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Article

The Relationship Between Cotton Bud Use and The Incidence of Cerumen Impaction Among Patients at The ENT Polyclinic of PKU Muhammadiyah Bantul Hospital

[1]Nadila Rahmayanti, [1]Rizky Firmansyah *, [1]Rizka Ariani
Email (Corresponding Author): *rfjousting@gmail.com
[1] Faculty of Medicine, Universitas Ahmad Dahlan, Yogyakarta, Indonesia

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ABSTRACT

Cotton buds are commonly used to clean ears, although improper use can be harmful to ear health by causing cerumen impaction. Cerumen is a natural substance that normally exits the ear canal on its own but can accumulate due to cotton bud use, leading to hearing problems. This study aims to examine the relationship between cotton bud use and the incidence of cerumen impaction in patients at the ENT Polyclinic of PKU Muhammadiyah Hospital, Bantul, considering the high prevalence of this condition in Indonesia. This research used a cross-sectional design and collected data through questionnaires from 65 patients at the ENT clinic. The data were analyzed using SPSS 25 with chi-square and Fisher's exact tests. Results showed that 86.2% of patients used cotton buds up to 2/3 of the inner ear canal. There was no significant relationship between the depth of cotton bud use and the incidence of cerumen impaction (p = 0.483). However, there was a significant relationship between the frequency of cotton bud use (> 1 time a week) and cerumen impaction in both ears (p = 0.032). Patients who frequently used cotton buds had a higher incidence of cerumen impaction compared to those who used them rarely. In conclusion, there is a relationship between the frequency of cotton bud use and the incidence of cerumen impaction.

INTRODUCTION

Cotton buds are objects made of several rolled paper balls that serve to clean the ears. Their use has become a common practice in society due to their easy accessibility and convenience. However, cotton buds pose potential risks to ear health, particularly by causing the accumulation of oil or cerumen. Cerumen is a natural substance produced by the sebaceous and ceruminous glands, playing a vital role in trapping dirt, preventing the entry of insects, and maintaining

moisture and pH balance in the ear canal. Although cerumen is normally expelled from the ear naturally through the process of epithelial skin migration, cotton buds remain the primary choice for many people due to the quicker cleaning process. Nonetheless, this practice carries the risk of damaging the tympanic membrane and can lead to uncontrolled cerumen buildup, resulting in a condition known as cerumen impaction[1].

Based on research conducted by Sevy (2023), cases of cerumen impaction in America reached 6% of the general population, with a higher incidence in children of around 10% and in the elderly group exceeding 30%[2]. In Indonesia, data shows that around 9.6 million people experience hearing loss due to cerumen impaction. According to the World Health Organization (WHO) quoted in Yuniardi's research (2010), the incidence of cerumen impaction in Indonesia reached 18.7% [3]. Data from Riskesdas (2013) obtained from research by Rantung, Palandeng, and Mengko in 2018 showed that the prevalence of cerumen impaction in Indonesia reached 18.8%. The highest prevalence related to cerumen impaction occurred in the age group ≥ 75 years with a figure reaching 37.3%, while the age group 15-24 years had the lowest prevalence of 14.3% [3].

Based on references (1-3) and prevalence data available to date, there has not been much research update related to cerumen impaction cases in the Special Region of Yogyakarta Province. Therefore, research is needed that focuses on the prevalence of cerumen obstruction due to the use of cotton buds. Given the dangers of using cotton buds can have fatal consequences in the form of hearing loss, it is important to increase public education and awareness of safe ear cleaning practices. Based on this, researchers are interested in conducting research on the relationship between the use of cotton buds and the incidence of cerumen obstruction in patients at the ENT Clinic of PKU Muhammadiyah Hospital Bantul.

METHODS

This study used an observational analytical approach with a cross-sectional design involving patients at the ENT Polyclinic of PKU Muhammadiyah Bantul Hospital. Data were collected through purposive sampling using questionnaires. The study population consisted of 88 patients diagnosed with cerumen impaction based on medical records from January 2024. Using Slovin's formula, the minimum required sample size was 47, and a total of 65 respondents participated in the study from April to May 2024. Inclusion criteria were patients diagnosed with cerumen impaction, having a history of cotton bud use, willing to undergo otoscopic examination by an ENT specialist, and willing to fill out a questionnaire and provide informed consent. Exclusion criteria included patients using hearing aids, having external ear infections, congenital ear malformations, eczematous or irritant contact dermatitis, and those who work with or frequently

use earplugs (including during swimming). Data were analyzed using SPSS version 25 with the chi-square and Fisher's exact tests.

RESULTS

The results of the examination of 65 patients diagnosed with cerumen blockage, the largest frequency distribution was female patients, as many as 33 people (50.8%). The largest age group was the adult group (19-59 years) which amounted to 42 people (64.6%). The largest occupation was students with a total of 19 people (29.23%). The highest frequency of cotton bud use was the rare category, which was 33 people (50.8%). This category includes use once a week and once a month, which can be categorized as use ≤1 time a week (Rare).

Table 1Patient characteristics

	Frequency (n)	***Percentage (%)***
Gender		
Man	32	49.2
Woman	33	50.8
Age		
Infant-Toddler < 5 years	2	3.1
Children 5-9 years	0	0.0
Teenagers 10-18 years	8	12.3
Adults 19-59 years	42	64.6
Seniors 60+	13	20.0
Work		
Child (Toddler)	2	3.08
Laborer	3	4.62
Housewife	10	15.38
Employee	6	9.23
Student	6	9.23
Collage Student	19	29.23
Government Employee	2	3.08
Self-Employed	9	13.85
Farmer	1	1.54
Retiree	7	10.77
Total	65	100.0

Based on the results, the depth of cotton bud use was 2/3 of the ear canal, as many as 56 people (86.2%), which was categorized as entering the ear. Symptoms often experienced by patients diagnosed with cerumen blockage with the use of *cotton buds* were hearing loss as many as 26 people (40.0%). The history of cerumen blockage experienced by most patients was the first time when visiting PKU Muhammadiyah Bantul Hospital as many as 48 people (73.8%).

The location of the cerumen blockage experienced by the most diagnosed patients was total (found in both ears) as many as 37 people (56.9%). Of the majority of patients who used cotton buds up to 2/3 of the inner ear canal, they experienced cerumen blockage in both ears (total) as

many as 33 samples (58.93%), while only 23 samples (41.07%) experienced cerumen blockage in one ear (partial). On the other hand, in the group that used cotton buds only in 1/3 of the outer ear canal, fewer experienced cerumen blockage in both ears as many as 4 people (44.44%), while 5 people (55.56%) experienced cerumen blockage in one ear.

The data obtained were analyzed using chi-square obtained a p-value = 0.651 (> a 0.05) followed by alternative analysis using the Fisher's-exact test obtained a p value = 0.483 (> a 0.05) so that H0 was accepted which means there is no significant relationship between the depth of cotton bud use and the incidence of cerumen blockage in patients at the ENT Polyclinic of PKU Muhammadiyah Bantul Hospital. The chi-square results are shown in table 2.

Of the patients who often used cotton buds > 1 time a week, there was a higher percentage of cerumen blockage in both ears (total) of 23 people (71.88%) compared to those who experienced cerumen blockage in one ear (partial) of 9 people (28.12%). On the other hand, in the group that rarely used cotton buds (≤ 1 time a week), the percentage of cerumen blockage in both ears was 14 people (42.42%), while in one ear it was 19 people (57.58%). From the results of the analysis using chi-square, the p-value was obtained = 0.032 (a = 0.05, p-value <a) so that H0 was rejected, which means there is a significant relationship between the frequency of cotton bud use and the incidence of cerumen blockage in patients at the ENT Clinic of PKU Muhammadiyah Bantul Hospital. The results of this chi-square analysis are shown in table 3.

Table 2Chi-square test of depth with cerumen location

Depth	***Total cerumen blockage group***	***Partial cerumen plug group***	***Total***	***p-value***
2/3 of the internal ear canal	(33) 58.93%	(23) 41.07%	(56) 100.0%	
1/3 of the external ear canal	(4) 44.44%	(5) 55.56%	(9) 100.0%	.651
Total	56.92%	43.08%	65	

Table 3Chi-square test of frequency with cerumen location

Frequency	***Total cerumen blockage group***	***Partial cerumen plug group***	***Total***	***p-value***
Often 1 time a week	23 71.88%	9 28.12%	32 100.0%	.032
Rarely ≤1 time a week	14 42.42%	19 57.58%	33 100.0%	
Total	37 56.92%	28 43.08%	65	

DISCUSSION

This study shows that the majority of patients with cerumen impaction at the ENT Polyclinic of PKU Muhammadiyah Bantul Hospital are adults aged 19-59 years, with a total of 42 people (64.6%), and the dominant age group is 19 years as many as 6 people. Similar results were found in the study of Money, Naftali, and Marliyawati (2018), which showed 69 adult samples with the

largest age range of 19-22 years, and an average age of 20.67 ± 0.66 years (7)[4]. Mustofa's study (2021) also supports these findings, with 196 respondents (59.5%) aged over 18 years[1]. The high prevalence in adults may be related to higher activity levels and a decrease in the number of cerumen glands with increasing age. However, research by Pradiptha, Budisetia, and Mukti (2021) found the highest prevalence at the age of 12 years (19.6%)[5] and Sari, Gunadi, and Handiani (2021) reported the highest prevalence at the age of 5-11 years (94%), possibly because their study was conducted in elementary schools[6]

Most of the cerumen obstruction patients at the ENT Clinic of PKU Muhammadiyah Bantul Hospital were female, namely 33 people (50.8%). This finding is consistent with the study by Larasati (2023), which reported 201 female respondents (79%), and the study by Wijayati and Engkartini (2017), which recorded 14 female respondents (77.8%) [6, 7]. Money, Naftali, and Marliyawati (2018) found 71% of the sample were female [7], while Mustofa (2021) recorded 156 female respondents, 51.5% [8]. However, Pradiptha, Budisetia, and Mukti (2021) reported that 56 participants (58.9%) were male [4]. Overall, there is no significant difference between gender and the incidence of cerumen impaction because the diameter between men and women is the same, but there are several physiological and pathological conditions that make it different. In the study, Melinda (2017) stated that there was no significant relationship between cerumen impaction and gender [9].

The most common symptom experienced by patients is hearing loss (40.0%). The accumulation of cerumen prevents sound waves from entering the ear, reducing the quality of sound transmission and changing the acoustic pressure in the ear canal. These results are in line with research by Hakim, Ristyaning, and Himayani (2023), which showed that cerumen impaction can cause hearing loss or conductive deafness. [10]. However, Larasati's research (2023) reported that the most frequent complaints were itching at 24%, followed by ear pain at 20% [5]. Itching is often caused by mechanical irritation due to frequent and aggressive use of cotton buds, while ear pain can be caused by injury to the ear canal.

Most of the patients with cerumen blockage at the ENT Polyclinic of PKU Muhammadiyah Bantul Hospital were in the category of rarely using cotton buds (≤1 time a week), with 33 people (50.8%), and the chi-square analysis showed a p value = 0.032 ($p < 0.05$), indicating a significant relationship between the frequency of cotton bud use and cerumen blockage. Research by Money, Naftali, and Marliyawati (2018) also found that 58% of respondents rarely used cotton buds (≤1 time a week) and showed a significant relationship ($p = 0.001$) [7]. Mustofa (2021) found that students of the Faculty of Medicine, Diponegoro University, Semarang who rarely used cotton buds

(<1 time/day) had knowledge about the dangers of using cotton buds too often [8]. However, research by Larasati (2023) and Alifa Nur Istiqomah (2023) did not find a significant relationship between the frequency of cotton bud use and cerumen blockage [6, 12].

The depth of cotton bud use in patients with cerumen blockage at the ENT Clinic of PKU Muhammadiyah Bantul Hospital did not show a significant relationship with cerumen blockage, with p = 0.651 (chi-square) and p = 0.483 (Fisher's exact), both greater than α (0.05). Gabriel, Mohammed, and Paul's (2015) study in Nigeria also found no significant relationship between insertion depth and cerumen blockage [12]. However, several other studies, such as Money, Naftali, and Marliyawati (2018), and Mustofa (2021), found a significant relationship between the depth of cotton bud use and cerumen blockage [7,8]. These results can be influenced by several things such as the ability of the ear's natural mechanism to clean and produce cerumen and things that can increase cerumen blockage such as using a headset for more than 30 minutes a day and using hearing aids or earplugs and improper use of cotton buds increases the risk of blockage and irritation in the ear canal.

CONCLUSION

Research at the ENT Polyclinic of PKU Muhammadiyah Bantul Hospital in April-May 2024 found that there was a significant relationship between the frequency of cotton bud use and the incidence of cerumen blockage (p-value 0.032). However, there was no significant relationship between the depth of cotton bud use and cerumen blockage (p-value chi-square 0.651 and fisher's-exact 0.483). Most patients who experienced cerumen blockage were women, adults, and students. They usually used cotton buds rarely (≤1 time a week) and only up to 2/3 of the ear canal. The majority of patients experienced cerumen blockage for the first time with the main symptom of hearing loss. This conclusion emphasizes the importance of education about the safe use of cotton buds to prevent cerumen blockage and its negative impacts

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