat, and N. Kamaruzaman, "The comparison of human body Electromagnetic radiation between Down Syndrome and Non Down Syndrome person for brain, chakra and energy field stability score analysis," Proceedings - 2012 IEEE Control and System Graduate Research Colloquium, ICSGRC 2012, no. Icsgrc, pp. 370–375, 2012.
27. S. Kirchengast, "Gender Differences in Body Composition from Childhood to Old Age: An Evolutionary Point of View," Journal of Life Sciences, vol. 2, no. 1, pp. 1–10, 2010.
28. B. Bontemps et al., "Children exhibit a more comparable neuromuscular fatigue profile to endurance athletes than untrained adults," Frontiers in Physiology, vol. 10, no. FEB, pp. 1–11, 2019

Authors Introduction

Dr. Hjh Ros Shilawani S Abdul Kadir



She is working as a Senior Lecturer at the School of Electrical Engineering, College of Engineering, UiTM Shah Alam, Selangor, Malaysia. She obtained her PhD in Electrical Engineering UiTM, Biomedical Engineering, specifically Human Body Electromagnetic Radiation and other research related to human beings.

Dr. Aziati Husna Awang



She works as a Senior Lecturer at School of Electrical Engineering, College of Engineering, UiTM Shah Alam, Selangor, Malaysia. She received her PhD in Electrical, Engineering at Leeds University, UK. Her interests include THZ Detection, Photonic Sensors Optical Devices Microwave/RF Devices and IoT Technologies

Muhamad Azizularif Mohamad Azizan



He is currently serving as a protege of Tenaga Nasional Berhad (TNB) Klang. He holds a degree in Electrical Engineering majoring in Power from UiTM. His interests are electrical power engineering.

Dr. Suzi Seroja Sarnin



She works as a Senior Lecturer at School of Electrical Engineering, College of Engineering, UiTM Shah Alam, Selangor, Malaysia. She received her PhD in Electrical, Engineering at Leeds University, UK. Her interests include THZ Detection, Photonic Sensors Optical Devices Microwave/RF Devices and IoT Technologies

Ir. Ts. Dr. Suhaila Subahir



She is working as a Senior Lecturer at the School of Electrical Engineering, College of Engineering, UiTM Shah Alam, Selangor, Malaysia. She secured PhD in Electrical Engineering from UiTM. Her interests include antenna design, integrated antenna, RF devices and circuits, and electromagnetic radiation analysis

Dr. Roshakimah Mohd Isa



She is working as a Senior Lecturer at the School of Electrical Engineering, College of Engineering, UiTM Shah Alam, Selangor, Malaysia. She received PhD in Electrical Engineering from UiTM. Her interests include Biomedical Engineering, Brain Computer Interface and Signal

Processing
