

A Qualitative Study on Awareness of Hearing Health, Hearing Impairment and Intervention among Pregnant Women and Mothers of Newborn in Rural Khordha District

Subhasmita Sahoo^{1*}, Sarita Rautara², Niharika Dash³, Satyabrata Panigrahi³ and Bhowmick Kandpal⁴

¹Department of Audiovestibular Medicine, Institute of Health Sciences, Bhubaneswar, India; ²Department of Speech Language Pathology, Sumandeep Vidyapeeth, Gujarat, India; ³Department of Speech Language Pathology, Institute of Health Sciences, Bhubaneswar, India; ⁴Department of Audiology, Institute of Health Sciences, Bhubaneswar, India

Corresponding author:

Subhasmita Sahoo, Department of Audio vestibular Medicine, Institute of Health Sciences, Bhubaneswar, India,
E-mail: internationalpublications2011@gmail.com

Abstract

Background & Objectives: The study was aimed to investigate the awareness regarding hearing health, causes and prevention measures for hearing disability at natal stages and awareness regarding the intervention among the pregnant women and mothers of newborn in rural areas. **Subjects & Methods:** Information from 51 pregnant women and 105 mothers of newborn living in rural areas were gathered *via* help of hospitals, nursing homes and maternity care. **Results:** Mothers of newborn were more aware with respect to the pregnant women however both the groups could not achieve 100% awareness in any of the selected parameters. Two-way ANOVA was suggesting $p < .0001$, a statistically significant difference between mothers of newborn and pregnant women for awareness of hearing health, causes and prevention of natal stages as well as for intervention. Post hoc analysis was done using unpaired t test by applying bonferroni correction in order to check which of the selected parameters are significantly differ from each other $p < 0.01$. Suggesting a significant difference for all the selected parameters for mothers of newborn and pregnant women. The obtained p value is 0.0001, suggesting a significant difference of selected parameters among pregnant women and mothers of newborn. **Conclusion:** It's very much important to utilize the existing knowledge of the mothers and pregnant women by attempting to bridge the gaps in acquiring information regarding the awareness of hearing impairment in children which can be done only by creating the awareness and spreading adequate information regarding hearing disability.

Keywords: Hearing health; Hearing impairment; Newborn; Prevention; Natal stages; Intervention

Introduction

According to WHO, 5% of the world's population (466 million people) are having hearing disability out of which 34 million children are with disabling hearing loss. ^[1,2] Although it's not possible to prevent all cases of hearing loss in infants but early and consistent information regarding the awareness regarding hearing health, causes and prevention measures for hearing disability along with the intervention taken by pregnant women and mothers of newborn during the pre to postnatal stage, can be a leading source for reducing the occurrence of hearing impairment in newborn especially in rural as well as urban parts of low and middle-income countries. ^[3]

Incident of hearing impairment was found to be 0.6% in rural and 0.4% in urban parts of Odisha followed by 28.45% prevalence rate of hearing disability since birth. ^[4] However, there are less evidence regarding the awareness of hearing impairment in children among the mothers of newborn and pregnant women in Odisha and lack of literature and documents can lead to delay in early identification and intervention. Hence, a small planned survey in rural parts of Khordha district of Odisha

was implemented to provide a record for awareness of hearing impairment in children amongst the mothers of newborn and pregnant women.

Aim and Objective

To determine the awareness of causes and prevention of hearing impairment, hearing health and intervention among pregnant women and mothers of newborn.

Materials and Methods

A cross sectional study was conducted among 156 sample comprising both the pregnant women and mothers of newborn residing in rural areas, collected from 5 panchayat (25 villages) of Khordha district of Odisha, who had visited and being

This is an open access article distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 3.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as the author is credited and the new creations are licensed under the identical terms.

How to Cite this Article: Sahoo S, et al. A Qualitative Study on Awareness of Hearing Health, Hearing Impairment and Intervention among Pregnant Women and Mothers of Newborn in Rural Khordha District. *Ann Med Health Sci Res.* 2021;11:S3:46-52.

treated at govt. and private hospitals, maternity home and nursing homes over a period of 6months *i.e.*, from July 2019 to January 2020. Participants were selected through purposive sampling. All the participants were divided into two groups consisting 51 pregnant women considered as group I and group II consisting 105 mothers of newborn. The inclusion criteria for pregnantwomen were considered to be the time period from conceived to 9 months while for mothers of new born was after delivery to 6months. Beyond this considered time period for both the group was regarded as an exclusion criteria.

An ethical approval consent was taken from the higher authority of selected hospitals and other setups. A survey was done by visiting the hospitals and maternity homes to get information regarding the pregnant women and mothers of newborn, who have visited them. Once the information was documented, an approach was made to all the participants to participate in the survey. All the interested participants were introduced with the aims and the objectives of the study and a written consent and permission was sought from them.

A close ended questionnaire was used to obtain responses from pregnant women and mothers of newborn from different hospitals and maternity care homes after the due permission granted from the setup. A close ended questionnaire and a small survey was taken into consideration as strategy for data collection.

The questionnaire relevant to awareness regarding hearing health, causes and prevention of hearing disorder during

prenatal, perinatal and postnatal stage and awareness for the intervention were considered in case of a hearing impaired child, was constructed by investigators and validated by 5 ASLPs. The questionnaire was initially developed in English which was further translated into Odia language by native Odia speaker and then back translated along with proofread in order to ensure that the meaning of the content remains the same. The duly filled questionnaire from the participants of the groups were collected and their responses were noted down which were further compiled for statistical analysis.

The recorded data were documented in Microsoft excel 2018 and analyzed using Statistical Package for Social Sciences (SPSS) version 18.0.0. Mean \pm SD were used to summarize the overall score of both the groups. Each factor under every under selected parameters were calculated in the form of percentile score. In order to determine the effects of selected parameters,two-way ANOVA was applied andpost hoc analysis using unpaired t test was used to check the difference between subgroups.

Results

The information was collected from 51 pregnant women in group I and 105 mothers of newborn in group II. The mean age range of pregnant women wasfound to be 24.2 years. Mothers of newborn have an average age range of 26 years. The demographic details of subjects participated in the study were given in terms of educational qualification and gross annual income. More than 50% of the participants (both mothers of new born and pregnant women) surveyed were well educated,

Table 1: Distribution of subject based on educational level.

Subjects	Up to secondary and other qualifications n (%)	Bachelor and higher degrees n(%)	Total (n)
Pregnant women	29 (56.86%)	22 (43.13%)	51
Mothers of new born	57 (54.28%)	48 (45.71%)	105

Table 2: Distribution of subjects by gross annual income.

Subjects	<1,00,000 P.A n (%)	1L-3L P.A n (%)	>5L P.A n (%)
Pregnant women	24 (47.05%)	16(31.37%)	11(21.56%)
Mothers of new born	44(41.90%)	38(36.19%)	23(21.90%)

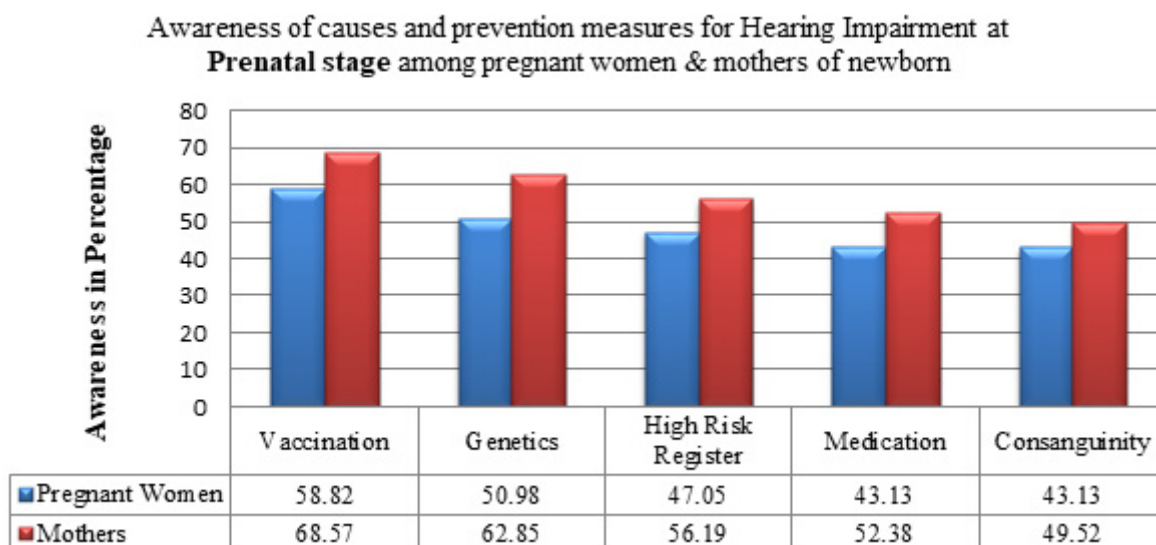


Figure 1: Depicts the percentage of awareness of causes and prevention of hearing impairment at prenatal stage, among the pregnant women and mothers of newborn.

with secondary and other qualifications [Table1]. More than 40% of the participant’s gross annual income was less than lakh [Table 2].

Results of each single factor in selected parameters were depicted as percentile score in the form of graphs. Mothers of newborn were more aware of genetic (62.85%) and high risk register factors (56.19%) as prenatal causes with respect to pregnant women. However, 69% mothers of newborn and 59% pregnant women have knowledge regarding the vaccination, as a preventive measure at primary level of prevention for any future disorder in new born, especially hearing impairment [Figure 1]. In terms of causes and prevention in the perinatal stage, mothers of new born and pregnant women have scored less than 50% for each factor although participants in each group had more than 55%awareness regarding the complications during caesarean, which may lead to hearing loss in children. Nevertheless,

45% participants in both the groups have perception regarding premature birth as a risk factor [Figure 2].

For postnatal period, more than half of mothers of newborn (57.14%) and pregnant women (52.94%) have an insight toward ear discharge and less than half of the total participants acknowledged that injury and/or infection can act as an active cause of hearing impairment in children [Figure 3]. Both the groups had scored above 50% regarding the awareness of neonatal hearing loss in infants although at the same time 50% mothers of newborn as well as pregnant women, use sharp objects and/or oil as an intervention part. However, more than one third of pregnant women (37.25%) and less than half of mothers of newborn (46.66%) were familiar with newborn hearing screening [Figure 4].

Mothers of new born and pregnant women are more acquainted

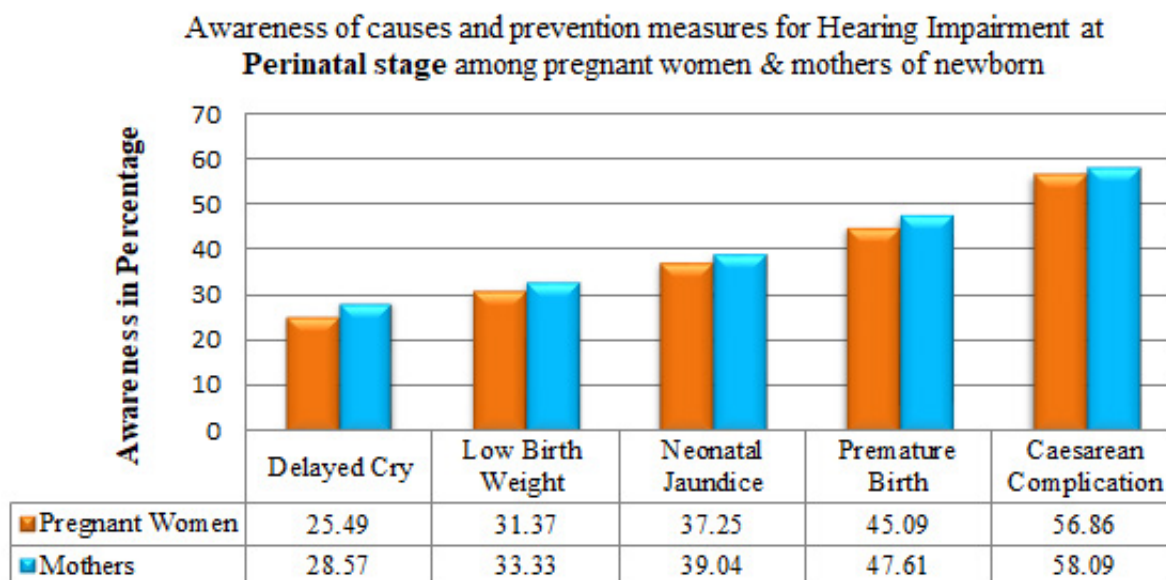


Figure 2: Depicts the percentile score of awareness of causes and prevention of hearing impairment at perinatal stage, among the pregnant women and mothers of newborn of rural areas.

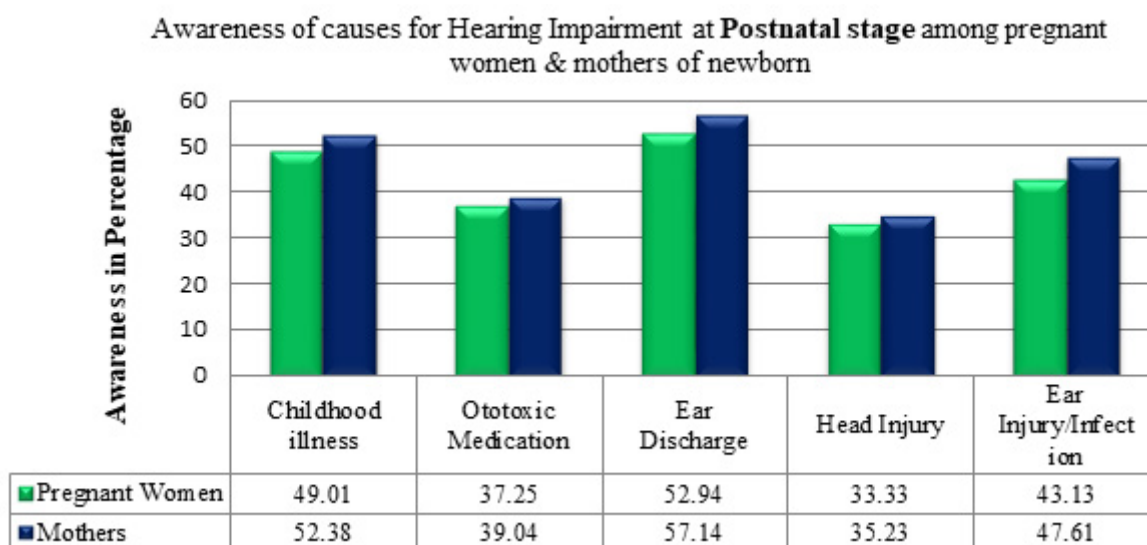


Figure 3: Depicts the percentile score of awareness of causes of hearing impairment at postnatal stage, among the pregnant women and mothers of newborn in rural areas.

with prenatal causes, its prevention and awareness of hearing health and intervention followed by postnatal and perinatal stage. Mothers of newborn has overall higher percentile score in all selected factors and parameters with respect to pregnant women, although no 100% awareness score was recorded for any of the groups [Figure 5].

Descriptive statistics was done for responses of pregnant women and mothers of newborn in rural are as towards the selected parameters *i.e.* awareness of the causes and prevention of hearing impairment in prenatal stage, perinatal stage, postnatal stage and awareness of hearing health and intervention for hearing impaired [Table 3].

A two-way analysis of variance was conducted to determine the influence of two independent variables (pregnant women and mothers of newborn) on awareness of causes and prevention of hearing impairment, hearing health and intervention in rural areas. All the effects were statistically significant at the .05 significance level [Table 4]. The main effect for pregnant women and mothers yielded an F ratio of $F(1,623)=12.84$,

$p=0.0004$, indicating a significant difference between Group I: Pregnant women with mean and standard deviation (\pm) were in prenatal stage: $2.43 (\pm 0.50)$; in perinatal stage: $1.96 (\pm 0.77)$, in postnatal stage: $2.15 (\pm 0.96)$; and for the awareness of hearing health and intervention for hearing impaired: $2.39 (\pm 0.60)$ and Group II-Mothers of newborn in prenatal stage: $2.89 (\pm 0.78)$; in perinatal stage: $2.06 (\pm 0.81)$; in postnatal stage: $2.31 (\pm 0.90)$ and for the awareness of hearing health and intervention for hearing impaired: $2.68 (\pm 0.62)$ [Table 3].The main effect for an awareness of hearing health & intervention and awareness of causes and prevention for hearing impairment at natal stages yielded an F ratio of $F(3,623)=17.05$, $p<.0001$, indicating a significant difference. The interaction effect was significant, $F(3,623)=1.26$, $p=0.002$ [Table 4].

In post hoc analysis using unpaired t test $p<0.01$, suggesting that the selected four parameters are significantly differing from each other along with a significant difference between pregnant women and mothers of newborn in rural area [Table 5].

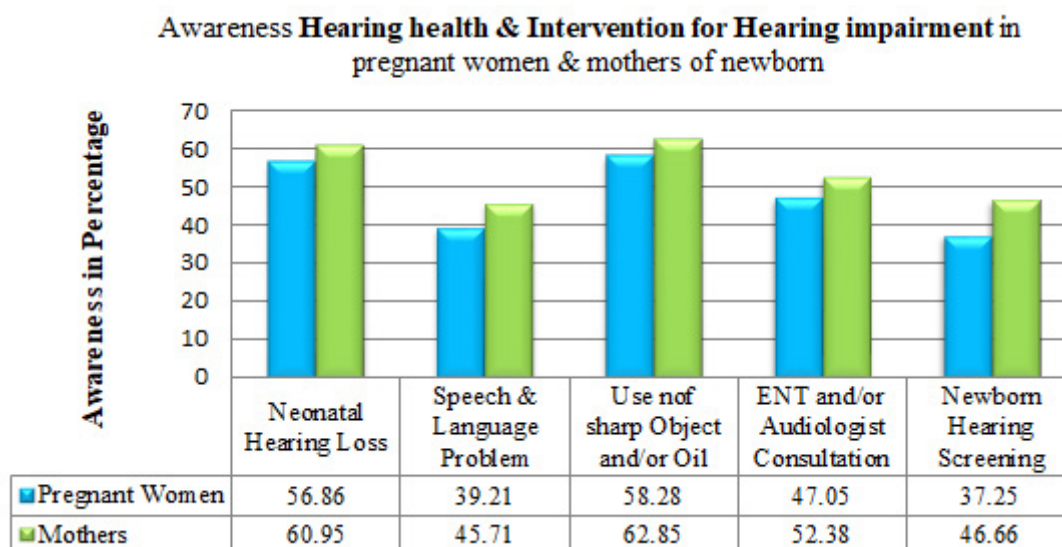


Figure 4: Depicts the awareness of hearing health and intervention taken by both the pregnant women and mothers of newborn in rural areas.

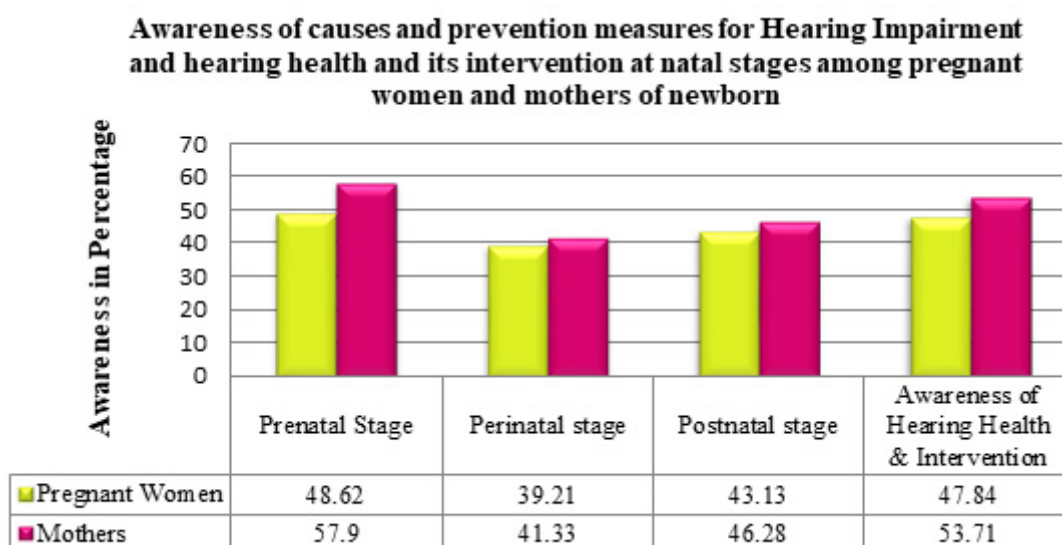


Figure 5: Depicts the overall comparison of awareness of causes and prevention measures for hearing impairment in all the natal stages and hearing health and its intervention among pregnant women and mothers of newborn in rural areas.

Table 3: Depicts descriptive statistics for responses of pregnant women and mothers of newborn in rural areas towards the selected parameters.

Area	Subjects	Awareness of the causes and prevention of hearing impairment in:						Awareness of hearing health and Intervention for hearing impaired	
		Prenatal stage		Perinatal stage		Postnatal stage		Mean	SD
		Mean	SD	Mean	SD	Mean	SD		
Rural area	Group I pregnant women	2.43	0.5	1.96	0.77	2.15	0.96	2.39	0.6
	Group II mothers of newborn	2.89	0.78	2.06	0.81	2.31	0.9	2.68	0.62

Table 4: Depicts results of two-way ANOVA regarding awareness of hearing health and intervention and awareness of causes and prevention for hearing impairment at natal stages among pregnant women and mothers of newborn in rural areas.

Source	SS	df	MS	F	p
Pregnant women and mothers	8.94	1	8.94	12.84	0.0004
Awareness of hearing health and intervention and Awareness of causes and prevention for hearing impairment at natal stages.	35.61	3	11.87	17.05	<.0001
Interaction	2.64	3	0.88	1.26	0.002
Error	428.97	616	0.7	-	-
Total	488.61	623	-	-	-

Table 5: Depicts post hoc analysis using unpaired t test with applied Bonferroni correction for comparisons of selected parameter for the pregnant women in rural area.

Selected parameter (in rural area)	Mean difference		Obtained p value		Bonferroni correction
	Pregnant women	Mothers of new born	Pregnant women	Mothers of new born	
Prenatal-perinatal	0.4706	0.8286	0.0002	<.0001	
Prenatal-postnatal	0.2745	0.581	0.0001	<.0001	
Prenatal- awareness of hearing health and intervention	0.0392	0.2095	0.0001	0.001	
Perinatal- postnatal	-0.1961	-0.2476	0.0002	0.0001	p= 0.01
Perinatal- awareness of hearing health and intervention	-0.4314	-0.619	0.001	0.0001	
Postnatal- awareness of hearing health and intervention	-0.2353	-0.3714	0.0005	0.002	

Discussion

Awareness in pregnant women and mothers towards the conditions that could occur either before, during or after birth *i.e.* all the natal stages, which may place their infant at risk for developing hearing loss, can be the best approach towards achieving early identification and intervention in case of infants with hearing impairment. The causes of hearing loss and deafness can be congenital or acquired. Approximately 50% of the cases are thought to be due to environmental factors (prenatal, perinatal or postnatal factors) and the remaining are due to genetic factors or unknown cause. [5]

Regarding causes and prevention during prenatal stage, WHO states that in prenatal stage, 31% childhood hearing loss are due to infection in mother during pregnancy (e.g. rubella or cytomegalovirus). [1] Govender et al., had reported that 54% mothers are aware of hereditary conditions resulting in hearing loss in infants which is congruent with the present study where both the groups have scored more than 50%. The study also indicated that only 16% of mothers were aware of infection or high-risk factors in them can lead to hearing loss in infant, which is contrasting with the present study results, where awareness in both groups is nearly 50%. [6]

Recent study suggest, less than 50% of mothers were aware

regarding the risk factors in prenatal stage which may lead to hearing impairment in infants, however in the present study, 50% in both groups are aware of the risk factors in prenatal stage, which is also similar to the study done by Olusanya et al. in Nigeria, where 73% of mothers were aware of the risk factors. [6,7] 56% mothers were aware of ill effects of consanguinity while rest 44 mothers were either had wrong or no knowledge regarding the effect of consanguinity on hearing loss as studied by Dudda et al which is incongruent with the present study result for consanguinity. [8-10].

Regarding perinatal causes and risk factors, 33% of mothers were aware of prematurity birth whereas 50% mothers displayed poor knowledge regarding low birth weight which is similar with the present study results. [5] Korres et al., have also included non-elective caesarean delivery as an emerging risk factor which also included in the present study result. Although how this factor can be directly causing hearing loss is still under research. [8] Research regarding the nature and risk factors for hearing loss, also concluded that hyperbilirubinemia/ neonatal jaundice was the most prevalent risk factor along with low birth weight (<1500gms) which directly correlates with factors contributing to hearing loss considered as a part of the present study.

Regarding postnatal causes, as studied by Ravi et al., mothers

exhibited good knowledge of risk factors where 54.3% mothers were aware of ear discharge as a risk factor for hearing loss. [11] A Nigerian study on mother suggest 50% mothers were aware that ototoxic drugs could affect hearing in infants. [7] Govender et al. had information that 58% of mothers have knowledge of head trauma or head injury, which can be a contributing factor for hearing loss. [6] Overall mothers are more aware regarding the ear infection and ear discharge as a cause for hearing loss in infants. The same result was documented in the present study.

Regarding the awareness of hearing health and intervention taken by mothers, study 89.2% of mothers were aware that hearing could be screened at birth which is different from the present study score. Only 45% mothers had idea that an audiologist provide services for rehabilitation of persons with hearing loss, however, more than 70% mothers were unaware that an audiologist can only be the professional to provide aural rehabilitation services including screening, assessing, diagnosing and managing hearing loss which correlates with the present study result. [6] The findings of the present study and review of literature suggests that this lack of knowledge exists in developing countries, and therefore should be addressed in all public awareness programmes on ear and hearing health.

However, no significant data regarding the awareness of hearing impairment in children among pregnant women could be obtained from literature, so the rationale behind this study found a strong motive to focus on the same and provide a record for the future.

With the aim of preventing avoidable hearing loss (primary prevention), early identification and treatment of ear problems, and rehabilitation of persons with hearing impairment, the Government of India initiated the National Programme for Prevention and Control of Deafness (NPPCD) and integrated it with National Rural Health Mission (NRHM) at the state and district levels. [12] Olusanya reported that in South-East Asia and Africa regions, where the burden of hearing impairment is highest, only India has established concrete steps towards nationwide hearing screening but still many rural parts of India are still away from achieving cent percent result. [13]

Conclusion

This study was carried out to gain insights into the knowledge and awareness regarding hearing health, causes and prevention for hearing loss along with intervention in mothers of newborn and pregnant women residing in a rural community.

The result of this study suggests that mothers as compared to pregnant women in rural community were more knowledgeable regarding the aspects of causes of hearing loss and prevention for the same, however, lack of information and misconceptions regarding intervention of a hearing impaired child were also prevalent. It is very much important to utilize the existing knowledge of the mothers and pregnant women by attempting to bridge the gaps in acquiring information regarding the awareness of hearing impairment in children which can be done only by creating the awareness and spreading adequate information regarding hearing disability. This can help in achieving the goals of early identification and early intervention for children with hearing loss while indirectly reducing the

burden of hearing disability.

Recommendation

76th round of The National Sample Survey (NSS) had surveyed disability in Indian households and found that hearing disability was overall 0.3% out of 2.2% total disability, ranking 2nd most common cause of disability. Public health services in country can help in detecting such hearing health issues as early as possible and responds appropriately to avoid the development of hearing impairment. In an initial attempt for prevention of hearing loss in infants, it is important for pregnant women and mothers of newborn to follow a strategic primary prevention followed by secondary and tertiary during natal stages, which can effectively reduce the impact of deafness and hearing loss in an individual's life. This can be considered as one of the crucial fact for improving and protecting community health and well-being, while emphasizing the prevention among large groups of people. Further it has been recommended that such type present study and/or survey can be conducted using a greater number of subjects in both the groups and including additional factors being considered for awareness of causes and prevention of hearing loss in infants while covering more districts.

Limitation of the study

The present study included a smaller number of subjects and restricted to selected rural parts of Khordha district. Further, the subject were included only pregnant women and mothers of new born but no other family members or general population for their awareness regarding the hearing loss in infants. Limited numbers of factors were considered in each natal stage.

Relevance of the study

Various NGO and NRHM partnership are being utilized under the disease control programs, reproductive and child health, routine immunization and Special Immunization Activities (SIAs). The current study was conducted among pregnant women and mothers of new born in order to investigate their awareness level regarding second highest disability *i.e.* hearing impairment and its prevention in infants. The objective was to use the information obtained to create appropriate awareness related to hearing impairment which can be a boon to public health welfare, NGOs and NRHM to reduce the occurrence or severity of hearing impairment in individual's life and to make avail the governmental support and facility being available for hearing impaired individuals. In other words, to reduce the burden of hearing disability and to improve quality of life.

Author's Contribution

All authors have equally contributed for this study.

References

1. <https://www.who.int/news-room/fact-sheets/detail/deafness-and-hearing-loss>
2. http://www.who.int/pbd/deafness/hearing_impairment_grades/en/
3. https://www.who.int/blindness/publications/Newborn_and_Infant_Hearing_Screening_Report.pdf?ua=1

4. http://www.mospi.nic.in/sites/default/files/publication_reports/Report_583_Final_0.pdf
5. Reddy P, Rani U, Reddy M, Bindu H. Role of intrauterine rubella infection in the causation of congenital deafness. *Ind J Hum Genet.* 2006;12:140-143.
6. Govender SM, Khan NB. Knowledge and cultural beliefs of mothers regarding the risk factors of infant hearing loss and awareness of audiology services. *J Public Health Africa.* 2017;8:43-48.
7. Olusanya BO, Luxon L, Wirz SL. Screening for early childhood hearing loss in Nigeria. *J Med Screen.* 2005;12:115-118.
8. Korres S, Balatsouras D, Nikolopoulos T, Korres GS, Ferekidis E. Making universal new-born hearing screening a success. *Int J Pediatr Otorhinolaryngol.* 2006;70:241-246.
9. Swanepoel DW, Johl L, Pienaar D. Childhood hearing loss and risk profile in a South African population. *Int J Pediatr Otorhinolaryngol.* 2013;77:394-398.
10. Dudda R, Muniyappa HP, Puttaraju S, Lakshmi MS. A qualitative study on knowledge and attitude towards risk factors, early identification and intervention of infant hearing loss among puerperal mothers: A short survey. *J Clin Diagn Res.* 2017;11:MC01-MC05.
11. Ravi R, Yerraguntla K, Dhanshree R, Gunjawate, Rajashekhar B, Lewis LE, et al. Knowledge and Attitude (KA) survey regarding infant hearing loss in Karnataka. India. *Int J Pediatr Otorhinolaryngol.* 2016;85:1-4.
12. <https://main.mohfw.gov.in/sites/default/files/51892751619025258383.pdf>
13. Olusanya BO. Neonatal hearing screening and intervention in resource-limited settings: An overview. *Arch Dis Child.* 2012;97:654-659.