MOH/P/PAK/482.22(GU)-e

MINISTRY OF HEALTH MALAYSIA

GUIDELINES FOR NEONATAL HEARING SCREENING

MEDICAL DEVELOPMENT DIVISION
2021

Guideline for Neonatal Hearing Screening
was developed by
Audiology Technical Committee 2020/2021, Ministry of Health Malaysia,
in collaboration with
the Surgical and Emergency Medical Services Unit of the
Medical Services Development Section, Medical Development Division,
Ministry of Health Malaysia
www.moh.gov.my

Published in 2022

A catalogue record of this document is available from the Institute of Medical Research, Ministry of Health;

MOH/P/PAK/482.22(GU)-e

And also available from the National Library of Malaysia;

e ISBN 978-967-26294-2-9

9 7 8 9 6 7 2 6 2 9 4 2 9

All rights reserved.

No part of this publication may be reproduced or distributed in any form or any means, or stored in a database or retrieval system, without prior written permission of the Ministry of Health, Malaysia.

TABLE OF CONTENTS

FOREWORD BY DIRECTOR GENERAL OF HEALTH

The World Report on Hearing 2021 estimates that by 2050, nearly 2.5 billion people will be living with some degree of hearing loss, with an estimated 1 trillion international dollars lost annually from unaddressed hearing loss. Neonatal hearing loss is one of the major congenital disorders, with an estimated 3 out of 1,000 live-born babies having significant hearing loss. Permanent childhood hearing loss is associated with language, cognitive, psychosocial, and academic development deficits, affecting future employment, productivity and income. Currently, available technology can detect a hearing loss in neonates using an objective test that allows early intervention and rehabilitation.

In 1995, WHO resolution recommended early detection of hearing loss in babies, toddlers, and children. It is followed by the 2017 WHO resolution urging countries to integrate strategies for ear and hearing care (EHC) within the framework of their health systems. Our National Cochlear Implant Program report has shown that early intervention and implantation yield better results in early detection of hearing loss among neonates, thus enabling the children to have better language development, speech and communication skills.

The Ministry of Health (MOH) started the neonatal hearing screening program in 2001, and since then, 44 MOH hospitals have successfully implemented the program. The Ministry strongly supports the program and will continue strengthening service deliveries and awareness of stakeholders, policymakers, hospital administrators, and related professionals. All stakeholders should consider the involvement at all levels of care and settings to sustain the program's success for the country.

This revised edition of the guideline is a benchmark for the healthcare professionals, management and operation staff to ensure protocols and procedures that adhere to the international standards. Congratulations to the editorial and review committee members for their effort to secure the latest and most effective clinical management for the Malaysian public.

TAN SRI DATO' SERI DR NOOR HISHAM BIN ABDULLAH
Director-General of Health
Ministry Of Health, Malaysia

FOREWORD BY HEAD OF OTORINOLARYNGOLOGY SERVICE

Congenital hearing loss is among the highest congenital abnormality worldwide. Unaddressed hearing loss is costly in terms of health and wellbeing of the affected individuals. The financial losses arising from the exclusion of the education, communication and employment can be avoided if hearing loss is detected at the appropriate time line and given due habilitation. Neonatal hearing loss is a Neurodevelopmental Emergency as in the first few years of life, the brain is at an optimal time to develop maximally for hearing and speech upon intervention.

Therefore, neonatal hearing screening (NHS) program is crucial in our healthcare system to help with early detection of hearing loss among infants. Joint infant Committee of Infant Hearing (JCIH) for Early Hearing Detection and Intervention (EHDI) recommended 1-3-6 goals in which neonatal hearing screening should be done before 1 month of age, followed by confirmatory diagnosis before 3 months and definitive intervention to be implemented before 6 months. Unaddressed hearing loss has proven negative impacts in speech and language development, academic performance, socio-economy and will miss out many life opportunities compared to their normal peers.

This revised guideline provides recommendation based on the latest international updates which is tailored to our local settings and needs. This NHS program under Ministry of Health Malaysia is a multidisciplinary team collaborating together in the aim to provide a comprehensive ear and hearing care to neonates with hearing loss. It is hoped that this revised edition will serve as a guiding principle for the Neonatal Hearing Screening Program in MOH hospitals and Primary Care centers.

I applaud well-thought efforts of all the dedicated committee members and reviewers involved in the preparation of this guideline.

Thank you

DATO' DR SITI SABZAH BT MOHD HASHIM
Head of Otorhinolaryngology Service
Ministry Of Health Malaysia

FOREWORD BY HEAD OF AUDIOLOGY PROFESSION

Newborn and infant hearing screening programs (NHS) are widely recommended by international committees worldwide. Implementation of these programs varies in size, program quality, performance, and reported permanent childhood hearing loss. Due to the high level of diversity in programs, there is often great variation within individual countries. WHO recommendations on the NHS program must be placed in the broader screening context which typically involves quality of all components – from screening through to intervention.

This 3rd edition of the Guidelines for Neonatal Hearing Screening provides a set of protocol and guideline to achieve consistency of practice in Malaysia. This guideline outlines the rationale for these programs, methods of screening, program outcomes and the crucial role of each team member. At the same time, the committee also reviewed training modules for hearing screeners. This *Modul Latihan dan Garis Panduan Privileging Petugas Saringan Pendengaran Bayi* offers a comprehensive, competency-based training module for hearing screeners and a helpful solution to educating hearing screeners on the importance of newborn hearing screening.

In line with the Joint Committee on Infant Hearing (JCIH 2019) position statement, the early hearing detection and intervention programs are strongly recommended and become the focus of our NHS program. Improvement in NHS programs should be based on best practice protocols and evidence-based practice. With early detection and appropriate intervention initiated, the child's true potential can be achieved.

I convey my sincere gratitude to the committee in every phase of the guideline shaped until completed perfectly. Hope this newest edition will continue to serve as the definitive resource for any disciplines concerned with a neonatal hearing screening.

SITI SURIANI BINTI CHE HUSSIN
Head of Audiology Profession
Ministry of Health Malaysia

LIST OF ABBREVIATION

AABR	Automated Auditory Brainstem Response
ABR	Auditory Brainstem Response
CI	Cochlear Implant
CMV	Cytomegalovirus
dBnHL	Decibel normal Hearing Level
DOB	Date of birth
DPOAE	Distortion Product Otoacoustic Emission
HRNHS	High Risk Neonatal Hearing Screening
JCIH	Joint Committee on Infant Hearing
JKTA	Jawatankuasa Teknikal Audiologi
MOH	Ministry of Health
NICU	Neonatal Intensive Care Unit
NHS	Neonatal Hearing Screening
OAE	Otoacoustic Emission
ORL	Otorhinolaryngology
SCN	Special Care Nursery
TEOAE	Transient Evoked Otoacoustic Emission
UNHS	Universal Neonatal Hearing Screening

1. INTRODUCTION

Hearing loss is one of the most common significant congenital abnormalities present at birth. If undetected, it will impair speech, language and cognitive development. Studies and surveys conducted in several countries showed that around 0.5 to 5 in every 1000 neonates have congenital hearing loss.

Congenital hearing loss is a hidden disability which often detected after causing serious consequences on the acquisition and development of language abilities (Paolo et al., Pisa, 2011). The critical period for language and speech development is generally within the first three years of life. Children identified with hearing loss between birth and six months of age and who received immediate interventions showed significantly higher cognitive, language and social development (Yoshinaga-Itano,1995).

Universal Neonatal Hearing Screening (UNHS) is the current standard practice in developed countries to detect hearing loss at a very early age. The purpose of UNHS is to screen all neonate prior to discharge from the birth hospital and no later than one month of age, audiological diagnosis before three months of age and provide appropriate intervention no later than six months of age (Joint Committee on Neonate Hearing, 2019)

Neonatal Hearing Screening in the Ministry of Health (MOH) hospital was introduced in 2001. To date, 44 MOH hospitals are running the NHS program; 19 hospitals perform the High-Risk Neonatal Hearing Screening (HRNHS), and another 25 hospitals conduct the UNHS program. MOH will expand this program to other hospitals that do not offer this service in the near future.

According to the National MOH Cochlear Implant (CI) Program report published in 2010, the mean age of diagnosis and implantation for CI candidate was 25.3 months and 38.6 months, respectively. To shorten these average ages, the committee recommended extending the NHS program to all MOH hospitals to facilitate early detection and intervention among prelingual hard of hearing children.

Multidisciplinary teams of professional at hospital level are also essential components to establishing the NHS program at MOH hospital. Each group of professionals should review a variety of factors, including the performance of the NHS program, to achieve quality indicators set by the national committee.

This revised Guideline aims to provide a standard protocol for neonatal hearing screening program in MOH hospitals. However, hospitals can adopt this Guideline accordingly based on the availability of local resources and technology, which is vital for the success of this program.

2. DESCRIPTIONS

Automated Auditory Brainstem Response (AABR)

An automated test of hearing that evaluates the nervous system in response to sound.

Fail

A condition in which a neonate does not pass the hearing screening at least in one ear.

First Hearing Screening

Hearing screening conducted on neonate for the first time after birth.

Hearing Screening

An objective screening method aims to identify neonates who may have hearing loss and require in-depth or diagnostic testing.

Hearing Screening Database

An information management system that is used to record hearing screening data.

Hearing Screening Personnel

Paramedic or nursing personnel, who had undergone proper training and were privileged by the Hospital Privileging Committee to perform the neonatal hearing screening.

High Risk Neonatal Hearing Screening

A hearing screening performed on neonates born with high risk factors associated with congenital or acquired hearing loss.

High Risk Hearing Register

A list of factors that place a neonate at risk for hearing loss. (See Appendix 1).

Infants

A young baby from more than 28 days of age to 12 months old.

Neonate

A baby from birth to 28 days of age.

Neonatal Hearing Screening (NHS)

Hearing screening offered to all neonates delivered in MOH hospitals with the NHS program, including well neonates and high risk neonates.

Not Tested / Missed Hearing Screening

A condition in which a neonate does not receive any hearing screening within 28 days of life.

One stage hearing screening

A hearing screening protocol involving only one method at any time, either Otoacoustic Emissions (OAE) or AABR.

Otoacoustic Emissions (OAE)

An automated test used to measure the function of the cochlea. There are two types of OAE technologies: (1) Transient Evoked Otoacoustic Emissions (TEOAE), and (2) Distortion Product Otoacoustic Emissions (DPOAE).

Pass

A condition in which a neonate passes the hearing screening test in both ears during the same session.

Second Screening

The rescreening conducted on neonates who did not pass the first hearing screening in one or both ears.

Two stage screening

Hearing screening protocol using both AABR and OAE tests at any time.

Universal Neonatal Hearing Screening (UNHS)

Hearing screening offered to all neonates.

3. OBJECTIVES OF THE MOH NHS PROGRAM

- To screen neonates by 1 month of age
- To diagnose any hearing loss by 3 months of age.
- To provide appropriate intervention by 6 months of age.
- To facilitate early cochlear implantation in suitable candidate children.

4. ROLES AND RESPONSIBILITIES OF PROFESSIONALS

The NHS program involves a multi-disciplinary team of professionals. All team members must work together to ensure the success of the program. The roles and responsibilities of each team member should be well defined. The team members are:

- State Health Director
- Hospital Director
- Otorhinolaryngologists
- Pediatricians
- Obstetricians
- District Health Officers
- Family Medicine Specialists
- Medical Officers
- Audiologists
- Speech Language Therapists
- State and Hospital Matrons
- Screening personnel
- Medical Social Officers
- Maternal and Child Health Nurses

4.1. State Health Director

- An advisor of the NHS program at the state level
- To delegate and provide support in terms of resources
- To ensure implementation of NHS program

4.2. Hospital Director

- An Advisor of the NHS program at the hospital level.
- To inform and report the progress of the NHS program to the State Health Director annually.
- To provide support in terms of:
  - i. Manpower
    - Screening Personnel (e.g., Staff Nurse, Community Nurse, Assistant Medical Officer)
    - Audiologists
    - Speech Language Therapist
    - Health Care Assistant (*Pembantu Perawatan Kesihatan*)
  - ii. Designated area for hearing screening
  - iii. Budget
    - Equipment and consumables
    - Materials for health education (e.g., brochures, pamphlets, posters, electronic Information about hearing screening and hearing development)

4.3. Otorhinolaryngologists

- To perform a full medical diagnostic evaluation of the head and neck, ears, and related structures, including a comprehensive history and physical examination, leading to a medical diagnosis and appropriate medical and surgical management including devices.
- To collaborate with audiologist and speech language therapist in delivering audiological results, impacts of hearing loss and the rehabilitation involved to parents.
- To coordinate and collaborate with other clinical disciplines in terms of comprehensive patient management.

4.4. Pediatricians

- To identify neonates who are at high risk of hearing loss.
- To monitor neonatal hearing screening outcomes, and ensuring follow-up with rescreening and audiologic diagnostic evaluation when indicated.
- To ensure that the audiological and medical assessment is conducted in a timely fashion

4.5. District Health Officers

- To assist in coordinating the NHS program at all the health clinics in their respective district
- To monitor the implementation of NHS program in all health clinics under their supervision
- To inform and report the progress of the NHS program to the NHS committee
- To provide support and leadership in the NHS program at the health clinic
    - Manpower
        - Medical Officer
        - Nurse
        - Health Care Assistant (to assist the Nurse)
    - Suitable designated area for hearing screening
    - Budget
        - Equipment and consumables
        - Materials for health education (e.g., brochures, pamphlets, poster, electronic information about hearing screening and hearing development)
        - Training
    - Training
        - Facilitate privileging program for targeted health personnel in health clinics
        - Awareness program to parents/public about NHS

4.6. Family Medicine Specialists (FMS)

- To identify cases of high risk of congenital hearing loss during antenatal visits and counsel parents regarding importance of hearing screening in the first month of life.
- To identify missed/unscreened neonates and refer for hearing screening.
- To supervise the monitoring of hearing and speech development of children at 6, 12, and 18 months of age by healthcare workers at the Health Clinic.
- To counsel parents/care provider regarding further management/therapy

4.7. Obstetricians

- To provide prenatal counseling and antenatal identification of patients with risk factors.
- To collaborate with FMS regarding hearing screening and hearing loss awareness.
- To increase public awareness of NHS at screening premises.
- To ensure all neonates are screened prior to discharge.

4.8. Medical Officers

- To identify missed/unscreened neonates and refer for hearing screening.
- To address parental concern regarding hearing loss and refer for audiological assessment.
- To identify neonates who are at high risk of hearing loss and counsel parents regarding importance of subsequent hearing monitoring.
- To facilitate hearing screening team and provide referral to audiologist if indicated.

4.9. Audiologists

- To coordinate NHS program development, management, quality assessment and service.
- To provide audiological diagnosis, treatment and management, including appropriate referral and documentation.
- To provide a comprehensive audiological assessment to confirm the existence of hearing loss.
- To inform parents regarding the audiological results, impacts of hearing loss and the rehabilitation involved.
- To evaluate the suitability for amplification, assistive listening devices and ensure prompt referral for early intervention programs.
- To provide timely fitting and monitoring of amplification.
- To ensure the Hearing Screening Database is up to date
- To submit an annual report of the NHS program to the Audiology Technical Committee, MOH.
- To promote hearing and speech-language awareness to parents and other professionals.
- To conduct training for hearing screening personnel

4.10. Speech Language Therapists

- To provide information to parents about normal and abnormal speech and language development.
- To administer ongoing formal and informal speech and language assessment and develop individualized therapy plans.
- To guide and empower parents and families to facilitate their child's listening ability and language into all aspects of the child's life.

4.11. State and Hospital Matrons

- To assist in coordinating the NHS program.
- To assist in selecting and providing adequate staffs for hearing screening.
- To facilitate the privileging of the screening personnel.
- To ensure all the screening personnel adhere to the protocols involved

4.12. Screening Personnel (Staff Nurse, Community Nurse, Assistant Medical Officer)

- To conduct hearing screening on neonates according to specific protocols (Appendix Flowchart) in the postnatal wards, Special Care Nursery (SCN), Neonatal Intensive Care Unit (NICU) and clinics.
- To inform parents regarding hearing screening result.
- To document hearing screening results in;
  a) *Buku Rekod Kesihatan Bayi dan Kanak-kanak (umur 0 – 6 tahun)*
  b) Hearing Screening Database.
- To schedule appointment for neonates who;
  a) failed the first hearing screening.
  b) missed the first hearing screening
  c) failed rescreening and required audiological diagnostic test
- To provide parents with appropriate resource information.

4.13. Maternal & Child Health (MCH) Nurse / Public Health Nurses

- To identify any missed/unscreened neonates by referring to *Buku Rekod Kesihatan Bayi dan Kanak-kanak (umur 0 – 6 tahun).*
- To reemphasize the importance of NHS to parents.
- To get another appointment for NHS if not done earlier.

4.14. Medical Social Officers

- To conduct the biopsychosocial assessment before the supportive therapy and practical assistance interventions are provided.
- To provide practical assistance interventions e.g. financial assistance to purchase of medical equipment, medication and treatment.
- To provide supportive therapy interventions including consultation, emotional support and crisis intervention.

4.15. Term of Reference for NHS Committee at Hospital Level

- To ensure implementation of NHS program including providing adequate equipment and screening personnel.
- To monitor the performance of NHS program in aspects of;
    i. Data collection
    ii. Quality indicators
- To rectify any issue or problem that hinder the performance of the program and execute remedial actions to improve the program.
- To facilitate in the application of privileging for screening procedure and monitor the performance of screening personnel.

5. TRAINING FOR SCREENING PERSONNEL

5.1. The trainer

- Audiologist

5.2. The trainee

- Staff Nurse, Community Nurse, Assistant Medical Officer

5.3. The components of training program include;

- Theory;
    i. Anatomy & physiology of hearing
    ii. Early Childhood Deafness
    iii. Introduction of neonatal hearing screening
    iv. Documentation and data management
    v. Hearing Screening Procedure
    vi. Audiological Management
- Practical session
- OSCE
- Theoretical evaluation
- The privileging criteria:
    i. Attend a minimum one (1) day course inclusive of theory and hands-on session.
    ii. Practical: perform screening test under the supervision of Audiologist for minimum 50 neonates within three months period; arrangement for attachment to hospital with NHS program is suggested for district hospitals.
    iii. Logbook: The screening personnel needs to maintain a record of cases performed
    iv. Renewal every 3 years: perform screening (within privileging period) supported by documentation at hospital level

6. FRAMEWORK OF HEARING SCREENING PROCEDURE

To implement the NHS program, the hospital shall take into consideration the following factors:

- Multidisciplinary teams of professionals including audiologists, physicians and nursing personnel.
- Appropriate screening facilities
- The availability of screening devices, with a proper backup supply.
- Appropriate space for screening.
- Availability of qualified screening personnel.
- Local policy and screening protocols.
- Follow-up referral criteria and referral pathways for follow-up.
- Availability of database for information management.
- Continuous Quality Improvement.

Hospitals running NHS program at MOH offer screening to the following populations;

i. Well neonates
ii. High-risk neonates

<u>WELL NEONATES</u>

- Target population : All healthy neonates

- Method used:
  - Otoacoustic Emission (OAE) alone, OR
  - Automated Auditory Brainstem Response (AABR) alone, OR
  - OAE and AABR.

- Hearing screening protocol involves;
  a) One stage screening protocol;
     - Use same method of hearing screening during first and second screening (e.g., OAE for the first and second screening)
  b) Two stage screening protocol;
     - Use different methods of hearing screening during first and second screening (i.e. OAE for the first screening and AABR for the second screening).

  Both protocols can be used for hearing screening depending on the availability of the equipment.

- All screening should be done prior to hospital discharge. An appointment should be arranged if hearing screening could not be performed.

- Neonates who do not pass the first hearing screening should be referred directly for second screening.

- Pass/Fail criteria for DPOAE*
  - Pass criteria: The difference between response/emission level and noise floor at least 6dB at a minimum of three of four frequencies in both ears
  - Fail criteria: Poor or no emission at more than 2 frequencies in one ear.

  *which may vary according to the type of OAE device and protocol used

- Pass/Fail criteria for TEOAE
  - Pass criteria: The difference between response/emission level and noise floor is at least 6dB in both ears.
  - Fail criteria: Poor or no emission recorded in one ear.

- Pass/Fail criteria for AABR
  - Pass criteria: Presence of required evoked responses at 35 dBnHL in both ears.
  - Fail criteria: No recordable responses at 35 dBnHL in any ear.

- Neonate's condition;
  - Neonates should be in a stable condition.
  - Neonates should be sleeping or in a quiet settled state throughout the screening period.
  - To ensure that ear canal is patent prior to screening.

- Screening Location
  - Screening should be done in a quiet environment.
  - In a designated hearing screening room or bedside.

- Equipment
  - Screening equipment must be check daily and calibrated annually.
  - A user guide and troubleshooting manual should be made available for each screening devices.

- **Management**
  - When there is a “PASS” RESULT:
    - Passing a hearing screening performed either by OAE or by AABR testing implies that hearing is adequate at the time of screening for the development of speech and language.
    - However, it does not indicate that the neonate can hear at normal level or guarantee his or her hearing will not change with time.
    - Imply that hearing thresholds are within normal limits (WNL), only those thresholds are not greater than approximately 35-50 dBHL. It is also indicating that a mild hearing loss could still be present and hearing can change over time.
    - **However, the use of OAE alone will not detect cases of Auditory Neuropathy Spectrum Disorder.**
    - Parents should be informed to monitor neonate’s hearing and speech at home and advised to get immediate referral if they noted any delay.
    - Ongoing monitoring and evaluation of hearing and speech development should also be done by Family Medicine Specialist or Medical Officers in Health Clinics.

  - When there is a “FAIL” RESULT:
    - Fail first screening indicates that the neonate should undergo the second screening
    - Fail second screening implies that the neonate requires further diagnostic audiological evaluation to determine hearing status.

  - Screening Personnel and/or Audiologist should communicate the screening results verbally and in writing to the parents before discharge, and schedule an appointment for neonates who did not pass the screening.

  - Surveillance and screening in the primary healthcare facility:
    - Regular surveillance of developmental milestones, auditory skill, parental concerns and speech and language development should be performed in the primary healthcare facility.
    - Children who do not follow normal development milestone or for whom there is a concern on hearing or language development should be referred to ORL for speech-language evaluation and audiology assessment.

- When the screening is NOT TESTED / MISSED:
    - If the infants are less than 28 days of age, conduct the first hearing screening by AABR / OAE.
    - If the infants are older than 28 days, perform hearing screening and/or diagnostic audiological evaluation within 3 months of age, depending on site facilities.
    - If the infants are over three months of age, refer directly to an audiologist for diagnostic audiological evaluation as early as possible (i.e., during the earliest appointment available).
    - These not tested / missed infants should be referred to the nearest ORL Clinic.

HIGH-RISK NEONATES

- Target population : All neonates with high-risk factors, refer to Appendix 1.

- All high-risk neonates should be screened prior to hospital discharge. An appointment for hearing screening should be arranged if hearing screening could not be performed.

- Method used:
  Ideally, it involves a one stage AABR protocol (*Joint Committee of Neonate Hearing 2019*). However, if AABR is not available, OAE can be performed prior to hospital discharge and to be followed by AABR / ABR at the earliest appointment available. OAE alone will not detect Auditory Neuropathy Spectrum Disorder cases, which is prevalent in the high risk group.

- Neonates who obtained a pass or fail screening result will be on close monitoring and subjected for further diagnostic audiological assessment as per guided by JCIH 2019 (refer Appendix 1).

- Pass/Fail criteria for AABR
  Pass : repeatable evoked responses present at 35 dBnHL in both ears
  Fail **:** No recordable responses at 35 dBnHL in any ear.

- Neonates condition;
    - Neonates should be in a stable condition.
    - Neonates should be sleeping or in a quiet settled state throughout the screening period
    - To ensure that ear canal is patent prior to screening

- Screening location
  - Screening should be done in a quiet environment.
  - In a designated hearing screening room or bedside.

- Equipment
  - Screening equipment must be check daily and calibrated annually.
  - A user guide and troubleshooting manual should be made available for each screening devices.

- **Management**
  - When there is a “PASS” RESULT:
    - Both the family and the primary-care provider should be advised that passing a hearing screening performed does not imply that hearing thresholds are within normal limits (WNL), only that thresholds are not greater than approximately 35-50 dB HL.
    - Passing a hearing screening performed either by OAE or by AABR testing implies that hearing is adequate at the time of screening for the development of speech and language.
    - However, it does not indicate that the neonate can hear at normal level or guarantee his or her hearing will not change over time. A mild hearing loss could still be present and hearing can change over time.
    - Parents should be informed to monitor neonate’s hearing and speech at home and advised to get an immediate referral if they noted any delay.
    - Emphasize the need for close monitoring and subject for further diagnostic audiological assessment as per guided by JCIH 2019 (refer to Appendix 1).
    - Ongoing monitoring and evaluation of hearing and speech development should also be done by Family Medicine Specialist or Medical Officers in Health Clinics.

  - When there is a “FAIL” RESULT:
    - Fail first screening indicates the need for immediate referral to Audiology for diagnostic assessment
    - Fail second screening: The neonate needs further diagnostic audiological evaluation to determine hearing status.

  - The result of the screening is shared with the parents before discharge, and an appointment for further evaluation is scheduled by the Screening Personnel and/or Audiologist. Screening Personnel and/or Audiologist should communicate the screening

results verbally and in writing to the parents before discharge, and refer to Audiology for diagnostic assessment.

- When the screening is NOT TESTED / MISSED:
  - If the infants are less than 28 days of age, conduct first hearing screening by AABR / OAE
  - If the infants are older than 28 days, perform hearing screening and/or diagnostic audiological evaluation within 3 months of age, depending on-site facilities.
  - If the infants are over three months of age, refer directly to an audiologist for diagnostic audiological evaluation as early as possible (i.e., during the earliest appointment available).

7. PROGRAM EVALUATION AND MONITORING

7.1. National / MOH level

- The performance of the hearing screening program should be collected and analyzed by Jawatankuasa Teknikal Audiologi (JKTA).
- The performance is reported to the Medical Development Division.

7.2. State level

- Performance of NHS program is collected & reported at the state committee level
- The committee should include
  i. State Health Director
  ii. Hospital Director
  iii. Otorhinolaryngologists
  iv. Pediatricians
  v. Obstetricians
  vi. District Health Officers
  vii. Family Medicine Specialists
  viii. Medical Officers
  ix. Audiologists
  x. Speech-Language Therapists
  xi. State and Hospital Matrons
- NHS Program at the state level should conduct Continuous Quality Improvement meeting, involving all committee members annually.

7.3. District Level

- For all infants, regular surveillance of developmental milestones, auditory skills, parental concerns and speech and language development should be performed in primary healthcare facilities.
- Infants who do not follow normal developmental milestones or for whom there is a concern on hearing or language development should be referred for audiology assessment and speech-language assessment.
- NHS program in the health clinic should be conducted in neonates.
- The committee should include
    i. Hospital Director
    ii. District Health Officers
    iii. Otorhinolaryngologists
    iv. Pediatricians
    v. Obstetricians
    vi. Family Medicine Specialists
    vii. Medical Officers
    viii. Audiologists
    ix. Speech-Language Therapists
    x. State and District Matrons
    xi. Screening personnel
    xii. Medical Social Officers
- Performance of hearing screening program should be reported and submitted to the State committee

7.4. Hospital level

- All screening data should be entered and updated regularly into the Hearing Screening Database.
- The committee has a system in place that can track the neonates from the first screening to receiving the intervention.
- The program coordinator (audiologist) from each hospital should report the quality indicators for the NHS program annually.
- NHS Program at each hospital should conduct Continuous Quality Improvement meetings, involving all committee members annually.
- The committee should include
    i. Hospital Director
    ii. Otorhinolaryngologists
    iii. Pediatricians

iv. Obstetricians
v. Medical Officers
vi. Audiologists
vii. Speech-Language Therapists
viii. Hospital Matrons
ix. Screening personnel
x. Medical Social Officers

- Performance of hearing screening program should be reported and submitted to the JKTA committee

8. QUALITY INDICATOR FOR NEONATAL HEARING SCREENING PROGRAM

A) Quality indicators for screening
According to JCIH 2019

i) Percentage of all inborn neonates who completed screening by 28 completed days of life; **≥ 95%**

$$\frac{\text{No of inborn neonates screened} \leq 28 \text{ days}}{\text{Total live birth}} \times 100$$

ii) Percentage of all inborn neonates who do not pass initial hospital-based screening and require subsequent outpatient rescreening; **≤ 4%**

$$\frac{\text{No of inborn neonates failed first screening}}{\text{No of inborn neonates screened}} \times 100$$

iii) Percentage of inborn neonates who do not pass initial and any/all subsequent rescreening(s) prior to comprehensive audiologic evaluation; **≤ 4%**

$$\frac{\text{No of inborn neonates failed both first and second screening}}{\text{No of inborn neonates screened}} \times 100$$

iv) Percentage of inborn neonates who do not pass initial screening and subsequently pass a re-screening; **≤ 8%**

$$\frac{\text{No of inborn neonates failed first screening and pass second screening}}{\text{No of inborn neonates screened}} \times 100$$

B) Quality indicators for confirmation of hearing status and diagnosis of hearing thresholds are:

According to JCIH 2019

i) Percentage of inborn neonates who do not pass initial birth screening and any subsequent rescreening; **≤ 12%**

$$\frac{\text{No of inborn neonates failed both first and second screening}}{\text{No of inborn neonates failed first screening}} \times 100$$

ii) Percentage of inborn neonates who complete a comprehensive audiologic evaluation by three months of age. **≥ 90%**

$$\frac{\text{Total inborn neonates complete diagnosis by 3 months of age}}{\text{Total inborn neonates complete diagnosis}} \times 100$$

C) **Quality indicators for intervention**

According to JCIH 2000

For families who elect amplification:

i) Percentage of deaf and hard of hearing inborn neonates receiving amplification devices within one month of confirmation of hearing status **≥ 95%**

$$\frac{\text{TOTAL inborn babies receive amplification within 1 month of confirmation of hearing loss}}{\text{Total inborn babies fitted with HA}} \times 100$$

APPENDIX 1

Risk Factors for Early Childhood Hearing Loss. Guidelines for neonates who pass the neonatal hearing screening.

	Risk Factor Classification	Recommended Audiological Diagnostic Follow-up	Monitoring Frequency
	Perinatal		
1	Family history* of early, progressive, or delayed onset permanent childhood hearing loss	by 9 months	Based on the etiology of family hearing loss and parents concern
2	Neonatal intensive care of more than 5 days	by 9 months	As per concerns of ongoing surveillance of hearing skills and speech milestone
3	Hyperbilirubinemia (> 340µmol/L or requiring Exchange Transfusion)	by 9 months	
4	Aminoglycoside administration for more than 5 days**	by 9 months	
5	Neonatal Encephalopathy	by 9 months	
6	Extracorporeal Membrane Oxygenation (ECMO)*	No later than 3 months after the occurrence	Every 12 months to school age or shorter intervals based on concerns of parent or provider
7	In utero infections, such as herpes, rubella, syphilis, and toxoplasmosis	by 9 months	As per concerns of ongoing surveillance
	In utero infections with cytomegalovirus (CMV)*	No later than 3 months after the occurrence	Every 12 months to age 3 or shorter intervals based on concerns of parent or provider
	Mother Zika +ve and neonate with NO laboratory evidence & no clinical findings	Standard	As per AAP (2017) Periodicity schedule
	Mother Zika +ve and neonate with laboratory evidence of Zika +ve clinical findings Mother Zika +ve and neonate with laboratory evidence of Zika -ve clinical findings	AABR by 1 month AABR by 1 month	ABR by 4-6 months or VRA by 9 months ABR by 4-6 months Monitor as per AAP (2017) Periodicity schedule (Adebanjo et al., 2017)
8	Certain birth conditions or findings: • Craniofacial malformations including microtia/atresia, ear dysplasia, oral-facial clefting, white forelock, and microphthalmia • Congenital microcephaly, congenital or acquired hydrocephalus • Temporal bone abnormalities	by 9 months	As per concerns of ongoing surveillance of hearing skills and speech milestone
9	Over 400 syndromes identified with atypical hearing thresholds***	by 9 months	According to the natural history of syndrome or concerns
	Perinatal or Postnatal		
10	Culture-positive infections associated with sensorineural hearing loss***, including confirmed bacterial and viral (especially herpes viruses and varicella) meningitis or encephalitis	No later than 3 months after the occurrence	Every 12 months to school age or shorter intervals based on concerns of parent or provider
11	Events associated with hearing loss • Significant head trauma especially basal skull/temporal bone fractures • Chemotherapy	No later than 3 months after the occurrence	According to findings and or continued concerns
12	Parents concern**** regarding hearing, speech, language, developmental delay and or developmental regression	Immediate referral	According to findings and or continued concerns

Note. AAP = American Academy of Pediatrics; ABR = Auditory brainstem response; AABR = Automated auditory brainstem response

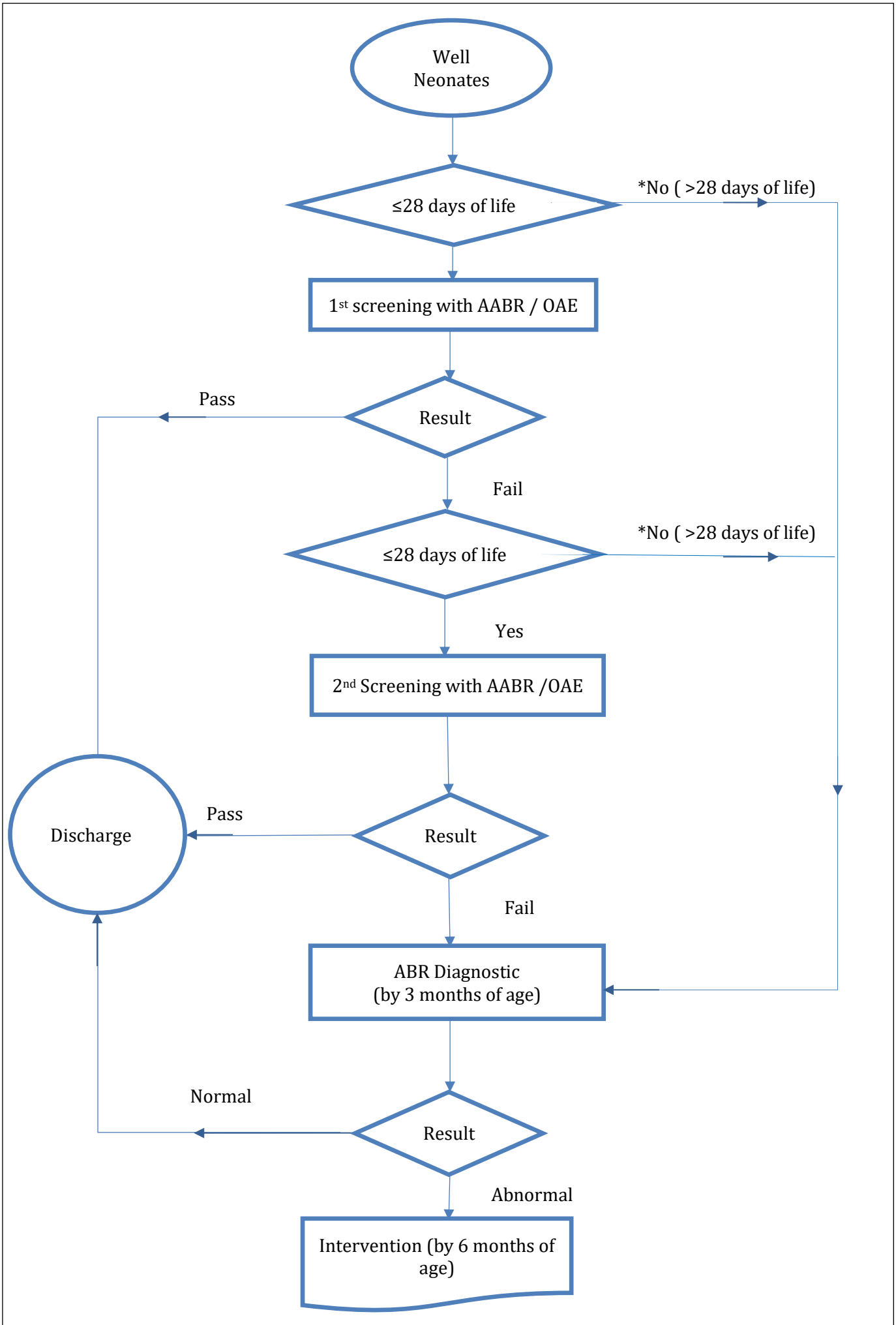
* Neonates at increased risk of delayed-onset or progressive hearing loss

** Neonates with toxic levels or with known genetic susceptibility remain at risk

*** For more information, visit the Hereditary Hearing Loss website (Van Camp & Smith, 2016)

**** Parental/parents concern should always prompt further evaluation

APPENDIX 2 : FLOWCHART FOR WELL NEONATES HEARING SCREENING



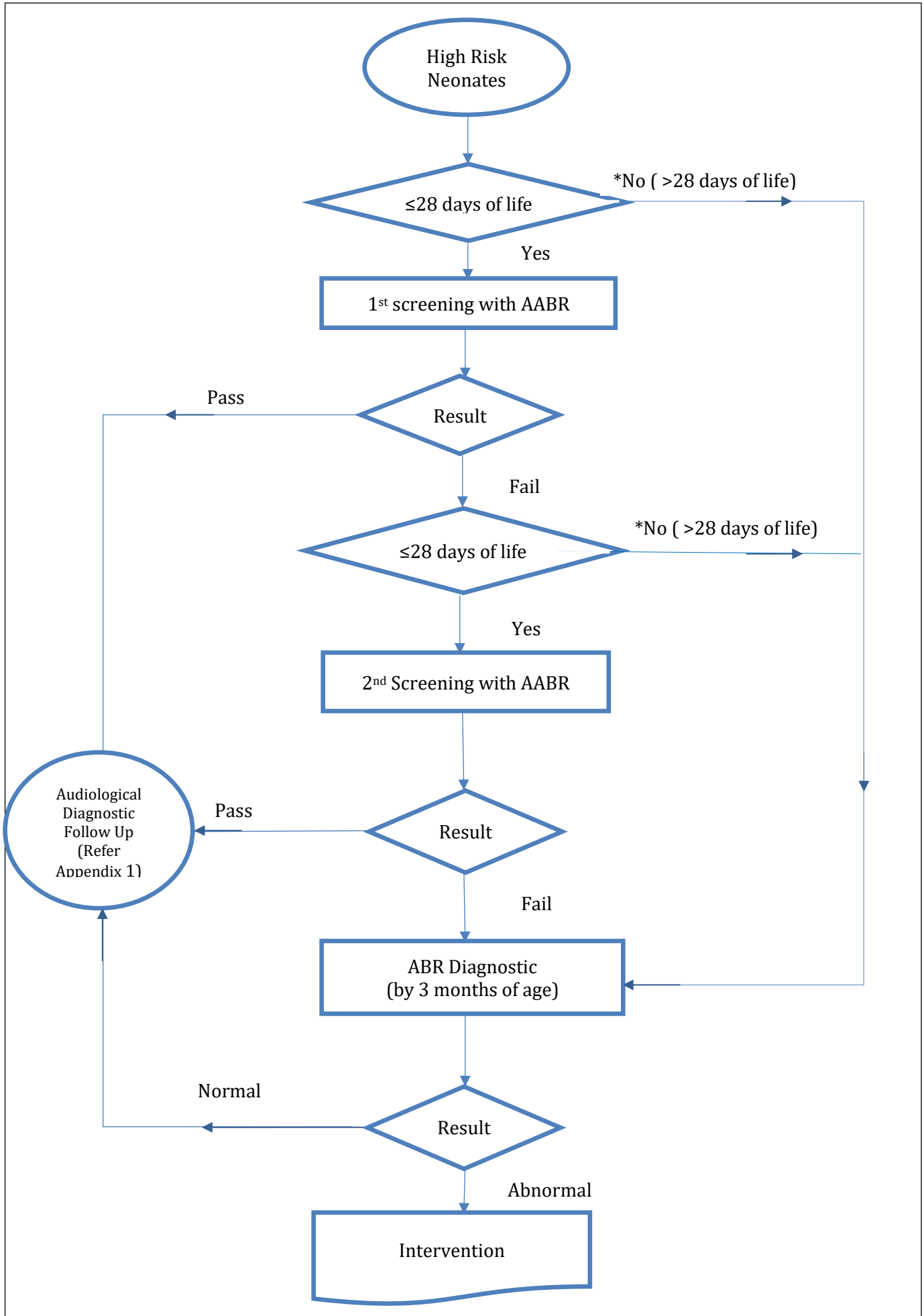
* they can be considered for hearing screening within 3 months of age depending on availability of earliest appointment

APPENDIX 3

SUGGESTED WORK PROCESS OF WELL NEONATES

1. Key in neonate's information in hearing screening database.
2. Inform the parents about the hearing screening process.
3. Prepare the hearing screening equipment.
4. Prepare neonate for the hearing screening procedure. The mother may be allowed to be with their baby during the procedure.
5. For infants older than 28 days of life, consider conducting hearing screening and/or audiological evaluation within three months of age, depending on the availability of the earliest appointment.
6. Perform the screening process according to Appendix 2.
7. Do not screen more than two times in each ear, either at the first or second screening. More than two attempts are not recommended.
8. Inform result to parents and record all results obtained in the hearing screening database.
9. Record result in Buku Rekod Kesihatan Bayi dan Kanak- Kanak (0-6 Tahun).
    i. Result of first and second screening
    ii. Equipment used
    iii. Name of screener
    iv. Hospital where screening is done
    v. Recommendation for monitoring / next appointment
10. For neonates with 'fail result', give appointment date for the second screening within 28 days of age
11. For neonates with 'pass result', monitoring of hearing and speech development should be done by the parents and during Health Clinic visits.
12. At any time, if there is a parental concern regarding hearing, the referral should be done immediately.
12. For neonates with confirmed hearing loss; an appropriate intervention of audiological, speech and medical intervention should be given as soon as possible.
13. For transferred neonates, the medical officer of the primary unit/ audiologist shall take note and refer them to the preferred hospital for further medical evaluation and/ or audiological diagnostic assessment.

APPENDIX 4 : FLOWCHART FOR HIGH RISK NEONATES HEARING SCREENING



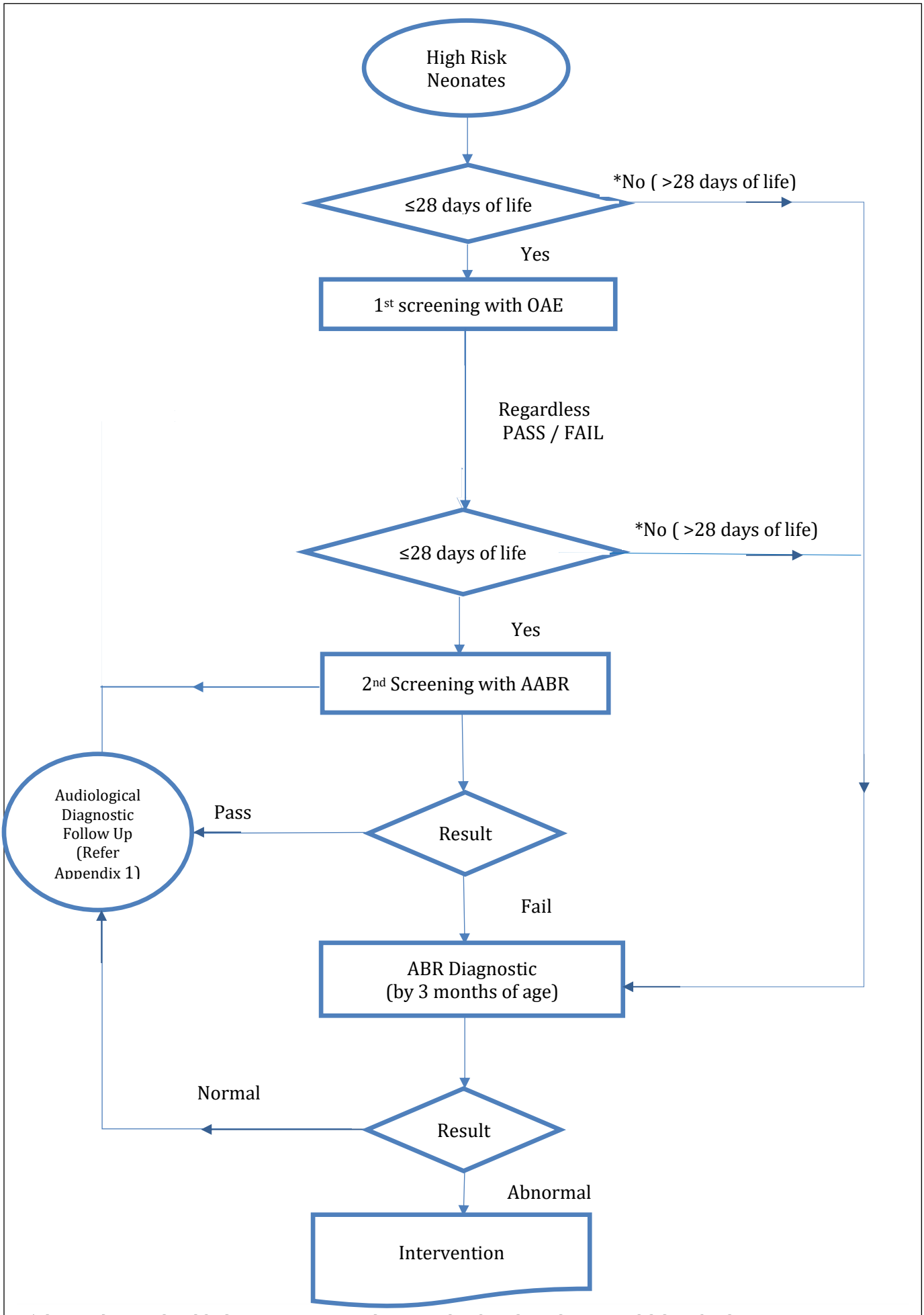
* they can be considered for hearing screening within 3 months of age depending on availability of earliest appointment

APPENDIX 5

SUGGESTED WORK PROCESS OF HIGH RISK NEONATES

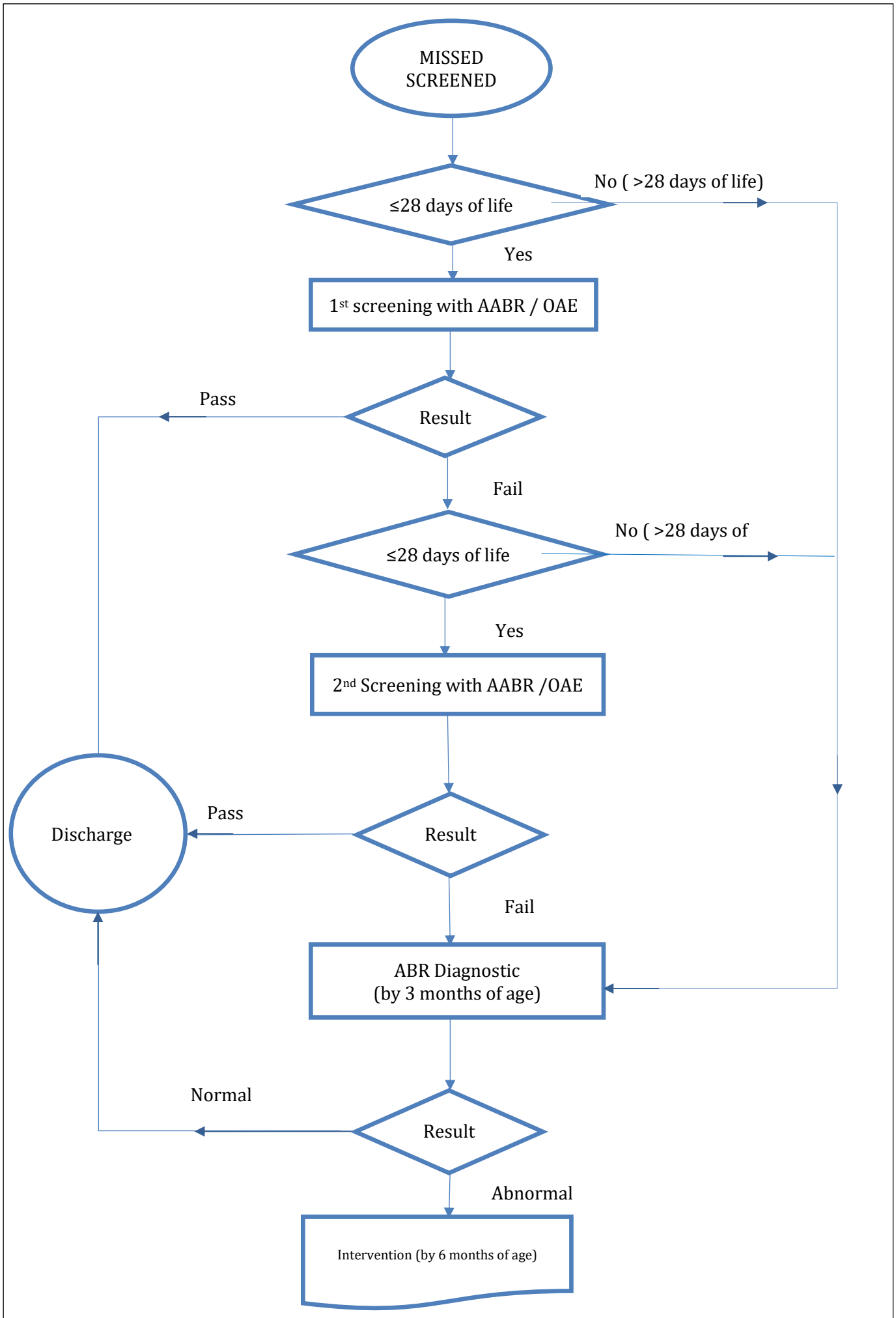
1. Key in neonate's information in hearing screening database.
2. Inform the parent/ parents about the hearing screening process.
3. Prepare the hearing screening equipment.
4. Prepare neonate for the hearing screening procedure. The mother may be allowed to be with their baby during the procedure.
6. For infants older than 28 days of life, consider conducting hearing screening and/or audiological evaluation within three months of age, depending on the availability of the earliest appointment.
6. Perform the screening process according to Appendix 4.
7. Do not screen more than two times in each ear, either at the first or second screening. More than two attempts are not recommended.
8. Inform result to parents and record all results obtained in the hearing screening database.
9. Record result in Buku Rekod Kesihatan Bayi dan Kanak- Kanak (0-6 Tahun).
    i. Result of first and second screening
    ii. Equipment used
    iii. Name of screener
    iv. Hospital where screening is done
    v. Recommendation for monitoring / next appointment
10. For neonates with 'fail result', give an appointment date for the second screening within 28 days of age.
11. For neonates with 'pass result', hearing monitoring should be done by the Audiologist (refer to Appendix 1).
12. For neonates with confirmed hearing loss; an appropriate intervention of audiological, speech and medical intervention should be given as soon as possible.
13. For transferred neonates, the medical officer of the primary unit/ audiologist shall take note and refer them to the preferred hospital for further medical evaluation and/ or audiological diagnostic assessment.

APPENDIX 6 : FLOWCHART FOR HIGH RISK NEONATES HEARING SCREENING USING OAE



* they can be considered for hearing screening within 3 months of age depending on availability of earliest appointment

APPENDIX 7 : FLOWCHART FOR NEONATES WHO MISSED HEARING SCREENING



* they can be considered for hearing screening within 3 months of age depending on availability of earliest appointment

APPENDIX 8

NEONATAL HEARING SCREENING FORM

B/O :
DOB :
Date of Referral :
Inborn : ☐ YES ☐ NO : _____ (Birth Place)
Gestational age :

IC/passport(M) :
Phone No. :
Gender :
Baby Category : ☐ Well Baby ☐ High Risk Baby

Risk factors (may tick √ more than 1 factor)			
Family history* of early, progressive, or delayed onset permanent childhood hearing loss		Craniofacial malformations including microtia/atresia, ear dysplasia, oral-facial cleft, white forelock, and microphthalmia	
Neonatal intensive care of more than 5 days		Temporal bone abnormalities	
Hyperbilirubinemia (> 340µmol/L or requiring Exchange Transfusion)		Congenital microcephaly, congenital or acquired hydrocephalus	
Aminoglycoside administration for more than 5 days**		Over 400 syndromes identified with atypical hearing thresholds***	
In utero infections, such as herpes, rubella, syphilis, toxoplasmosis, and cytomegalovirus (CMV)*		Culture-positive infections associated with sensorineural hearing loss***, including confirmed bacterial and viral (especially herpes viruses and varicella) meningitis or encephalitis	
Extracorporeal Membrane Oxygenation (ECMO)*		Significant head trauma especially basal skull/temporal bone fractures	
Neonatal Encephalopathy		Chemotherapy	
Mother positive Zika		Parental concern**** regarding hearing, speech, language, developmental delay and or developmental regression	

* Neonates at increased risk of delayed-onset or progressive hearing loss
** Neonates with toxic levels or with known genetic susceptibility remain at risk
*** For more information, visit the Hereditary Hearing Loss website (Van Camp & Smith, 2016)
**** Parental/parents concern should always prompt further evaluation

Hearing screening result

Date	Screening	Equipment	Findings	TCA	Screener
	First	OAE/AABR	RIGHT ☐ PASS ☐ FAIL ☐ NOT TESTED LEFT ☐ PASS ☐ FAIL ☐ NOT TESTED		
	Second	OAE/AABR	RIGHT ☐ PASS ☐ FAIL ☐ NOT TESTED LEFT ☐ PASS ☐ FAIL ☐ NOT TESTED		
	Diagnostic	ABR/SSEP	RIGHT : LEFT :		

Not tested due to reasons (i.e parents refusal, machine faulty, no screening personnel available, etc)

Referred by:

REFERENCES

1. Buku Kesihatan Bayi dan Kanak-kanak (0-6 Tahun). Kementerian Kesihatan Malaysia.

2. Clemens C.J., & Davis, S.A. Minimizing False-Positives in Universal Newborn Hearing Screening: A Simple Solution. 2001. *Pediatrics, 107(3), E29. https://doi.org/10.154/peds.107.3.e29*

3. Ghirri, P., Liumbruno, A., Lunardi, S. *et al.* Universal Neonatal Audiological Screening: Experience of the University Hospital of Pisa. Italian Journal of Pediatric 37, 16(2011).

4. Guidelines For Neonatal Hearing Screening. 2015. Medical Development Division. Ministry of Health Malaysia.

5. Integrated Plan for Detection & Management of Neonatal Jaundice (2nd Revision). 2017. Division of Family Health Development. Ministry of Health Malaysia.

6. Management of Neonatal Jaundice (2nd Edition). Clinical Practice Guidelines. 2015. MOH/P/PAK/288.15(GU).

7. National MOH Cochlear Implant Program, 10-Year Report: 2008 – 2018. Jan 2020. Medical Development Division, Ministry of Health Malaysia.

8. Pelan Pengurusan Operasi, Perkhidmatan Kerja Sosial Perubatan. 2018. Bahagian Sains Kesihatan Bersekutu. Kementerian Kesihatan Malaysia.

9. Year 2019 Position Statement: Principle and Guidelines for Early Hearing Detection and Intervention Programs. The Journal of Early Hearing Detection and Intervention 2019; 4(2).

10. Year 2000 Position Statement: Principle and Guidelines for Early Hearing Detection and Intervention Programs. Joint Committee on Infant Hearing.

11. Yoshinaga-Itano C. Efficacy of Early Identification and Early Intervention. Seminar Hearing. 1995; 16:11-123.

DRAFTING COMMITTEE

Dato' Dr Siti Sabzah Binti Md Hashim
Head of Otorhinolaryngology Service,
Hospital Sultanah Bahiyah

Dr Zulkiflee Bin Salahuddin
Deputy Head of Otorhinolaryngology Service,
Hospital Raja Perempuan Zainab II

Dr Rozita Binti Zakaria
Head of Family Medicine Service,
Klinik Kesihatan Presint 18, Putrajaya

Assoc. Prof. Dr Rafidah Binti Mazlan
Head of Center for Ear, Hearing and Speech (Pusat HEARS)
Faculty of Health Sciences
Universiti Kebangsaan Malaysia

Dr Norashikin Binti Abdul Fuad
Head of Department, Obstetrics & Gynaecology Department,
Hospital Sungai Buloh

Dr Neoh Siew Hong
Consultant Paediatrician and Neonatologist, Department of Paediatrics
Hospital Tunku Azizah

Dr Farah Inaz Binti Syed Abdullah
Consultant Paediatrician and Neonatologist, Department of Paediatrics
Hospital Tunku Azizah

Dr Norzi Binti Gazali
Paediatric ORL Specialist,
Hospital Sultanah Bahiyah

Dr Lee Whai Khew
Family Medicine Specialist,
Klinik Kesihatan Luyang, Kota Kinabalu

En Mohd Faishal Bin Ismail Udin
Head of Department, Medical Social Work Department,
Hospital Tuanku Azizah

Pn Siti Suriani Binti Che Hussin
Head of Audiology Profession,
Hospital Kuala Lumpur

Pn Yuzaida Binti Md Yusoff
Audiologist,
Hospital Sultanah Bahiyah

Pn Asyah Hafiza Binti Mohamad Nor Anual
Audiologist,
Hospital Tuanku Fauziah

Pn Nurul Ain Binti Abdullah
Audiologist,
Hospital Sungai Buloh

Pn Mas Diana Binti Samsudin
Audiologist,
Hospital Kuala Lumpur

Pn Wan Hashimah Binti Wan Mamat
Audiologist,
Hospital Sultanah Nur Zahirah

Pn Norasuzi Binti Abd Halim
Audiologist,
Hospital Sultanah Bahiyah

Pn Nahazatul Islia Binti Jamari
Audiologist,
Hospital Taiping

Pn Siti Fatimah Azzahra Binti Zainudin
Audiologist,
Hospital Raja Perempuan Zainab II

Pn Erni Heliza Binti Yusof
Speech Language Therapist,
Hospital Tuanku Ja'afar

Pn Mona Azma Binti Abu Bakar
Matron
Jabatan Kesihatan Negeri Kelantan

Pn Vanaja A/P V. Ramasamy Pillay
Matron
Hospital Tunku Azizah Kuala Lumpur

EXTERNAL REVIEWER

Dr Salimah Binti Othman
Public Health Medicine Specialist,
Family Health Development Division, Ministry of Health

Prof Madya Dr Mohd Normani Bin Zakaria
Program Chairperson,
School of Health Sciences
Universiti Sains Malaysia

Dr Suhaimi Bin Yusuf
Paediatric ORL Specialist,
Hospital Tengku Ampuan Afzan

Dr Maneet Kaur Ranjoth Singh
Consultant Paediatrician and Neonatologist,
Hospital Raja Perempuan Bainun

Dr Mohd Fozi Bin Kamarudin
Family Medicine Specialist,
Klinik Kesihatan Beseri

SECRETARIAT

Dr Syazni Binti Badrol Hisham
Senior Principal Assistant Director
Medical Development Division, Ministry of Health

Dr Abdul Hakim Bin Abdul Rashid
Former Senior Principal Assistant Director
Medical Development Division, Ministry of Health

Pn Yusfarima Binti Yamsuri
Administrative Assistant
Medical Development Division, Ministry of Health

Pn Lindadiana Binti Bahruddin
Administrative Assistant
Medical Development Division, Ministry of Health

MODUL LATIHAN DAN GARIS PANDUAN PRIVILEGING PETUGAS SARINGAN PENDENGARAN BAYI

KEMENTERIAN KESIHATAN MALAYSIA

BIRO PEMBANGUNAN KLINIKAL (NHS)
JAWATANKUASA TEKNIKAL AUDIOLOGI
BAHAGIAN SAINS KESIHATAN BERSEKUTU
KEMENTERIAN KESIHATAN MALAYSIA
NOV 2021

KANDUNGAN

SENARAI SINGKATAN

AABR	*Automated Auditory Brainstem Response*
JKTA	Jawatankuasa Teknikal Audiologi
KKM	Kementerian Kesihatan Malaysia
OAE	*Otoacoustic Emission*
OSCE	Pemeriksaan Klinikal Berstruktur Objektif
PPP	Pegawai Pemulihan Perubatan
PSPB	Petugas Saringan Pendengaran Bayi

TUJUAN

Modul latihan saringan pendengaran bayi ini merangkumi 2 skop modul iaitu kursus pembelajaran dan latihan sangkutan. Modul latihan ini menjadi panduan dan rujukan kepada petugas saringan pendengaran bayi (PSPB) di fasiliti Kementerian Kesihatan Malaysia (KKM) yang memohon untuk mendapatkan pensijilan *privileging* bagi prosedur saringan pendengaran bayi.

PENGENALAN

Pendengaran adalah salah satu deria penting bagi merangsang perkembangan otak untuk perkembangan bahasa dan pertuturan bayi. Masalah pendengaran dalam kalangan bayi boleh dikesan seawal selepas dilahirkan melalui ujian saringan pendengaran. Pengesanan awal masalah pendengaran dilakukan sebelum bayi berusia sebulan, dan disahkan sebelum bayi berusia tiga bulan. Melalui pengesanan awal masalah pendengaran, intervensi awal dapat dilaksanakan agar bayi berkenaan dapat menguasai kemahiran bahasa dan pertuturan yang setara dengan bayi berpendengaran normal.

Impak masalah pendengaran kepada bayi amat kritikal. Bayi yang tidak dapat mendengar bunyi-bunyi pertuturan tidak akan menguasai kemahiran bertutur secara verbal. Keadaan ini boleh mengakibatkan kecelaruan emosi, sosial, kognitif dan seterusnya memberi kesan kepada pencapaian akademik.

OBJEKTIF MODUL

1. Memperkenalkan program saringan pendengaran bayi di KKM secara menyeluruh kepada PSPB
2. Menyediakan panduan bagi merangka dan melaksanakan kursus pembelajaran saringan pendengaran bayi
3. Memudahcara pelaksanaan, penyelarasan dan pemantauan latihan sangkutan saringan pendengaran bayi

SKOP MODUL LATIHAN

Modul 1 : Kursus Pembelajaran Saringan Pendengaran Bayi

Modul 2 : Latihan Sangkutan Saringan Pendengaran Bayi

MODUL 1

KURSUS PEMBELAJARAN SARINGAN PENDENGARAN BAYI

Pengenalan

Kursus ini dijalankan selama satu hari, merangkumi ceramah/ pembentangan, latihan amali dan pemeriksaan klinikal berstruktur objektif (OSCE). Informasi berkaitan saringan pendengaran bayi disampaikan oleh PPP Audiologi (Audiologis), Pakar ORL dan Pakar Pediatrik bagi membantu PSPB meningkatkan pengetahuan klinikal dan kemahiran teknikal.

Objektif

1. Menerangkan anatomi dan fisiologi pendengaran, faktor risiko masalah pendengaran dalam kalangan bayi dan kanak-kanak serta kepentingan saringan pendengaran bayi.
2. Mempraktikkan teknik dan tatacara yang betul dalam menjalankan saringan pendengaran bayi.
3. Memberi pendedahan berkaitan pengurusan data dan dokumentasi saringan pendengaran bayi.

Skop Modul Latihan

Modul ini mengandungi enam (6) topik dan satu (1) OSCE seperti tertera di dalam jadual.

SENARAI TOPIK MODUL 1	
1	Anatomi dan Fisiologi Sistem Auditori
2	Kecacatan Pendengaran Peringkat Awal Kanak-Kanak
3	Pengenalan Program Saringan Pendengaran Bayi
4	Prosedur Saringan Pendengaran Bayi
5	Dokumentasi Dan Pengurusan Data
6	Pengurusan Audiologi
7	Latihan Amali
8	Pemeriksaan Klinikal Berstruktur Objektif (OSCE)

Tentatif Program

MASA	TOPIK	PENCERAMAH
0800 – 0830	Pendaftaran	
0830 – 0915	Anatomi dan Fisiologi Sistem Auditori	ORL
0915 – 1000	Kecacatan Pendengaran Peringkat Awal Kanak-Kanak	Pediatrik
1000 – 1015	Minum Pagi	
1015 – 1100	Pengenalan Program Saringan Pendengaran Bayi	Audiologis
1100 – 1145	Prosedur Ujian Saringan Pendengaran	Audiologis
1145 – 1200	Latihan Amali	Audiologis
1200 – 1300	Dokumentasi Dan Pengurusan Data	Audiologis
1300 – 1400	Rehat	
1400 – 1445	Pengurusan Audiologi	Audiologis
1445 – 1645	Pemeriksaan Klinikal Berstruktur Objektif (OSCE)	
1645 - 1700	Penutup/Penyampaian Sijil & Bersurai	

TOPIK 1

ANATOMI DAN FISIOLOGI SISTEM AUDITORI

1. OBJEKTIF PEMBELAJARAN

- Memberi kefahaman mengenai anatomi dan fisiologi telinga.
- Menerangkan mekanisme sistem auditori
- Memberi penjelasan berkaitan *brain/ auditory plasticity*

2. ISI KANDUNGAN

i. Sistem Auditori Manusia
   - Telinga Luar
   - Telinga Tengah
   - Telinga Dalam

ii. Mekanisme sistem auditori

iii. *Brain / Auditory Plasticity*

3. JANGKA MASA

- 30 minit pembentangan
- 15 minit sesi soal jawab

TOPIK 2

KECACATAN PENDENGARAN PERINGKAT AWAL KANAK-KANAK

1. OBJEKTIF PEMBELAJARAN

- Memberi pendedahan berkenaan etiologi kecacatan pendengaran dalam kalangan bayi dan kanak-kanak.
- Meningkatkan pengetahuan mengenai impak daripada masalah pendengaran di peringkat awal perkembangan

2. ISI KANDUNGAN

i. *Congenital hearing loss*
   - *Genetic*
   - *Acquired*

ii. *Childhood onset Hearing Loss*
   - *Genetic*
     - *non-syndromal (75%)*
     - *syndromal*
     - *autosomal recessive (75%)*
     - *autosomal dominant*
     - *1-2% X-linked*
     - *Mitochondrial - rare*
   - *Acquired*
     - *Prenatal*
     - *Perinatal*
     - *Postnatal*
   - *Unknown*

iii. *Inner Ear Dysmorphologies*

iv. *Impact Hearing Loss to newborn*

3. JANGKA MASA

- 30 minit pembentangan
- 15 minit sesi soal jawab

TOPIK 3

PENGENALAN PROGRAM SARINGAN PENDENGARAN BAYI

1. OBJEKTIF PEMBELAJARAN

- Memberi pendedahan kepada peserta mengenai program saringan pendengaran bayi.
- Menerangkan aktiviti dan proses yang terlibat dalam program saringan pendengaran bayi

2. ISI KANDUNGAN

- Latar belakang program saringan pendengaran bayi dan perkembangan semasa di Malaysia.
- Terminologi berkaitan program saringan pendengaran bayi.
- Tugas dan tanggungjawab pasukan profesional pelbagai disiplin yang terlibat di dalam program saringan pendengaran bayi.
- Latihan sangkutan saringan pendengaran bayi.

3. JANGKA MASA

- 30 minit pembentangan
- 15 minit sesi soal jawab

TOPIK 4

PROSEDUR UJIAN SARINGAN PENDENGARAN

1. OBJEKTIF PEMBELAJARAN

- Mempelajari asas pelaksanaan ujian *"Otoacoustic Emission (OAE)"* dan *"Automated Auditory Brainstem Response (AABR)"*.
- Mengetahui tatacara penggunaan serta penjagaan peralatan yang betul.
- Mengenalpasti peralatan dalam keadaan baik dan tindakan yang patut dijalankan sekiranya peralatan tidak berfungsi.
- Mempraktikkan etika dan tatacara pelaksanaan saringan pendengaran.
- Memahami maksud keputusan saringan pendengaran dan menyampaikan keputusan kepada penjaga (ibu/bapa).
- Mengamalkan prosedur kawalan jangkitan sebelum, semasa dan selepas melakukan saringan pendengaran.

2. ISI KANDUNGAN

- Ujian asas OAE dan AABR
- Penggunaan dan penjagaan peralatan.
- Prosedur sebelum dan selepas menjalankan saringan pendengaran oleh PSPB.
- Etika dan tatacara PSPB.
- Prosedur pengendalian bayi.
- Kawalan jangkitan penyakit.

3. JANGKA MASA

- 30 minit pembentangan
- 15 minit sesi soal jawab

TOPIK 5

DOKUMENTASI DAN PENGURUSAN DATA

1. OBJEKTIF PEMBELAJARAN

- Menerangkan proses aliran kerja program saringan pendengaran bayi di hospital-hospital KKM.
- Menunjukkan kaedah untuk merekodkan keputusan yang diperolehi daripada saringan pendengaran bayi di dalam Buku Rekod Kesihatan Bayi dan rekod hospital.
- Menerangkan prosedur pengurusan bagi bayi yang lulus dan gagal dalam saringan pendengaran.
- Menjelaskan kod etika kerja dan kelakuan bagi PSPB.

2. ISI KANDUNGAN

- Aliran kerja program saringan pendengaran bayi di KKM.
- Dokumentasi keputusan saringan pendengaran bayi.
- Pengurusan data saringan pendengaran bayi.
- Etika kerja dan kelakuan PSPB.

3. JANGKA MASA

- 30 minit pembentangan
- 15 minit sesi soal jawab

TOPIK 6

PENGURUSAN AUDIOLOGI

1. OBJEKTIF PEMBELAJARAN

- Menerangkan ujian-ujian pendengaran asas yang dijalankan di Klinik Audiologi.
- Memberi pendedahan kepada peserta tentang kesesuaian jenis ujian pendengaran berdasarkan umur dan keupayaan pesakit.
- Menjelaskan maksud keputusan ujian pendengaran diagnostik.
- Menerangkan intervensi awal yang dijalankan oleh Audiologis.

2. ISI KANDUNGAN

i. Ujian Pendengaran
   - Pemeriksaan Otoskopik
   - Ujian *Tympanometry*
   - Ujian Pendengaran Objektif
     - *Auditory Brainstem Response*
     - *Auditory Steady State Response*
   - Ujian Pendengaran Subjektif
     - *Behavioral Observation Audiometry*
     - *Visual Reinforcement Audiometry*
     - *Play Audiometry*

ii. Intervensi
   - Amplifikasi- peranti pendengaran (cth: alat bantu pendengaran, implan, *assistive listening devices)*
   - Rehabilitasi aural
   - Rujukan kepada pakar dan profesional kesihatan yang berkaitan

3. JANGKA MASA

- 30 minit pembentangan
- 15 minit sesi soal jawab

TOPIK 7

PEMERIKSAAN KLINIKAL BERSTRUKTUR OBJEKTIF (OSCE)

1. OBJEKTIF UJIAN

- Menguji pengetahuan asas peserta mengenai saringan pendengaran bayi.
- Menguji kebolehan peserta mengendalikan peralatan saringan pendengaran.
- Menilai kemahiran peserta memberi maklumbalas keputusan saringan pendengaran.
- Menilai kebolehan peserta menyelesaikan masalah (*troubleshoot*) peralatan saringan pendengaran.

2. OSCE

- *Station* 1 : Anatomi dan Fisiologi pendengaran
- *Station* 2 : Prosedur Saringan Pendengaran Bayi
- *Station* 3 : Penggunaan peralatan dan *troubleshoot*
- *Station* 4 : Maklumbalas keputusan saringan pendengaran
- *Station* 5 : Dokumentasi dan Pengurusan data

3. JANGKA MASA

- Setiap *station* : 5 minit
- Satu pusingan OSCE : 30 minit

MODUL 2

LATIHAN SANGKUTAN SARINGAN PENDENGARAN BAYI

Pengenalan

Latihan sangkutan dilaksanakan selepas PSPB menamatkan modul 1. Latihan sangkutan dijalankan di wad-wad posnatal, NICU dan SCN di bawah seliaan Audiologis yang telah dilantik oleh Jawatankuasa *Privileging,* Program Saringan Pendengaran Bayi Peringkat Hospital. Sepanjang tempoh latihan sangkutan ini, PSPB perlu melengkapkan semua prosedur yang telah ditetapkan dan di rekod di dalam buku log. Latihan sangkut bertujuan untuk memberi pendedahan kepada PSPB mengaplikasi kemahiran, membina keyakinan diri, dan memupuk semangat kerja berpasukan.

Objektif

1. Melatih PSPB dengan teknik saringan pendengaran bayi yang betul di lapangan.
2. Melatih PSPB mempraktikkan kaedah dokumentasi mengikut format yang standard.
3. Mempraktikkan prosedur dan tatacara rujukan kes saringan pendengaran bayi untuk pengurusan lanjut.

Skop Latihan

Terdapat 3 komponen latihan sangkutan iaitu;

i. Saringan pendengaran bayi
ii. Dokumentasi keputusan saringan pendengaran bayi
iii. Rujukan ke Klinik Audiologi

Pelaksanaan Saringan Pendengaran Bayi

Modul ini menerangkan tatacara saringan pendengaran bayi secara terperinci sebelum, semasa dan selepas saringan dijalankan.

A. Prosedur Sebelum Menjalankan Saringan Pendengaran Bayi

i. Semak rekod bayi.
ii. Terangkan kepada ibu / penjaga bayi mengenai prosedur saringan yang akan dijalankan dan mendapatkan keizinan dari ibu / penjaga bayi.
iii. Pastikan keadaan persekitaran sesuai, senyap dan terkawal.

B. Prosedur Semasa Menjalankan Saringan Pendengaran

i. **Prosedur Saringan Pendengaran Bayi Menggunakan *Otoacoustic Emission (OAE)***

1. Posisikan bayi pada kedudukan yang sesuai.
2. Pastikan bayi berada dalam keadaan senyap, tenang dan selesa.
3. Pilih prob tip yang sesuai dengan saiz telinga bayi.
4. Mulakan ujian pada telinga kanan atau kiri.
5. Tarik sedikit cuping telinga bayi ke bawah dan belakang (julat antara jam 6 ke 9) bagi meluruskan salur telinga bayi.
6. Masukkan prob tip ke bukaan salur telinga dan pastikan tiada kebocoran *(leaking).*
7. Pantau kekuatan bunyi bising artifak (*noise artifact*) pada skrin OAE
8. Perhatikan indikasi respon OAE
9. Sekiranya tiada indikasi respon OAE, walaupun bayi dan persekitaran bilik dalam keadaan senyap, periksa semula kedudukan prob.
10. Perhatikan semula sekiranya terdapat indikasi respon OAE.
11. Ulang langkah 4 hingga 10 di telinga sebelah lagi.
12. Rekodkan keputusan ujian OAE, tarikh ujian dan tandatangan serta cop di dalam Buku Rekod Perkembangan Bayi dan Kanak-Kanak 0 – 6 Tahun.

ii. **Prosedur Saringan Pendengaran Bayi Menggunakan *Automated Auditory Brainstem Response (AABR)***

1. Posisikan bayi pada kedudukan yang sesuai.
2. Pastikan bayi berada dalam keadaan senyap, tenang dan selesa.
3. Sapukan *electrode gel* di bahagian kepala dan telinga (rujuk manual peralatan).
4. Posisikan elektrod dan *earcup* di telinga bayi. Pastikan kedudukan elektrod adalah betul.
5. Pastikan impedans elektrod di dalam julat yang ditetapkan.
6. Mulakan ujian pada telinga kanan atau kiri.
7. Lihat respon AABR pada skrin
8. Ulang langkah 3 hingga 7 di telinga sebelah lagi.
9. Rekodkan keputusan ujian AABR, tarikh ujian dan tandatangan serta cop di dalam Buku Rekod Perkembangan Bayi dan Kanak-Kanak 0 – 6 Tahun.

Nota penting:

1. **Setiap sesi saringan tidak melebihi dua percubaan pada setiap telinga kecuali disebabkan oleh masalah teknikal, contohnya prob tersumbat.**
2. **Sekiranya saringan pertama menggunakan OAE, untuk pemeriksaan kedua gunakan OAE atau AABR; jika saringan pertama menggunakan AABR, untuk saringan kedua gunakan AABR.**
3. **Ulang saringan pada kedua-dua telinga walaupun pada awalnya hanya satu telinga yang gagal.**

(*A maximum of two attempts should be performed on each ear. Rescreen both ears even if only one ear did not pass the initial screen.)*

C. Prosedur Selepas Menjalankan Saringan Pendengaran Bayi

1. Maklumkan keputusan saringan pendengaran kepada ibu /penjaga bayi.

   a. Lulus (bayi tanpa risiko);
      - *Tahniah atas kelahiran bayi puan.*
      - *Saya telah menjalankan saringan pendengaran kepada bayi puan.*
      - *Keputusan saringan pendengaran adalah lulus di kedua-dua telinga.*
      - *Puan disarankan untuk merujuk panduan perkembangan bahasa dan pertuturan dalam Buku Rekod Perkembangan Bayi dan Kanak-Kanak 0 – 6 Tahun dan risalah saringan pendengaran ini.*
      - *Hal ini penting kerana pendengaran bayi boleh berubah pada bila-bila masa.*
      - *Sekiranya terdapat kerisauan anak puan tidak mendengar atau berlaku kelewatan dalam perkembangan pendengaran dan pertuturan, puan boleh segera memaklumkan kepada doktor untuk membuat rujukan kepada Audiologis.*

   b. Lulus (bayi dengan risiko);
      - *Tahniah atas kelahiran bayi puan.*
      - *Saya telah menjalankan saringan pendengaran kepada bayi puan.*
      - *Keputusan saringan pendengaran adalah lulus di kedua-dua telinga.*
      - *Walaubagaimanapun, bayi puan mempunyai faktor risiko (penerangan lanjut akan diberikan oleh pegawai perubatan) yang mungkin boleh menyebabkan masalah pendengaran di masa akan datang.*
      - *Puan disarankan untuk merujuk panduan perkembangan bahasa dan pertuturan dalam Buku Rekod Perkembangan Bayi dan Kanak-Kanak 0 – 6 Tahun dan risalah saringan pendengaran ini.*

- *Puan dinasihatkan untuk menghadiri sesi janji temu secara berkala seperti yang disarankan.*
- *Hal ini penting kerana pendengaran bayi boleh berubah pada bila-bila masa.*
- *Sekiranya terdapat kerisauan anak puan tidak mendengar atau berlaku kelewatan perkembangan pertuturan, puan boleh segera memaklumkan kepada doktor untuk membuat rujukan kepada Audiologis.*

c. Gagal;

- *Tahniah atas kelahiran bayi puan.*
- *Saya telah menjalankan saringan pendengaran kepada bayi puan.*
- *Hasil keputusan saringan pendengaran menunjukkan bayi puan perlu menjalani pemeriksaan lanjut untuk mengesahkan status pendengaran bayi.*
- *Kerana terdapat sedikit kebimbangan dengan status saringan pada hari ini.*
- *Bayi puan akan dirujuk kepada Audiologis untuk pemeriksaan seterusnya di hospital.*
- *Puan perlu membawa bayi hadir ke janji temu berkenaan seperti yang telah ditetapkan.*

2. Berikan risalah saringan pendengaran bayi untuk tujuan pemantauan perkembangan pendengaran dan pertuturan oleh pihak ibubapa.
3. Rekodkan data bayi dan keputusan saringan pendengaran di dalam pangkalan data Program Saringan Pendengaran Bayi Peringkat Hospital.

D. Prosedur Sekiranya Saringan Pendengaran Tidak Dapat Dilakukan

Terdapat beberapa situasi tertentu yang menyebabkan prosedur saringan pendengaran tidak dapat dijalankan sebelum bayi dibenarkan discaj dari wad.

1. Jika ibu / penjaga tidak memberi keizinan untuk saringan pendengaran dijalankan ke atas bayi mereka. Tindakan yang boleh dilakukan oleh PSPB adalah:
   a. Berikan risalah-risalah berkaitan saringan pendengaran bayi;
      i. Risalah saringan pendengaran bayi KKM
      ii. Senarai faktor risiko masalah pendengaran bayi
   b. Berikan rujukan dan tarikh temujanji untuk saringan pendengaran selepas discaj dari wad. Dokumenkan dalam pengkalan data; *refusal of the screening.*
   c. Maklumkan kepada ibu/ penjaga, sekiranya mereka berubah fikiran hendaklah menghubungi hospital seperti yang tertera di risalah saringan untuk pemeriksaan secepat mungkin; sebaiknya sebelum umur 1 bulan.

2. Jika bayi dipindahkan ke fasiliti kesihatan yang lain sebelum menjalani saringan pendengaran, PSPB hendaklah:
   a. Dapatkan maklumat lengkap bayi dan penjaga, serta fasiliti bayi dipindahkan.
   b. Kenalpasti sekiranya fasiliti tersebut menjalankan saringan pendengaran bayi. Sekiranya tiada, maklumkan kepada penjaga untuk mendapatkan tarikh janji temu saringan pendengaran di fasiliti kesihatan yang menawarkan perkhidmatan saringan pendengaran atau
   c. Menghubungi terus fasiliti berdekatan untuk mendapatkan tarikh janji temu saringan pendengaran bayi.

3. Jika disebabkan masalah teknikal, PSPB hendaklah:
   a. Maklumkan kepada Pegawai Perubatan untuk memberikan surat rujukan saringan pendengaran.
   b. Maklumkan kepada penjaga untuk mendapatkan tarikh janji temu saringan pendengaran di fasiliti kesihatan yang menawarkan perkhidmatan saringan pendengaran atau
   c. Menghubungi terus fasiliti berdekatan untuk mendapatkan tarikh janji temu saringan pendengaran bayi.

E. PANDUAN DOKUMENTASI

- Semua keputusan saringan pendengaran perlu direkodkan selepas saringan pendengaran bayi dijalankan.
  i. Pertama, keputusan direkod di dalam Buku Rekod Perkembangan Bayi dan Kanak-Kanak 0 – 6 Tahun sebaik sahaja selepas saringan pendengaran dijalankan.
  ii. Kedua, data bayi dan keputusan saringan pendengaran direkodkan di dalam pangkalan data Program Saringan Pendengaran Bayi Peringkat Hospital.
- Rujukan ke klinik Audiologi
  i. Bayi yang GAGAL saringan pendengaran
  ii. Bayi yang LULUS saringan pendengaran dan mempunyai faktor risiko.

F. KAWALAN DAN PENAMBAHBAIKAN KUALITI

Untuk mencapai standard kualiti yang ditetapkan, langkah-langkah berikut perlu dilakukan:

1. Penyeliaan dan pemantauan berterusan dari pegawai penyelia.
2. Pembelajaran berterusan bagi meningkatkan kemahiran dan mutu perkhidmatan.
3. Menggalakkan kepatuhan kepada prosedur operasi standard dan kesempurnaan dokumentasi.
4. Pengukuran pencapaian ciri-ciri kualiti perkhidmatan secara berkala.
5. Audit secara berkala.

GARIS PANDUAN *PRIVILEGING* PETUGAS SARINGAN PENDENGARAN BAYI KEMENTERIAN KESIHATAN MALAYSIA

1.0 PENDAHULUAN

Garis panduan ini bertujuan memudahcara petugas saringan pendengaran bayi (PSPB) mendapatkan pengiktirafan *privileging* dalam prosedur saringan pendengaran bayi.

Privileging merupakan proses pentauliahan yang diberi oleh pihak hospital kepada seseorang pengamal kesihatan untuk memberikan rawatan atau melakukan prosedur yang khusus berdasarkan latihan, pengalaman dan kompetensi individu tersebut. Garis panduan ini merangkumi definisi terminologi yang digunakan, carta organisasi ahli jawatankuasa *privileging* program saringan pendengaran bayi di peringkat hospital serta terma rujukan, proses kerja, dan informasi berkaitan yang diperlukan.

2.0 OBJEKTIF *PRIVILEGING*

a) Meningkatkan dan mengekalkan mutu perkhidmatan melalui pengamalan yang cekap dan selamat.
b) Memupuk nilai moral dan etika PSPB dalam melaksanakan tugasan.
c) Melindungi PSPB daripada aspek perundangan perubatan (*medico-legal*)

3.0 KRITERIA *PRIVILEGING* PETUGAS SARINGAN PENDENGARAN BAYI

a. Pemohon (Jururawat Terlatih, Jururawat Masyarakat dan Penolong Pegawai Perubatan) boleh mengemukakan borang permohonan *privileging* ke Jawatankuasa *Privileging*, Unit Kualiti Hospital.
b. Pemohon mesti mempunyai sijil amalan yang sah (Jururawat Masyarakat / Jururawat Terlatih / Penolong Pegawai Perubatan).
c. Semua borang permohonan hendaklah diisi lengkap mengikut fasiliti kesihatan yang dimohon (Rujuk Senarai Semak pada borang).
d. Pemohon perlu mendapat sokongan dan kelulusan daripada Ketua Jabatan di fasiliti masing-masing.
e. Mempunyai kecenderungan dan komitmen dalam saringan pendengaran bayi.
f. Kelulusan permohonan Privileging hanya akan dipertimbangkan sekiranya kriteria berikut telah dipenuhi:

Prosedur	Kriteria	Pengekalan Tahap Kecekapan	Penyelia
Saringan Pendengaran Bayi	1. Menghadiri Kursus Pembelajaran Saringan Pendengaran Bayi selama 1 hari dengan lengkap. 2. Latihan sangkutan di hospital yang mempunyai perkhidmatan audiologi dan melengkapkan buku log untuk prosedur: a. Pemerhatian – 2 prosedur. b. Membantu dalam saringan – 3 prosedur. c. Menjalankan saringan bawah penyeliaan – 50 prosedur. d. Perlu mendapat sekurang-kurangnya 50% markah kompetensi untuk keseluruhan prosedur. 3. Tempoh penempatan bergantung pada jumlah prosedur yang diperlukan (maksimum 3 bulan).	Setiap tiga tahun: 1. Merekodkan bilangan prosedur saringan pendengaran di dalam Buku Log (Kompetensi). 2. Audit buku log dan census oleh Penyelia. 3. Menjalankan prosedur minima 100 prosedur setahun. 4. Menghadiri kursus ulang kaji / latihan dalam perkhidmatan sekurang-kurangnya sekali dalam tempoh tiga tahun.	Audiologis

4.0 TERMA RUJUKAN PENYELIA PRIVILEGING SARINGAN PENDENGARAN BAYI

a. Kriteria Penyelia

i. Telah menghadiri kursus *Training of Trainers* Modul Saringan Pendengaran Bayi.
ii. Disokong oleh Ketua Unit Audiologi dan diperakui oleh Ketua Jabatan Otorinolaringologi untuk dilantik sebagai penyelia saringan pendengaran bayi.

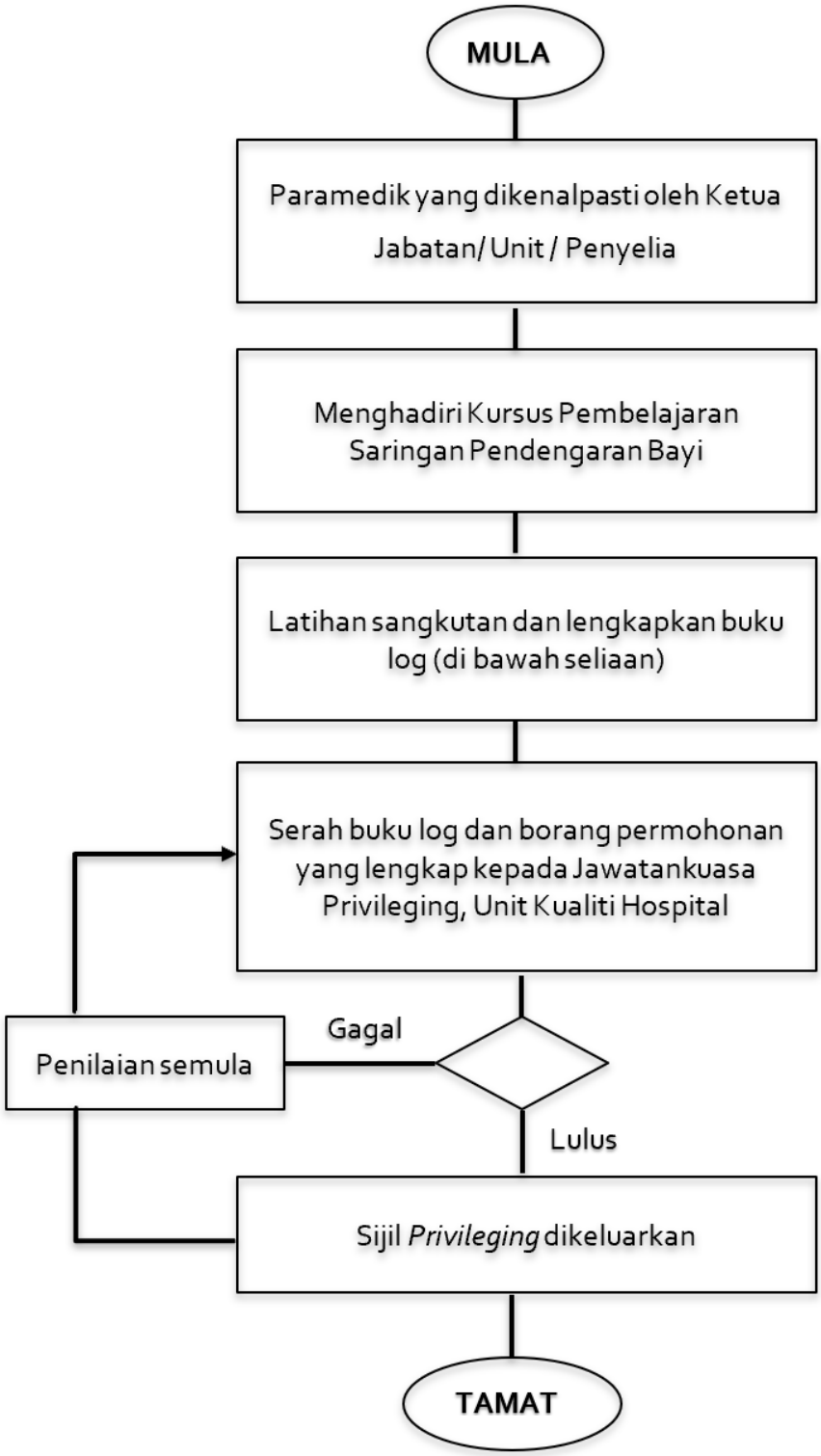
b. Tugas dan Tanggungjawab Penyelia

i. Melatih PSPB yang menjalani latihan sangkutan mengikut modul latihan yang ditetapkan.
ii. Menyampaikan informasi dan teori pembentangan modul latihan kepada PTSB.
iii. Menyemak dan menilai buku log latihan sangkutan pemohon sebelum dihantar kepada Jawatankuasa *Privileging* Hospital untuk tindakan.
iv. Merancang latihan tahunan berkala untuk PSPB yang telah memperolehi sijil privileging.
v. Memastikan PSPB membuat permohonan semula (*reprivileging)* sebelum tarikh luput.

5.0 PROSES KERJA PERMOHONAN BARU *PRIVILEGING*

i. Permohonan *privileging* hendaklah dibuat kepada Jawatankuasa *Privileging* Hospital dengan menggunakan borang seperti yang telah ditetapkan di fasiliti kesihatan yang dimohon.
ii. Semua borang permohonan hendaklah diisi dengan lengkap.
iii. Dokumen berikut perlu disertakan bersama borang permohonan:
    a. Sijil kehadiran Kursus Pembelajaran Saringan Pendengaran Bayi
    b. Buku log
    c. Sijil-sijil lain yang berkaitan dengan prosedur yang dipohon (dalam tempoh 2 tahun terkini) sekiranya ada.
iv. Pemohon mestilah mempunyai sijil amalan yang sah.
v. Keputusan permohonan *privileging* hendaklah dimaklumkan kepada pemohon secara bertulis.
vi. Pengiktirafan *privileging* akan diberikan untuk jangka masa 3 tahun, dikemaskini dan diperbaharui sebelum tempoh tamat.
vii. Senarai nama PSBP beserta no sijil *privileging* perlu disimpan dalam pangkalan data Program Saringan Pendengaran Bayi Peringkat Hospital.

CARTA ALIR PERMOHONAN BARU



6.0 PROSES KERJA *REAPPRAISAL AND REPRIVILEGING*

i. Penilaian semula *reappraisal* adalah proses di mana Jawatankuasa Program Saringan Pendengaran Bayi Hospital, menyemak semula dan menilai tahap kompetensi klinikal PSPB yang telah mendapat pengiktirafan privileging. Penilaian merangkumi prestasi profesional, penilaian klinikal, kemahiran dan kompetensi teknikal.

ii. *Reprivileging* adalah proses pemberian *privileging* buat kali kedua dan seterusnya kepada PSPB pada setiap tiga (3) tahun.

iii. Pemohon perlu memohon semula *privileging* dalam tempoh enam (6) bulan sebelum tarikh tamat tempoh pengiktirafan terdahulu. Dokumen yang diperlukan adalah;
   a. Borang permohonan (mengikut fasiliti kesihatan yang dimohon)
   b. Penilaian semula (*reappraisal assessment*) (mengikut fasiliti kesihatan yang dimohon)
   c. Pengisian Buku Log (minimum 100 kes setahun tanpa seliaan)
   d. Sijil-sijil mengikuti latihan atau kursus yang berkaitan dengan Program Saringan Pendengaran Bayi dan diperakukan oleh Audiologis.

iv. Penilaian semula bagi permohonan memperbaharui privileging perlu mengambil semua faktor yang boleh menjejaskan seseorang anggota kesihatan untuk mendapatkan pengiktirafan privileging buat kali kedua dan seterusnya. Contohnya kerosakan alat sehingga tidak dapat menjalankan saringan pendengaran dan mencapai jumlah minimum yang digariskan dalam kriteria *standard* bagi prosedur yang dipohon.

v. Keputusan permohonan *reprivileging* hendaklah dimaklumkan kepada pemohon secara bertulis.

7.0 PEMANTAUAN BERKALA

i. Pemantauan perlu dilaksanakan oleh Audiologis setahun sekali bagi yang telah menerima sijil privileging.

ii. Pemantauan dilakukan dengan meninjau aspek persekitaran tempat saringan, kaedah saringan dan dokumentasi.

iii. Pemeriksa perlu menggunakan borang Senarai Semak Proses Pemantauan.

iv. Perkara berikut juga boleh digunakan dalam proses pemantauan
   a. Aduan Pelanggan
   b. Buku Log
   c. Audit teknikal

v. Sekiranya 60% proses kerja tidak dipatuhi tanpa sebab yang kukuh, anggota kesihatan tersebut perlu melalui proses *re-appraisal*.

LAMPIRAN : RISALAH SARINGAN PENDENGARAN BAYI

PERKEMBANGAN PERTUTURAN & PENDENGARAN

0-3 bulan
- Terkejut/menangis/terjaga apabila ada bunyi kuat
- Menghasilkan bunyi 'aaah', 'ooooh'

4-6 bulan
- Memalingkan kepala,
- Menggerakkan anak mata ke arah bunyi
- Menghasilkan bunyi /bababa/ /mamama/
- Meniru bunyi

7-9 bulan
- Berpaling bila nama dipanggil
- Faham perkataan biasa seperti 'jangan', 'bye'
- Boleh menggunakan komunikasi bukan lisan seperti geleng kepala untuk 'tidak', menunjuk dengan jari

10-11 bulan
- Menoleh pada bunyi perlahan
- Mula menuturkan perkataan pertama
- Boleh sebut perkataan yang mudah

12-18 bulan
- Bertutur dalam 1 patah perkataan
- Menggunakan 7 atau lebih perkataan secara konsisten
- Boleh memahami arahan ringkas

18-24 bulan
- Bertutur dalam 2 patah perkataan seperti "nak mandi"
- Menggunakan 50 atau lebih perkataan secara konsisten

2-3 tahun
- Menggunakan 2 atau 3 perkataan dalam satu ayat
- Mempunyai lebih kurang 450 perkataan
- Boleh memahami arahan panjang
- Pertuturan boleh difahami oleh ahli keluarga terdekat

SENARAI HOSPITAL YANG MENJALANKAN SARINGAN PENDENGARAN BAYI

PERLIS
Hosp. Tuanku Fauziah
04-973 8219

KEDAH
Hosp. Sultanah Bahiyah
04-7407920 ext 7852
Hosp. Sultan Abd Halim
04-445 7333 ext 3700
H. Kulim 04-427 2733 ext 3524
H.Langkawi 04-9663333ext3254

PULAU PINANG
Hosp. Pulau Pinang
04-222 5097
Hosp. Bukit Mertajam
04-549 7333

PERAK
Hosp. Raja Perempuan Bainun
05-208 7411
Hosp. Taiping 05-820 4065
Hosp. Teluk Intan
05-621 3333

SELANGOR
Hosp. Tengku Ampuan Rahimah
03-3375 6130/6320
Hosp. Sg Buloh 03-6145 4333
Hosp. Ampang 03-4289 6000
Hosp. Serdang 03-8947 5555
Hosp. Selayang 03-6126 3265
Hosp. Shah Alam 03-5526 3000

KUALA LUMPUR
Hosp. Putrajaya
03-88924233/ 83145474
Hosp. Tunku Azizah
03-2600 3000 ext 2211

NEGERI SEMBILAN
Hosp. Tuanku Jaafar
06-768 5004
Hosp. Tuanku Ampuan Najihah
06-482 1225

MELAKA
Hosp. Melaka
06-289 2703/2701

JOHOR
Hosp. Sultanah Aminah
07-223 1666 ext 2319
Hosp. Sultanah Fatimah
06-9521901 ext 472
Hosp. Sultan Ismail
07-356 5000 ext 2101
Hosp. Sultanah Nora Ismail
07- 436 3123
Hosp. Segamat 07-943 3333
H. Enche Besar Hjh Khalsom
07-778 7000 ext 2310

PAHANG
Hosp. Tengku Ampuan Afzan
09-557 2771
H. Sultan Haji Ahmad Shah
09-295 3333 ext 1555/1557
Hosp. Kuala Lipis
09-312 3333

TERENGGANU
H.Sultanah Zahirah
09-621 2121 ext 3194
H.Kemaman 09 851 3333 ext 3389

KELANTAN
Hosp. Raja Perempuan Zainab
09-745 2651
H. Sultan Ismail Petra
09-961 166 ext 2121
Hosp. Tanah Merah
09-954 5000 ext 5022

SARAWAK
Hosp. Umum Sarawak
082-2276666 ext 5143
Hosp. Sibu 084-343 333
Hosp. Miri 085-460632 ext 151

SABAH
Hosp. Tawau
089-983533 ext 8108
Hosp. Duchess of Kent
089-248600 ext 5322
Hosp. Wanita & Kanak-Kanak Sabah 08-852 2600

Saringan Pendengaran Bayi

KEMENTERIAN KESIHATAN MALAYSIA

AUDIOLOGI

Masalah Pendengaran adalah Masalah Kesihatan yang Tersembunyi

Semua bayi yang baru lahir digalakkan untuk menjalani saringan pendengaran terutamanya bayi yang mempunyai risiko mengalami masalah pendengaran (14 risiko seperti yang disenaraikan oleh JCIH 2019).

Walaubagaimanapun, 50% bayi yang mempunyai masalah pendengaran tidak mempunyai sebarang masalah kesihatan/faktor risiko. Tambahan pula, masalah pendengaran hanya disedari oleh ibubapa bila anak sudah besar dan ingin memasuki alam persekolahan.

Tips Penyediaan Bayi Bagi Menjalani Ujian Saringan Pendengaran

Ujian adalah pantas, selamat dan tidak menyakitkan

Pastikan bayi anda tenang, kenyang dan tidur semasa ujian dilakukan

Kepentingan Pendengaran

Tempoh optimum untuk bayi/kanak-kanak menguasai bahasa ialah 0-3 tahun

Untuk perkembangan bahasa dan pertuturan

Asas untuk berkomunikasi

Asas untuk perkembangan pembelajaran

Keputusan Saringan

LULUS

Pendengaran bayi adalah baik

Ibubapa/penjaga haruslah memantau perkembangan pendengaran, pertuturan dan bahasa.

GAGAL

Perlu menjalani ujian saringan kedua.

Jika gagal saringan kedua, ujian diagnostik perlu dijalankan bagi mengesahkan status pendengaran bayi.

PASTIKAN ANDA DATANG MENGIKUT TEMUJANJI YANG DITETAPKAN

DEMI MASA DEPAN ANAK ANDA

Dihasilkan oleh: Jawatankuasa Promosi Newborn Hearing Screening

KEMENTERIAN KESIHATAN MALAYSIA

Saringan Pendengaran Bayi
FAQs:

1. **Adakah saringan pendengaran ini perlu dilakukan?**
   Ya, kerana ujian ini membolehkan pengesanan masalah pendengaran dalam kalangan bayi di peringkat awal

2. **Apakah kepentingan ujian ini?**
   Ujian ini adalah langkah pertama untuk mengesan samada anak anda ada masalah pendengaran atau tidak. Apabila ada masalah pendengaran, ia akan memberi kesan kepada perkembangan pertuturan anak dan seterusnya memberi kesan kepada pembelajaran dan pergaulan seharian anak.

3. **Bila ujian ini perlu dilakukan?**
   Ujian ni akan dilakukan sebelum anak anda discaj daripada hospital. Walaubagaimanapun jika tidak dilakukan, anda perlu hadir mengikut tarikh temujanji yang diberikan dan sebaik-baiknya sebelum bayi berumur sebulan.

4. **Bolehkah ujian ini dijalankan di hospital lain?**
   Boleh. Sila hubungi hospital seperti yang yang tertera pada risalah saringan pendengaran bayi dan dapatkan tarikh temujanji di sana. Walaubagaimanapun puan perlu memaklumkan kepada kami sebelum discaj.

LAMPIRAN 3

Risk Factors For Early Childhood Hearing Loss. Guidelines For Neonates Who Pass Neonates Hearing Screen (JCIH, 2019)

	Risk Factor Classification	**Recommended Audiological Diagnostic Follow-up**	**Monitoring Frequency**
	Perinatal		
1	Family history* of early, progressive, or delayed onset permanent childhood hearing loss	by 9 months	Based on etiology of family hearing loss and parents concern
2	Neonatal intensive care of more than 5 days	by 9 months	As per concerns of on-going surveillance of hearing skills and speech milestone
3	Hyperbilirubinemia (> 340µmol/L or requiring Exchange Transfusion)	by 9 months	
4	Aminoglycoside administration for more than 5 days**	by 9 months	
5	Neonatal Encephalopathy	by 9 months	
6	Extracorporeal Membrane Oxygenation (ECMO)*	No later than 3 months after occurrence	Every 12 months to school age or shorter intervals based on concerns of parent or provider
7	In utero infections, such as herpes, rubella, syphillis, and toxoplasmosis	by 9 months	As per concerns of on-going surveillance
	In utero infections with cytomegalovirus (CMV)*	No later than 3 months after occurrence	Every 12 months to age 3 or shorter intervals based on concerns of parent or provider
	Mother Zika +ve and neonate with NO laboratory evidence & no clinical findings	Standard	As per AAP (2017) Periodicity schedule
	Mother Zika +ve and neonate with laboratory evidence of Zika +ve clinical findings Mother Zika +ve and neonate with laboratory evidence of Zika -ve clinical findings	AABR by 1 month AABR by 1 month	ABR by 4-6 months or VRA by 9 months ABR by 4-6 months Monitor as per AAP (2017) Periodicity schedule (Adebanjo et al., 2017)
8	Certain birth conditions or findings: • Craniofacial malformations including microtia/atresia, ear dysplasia, oral facial clefting, white forelock, and microphthalmia • Congenital microcephaly, congenital or acquired hydrocephalus • Temporal bone abnormalities	by 9 months	As per concerns of on-going surveillance of hearing skills and speech milestone
9	Over 400 syndromes identified with atypical hearing thresholds***	by 9 months	According to natural history of syndrome or concerns
	Perinatal or Postnatal		
10	Culture-positive infections associated with sensorineural hearing loss***, including confirmed bacterial and viral (especially herpes viruses and varicella) meningitis or encephalitis	No later than 3 months after occurrence	Every 12 months to school age or shorter intervals based on concerns of parent or provider
11	Events associated with hearing loss • Significant head trauma especially basal skull/temporal bone fractures • Chemotherapy	No later than 3 months after occurrence	According to findings and or continued concerns
12	Parents concern**** regarding hearing, speech, language, developmental delay and or developmental regression	Immediate referral	According to findings and or continued concerns

Note. AAP = American Academy of Pediatrics; ABR = Auditory brainstem response; AABR = Automated auditory brainstem response

* Neonates at increased risk of delayed onset or progressive hearing loss

** Neonates with toxic levels or with known genetic susceptibility remain at risk

*** For more information, visit the Hereditary Hearing Loss website (Van Camp & Smith, 2016)

**** Parental/parents concern should always prompt further evaluation

RUJUKAN

1. Prosedur Operasi Standard: Penjagaan Pesakit Pediatrik Bermasalah Pendengaran. 2014. Bahagian Sains Kesihatan Bersekutu. Kementerian Kesihatan Malaysia.

2. Protocol for Newborn Hearing Screening. 2018. *Washington State Department of Health*.

3. Year 2019 Position Statement: Principle and Guidelines for Early Hearing Detection and Intervention Programs. *The Journal of Early Hearing Detection and Intervention* 2019; 4(2).

JAWATANKUASA KERJA MODUL NHS

1. Puan Siti Suriani Binti Che Hussin
2. Puan Yuzaida Binti Md Yusoff
3. Puan Asyah Hafiza Binti Mohamad Nor Anual
4. Puan Nurul Ain Binti Abdullah
5. Puan Norasuzi Binti Abd Halim
6. Puan Wan Hasyimah Binti Wan Mamat
7. Puan Juliana Binti Samsudin
8. Puan Nurzila Binti Omar
9. Puan Umi Asura Binti Sanusi
10. Puan Adibah Rokinah Binti Abd Zazah
11. Puan Siti Fatimah Azzahra Binti Zainudin
12. Puan Zahratul Huda Binti Pauzi
13. Puan Nor Farizan Binti Md Noh
14. Puan Nurul Fatin Binti Md Rais
15. En Ahmad Fadzil Bin Roslan
16. Puan Fathiah Abdullah
17. Puan Marlia Mardiana Binti Mokhtar

KEMENTERIAN KESIHATAN MALAYSIA

BUKU LOG

PROSEDUR SARINGAN PENDENGARAN BAYI

NAMA : _____

JAWATAN / GRED :_____

TEMPAT BERTUGAS : _____

TARIKH MULA : _____

TARIKH TAMAT : _____

BIRO PEMBANGUNAN KLINIKAL (NHS)
JAWATANKUASA TEKNIKAL AUDIOLOGI
BAHAGIAN SAINS KESIHATAN BERSEKUTU
KEMENTERIAN KESIHATAN MALAYSIA

KRITERIA *PRIVILEGING*

<table>
<tr><th rowspan="2">No</th><th rowspan="2">Prosedur</th><th colspan="4">Kriteria yang perlu dipenuhi (bilangan prosedur)</th></tr>
<tr><th>Observe</th><th>Assist</th><th>Perform</th><th>Reprivileging</th></tr>
<tr><td>1</td><td>Saringan Pendengaran Bayi</td><td>2</td><td>3</td><td>50</td><td>100 per tahun</td></tr>
<tr><td>2</td><td>Kursus dan Latihan Sangkutan</td><td colspan="4">i. Hadir Kursus Latihan Saringan Pendengaran Bayi
ii. Latihan Sangkutan di hospital yang menjalankan saringan pendengaran bayi
iii. Sijil-sijil lain yang berkaitan dengan prosedur yang dipohon (dalam tempoh 2 tahun terkini) sekiranya ada</td></tr>
<tr><td>3</td><td>Penilaian</td><td colspan="4">Butiran Pemarkahan :

<table>
<tr><th>Skala</th><th>Markah</th><th>Deskripsi</th></tr>
<tr><td>5</td><td>Cemerlang</td><td>Individu menunjukkan kualiti prestasi (pencapaian dan komitmen) yang cemerlang dari segi kemahiran teknikal, pengetahuan, kreatif dan menunjukkan inisiatif untuk terus maju.</td></tr>
<tr><td>4</td><td>Sangat Memuaskan</td><td>Prestasi dan kualiti kerja yang ditunjukkan melebihi jangkaan. Berjaya menyempurnakan kesemua komponen melebihi standard yang ditetapkan.</td></tr>
<tr><td>3</td><td>Memuaskan</td><td>Prestasi dan kualiti kerja yang ditunjukkan mencapai tahap jangkaan, terutama dari segi keberkesanan dan ketepatan masa.</td></tr>
<tr><td>2</td><td>Tidak Memuaskan</td><td>Prestasi yang ditunjukkan tidak mencapai matlamat latihan dan satu atau lebih komponen tidak lengkap.</td></tr>
<tr><td>1</td><td>Teruk</td><td>Individu secara konsisten menunjukkan prestasi di bawah par dan tidak menunjukkan sebarang inisiatif/kemajuan untuk mencapai matlamat dan objektif latihan. Individu perlu menunjukkan perubahan yang lebih signifikan dalam satu atau lebih komponen.</td></tr>
</table></td></tr>
</table>

1.0 LOG PROSEDUR PERMOHONAN BARU

No	*Observe* (2 prosedur)				
	Tarikh	**Nama & No KP Ibu**	**Tarikh Lahir Bayi**	**Keputusan**	**T/tgn Penyelia**
1					
2					

No	*Assist* (3 prosedur)				
	Tarikh	**Nama & No KP Ibu**	**Tarikh Lahir bayi**	**Keputusan**	**T/tgn Penyelia**
1					
2					
3					

No	*Perform* di bawah penyeliaan (50 prosedur)				
	Tarikh	Nama & No KP Ibu	Tarikh Lahir bayi	Keputusan	T/tgn Penyelia
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					

No	*Perform* di bawah penyeliaan (50 prosedur)				
	Tarikh	Nama & No KP Ibu	Tarikh Lahir bayi	Keputusan	T/tgn Penyelia
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					

No	*Perform* di bawah penyeliaan (50 prosedur)				
	Tarikh	Nama & No KP Ibu	Tarikh Lahir bayi	Keputusan	T/tgn Penyelia
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					

No	*Perform* di bawah penyeliaan (50 prosedur)				
	Tarikh	Nama & No KP Ibu	Tarikh Lahir bayi	Keputusan	T/tgn Penyelia
31					
32					
33					
34					
35					
36					
37					
38					
39					
40					

No	*Perform* di bawah penyeliaan (50 prosedur)				
	Tarikh	Nama & No KP Ibu	Tarikh Lahir bayi	Keputusan	T/tgn Penyelia
41					
42					
43					
44					
45					
46					
47					
48					
49					
50					

1.2 PENILAIAN PRESTASI

BIL	KOMPONEN	SKALA PRESTASI				
1	Memastikan identiti pesakit dengan tepat	1	2	3	4	5
2	Memberikan penerangan kepada ibu /penjaga bayi mengenai prosedur saringan yang akan dijalankan dan mendapatkan keizinan ibu /penjaga bayi	1	2	3	4	5
3	Mempunyai kemahiran asas untuk mengenalpasti kesesuaian tempat ujian (Persekitaran sesuai, senyap dan terkawal)	1	2	3	4	5
4	Posisi bayi pada kedudukan yang sesuai	1	2	3	4	5
5	Menjalankan prosedur saringan pendengaran dengan betul	1	2	3	4	5
6	Memaklumkan keputusan saringan pendengaran kepada ibu / penjaga bayi dengan tepat	1	2	3	4	5
7	Meyampaikan makluman kepentingan pemantauan perkembangan pendengaran dan pertuturan dan menyerahkan risalah saringan pendengaran kepada ibu/ penjaga bayi	1	2	3	4	5
8	Merekod keputusan saringan pendengaran bayi di dalam Buku Rekod Perkembangan Bayi dan Kanak-Kanak 0 – 6 Tahun	1	2	3	4	5
9	Data setiap bayi dan keputusan saringan pendengaran direkodkan di dalam *database/cencus*	1	2	3	4	5
10	Memahami keperluan membuat rujukan untuk saringan pendengaran kedua atau penilaian diagnostik audiologi	1	2	3	4	5
JUMLAH MARKAH SEMUA KOMPONEN						

1.3 ULASAN & PENILAIAN

Ulasan Penyelia:

……

……

……

……

Pemarkahan Penilaian:

Jumlah Markah = $\frac{\text{Jumlah markah semua komponen x 100\%}}{50}$ =

Tandatangan Penyelia : ……

Nama Penyelia : ……

Jawatan (cop) : ……

Tarikh : ……

2.0 LOG PROSEDUR *REPRIVILEGING*

No	*Perform* tanpa penyeliaan (100 prosedur)				
	Tarikh	**Nama & No KP Ibu**	**Tarikh Lahir Bayi**	**Keputusan**	**T/tgn Penyelia**
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					

No	*Perform* tanpa penyeliaan (100 prosedur)				
	Tarikh	**Nama & No KP Ibu**	**Tarikh Lahir bayi**	**Keputusan**	**T/tgn Penyelia**
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					

No	*Perform* tanpa penyeliaan (100 prosedur)				
	Tarikh	**Nama & No KP Ibu**	**Tarikh Lahir bayi**	**Keputusan**	**T/tgn Penyelia**
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					

No	*Perform* tanpa penyeliaan (100 prosedur)				
	Tarikh	**Nama & No KP Ibu**	**Tarikh Lahir bayi**	**Keputusan**	**T/tgn Penyelia**
31					
32					
33					
34					
35					
36					
37					
38					
39					
40					

No	*Perform* tanpa penyeliaan (100 prosedur)				
	Tarikh	**Nama & No KP Ibu**	**Tarikh Lahir bayi**	**Keputusan**	**T/tgn Penyelia**
41					
42					
43					
44					
45					
46					
47					
48					
49					
50					

No	*Perform* tanpa penyeliaan (100 prosedur)				
	Tarikh	**Nama & No KP Ibu**	**Tarikh Lahir bayi**	**Keputusan**	**T/tgn Penyelia**
51					
52					
53					
54					
55					
56					
57					
58					
59					
60					

No	*Perform* tanpa penyeliaan (100 prosedur)				
	Tarikh	**Nama & No KP Ibu**	**Tarikh Lahir bayi**	**Keputusan**	**T/tgn Penyelia**
61					
62					
63					
64					
65					
66					
67					
68					
69					
70					

No	*Perform* tanpa penyeliaan (100 prosedur)				
	Tarikh	**Nama & No KP Ibu**	**Tarikh Lahir bayi**	**Keputusan**	**T/tgn Penyelia**
71					
72					
73					
74					
75					
76					
77					
78					
79					
80					

No	*Perform* tanpa penyeliaan (100 prosedur)				
	Tarikh	**Nama & No KP Ibu**	**Tarikh Lahir bayi**	**Keputusan**	**T/tgn Penyelia**
81					
82					
83					
84					
85					
86					
87					
88					
89					
90					

No	*Perform* tanpa penyeliaan (100 prosedur)				
	Tarikh	**Nama & No KP Ibu**	**Tarikh Lahir bayi**	**Keputusan**	**T/tgn Penyelia**
91					
92					
93					
94					
95					
96					
97					
98					
99					
100					

SENARAI SEMAK PEMANTAUAN

Bil	Tindakan	Ya	Tidak	Catatan
1	Pastikan identiti pesakit			
2	Jalankan saringan pendengaran bayi • Penerangan kepada ibu /penjaga bayi mengenai prosedur saringan yang akan dijalankan dan mendapatkan keizinan ibu /penjaga bayi • Persekitaran sesuai, senyap dan terkawal • Posisi bayi pada kedudukan yang sesuai • Menjalankan saringan pendengaran mengikut prosedur yang betul			
3	Rekod keputusan saringan pendengaran bayi i. Keputusan direkodkan di dalam Buku Rekod Perkembangan Bayi dan Kanak-Kanak 0 – 6 Tahun ii. Data setiap bayi dan keputusan saringan pendengaran direkodkan di dalam *database/cencus*			
4	Makluman keputusan saringan pendengaran bayi • Menyampaikan keputusan saringan pendengaran kepada ibu bayi dengan tepat • Memaklumkan kepentingan pemantauan perkembangan pendengaran dan pertuturan			
5	Rujukan kepada Audiologis • Membuat rujukan sekiranya keputusan saringan adalah GAGAL • Membuat rujukan untuk penilaian diagnostik audiologi bagi bayi yang berisiko tinggi			