



Search Here...



Archive

[Home \(https://ijrp.org/\)](https://ijrp.org/) o [Archive](#)

Archive

Archive

+ 2023

+ 2022

+ 2021

+ 2020

+ 2019

+ 2018

+ 2017

**Integrative curriculum management in Islamic boarding schools and schools in improving the quality of education
(multi-case study at SMP Negeri 3 Peterongan Jombang and SMP A. Wahid Hasyim Tebuireng Jombang)**

(<https://ijrp.org/paper-detail/4435>)

Published Online: 31 January 2023 Pages: 268-276

DOI: 10.47119/IJRP1001171120234456 (<https://doi.org/10.47119/IJRP1001171120234456>) , Views: **43** ,

Download: **18**

 [Download PDF \(https://ijrp.org/filePermission/fileDownlaod/4/9c1bc1b0537ed9fddd33c22ebc1fb57d/3\)](https://ijrp.org/filePermission/fileDownlaod/4/9c1bc1b0537ed9fddd33c22ebc1fb57d/3)

CORRELATION OF INSULIN RESISTANCE WITH COVID-19 SEVERITY IN TYPE 2 DIABETES MELLITUS PATIENTS

(<https://ijrp.org/paper-detail/4403>)

Published Online: 01 February 2023 Pages: 277-283

DOI: 10.47119/IJRP1001171120234474 (<https://doi.org/10.47119/IJRP1001171120234474>) , Views: **38** ,

Download: **19**

 [Download PDF \(https://ijrp.org/filePermission/fileDownlaod/4/f040166c5ee70df18ce0d53ffb50321b/1\)](https://ijrp.org/filePermission/fileDownlaod/4/f040166c5ee70df18ce0d53ffb50321b/1)

Risk Factors with Otoacoustic Emission and Automated Auditory Brainstem Response examinations in Infant

(<https://ijrp.org/paper-detail/4285>)

Published Online: 01 February 2023 Pages: 284-288

DOI: 10.47119/IJRP1001171120234473 (<https://doi.org/10.47119/IJRP1001171120234473>) , Views: **20** ,

Download: **18**

 [Download PDF \(https://ijrp.org/filePermission/fileDownlaod/4/3785c91dcadd8e2154d1bf1c2e632076/2\)](https://ijrp.org/filePermission/fileDownlaod/4/3785c91dcadd8e2154d1bf1c2e632076/2)

<< (<https://ijrp.org/archive/117>)

1 (<https://ijrp.org/archive/117>)

2

Quick Contact

 editor.ijrp@gmail.com, editor@ijrp.org (<mailto:editor.ijrp@gmail.com>, editor@ijrp.org)

 H- 280, 14 Atish Deepankar Rd, Dhaka 1219, Bangladesh

Important Links

Join as an Editor / Reviewer (<https://ijrp.org/join>)

Submit Paper (<https://ijrp.org/paper-submit>)



[Archive \(https://ijrp.org/archive\)](https://ijrp.org/archive)

[Download template \(https://ijrp.org/download-template\)](https://ijrp.org/download-template)

[Feedback \(https://ijrp.org/feedback\)](https://ijrp.org/feedback)

Subscribe to our newsletter

Get in touch & be the first one .



Medicine, Health & Food

[Home \(https://ijrp.org/\)](https://ijrp.org/) ○ [Journal List \(https://ijrp.org/journallist\)](https://ijrp.org/journallist) ○ [Medicine, Health & Food](#)

Medicine, Health & Food

[Home \(https://ijrp.org/\)](https://ijrp.org/) / [Journal List \(https://ijrp.org/journallist\)](https://ijrp.org/journallist)

/ [Medicine, Health & Food \(https://ijrp.org/paper/Medicine--Health--Food/3/home\)](https://ijrp.org/paper/Medicine--Health--Food/3/home) / **Editor**

Editorial Board (24)

Behzad (<https://ijrp.org/user/Behzad/230>)

Shahroud University of Medical Sciences, Iran

Assistant Professor

Dr SONALI CHATURVEDI (<https://ijrp.org/user/Dr-SONALI-CHATURVEDI/239>)

UNIVERSITY OF CALIFORNIA- San Francisco, USA

Postdoctoral Researcher

USA

Dr. Estari Mamidala, Ph.D, PDF (USA) (<https://ijrp.org/user/Dr.-Estari-Mamidala- Ph.D--PDF--USA-/240>)

Metabolic Disorders & Infectious Diseases Research Lab, USA

Assistant Professo

India

Mahavir Singh (<https://ijrp.org/user/Mahavir-Singh/241>)

CSIR-National Physical Laboratory, New Delh, India

Sr. Principal Scientist & Head,

India

Dr. Simon Obwatho (<https://ijrp.org/user/Dr.-Simon-Obwatho/244>)

AFRICA NAZARENE UNIVERSITY

Director of Postgraduate Programs

Rifky A.L.M (<https://ijrp.org/user/Rifky-A.L.M/54>)

Eastern University, Sri Lanka

Lecturer

Sri Lanka

Jiban Shrestha (<https://ijrp.org/user/Jiban-Shrestha/245>)

Nepal Agricultural Research Council

Scientist (Plant Breeding & Genetics)

Md. Saiful Islam (<https://ijrp.org/user/Md.-Saiful-Islam/49>)

Daffodil International University

Software Engineer

Bangladesh

KAVYACHAND YALAMUDI (<https://ijrp.org/user/KAVYACHAND-YALAMUDI/1155>)

Q1HOSPITALS-HEALTHCITY-VIZAG-ANDHRAPRADESH

CONSULTANT PHYSICIAN AND DIABETOLOGIST

India

Dr. S. Azhagu Madhavan (<https://ijrp.org/user/Dr.-S.-Azhagu-Madhavan/1504>)

A. V. V. M. Sri Pushpam College (Autonomous), Poondi, Thanjavur Dt, Pin -613504

Current affairs Ph.D., Completed Lock down period

India

Sadekur Rahman (<https://ijrp.org/user/Sadekur-Rahman/1665>)

IJRP

Editor

Nihad Khalawe Tektook (<https://ijrp.org/user/Nihad-Khalawe-Tektook/965>)

MIDDLE TECHNICAL UNIVERSITY

Middle Technical University Co

Iraq

KHIN THANDAR AUNG (<https://ijrp.org/user/KHIN-THANDAR-AUNG/1837>)

International Islamic University, Malaysia(IIUM)

lecturer

Malaysia

Dr Owais Yousuf (<https://ijrp.org/user/Dr-Owais-Yousuf/1677>)

Integral University

Assistant Professor

India

Sanjay Pandey (<https://ijrp.org/user/Sanjay-Pandey/3275>)

Albert Einstein college of medicine

Research Fellow

USA

KUMAR AVINASH CHANDRA (<https://ijrp.org/user/KUMAR-AVINASH-CHANDRA/2079>)

Dr. A.P.J.A.K. WOMEN'S INSTITUTE OF TECHNOLOGY

ASSISTANT PROFESSOR

India

ASHWIN SINGH CHOUHAN (<https://ijrp.org/user/ASHWIN-SINGH-CHOUHAN/3750>)

Jai narain vyas university jodhpur rajasthan

Assistant Professor (Pharmacology)

India

Heba Muwafaq Attash (<https://ijrp.org/user/Heba-Muwafaq-Attash/4143>)

University of Mosul/ Pharmacy College

Pharmacist

Iraq

Rudaina Ismail Osman Ahmed (<https://ijrp.org/user/Rudaina-Ismail-Osman-Ahmed/4364>)

Napata College

Medical Researcher and Teaching Assistant

Sudan

Sheryl J. Contreras (<https://ijrp.org/user/Sheryl-J.-Contreras/4519>)

Antonio A. Maceda Integrated School (JHS)

Head Teacher III

Philippines

Dr. Isiaka Sanni Oluwasegun (<https://ijrp.org/user/Dr.-Isiaka-Sanni-Oluwasegun/4846>)

Makkah Specialist Eye Hospital Bauchi

Kobi street, Bauchi

Nigeria

SULEIMAN IBRAHIM KARAYE (<https://ijrp.org/user/SULEIMAN-IBRAHIM-KARAYE/5427>)

Federal College of Agricultural Produce Technology, Kano.

Junior Director CTA

Nigeria

Luma M. Al-Obaidy (<https://ijrp.org/user/Luma-M.-Al-Obaidy/5520>)

University of Mosul

Lecturer at University of Mosul

Iraq

EVIYATI AINI MURIANA (<https://ijrp.org/user/EVIYATI-AINI-MURIANA/5943>)

Universitas Gadjah Mada

Master of Applied Midwifery

Indonesia

Quick Contact

✉ editor.ijrp@gmail.com, editor@ijrp.org (<mailto:editor.ijrp@gmail.com>, editor@ijrp.org)

📖 H- 280, 14 Atish Deepankar Rd, Dhaka 1219, Bangladesh

Important Links

[Join as an Editor / Reviewer \(https://ijrp.org/join\)](https://ijrp.org/join)

[Submit Paper \(https://ijrp.org/paper-submit\)](https://ijrp.org/paper-submit)

[Check Paper Status \(https://ijrp.org/check-status\)](https://ijrp.org/check-status)

Important Links

[Archive \(https://ijrp.org/archive\)](https://ijrp.org/archive)

[Download template \(https://ijrp.org/download-template\)](https://ijrp.org/download-template)

[Feedback \(https://ijrp.org/feedback\)](https://ijrp.org/feedback)

Subscribe to our newsletter

Get in touch & be the first one .

Copyright ©2023 IJRP Inc. All Rights Reserved.

Risk Factors with Otoacoustic Emission and Automated Auditory Brainstem Response examinations in Infant

Fatimah Azizah Salsabila^a, Nyilo Purnami^{b*}, Gadis Meinar Sari^c

^b nyilo@fk.unair.ac.id

^a Faculty of Medicine, Universitas Airlangga, Jalan Mayjen Prof. Dr. Moestopo no. 6-8, Airlangga, Gubeng, Surabaya 60286, Indonesia

^b Department of Otorhinolaryngology, Head and Neck Surgery, Faculty of Medicine, Universitas Airlangga - Dr. Soetomo Academic Medical Center, Jalan Mayjen Prof. Dr. Moestopo no. 6-8, Airlangga, Gubeng, Surabaya 60286, Indonesia

^c Department of Medical Physiology and Biochemistry, Faculty of medicine, Universitas Airlangga, Jalan Mayjen Prof. Dr. Moestopo no. 6-8, Airlangga, Gubeng, Surabaya 60286, Indonesia

Abstract

Hearing loss in children can be caused by various risk factors and sometimes they overlap. These risk factors include a family history of hearing loss, TORCH infection (Toxoplasmosis, Rubella, Cytomegalovirus, and Herpes Simplex). Purpose: To describe an overview of risk factors in infants by OAE and AABR examination. Methods: This study is a retrospective observational analytic study with a cross-sectional approach. This study uses a secondary data source in the form of medical records of infants with hearing loss. The research was conducted at Dr. Soetomo Surabaya Hospital. Results: The most common risk factor was premature birth, 287 (79.1%). The least risk factors are toxoplasma, pneumonia, speech delay and Aminoglycosides 4 days as much as 1 (0.3%). Conclusion: risk factors for babies with hearing loss include: premature, LBW, hyperbilirubinemia, asphyxia, NICU >5 days, mechanical ventilator >5 days, Toxoplasma, rubella, CMV, meningitis, pneumonia, sepsis, family history, microcephaly, hydrocephalus, congenital syndrome, craniofacial malformations, global development delay, speech delay, respiratory distress syndrome, aminoglycosides.

Keywords : Risk Factor, Infant, OAE, AABR

1. Introduction

The auditory system plays an important role in helping children learn the language around them. Through understanding language, children can learn to speak, socialize, and hone their cognitive abilities [1]. Hearing loss in children can occur at any age from newborn to childhood. However, children with hearing loss from birth (congenital) that are not detected and left untreated will increase the incidence of impacts such as speech delays accompanied by psychological disorders and behavioral disorders which will also affect the child's socialization abilities and academic achievement [1] [2]. In addition, if hearing loss persists and is left until adulthood, the number of unemployed people in the country will increase. This is because sufferers have difficulty communicating and understanding lessons [3].

In terms of prevalence in 2019, the loss due to untreated hearing loss is around 1 trillion international dollars. If it is not addressed immediately, the number of sufferers will continue to increase. The prevalence of hearing loss in the world in 2019 is around 1.5 billion people, with 430 of them experiencing moderate to severe impairment [4]. Children suffer from 34 million people [5].

The most common type of hearing loss from birth is the bilateral sensorineural type, but conductive disorders can be found if there are anatomical abnormalities [6]. Hearing loss in children can be caused by various risk factors and sometimes overlap [7]. These risk factors include a family history of hearing loss, intrauterine TORCH infection (Toxoplasmosis, Rubella Cytomegalovirus, and Herpes Simplex), undergoing treatment in the Neonatal Intensive Care Unit (NICU) > 5 days, administration of aminoglycoside drugs > 5 days, use of mechanical ventilation > 5 days, use of extracorporeal membrane oxygenation (ECMO), hyperbilirubinemia (kernicterus), perinatal asphyxia or hypoxic ischemic encephalopathy (HIE), prematurity, low birth weight (LBW), craniofacial malformations, microcephaly, hydrocephalus, syndromes associated with hearing loss, and meningitis or encephalitis [8] [9] [10] [11] [12].

This study aims to determine and analyze the distribution of the characteristics of infants with and without risk factors who were examined with OAE and AABR at the Audiology Outpatient Unit at RSUD Dr. Soetomo for the 2016-2020 period.

2. Method

Our study used an observational analytic method, with the types of dengan studi retrospektif. We used secondary data, namely reading the data related to gender, age, family history of risk factor patients at the clinic of Audiology, Soetomo General Hospital in November 2016 until June 2020. The sampling technique used purposive non-probability sampling dengan metode total sampling that met the inclusion criteria. Variables will be collected in the Microsoft Excel application, processed using Statistical Package for the Social Sciences application, and presented in a table.

3. Result

Table 1.1 Distribution of Risk Factors for Infants Examined with OAE and AABR

No	Risk Factor	n	
		Frequency	Percentage
1	Prematur	287	79,1
2	BBLR	258	71,1
3	Hiperbilirubinemia	70	19,3
4	Asfiksia	58	16
5	NICU>5hari	79	21,8
6	Ventilator mekanik > 5 hari	10	2,8
7	Toxoplasma	1	0,3

8	Rubella	4	1,1
9	CMV	4	1,1
10	Meningitis/Ensefalitis	2	0,5
11	Pneumonia	1	0,3
12	Sepsis	2	0,5
13	Riwayat Keluarga Tuli	2	0,5
14	Mikrosefali	6	1,7
15	Hidrosefalus	3	0,8
16	Sindrom Kongenital	4	1,1
17	Malformasi kraniofasial	2	0,5
18	Global Developmental Delay	4	1,1
19	Speech Delay	1	0,3
20	Respiratory Distress Syndrome	2	0,5
21	Aminoglikosida 4 hari	1	0,3

Table 1.1 shows the distribution of risk factors for babies who were examined with OAE and AABR at the Audiology Outpatient Unit at RSUD Dr. Soetomo for the 2016-2020 period. The most common risk factor for hearing loss was premature birth, in 287 (71.9%) patients, counted from a total of 363 babies, followed by LBW (71.1%). The number of babies with a combination of premature and LBW risk factors was 88 (24.2%) babies.

4. Discussions

Hearing screening is an important program used to reduce the number of hearing loss in children. This screening uses acoustic emission devices, OAE, and ABR [13][14]. Early intervention programs and newborn hearing screening programs (based on physiological methods) that focus on early intervention, ideally starting before 6 months of age; family support, including parental guidance and counseling; hearing rehabilitation through hearing aids and cochlear implants; appropriate therapeutic and communication options [15].

Premature is a risk factor that is often found in this study, which is 79.1%. Prematurity is often not a single risk factor, but overlaps especially with LBW [16]. In this study, 88 (24.2%) infants had both of these risk factors. Meanwhile, research at the Assiut University Hospital in Egypt showed that the combination of these two risk factors had the highest prevalence, namely 57% [17].

The results in this study indicate that both premature and LBW babies both show more referrals to OAE than those with AABR. This indicates a disturbance in the outer, middle ear, or cochlea. The relationship between pure prematurity and hearing loss is still unclear [18] [19]. According to Wroblewska et al, prematurity often overlaps with other risk factors because prematurity itself is the cause of other risk factors such as asphyxia, hyperbilirubinemia, and stay in the NICU > 5 days [7][20]. This is consistent with the study of Moore et al, which stated that cochlear maturity has an effect on DPOAE examination [21]. However, according to Hof et al, it is suspected that delayed maturation of the auditory nerve pathways causes hearing loss [22]. Meanwhile, in cases of LBW infants, screening failures are caused by accumulation of fluid in the middle ear, but this fluid will disappear on its own within a few days or weeks [23]. In contrast to this opinion, Barker stated that there were changes in microcirculation in the cochlea of LBW babies which caused sensorineural disturbances [24].

Prematurity and LBW are not included in the category of risk factors in JCIH, but prematurity and LBW are included as risk factors for hyperbilirubinemia which causes sensorineural disturbances. According to research in Surabaya, prematurity and LBW are not related to congenital hearing loss [25]. Supporting this research, Swaiman et. al stated that prematurity is rarely categorized as a risk factor because ear formation is complete during the second trimester [9]. Nonetheless, there are reports that babies born <32 weeks must be monitored intensively until the baby is 3-4 years old [26]. Infants with LBW are also reported to have a risk of hearing loss both early and late onset, so their speech and language development must be monitored [23] [25].

Risk factors for babies with hearing loss include: premature, low birth weight, hyperbilirubinemia, asphyxia, NICU > 5 days, mechanical ventilation > 5 days, Toxoplasma, rubella, CMV, meningitis, pneumonia, sepsis, family history, microcephaly, hydrocephalus, congenital syndromes, malformations craniofacial, global development delay, speech delay, respiratory distress syndrome, aminoglycosides

Acknowledgements

The author would like to thank Airlangga University and all the staff at Dr. Soetomo General Hospital, Surabaya, for their assistance during data collection

References

- [1]. Appelbaum, E. N. et al, 2018. Analysis of risk factors associated with unilateral hearing loss in children who initially passed newborn hearing screening. *International Journal of Pediatric Otorhinolaryngology*, 106(September 2017), pp. 100–104.
- [2]. Pimperton, H. dan Kennedy, C. R., 2012. The impact of early identification of permanent childhood hearing impairment on speech and language outcomes. *Archives of Disease in Childhood. Arch Dis Child*, pp. 648–653.
- [3]. Pusat Data dan Informasi, 2019. Infodatin Tunarungu 2019, Retrieved: 10 Juni 2021, from: <https://pusdatin.kemkes.go.id/resources/download/pusdatin/infodatin/infodatin-tunarungu-2019.pdf>.
- [4]. World Health Organization, 2021c. World Report 2019: World Report. Human Rights Watch, pp. 1–8.
- [5]. World Health Organization, 2021a. Deafness and Hearing Loss. Retrieved: June 12, 2021, from: <https://www.who.int/news-room/fact-sheets/detail/deafness-and-hearing-loss>.
- [6]. Perhati-KL, 2016. Panduan Praktik Klinis Prosedur Tindakan di Bidang Telinga Hidung Tenggorok-Kepala Leher volume 2. Perhimpunan Dokter Spesialis Telinga Hidung Tenggorok Bedah Kepala Leher Indonesia, pp. 17.
- [7]. Wroblewska-Seniuk, K. E. et al., 2017a. Universal newborn hearing screening: Methods and results, obstacles, and benefits. *Pediatric Research*, 81(3), pp. 415–422.
- [8]. The Joint Committee on Infant Hearing, 2007. Year 2007 position statement: Principles and guidelines for early hearing detection and intervention programs. *Pediatrics*, 120(4), pp. 898–921.
- [9]. Swaiman, K. F. et. al. 2012. *Pediatric Neurology: Principles and Practices*, 5th ed, China. Elsevier, pp. 89-110.
- [10]. Hille, E. T. M. et al. 2016. Prevalence and independent risk factors for hearing loss in NICU infants. *Acta Paediatrica, International Journal of Paediatrics*, 96(8), pp. 1155–1158.
- [11]. The Joint Committee on Infant Hearing, 2019. Year 2019 position statement: Principles and guidelines for early hearing detection and intervention programs. *American Journal of Audiology*, 9(1), pp. 9–29.
- [12]. Fiona Widayari et al. 2021. Risk factors for congenital deafness in pediatric patients who underwent otoacoustic emission (OAE) and auditory brainstem response (ABR) examinations in General Hospital Mohammad Hoesin Palembang, Indonesia. *Bioscientia Medicina: Journal of Biomedicine and Translational Research*, 5(3), pp.752–763.
- [13] Kusumagani, Hamam, Purnami, Nyilo, 2020. Newborns Hearing Screening With Otoacoustic Emissions and Auditory Brainstem Response. *Journal of Community Medicine and Public Health Research*, 1(1)
- [14] Warasanti, E S, Purnami Nyilo, Soeprijadi. 2020. Comparison Results of Automated Auditory Brainstem Response and Brainstem Evoked Response Audiometry for Hearing Loss Detection in High-risk Infants. *Open Access Macedonian Journal of Medical Sciences*, 8(8): 593-596
- [15] Sholehah, Alif, Purnami Nyilo, et al. 2020. The Role of Family Intervention in early Detection of Congenital Deafness: A case Study', *Journal of Community Medicine and Public Health Research*, 1(2)

- [16] Barreiro, S. B., Gonzalez, J. C. F. dan Acosta, A. O. 2021. Hearing loss and very low birthweight. *Journal of Hearing Science*, 5(3), pp. 19–24.
- [17]. Mohamed Omar, K. et al, 2022. Targeted newborn hearing screening in the neonatal intensive care unit of Assiut University Hospital. *The Egyptian Journal of Otolaryngology*, 38, p. 39.
- [18]. Tanuwijaya, F.F., Purnami, Nyilo., Prajitno, Subur., Etika, Risa. 2020. Correlation between Prenatal, Perinatal, and Postnatal Factors with Congenital Hearing Loss. *European Journal of Molecular & Clinical Medicine*, 7(10)
- [19]. Wroblewska-Seniuk, K. et al., 2017, Hearing impairment in premature newborns-Analysis based on the national hearing screening database in Poland, *PLoS ONE*, 12(9), pp. 3-15.
- [20]. Aji, D. S., 2015, Gangguan pendengaran pada bayi baru lahir dengan faktor risiko prematur di rumah sakit PKU Muhammadiyah Yogyakarta'. Retrieved: November 9, 2022, from: <http://repository.umy.ac.id/handle/123456789/18226> (Accessed: 9 November 2022).
- [21]. Moore, J. K. dan Linthicum, F. H, 2007, The human auditory system: A timeline of development. *International Journal of Audiology*, 46(9), pp. 460–478.
- [22]. Hof, J. R. et al. 2013. Auditory maturation in premature infants: A potential pitfall for early cochlear implantation', *Laryngoscope*, 123(8), pp. 2013–2018.
- [23]. Cristobal, R. dan Oghalai, J. S. 2008. Hearing loss in children with very low birth weight: Current review of epidemiology and pathophysiology. *Archives of Disease in Childhood: Fetal and Neonatal Edition*. NIH Public Access, p. F462.
- [24]. Barker DJP. (1998). *Mothers, Babies And Health In Later Life*, Edimburg:Church Livingstone; 2nd edition
- [25]. Tanuwijaya, F. F. et al, 2020. European journal of molecular & clinical medicine correlation between prenatal, perinatal, and postnatal factors with congenital hearing loss. *Ejmcm.Com*, 07(10), pp. 2263–2274.
- [26]. Savenko, I. V, Garbaruk, E. S. and Krasovskaya, E. A. (2020) 'Journal Preof', *International Journal of Pediatric Otorhinolaryngology*, p. 110456