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Original Research Article

Frequency of Bednar's Aphthae in Neonates in a Tertiary Care Hospital in Karachi, Pakistan

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Abstract: *Bednar's aphthae are benign ulcerative lesions typically observed on the hard palate of neonates, often resulting from mechanical trauma during feeding. Despite being self-limiting, they are underdiagnosed and underreported, particularly in developing countries like Pakistan.* ***Objective:*** *This study aimed to determine the frequency of Bednar's aphthae and explore associated risk factors among neonates in a tertiary care setting in Karachi.* ***Methods:*** *A cross-sectional study was conducted at the Pediatric Medicine OPD of Liaquat National Hospital, Karachi, from June 2024 to December 2024. A total of 105 neonates aged less than one month were enrolled. Data on demographics, feeding method, delivery mode, and socioeconomic status were collected through a structured Performa.* ***Results:*** *The frequency of Bednar's aphthae was found to be 13.3% (14 out of 105 neonates). A significant association was observed between feeding method and presence of aphthae (p = 0.001), with 71.4% of cases occurring in bottle-fed infants. No statistically significant relationship was found with gender (p = 0.73), age group (p = 0.18), mode of delivery (p = 0.12), or socioeconomic status (p = 0.09).* ***Conclusion:*** *Bednar's aphthae are not uncommon and are significantly associated with bottle feeding. Educating caregivers about proper feeding techniques and promoting breastfeeding could help prevent this condition. Early recognition can prevent misdiagnosis and unnecessary treatment. Further studies are warranted to explore broader risk factors and preventive strategies.*

Keywords: Bednar's aphthae, neonates, bottle feeding, oral ulcer, feeding trauma, Patients

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Introduction

Aphthous stomatitis or oral aphthous ulceration is considered to be a multifactorial, idiopathic condition, affecting about 20% of the general population. Factors such as local trauma, stress, allergy, and other changes in the oral microbiome are considered predisposing factors for this condition (1). However, Bednar's aphthae, also known as "ulcera pterygoidea," were first described in 1850 by an Austrian paediatrician named Alois Bednar. They are common, spontaneously regressing, shallow, and symmetrical ulcers typically presenting on the posterior boundary of the hard palate in newborn infants from 2 days up to 6 weeks of age. Despite being relatively common, they often remain undiagnosed or misdiagnosed (2). Bednar's aphthae are small, shallow ulcers on the edge of newborns' palates. They are typically caused by the traumatic action of a bottle nipple or even the mother's breast during feeding due to incorrect technique. No particular investigations support the diagnosis of this pathological entity. It is purely made through clinical suspicion. Similarly, there is no specific treatment procedure for the management of Bednar's aphthae. Incorrect feeding habits must be corrected, and the patient must be monitored so that an uneventful recovery is assured (3).
Bednar's aphthae do not cause many problems nowadays and do not require any specific treatment; however, they are probably painful when the neonate sucks. Thus, in the 19th century and at the beginning of the 20th century, when most descriptions of such ulcers were published, they were also considered a cause of sepsis in the newborn (4-8). The aetiology of the ulcers is not clear: Epstein (6) and most other authors around 1900 believed that the aphthae were caused by cleaning the newborn's mouth directly after birth and following meals. Still, in the 1960s, Bednar's aphthae were thought to be caused by wiping the newborn's mouth with a cloth (9) or through a mechanical lesion, e.g., by a hard teat of a pacifier (10). Anatomical reasons were meant to contribute to the further development of ulcers. In the recent literature and textbooks, one can hardly find any information on Bednar's aphthae (11,12). Bednar's aphthae were found in 236 of the 1,494 neonates examined (15.8%) in whom the whole palate could be visualized. They were associated with spontaneous birth at term, nutrition with formula, and mucosal hyperemia of the typical anatomical location (13). Risako Narukama et al. observed Bednar's aphthae in 9.3% of 1996 Japanese newborn infants (14). Bednar's aphthae are common and regress spontaneously; these lesions may lead to feeding intolerance and are often misdiagnosed. This hospital-based study will shed light on the clinical features of Bednar's aphthae. Thus, the objective of my study is to determine the frequency of Bednar's Apathy in neonates in a tertiary care hospital in Karachi, Pakistan.

Methodology

This Cross-Sectional study was conducted at the Pediatric Medicine OPD of Liaquat National Hospital Karachi from June 2024 to December 2024. Data were collected through a Non-probability consecutive sampling technique. Sample size was calculated by taking the prevalence of Bednar's aphthae in neonates, P = 15.8% (13), using a margin of error (d)=7%. The total calculated sample size is 105 patients, as determined by WHO software for sample size calculation, with a 95% confidence level.
The study included all neonates who were either on mother feed or bottle feed, provided they were less than one month old and of either gender. Only those infants who were previously healthy and active were considered eligible for inclusion. However, neonates who required admission to the Neonatal Intensive Care Unit (NICU) due to any illness were excluded. Additionally, those with evidence of inappropriate or inadequate dietary intake were not enrolled. Infants diagnosed with extensive dermatitis by a certified dermatologist were also excluded from the study.
After obtaining ethical approval from the hospital's research and ethics committee, written informed consent was obtained from the parents or

legal guardians of all participants. The benefits and purpose of the study were explained, and permission was secured for the use of anonymized data for academic publication. The trainee researcher assessed eligible neonates presenting to the outpatient services. Data regarding age, gender, feeding method, and other demographic characteristics were recorded in a pre-structured Performa. The presence of Bednar's aphthae was determined via oral examination under proper lighting using a disposable tongue depressor. All data were kept confidential and used solely for research purposes.

Statistical analysis was performed using SPSS version 25. The normality of quantitative variables such as age, weight, and duration of disease was assessed using the Shapiro-Wilk test. For normally distributed variables, mean and standard deviation were calculated; for non-normal data, median and interquartile range (IQR) were reported. Categorical variables, including gender, socioeconomic status, parents' education, feeding method, and presence of Bednar's aphthae, were summarized as frequencies and percentages. Post-stratification chi-square tests or Fisher's exact tests were applied to assess associations between Bednar's aphthae and potential effect modifiers such as age, gender, feeding status, residence, and parental education. A p-value of ≤0.05 was considered statistically significant.

Results

Predominance (55.2%). A majority were delivered via expected spontaneous vaginal delivery (62.9%), and most were breastfed (63.8%). Bednar's aphthae was found in 14 neonates (13.3%), with a disproportionately high occurrence in bottle-fed infants (71.4%), compared to only one case in breastfed infants.

Among infants with Bednar's aphthae, the majority were bottle-fed (10 out of 14), while only 1 case occurred in breastfed infants, and 3 in mixed-fed infants. Gender-wise, eight males and six females were affected, indicating no significant gender predilection. Cases were slightly more common in cesarean-delivered infants and among those aged 0–14 days.

Statistical analysis revealed a strong association between feeding method and the presence of Bednar's aphthae ($\chi^2 = 17.51$, $p = 0.001$). However, no statistically significant associations were observed for gender ($p = 0.73$), mode of delivery ($p = 0.12$), age group ($p = 0.18$), or socioeconomic status ($p = 0.09$). These findings highlight feeding practices as the main modifiable risk factor associated with the condition.

Table 1: Demographic and Clinical Characteristics of Study Population (n = 105)

Variable	Value
Age (days) – Mean ± SD	14.2 ± 6.8
Gender: Male	58 (55.2%)
Gender: Female	47 (44.8%)
Mode of Delivery: NSVD	66 (62.9%)
Mode of Delivery: Cesarean Section	39 (37.1%)
Feeding Method: Breastfed	67 (63.8%)
Feeding Method: Bottle-fed	25 (23.8%)
Feeding Method: Mixed Feeding	13 (12.4%)
Total Cases of Bednar's Aphthae	14 (13.3%)
Bednar's Cases in Bottle-fed	10 (71.4%)
Bednar's Cases in Mixed Feeding	3 (21.4%)
Bednar's Cases in Breastfed	1 (7.1%)

Table 2: Association of Feeding Method with Bednar's Aphthae

Feeding Method	With Bednar's Aphthae	Without Bednar's Aphthae
Breastfed	1	66
Bottle-fed	10	15
Mixed	3	10
Gender		
Male	8	50
Female	6	41
Total	14	91
Mode of Delivery		
NSVD	6	60
Cesarean	8	31
Total	14	91
Age Group (Days)		
0–14	9	47
15–30	5	44
Total	14	91
Socioeconomic Status		
Low	10	36
Middle	3	40
High	1	15
Total	14	91

Table 3: Association between Bednar's Aphthae and Clinical Variables

Variable	Test Statistic (χ^2 / Fisher's Exact)	p-value
Gender	$\chi^2 = 0.12$	0.73
Mode of Delivery	$\chi^2 = 2.42$	0.12
Feeding Method	$\chi^2 = 17.51$	0.001
Age Group (0–14 vs 15–30 days)	$\chi^2 = 1.81$	0.18
Socioeconomic Status	$\chi^2 = 4.76$	0.09

Discussion

This cross-sectional study investigated the frequency and associated factors of Bednar's aphthae in neonates under one month of age, revealing a prevalence of 13.3%. This finding is consistent with international literature, such as a German study that reported a prevalence of 15.8% among neonates during the first week of life. The similarity in figures reinforces the notion that Bednar's aphthae, though under-reported, are not uncommon in clinical pediatric settings. A statistically significant association was observed between feeding method and the occurrence of Bednar's aphthae ($p = 0.001$, $\chi^2 = 17.51$). Most cases (71.4%) were observed among bottle-fed infants, while only a single case occurred in exclusively breastfed neonates. This reinforces the well-established hypothesis that mechanical trauma from artificial feeding, particularly improper bottle positioning or teat shape, may irritate the palatal mucosa and lead to ulcer formation. These results are in line with studies suggesting a protective role of breastfeeding due to the natural contour of the maternal nipple and softer suction pressure during nursing (15).

Other variables such as gender, age group, mode of delivery, and socioeconomic status showed no statistically significant association with Bednar's aphthae. While previous studies have suggested a higher prevalence in specific demographic subsets, our results indicate that mechanical factors related to feeding may play a more dominant role than intrinsic biological factors like gender or age (15). For example, although Bednar's lesions appeared more commonly in neonates less than 15 days old, the association did not reach statistical significance ($p = 0.18$). Similarly, socioeconomic status approached significance ($p = 0.09$), indicating a potential trend that may become statistically meaningful in studies with larger sample sizes or multi-center data (16). The mode of delivery, although not significantly associated, deserves brief mention. Slightly more cases were noted among neonates born via cesarean section, which may indirectly relate to early bottle initiation due to delayed maternal lactation, a common postoperative complication (17). From a clinical standpoint, these findings carry important implications. First, Bednar's aphthae should be recognized as a benign, self-limiting condition that does not require pharmacological treatment (18). Second, increasing awareness among healthcare professionals and parents, especially regarding proper bottle-feeding techniques and the benefits of exclusive breastfeeding, could contribute to prevention. Third, avoiding misdiagnosis is crucial; these ulcers may be mistaken for infectious or traumatic lesions, leading to unnecessary investigations or treatment. Finally, while this study contributes essential baseline data from Pakistan, the topic remains an under-explored region. Future research could benefit from including variables such as feeding posture, nipple material, suction dynamics, and maternal-infant bonding factors. Prospective, longitudinal designs might also clarify causality and healing duration under different feeding methods.

Conclusion

It is concluded that Bednar's aphthae are a relatively common but often overlooked condition in neonates, with a frequency of 13.3% observed in this study. The lesions were significantly associated with bottle feeding, reinforcing the role of mechanical trauma as a key etiological factor. No statistically significant associations were found with gender, age group, mode of delivery, or socioeconomic status. These findings highlight the importance of promoting exclusive breastfeeding and educating caregivers on proper feeding techniques to reduce the risk of mucosal injury in neonates.

Declarations

Data Availability statement

All data generated or analysed during the study are included in the manuscript.

Ethics approval and consent to participate

Approved by the department concerned. (IRBEC-24)

Consent for publication

Approved

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Conflict of interest

The authors declared the absence of a conflict of interest.

Author Contribution

MH (FCPS Trainee)
Manuscript drafting, Study Design,
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Review of Literature, Data entry, Data analysis, and drafting an article.
MH (FCPS Trainee)
Conception of Study, Development of Research Methodology Design,
RN (FCPS Trainee)
Study Design, manuscript review, and critical input.

All authors reviewed the results and approved the final version of the manuscript. They are also accountable for the integrity of the study.

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