

ORIGINAL ARTICLE

Relationship Between Cleft Type and Body Weight in Cleft-Lip and Palate Aged 0-5 Years of Age: Cross Sectional Study and Bibliometric Analysis

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ABSTRACT

Introduction: Baby with cleft lip and palate are underweight due to inadequate nutritional status, which puts their physical growth at risk. This can have an impact on malnutrition. The research aims to determine the relationship between the type of cleft palate and the weight of cleft-lip and palate aged 0-5 years, as well as to map the general picture and find out the research themes that have been researched in nutrition and cleft studies which can strengthen the research findings. **Methods:** A cross-sectional study design with a total sample of 110 based on data at Paru Jember Hospital Indonesia. Analysis uses Spearman's rho and z score statistics. Later, the bibliometric analysis was performed based on the Google Scholar and Scopus data based. **Results:** Statistical tests ($p=0.755$), correlation coefficient (0.30). The z score for cleft type on body weight (1.759 ± 1.5). The bibliometric analysis of 980 articles contained 4 main keywords, one of which was "nutritional" AND "cleft lip and palate" which had 71 items. The dominant themes that were often discussed in 2018. These findings are suitable to support the results of research in phase one. **Conclusion:** There is no relationship between cleft type and baby's weight. One of the supporting factors is related to nutritional support, nutritional need, and feeding. These three factors are in accordance with the findings obtained from bibliographic analysis and are still rare so they have a great opportunity to be researched. *Malaysian Journal of Medicine and Health Sciences* (2026) 22(SUPP7): 34-41. doi:10.47836/mjmhs.22.s7.6

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INTRODUCTION

The nutritional status of a large number of infants with orofacial clefts overall and by type of cleft at birth is still under prediction (1). The increased risk of malnutrition in children with cleft lip and/or palate can affect the nutritional status of sufferers (2). The prevalence of malnutrition in children with orofacial clefts is at risk of increasing (3).

Patients with cleft lip and/or palate have a higher risk of experiencing malnutrition (4). Children with non-syndromic oral clefts may experience growth retardation and malnutrition (5). Babies with cleft lip and palate are underweight due to inadequate nutritional status, which puts their physical growth at risk. This can have an impact on malnutrition.

Then the problem regarding the general description of research themes and what research themes have been researched in the study of nutritional status and cleft palates, research trends, and research opportunities that can be carried out in the future are still unmapped.

Prevalence of non-syndromic oral clefts. Children with non-syndromic oral clefts may experience growth retardation and malnutrition. However, the growth status of children with non-syndromic oral disorders in China remains unclear (5). The results of research in the United States on a sample of 883 babies with orofacial gaps showed that the estimated proportion of babies underweight was 2.3%, the majority of babies with orofacial gaps experienced underweight between birth and 1 month as much as 10.6%, peaking between 2 and

3 months as much as 27.1%, and remains high between the ages of 5 and 6 years as much as 16.3% (1). The results of research in Indonesia on a sample of 1,899 records after data validation for cleft lip and palate sufferers showed that the national prevalence of stunting was 24.4%, wasting was 12.5%, and overweight was 12.9%, including high, while cases of underweight body weight of 6.8% are low (2).

MATERIALS AND METHODS

First, a cross-sectional research design using a sample of 110 babies with cleft lip and palate was taken using a consecutive sampling technique from data collection at RSU Paru Jember Indonesia between January 2023 and January 2024. Respondent inclusion criteria include: babies aged 0 -5 years, non-syndromic cleft, first operation, complete physical examination history, and the patient's parents agree to informed consent. The research is a development of nutritional research in patients with congenital abnormalities in the facial area which has received ethical approval from the Ethics Committee of the Faculty of Medicine, University of Jember (reference: 1.577/H25.1.11/KE/2022). The research data obtained was then described as percentages for cleft type based on ICD-11 (6) and weight categories based on age (7), while bivariate variables were tested using Spearman's rho and z score analysis using SPSS statistical software.

Second, bibliometric analysis using the VOSviewer application. Bibliometric performance analysis was carried out based on literature meta-analysis from Google Scholar and Scopus data using predetermined keywords to produce article metadata. Publication year range of articles used 1937-2024. In this study, 4 keywords were used, namely: "nutritional" AND "cleft lip and palate", "nutritional status" AND "body weight" "cleft palate" AND "baby", "nutritional" AND "non-

syndromic cleft lip" AND "body weight", "nutritional" AND "cleft lip and palate". The bibliometric analysis procedure in this research is as follows: 1) define the aims and scope of the bibliometric study; 2) choose the techniques for bibliometric analysis; 3) collect the data for bibliometric analysis; 4) run the bibliometric analysis and report the findings. Then produces a network analysis which includes: network metrics visualization, clustering visualization, and density visualization.

RESULTS

Phase 1 research

Table I show that the most common type of cleft lip based on age is 0-1 years with unilateral cleft lip as many as 55 people (36.85%). The most common type of cleft lip based on gender is male, namely unilateral cleft lip, 42 people (28.14%). Meanwhile, the most common type of cleft lip based on body weight, namely normal status, was unilateral cleft lip, in 53 people (35.51%).

The results of the Spearman's rho statistical test in Table 1 show a value of $p = 0.755$ ($p > 0.05$) with a correlation coefficient of 0.30, which means there is no strong relationship between the type of cleft and body weight. The z score result of cleft lip type on body weight is positive $1.759 \pm 1-5$, meaning that babies with various types of cleft lip do not have a risk of malnutrition, but on the contrary, the baby's weight increases.

Stage 2 bibliometric analysis

The investigation used the Google Scholar and Scopus databases based on the search terms "cleft type" and "body weight" by identifying relevant articles. Then carry out an objective filter based on the title and keywords, and evaluate the suitability by analyzing the title and keywords of the publication with the inclusion criteria, namely: English language articles, the search is limited to the topic of cleft type and body weight using 4 different

Table I: Distribution of main cleft types for age, sex, and weight and correlations cleft types with weight, and z score

	All (n = 110)	Unilateral cleft lip (n = 67)	Bilateral cleft lip (n = 4)	Cleft lip and palate unilateral (n = 7)	Cleft lip and palate bilateral (n = 3)	Cleft palate (n = 29)
	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)
Age groups (year):						
0-1	78 (54.5)	55 (36.85)	2 (0.08)	5 (0.35)	1 (0.03)	15 (4.35)
1-2	24 (16.8)	10 (6.7)	1 (0.04)	1 (0.07)	2 (0.06)	10 (29)
2-3	5 (3.5)	0 (0)	1 (0.04)	1 (0.07)	0 (0)	3 (0.87)
3-4	2 (1.4)	1 (0.67)	0 (0)	0 (0)	0 (0)	1 (0.29)
4-5	1 (7)	1 (0.67)	0 (0)	0 (0)	0 (0)	0 (0)
sex:						
Male	73 (51.0)	42 (28.14)	3 (0.12)	3 (0.21)	2 (0.06)	23 (6.67)
Female	37 (25.9)	25 (16.75)	1 (0.04)	4 (0.28)	1 (0.03)	6 (1.74)
Weight measurements per child:						
Malnutrition	7 (4.9)	6 (4.02)	0 (0)	0 (0)	0 (0)	1 (0.29)
Normal	89 (62.2)	53 (35.51)	2 (0.08)	7 (0.49)	3 (0.09)	25 (7.25)
Over Weight	14 (9.8)	8 (5.36)	2 (0.08)	0 (0)	0 (0)	3 (0.87)
	r		p-value		z score	
Cleft types - weight	0,030		0,755		1,759±1-5	

types of keywords to obtain articles and Bibliometric analysis was carried out. As a result of the selection of the two databases, relevant articles were obtained according to the variables of cleft type and body weight.

The results of the analysis in Table II using 4 keywords "nutritional" AND "cleft lip and palate" as many as 980 articles, "nutritional status" AND "body weight" AND "cleft palate" AND "baby" as many as 493 articles, "nutritional" AND "non-syndromic cleft lip" AND "body weight" as many as 73 articles, and "nutritional" AND "cleft lip and palate" as many as 77 articles.

The results of the bibliometric analysis in Table III show that there are 5 clusters, each cluster has several items in each of the 4 keywords.

Network visualization

The results of the bibliometric analysis in Figure 1 were obtained using the keywords "nutritional" AND "cleft lip and palate" in 980 network articles, 4 main clusters emerged, each of which could be identified based on its colour, namely: the 1st cluster (bilateral cleft lip) was red, the 2nd cluster (nutritional deficiency) is colored green, the 3rd cluster (nutritional support) is blue, and the 4th cluster (nutritional problems) is yellow. This network consists of 71 items with 1043 links and a total link strength of 2309.

The results of the bibliometric analysis in Figure 2(a) show that the 1st cluster (bilateral cleft lip) which is colored red includes 26 items or terms, including focusing on baby, infant, nutritional, surgery, nutritional support, unilateral cleft lip and palate, cleft lip palate, nutritional deficiency, risk, risk factors, nutritional factors, non-syndromic cleft lip, maternal nutritional status. The network has 43 links with a total link strength

Table III: Distribution of clustering based on keywords

Keywords	Cluster				
	1	2	3	4	5
"nutritional" AND "cleft lip and palate"	26 item	23 item	12 item	10 item	-
"nutritional status" AND "body weight" AND "cleft palate" AND "baby"	8 item	6 item	6 item	4 item	3 item
"nutritional" AND "non syndromic cleft lip" AND "body weight"	3 item	-	-	-	-
"nutritional" AND "cleft lip and palate"	3 item	-	-	-	-

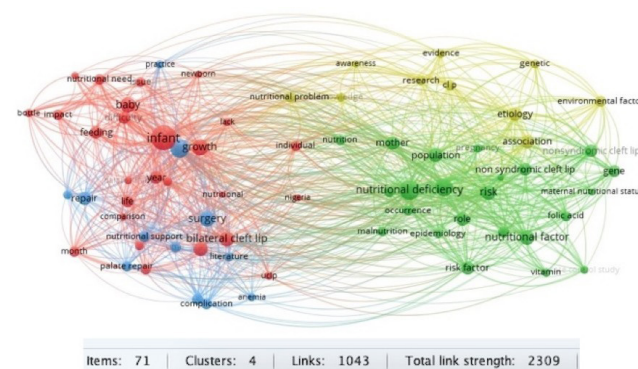


Figure 1: Keyword strength analysis for "nutritional" AND "cleft lip and palate" of 980 published articles analyzed

of 75.

In Figure 2(b), the second cluster (nutritional deficiency) which is colored green includes 23 items or terms, including focusing on baby, infant, feeding, nutritional, nutritional support, bilateral cleft lip, knowledge, nutrition, malnutrition, risk factors, cleft lip palate, non-syndromic cleft lip, risk, deficiency. The network has 58 links with a total link strength of 215.

Table II: Distribution of databased used to bibliometric analysis

Citation metrics		Google Scholar and Scopus databased			
Key words	"nutritional" AND "cleft lip and palate"	"nutritional status" AND "body weight" AND "cleft palate" AND "baby"	"nutritional" AND "non syndromic cleft lip" AND "body weight"	"nutritional" AND "cleft lip and palate"	
Publication years	1943-2024	1937-2024	2021-2024	1976-2024	
Citation years	81 [1943-2024]	87 [1937-2024]	23 [2021-2024]	48 [1976-2024]	
Papers	980	493	73	77	
Citations	28542	16212	1509	1433	
Cites per year	352.37	186.34	65.61	29.85	
Cites per paper	29.12	32.88	20.67	18.61	
Cites per author	12009.67	11574.65	490.46	1433.00	
Papers per author	445.54	337.18	32.34	77.00	
Authors per paper	3.02	2.05	3.41	1.00	
h-index	83	50	18	19	
g-index	154	125	38	37	
hi,norm	45	39	10	19	
hi,annual	0.56	0.45	0.43	0.40	
hA-index	16	16	8	5	

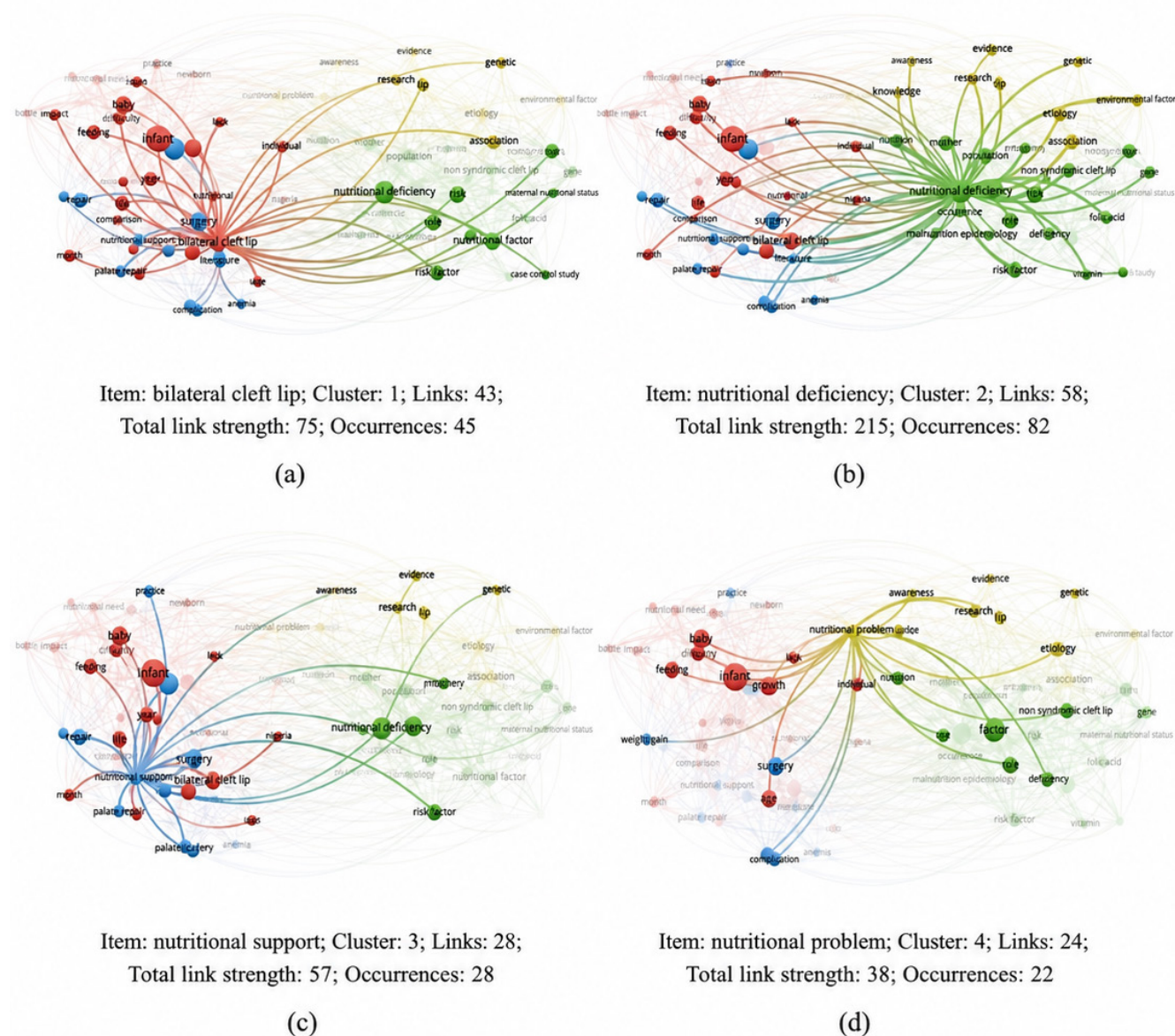


Figure 2: Analysis of keywords strength for (a) the first cluster bilateral cleft lips; (b) the 2nd cluster nutritional deficiency; (c) the 3rd cluster nutritional support; (d) the 4th cluster nutritional problem

In Figure 2(c), the third cluster (nutritional support) in blue includes 12 items or terms, including focusing on baby, infant, feeding, surgery, palate repair, bilateral cleft lip, unilateral cleft lip and palate, pregnancy, nutritional deficiency, and risk factors. The network has 28 links with a total link strength of 57.

In Figure 2(d), the 4th cluster (nutritional problem) which is colored yellow includes 10 items or terms, including focusing on baby, infant, feeding, growth, weight gain, surgery, cleft lip and palate, nutrition, factors, non-syndromic cleft lip, deficiency. The network has 24 links with a total link strength of 38.

Clustering visualization

The results of the bibliometric analysis in Figure 3(a) show that the 1st cluster (bilateral cleft lip) has 43 frequently researched variables, and the total link strength is 75 with the year of publication being 2015.

This cluster has topics related to feeding, nutritional, and nutritional factors, maternal nutritional status were topics discussed in early 2010-2012. Topics including palate repair, nutritional support, baby, infant, nutritional deficiency, and non-syndromic cleft lip were widely discussed between 2012-2016, while topics related to cleft lip palate, and risk factors started to become widely discussed closer to 2018. So, the topic is a research trend in the field of bilateral cleft lip.

In Figure 3(b), the second cluster (nutritional deficiency) is found with variables that are often studied, there are 58 links, and the total link strength is 215 with the year of publication, namely 2014. This cluster has topics related to nutritional, baby, nutrition, and folic acid, namely topics discussed early in 2010-2012. Topics including bilateral cleft lip, nutritional support, risk, and deficiency were widely discussed between 2012-2016, while issues related to malnutrition, cleft lip palate, risk

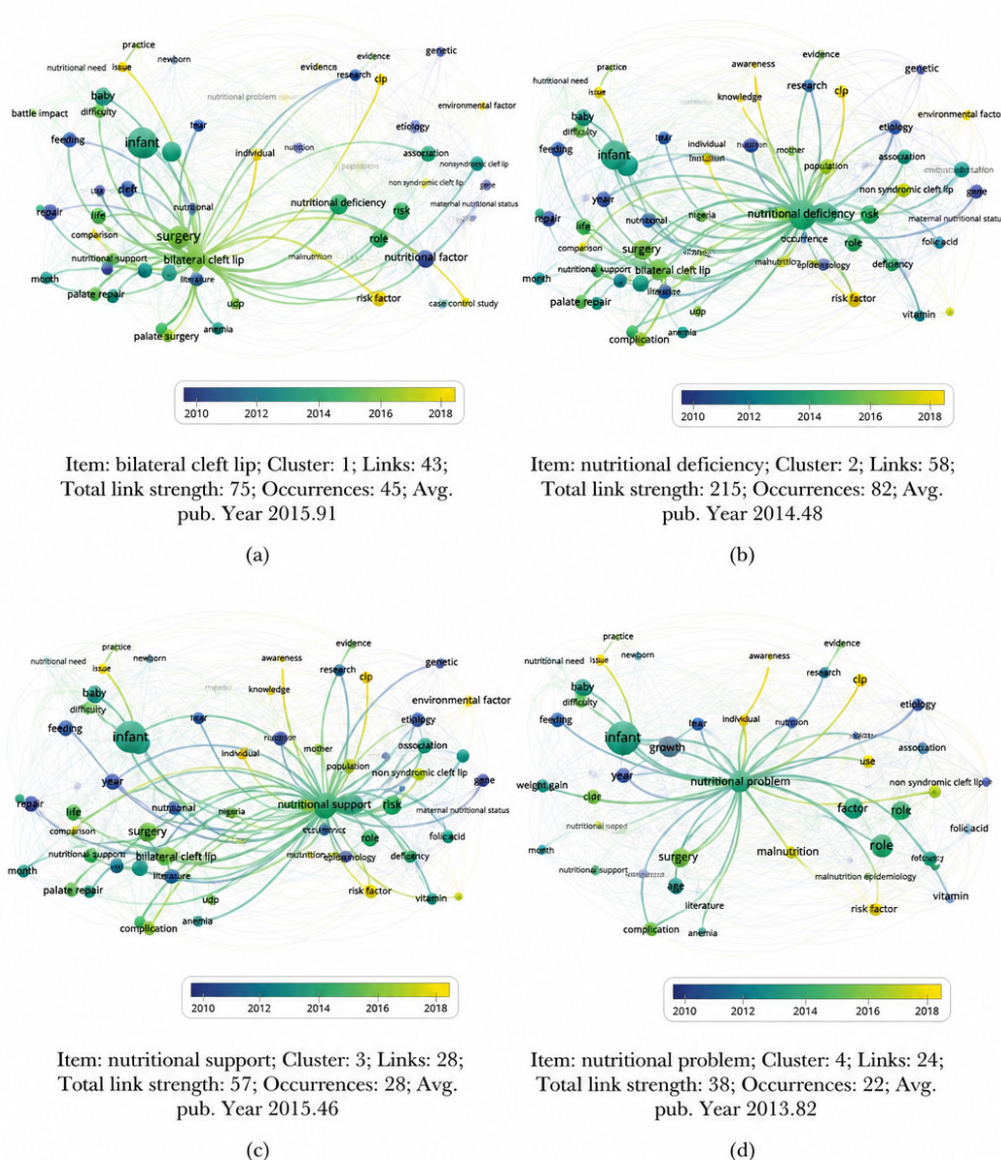


Figure 2: Analysis of keywords strength for (a) the first cluster bilateral cleft lip; (b) the 2nd cluster nutritional deficiency; (c) the 3rd cluster nutritional support; (d) the 4th cluster nutritional problem

factors, non-syndromic cleft lip, environmental factors, knowledge, and awareness began to spread. discussed approaching 2018. So this topic has become a research trend in the field of nutritional deficiency.

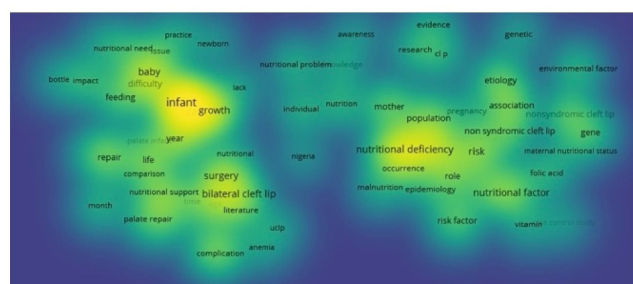
In Figure 3(c), we get the third cluster (nutritional support) with variables that are often researched, there are 28 links, and the total link strength is 57 with the year of publication 2015. This cluster has topics related to feeding, baby, infant, repair, and pregnancy, namely topics discussed early in 2010-2012. Topics including palate surgery, palate repair, bilateral cleft lip, unilateral cleft lip, and palate were widely discussed between 2012-2016, while issues related to risk factors started to become widely discussed closer to 2018. So this topic became a research trend in the nutritional support.

In Figure 3(d), we get the 4th cluster (nutritional support) with variables that are often studied, there

are 24 links, and the total link strength is 38 with the year of publication 2013. This cluster has topics related to age, feeding, baby, nutrition, etiology, etc. topics discussed early in 2010-2012. Topics including infants, growth, factors, and deficiencies were widely discussed between 2012-2016, while issues related to cleft lip and palate, non-syndromic cleft lip, and awareness began to become widely discussed closer to 2018. So this topic has become a research trend. in the field of nutritional problems.

Density visualization

The results of the bibliometric analysis in Figure 4 show that the density level has 71 items, 1043 links, and a total link strength of 2309. These results show a dense area with many adjacent topics and a high level of saturation with many frequently appearing keywords marked in color. around nutritional deficiency, bilateral cleft lip, baby, infant, and growth. This area represents a topic that



Items: 71; Cluster: 4; Links: 1043; Total link strength: 2309

Figure 4: Analysis of density

has been widely researched. Different from the topics covered in green such as nutritional needs, feeding, nutritional support, palate repair, nutritional, nutritional problems, malnutrition, risk factors, nutritional factors, maternal nutritional status, non-syndromic cleft lip, and pregnancy. This means that the topic is still not widely researched. This indicates the gap (research gap) that exists in cleft lip and palate research currently so the opportunities for researching this topic are still very wide.

DISCUSSION

Cleft type

The results of the study showed that the most common type of cleft lip was unilateral cleft lip, in 67 babies/children (46.9%). These results are in line with 2 other studies which showed that 1135 children had this type of cleft lip (8) and 22.3% of the 855 samples had this type of cleft lip (9). The results of research on 218 children showed that 50.46% were boys with a prevalence of cleft palate (52.75%) (10). Among 179 people and 204 families, there was an increased prevalence of the risk of giving birth to a child with cleft lip/palate (11). The results of another study showed that the incidence of cleft lip was 123 babies out of 508 babies who had cleft lip/palate (12). This is different from the prevalence of cleft lip/palate from the results of other studies which showed a slight decrease in 64 articles resulting from a systematic review (13).

This is in accordance with figures 2(a), 2(b), and 2(d) which show that the first cluster (bilateral cleft lip) is colored red, the second cluster (nutritional deficiency) is colored green, and the 4th cluster (nutritional problems) which are colored yellow each include items or terms that focus on non-syndromic cleft lip events. This is proven by data from the first cluster network consisting of 43 links with a total link strength of 75, the second cluster network consisting of 58 links with a total link strength of 215, and the 4th cluster network consisting of 24 links with a total link strength of 38.

This is also supported by figures 3(a), 3(b), and 3(d) that in the 1st cluster (bilateral cleft lip) with frequently studied variables there are 43 links, with a total link strength of 75 with the year of publication, namely 2015. The topic

of non-syndromic cleft lip was widely discussed between 2012-2016 which became a research trend in the field of bilateral cleft lip in the 2nd cluster with 58 frequently researched variables, with a total link strength of 215. While approaching 2018 the topic The same thing is also starting to be widely discussed in connection with the field of nutritional support in the 3rd cluster with 28 frequently researched variables and a total link strength of 57.

Weight

The results of the study showed that the majority of body weights were in the normal category 89 (62.2%), compared to the categories more than normal (9.8%), and less than normal (4.9%). The results of other studies show the same results regarding nutritional status (weight for height) which is mostly normal body weight (76.00%), followed by underweight (20.80%), excess body weight (3.10%). % and no obesity was found in 96 children. Based on BMI, there is underweight (43.80%), normal weight (41.70%), overweight (11.50%), and obesity (3.10%) (14). The results of the same study on 83 children with cleft lip and/or palate showed their growth reached the expected weight and height (15). The results of another study showed the same thing, namely that 112 patients experienced weight gain (16).

Relationship between cleft type and body weight

The results of the study showed that there was no strong relationship between cleft type and body weight ($p = 0.755$) with a correlation coefficient of 0.30. The z score result of cleft type on body weight is positive 1.759 ± 1.5 , meaning that babies who have various types of cleft lip do not have a risk of malnutrition, but on the contrary, the baby's weight increases. These results were also shown by research that the type or severity of cleft palate was not significantly related to body height ($p = 0.210$). Therefore, although cleft palate is associated with impaired growth in early infancy, rapid recovery occurs after surgical repair and does not result in growth deficits. This is because short-term weight loss is commonly seen in children with secondary cleft palate, mainly occurring in isolation, but this is short-term. After reparative surgery, lagging occurs in children with all types of clefts and there are no long-term effects on either weight or height. If differences in height are found, this is most likely a constitutional growth pattern related to the underlying syndrome (15). The results of other studies also show the same thing babies with cleft lip or palate or cleft lip and palate have an increase in their physical growth status. Although growth lags slightly compared to healthy babies of the same age or gender group, growth parameters (body weight) increase significantly, illustrating accelerated growth after primary surgery (17).

The results of this study are supported by Figure 2(c) that the 3rd cluster (nutritional support) focuses on unilateral cleft lip and palate which is an item that may have

nothing to do with nutritional support (in blue) because the item is unilateral cleft lip and palate included in the 1st cluster in red, which does not show the relationship between the two because they are different clusters. The same thing is shown in Figure 2(d) the topic of nutritional problems is the 4th cluster (yellow) which is an item that may have nothing to do with the non-syndromic cleft lip theme which is part of the 2nd cluster (blue).

Apart from that, the size of the circle (node) in nutritional support with unilateral cleft lip and palate is very small, which means the smaller the theme is to have relevance between the two. Topics related to nutritional support with unilateral cleft lip and palate are no longer widely researched and have a low total link strength of 57 (based on Figure 3(c)). Likewise, Figure 2(d) which shows the size of the nodes in nutritional problems with non-syndromic cleft lip is the same small, which means the smaller the theme is to have relevance between the two, with a very low total link strength of 38.

This is also reinforced by Figure 4 that in terms of density visualization, the topic of nutritional support is far from the topic of unilateral cleft lip and palate, similarly, the topic of nutritional problems is also far from the topic of non-syndromic cleft lip, which are areas that densely packed with many topics that are far from each other. In addition, the level of saturation on the topic of nutritional support with the topic of unilateral cleft lip and palate as well as the topic of nutritional problems with the topic of non-syndromic cleft lip both show topics that have appeared for a long time which are marked by the darker colour around it which means the area this is a topic that is increasingly being discussed or researched.

The findings of other studies show something different, namely that there is a positive correlation between children with cleft palates and the prevalence of underweight ($r_s = 0.6305$; $p < 0.001$). This is because children with clefts experience a prevalence of underweight that varies according to cleft epidemiology and time of primary surgery, as well as ethnic group and environmental factors. The prevalence of underweight was higher in children with cleft lip than in children born without cleft lip ($p < 0.05$) (3). Results of other studies also showed that non-syndromic cleft palate and non-syndromic cleft lip and palate were associated with lower weight-for-age Z-scores compared with non-syndromic cleft lip (all $p < 0.01$), while non-syndromic cleft lip and palate were associated with a lower weight-for-height Z score compared with non-syndromic cleft lip ($p < 0.01$). This is because growth retardation and low body weight rates for non-syndromic oral cleft children <5 years are below the national average and differ according to the age of non-syndromic oral cleft children and disease (5). Likewise, research results show that cleft palate can be associated with demographic factors that are at risk of malnutrition in sufferers, such as low family economic income with a z score = 0.05 (4).

In the opinion of researchers, there is no strong relationship between the type of cleft lip and body weight (nutritional status), that babies who have various types of cleft lip do not have a risk of malnutrition, but on the contrary, the baby's weight increases (nutritional status). This is due to the factor of providing proper nutrition by parents to babies. Providing nutrition in the right and regular manner and using the right tools can increase nutritional intake.

CONCLUSION

There is no relationship between cleft type and baby's weight. Suggestions for parents of cleft sufferers include improving proper and regular feeding management to maintain the nutritional status of children with cleft palate, setting a schedule for frequent exclusive breastfeeding, using bottles with teats, and consuming pureed food. Mapping and clustering of research themes based on the keywords "nutritional" AND "cleft lip and palate" from 980 articles began to be widely discussed or researched approaching 2018. The dominant research topics include discussing nutritional deficiency, bilateral cleft lip, baby, infant, growth, and surgery. As new topics emerge, such as studies on the relationship between nutritional need, feeding, nutritional support, palate repair, nutritional, nutritional problems, malnutrition, risk factors, nutritional factors, maternal nutritional status, non-syndromic cleft lip, and pregnancy. However, research specifically on the theme of cleft type and body weight is still not widespread or popular to discuss. Suggestions for further research are being able to carry out research using newly emerging topics, and the need to collaborate with various multidisciplinary sciences.

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