

Association of Earwax type, Colostrums secretion and Types of human Axillary Microbium: A study on Bengalee Hindu Caste females of West Bengal, India

D. Das¹, G. Mukherjee², P. Sarkar³, A.K. Sil⁴, D. Chatterjee⁵ and A.R. Bandyopadhyay⁶

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¹Debasree Das, Department of Anthropology, University of Calcutta, 35, Ballygunge Circular Road, Calcutta-700019. Email dasdebasree733@gmail.com

²Goutam Mukherjee, Department of Microbiology, University of Calcutta, 35, Ballygunge Circular Road, Calcutta -700019. Email: rkmv.raja426@gmail.com

³Pranabesh Sarkar, Department of Anthropology, University of Calcutta, 35, Ballygunge Circular Road, Calcutta-700019. Email: p.sarkar1991@gmail.com

⁴Aloke Kumar Sil, Department of Microbiology, University of Calcutta, 35, Ballygunge Circular Road, Calcutta-700019. Email: alokksil7@gmail.com

⁵Diptendu Chatterjee, Department of Anthropology, University of Calcutta, 35, Ballygunge Circular Road, Calcutta-700019. Email: dip_cu@rediffmail.com

⁶Arup Ratan Bandyopadhyay, Department of Anthropology, University of Calcutta, 35, Ballygunge Circular Road, Calcutta-700019. E-mail: arup.cu@gmail.com

Corresponding author: Dr. Arup Ratan Bandyopadhyay, Professor, Department of Anthropology, University of Calcutta, 35, Ballygunge Circular Road, Calcutta-700019. E-mail: arup.cu@gmail.com

ABSTRACT:

Previous studies revealed relationship between human earwax (cerumen) type and colostrums secretion. However, the earwax, colostrums are produced from apocrine gland. Furthermore, the human axillary gland secretion is also from apocrine gland. In this context, the present study is attempted to understand the association of earwax type, colostrums secretion and axillary microbium. To achieve the purpose, earwax type, information about colostrums secretion and axillary microbium have been obtained from 35 lactating Bengalee Hindu caste females. To best of the knowledge, this is the first attempt from India to understand the relationship between earwax type, colostrums secretion and axillary microbiums. The result demonstrated significant ($p < 0.05$) association between wet earwax type and colostrums secretion. To understand the relationship between axillary microbium and earwax type, the cultured microbium (taken from 11 participants) were digested by Hind III restriction enzyme and genotyping was done by agarose electrophoresis using standard technique. Examination on genotypes revealed three variations in genotypes e.g. A (>1000bp), B (1000-750 bp) and C (750-500bp) in cultured microbium. Further analysis demonstrated significant ($p < 0.05$) association between wet earwax and B type of axillary microbium. Therefore, the present study envisaged strong association of wet earwax type with high colostrums secretion and B type axillary microbium.

Key words: Earwax, Colostrums, Axillary Microbium, Bengalee females.

INTRODUCTION

Human earwax (cerumen), a mix product of sebaceous glands (Sebum) and modified apocrine glands (Roeser and Ballachanda, 1997), and inherited as Mendelian trait for wet and dry types (Matsunaga, 1962). The *ABCC11*(SNP rs17822931) gene determines the earwax type as AA genotype express the dry earwax and GA and / or GG genotypes express the wet type (Yoshiura, *et al.* 2006).

Human earwax type is associated with the amount of colostrums secretion (Jirka 1968; Petrakis *et al.*, 1971) as both having the same origin. Earlier study (Miura, *et al.*, 2007) from Japan reported that the frequency of women without colostrum among dry-type women was significantly higher than that among wet-type women. Since, the ceruminous gland is an apocrine gland, and the breast glands are ceruminous gland, therefore, there might be association between ear wax and breast milk.

Apart from earwax and colostrums, apocrine gland is also responsible for axillary sweat secretion (Sato and Sato, 1987; Chang et al., 2009) and the *ABCC11* gene has been reported to determine axillary body odour and also the type of earwax (Martin, *et al.*, 2010; Yoshiura, *et al.*, 2006; Nakano, *et al.*, 2009; Kanlayavattanakul and Lourith, 2011;). Apocrine glands are found around armpits, nipples and the groin regions of the body and it secretes the majority of chemical compounds needed for the skin flora to metabolize it into odorant substances (Nicolaidis, 1974, Black, 1999). Armpit has higher moisture content and a neutral or slightly alkaline pH, which allows microbe populations to grow a lot denser (Chen and Tsao, 2013). The human axillae are characterized by warm, moist and nutritionally rich area in the body and thus, sustaining highest densities of microorganisms on that body surface (Nicolaidis, 1974; Robinson and Robinson, 1954).

Analyses of the topographical diversity of microbes that inhabit these niches of the human skin using 16S rRNA gene phylotyping revealed that the habitats have large effects on the microbial composition. Microbiome analyses take advantage of the universal presence of the small-subunit (16S) ribosomal RNA gene in all prokaryotes (Kong, 2011). The 16S rRNA gene contains highly conserved regions, which facilitates PCR, whereas hypervariable regions can be used for phylogenetic categorization (Srinivas et al., 2015).

In this background, the present work has attempted to investigate the relationship between the earwax types with colostrums secretion and also to identify the types of microbes surviving in axillae in a sample of Bengalee Hindu women. To the best of our knowledge, the present study is the first attempt to understand the association of earwax type, colostrums secretion and the types of axillary microbes among the lactating women of Bengalee Hindu caste population.

MATERIALS & METHODS

The present study has been conducted on 35 Bengalee Hindu lactating women aged between 18-30 years. On the basis of sticky (Wet type) and non-sticky (Dry type) character of the earwax (collected by swab sticks) revealed that 12 of 35 (34.28%) women were dry-type and 23 (65.72%) were wet-type. Self-reported status of colostrums secretion collected in prepared schedule. The bacterial DNA extractions for 11 samples were done following standard technique (Vingataramin and Frost, 2015) with slight modifications. Then the extracted bacterial DNA (16s r DNA) further processed by PCR amplification (Forward Primer: 5' GTGCCAGCAGCCGCGGTAA 3' and reverse primer: 5'TACGGYTACCTTGTTACGACTT 3') and PCR products were directly digested on Hind III restriction enzyme. Subsequently, the PCR products were genotyped by 2.5% agar gel electrophoresis.

RESULTS

Among the participants, wet earwax type individuals revealed highest frequency (65.72%). Examination on the distribution of Dry and Wet earwax phenotypes and the colostrums secretion among the participants (table 1) revealed significant ($p < 0.05$) difference indicating significantly higher production of colostrums and as well as Profuse' milk secretion category among the participants having Wet earwax type. Subsequently, it has been noticed highest (52.17%) frequency during post-natal period.

The axillary microbium of the present participants were all gram negative species. Distribution of Dry and Wet earwax phenotypes and the RFLP (HindIII) type among the participants (Table 2) revealed significantly ($p < 0.05$) higher frequency (80.00%) of B-type RFLP (HindIII) among the participants with wet type earwax.

DISCUSSIONS

Earwax type determined the amount of colostrums secretion that demonstrates from this study. The association study shows that Wet earwax type individuals are likely to have profuse colostrums secretion rather than Dry earwax type individuals. Human earwax type is associated with colostrum secretion in a direct relationship (Petrakis, *et al.*, 1975). The present study revealed consistency with the earlier study (Ibraimov, 1991), that Mongoloids are likely to have dry earwax type than that of the other population. Moreover the short report published by Miura et al., (2007) the first report on earwax type and ABCC11 gene interaction reported more than 60% was dry ear wax type; the population were from Japan.

Now, though colostrums and earwax both are governed by apocrine gland, as is also the axillary sweat secretion, it has been speculated that these three may have some association. In this context the present study vindicated strong association between wet type ear wax and colostrums secretion. In addition to that, we are also reporting that Hind III restriction enzyme digestion, of axillary microbium revealed strong association of B type (1000-750bp) with wet ear wax and higher colostrums secretion. Therefore, the present study stimulates more work on human microbium variation as new horizon of anthropological research

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Table 1: Distribution of Earwax type and Colostrums secretion

Earwax type	Colostrums secretion			
	Profuse	Medium	Low	Total
Dry	4 (33.33)	3 (25)	5 (41.67)	12 (34.28)
Wet	12 (52.17)	10 (43.48)	1 (4.35)	23 (65.72)
Total	16	13	6	35

Figures in the (parenthesis) denotes percentage

Table 2: Distribution of Earwax type with RFLP (HindIII) type

RFLP(HindIII) type	Earwax type		
	Dry	Wet	Total
A(>1000, 750,500bp)	0	3(100)	3 (27.27)
B(1000- 750bp)	1(20.00)	4(80.00)	5 (45.45)
C(750,500bp)	3 (100)	0	3(27.27)
Total	4(36.36)	7(63.64)	11

Figures in the (parenthesis) denotes percentage

*p<0.05

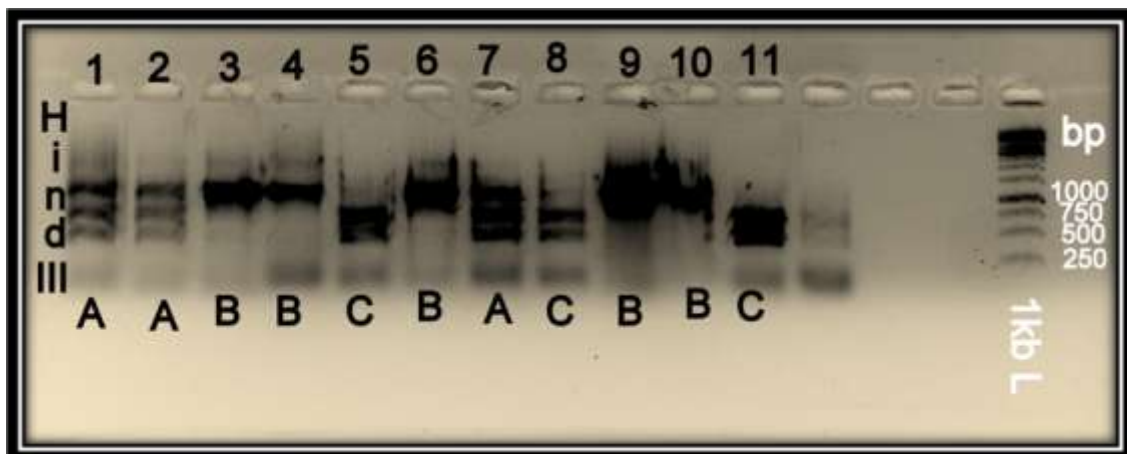


Figure 1: Gel documentation of RFLP (HindIII) digestions (A, B, C are the types of banding pattern)