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Research Article

The Effect of Giving Fish Products on Albumin Levels, Mid Upper Arm Circumference, Body Mass Index: (*Systematic Literature Review*)

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Abstract: ***Background:*** Continuous and prolonged lack of energy and protein intake can reduce chronic energy (CED). The indicator of protein intake can be determined by the level of albumin as a stored protein in the body, mid upper arm circumference and body mass index. Inadequate ECG will pose various risks of health. ***Objective:*** To see the effect of fish products on albumin level, mid upper arm circumference content and body mass index. ***Methods:*** Searches in this literature use electronic data from Scopus, Pubmed, Elsevier, Google Scholar, Plos One published from 2015-2020. The keywords used in the search were (1) "fish", (2) "pregnant women", (3) "chronic energy deficiency" (4) "albumin level" (5) "mid upper arm circumference", (6) "body mass index", articles that are irrelevant and do not meet the criteria will not be used. The research was carried out on humans with this type of experimental research. Compile with prism techniques for reviewing titles, abstracts, full text, and methodologies for feasibility studies. ***Results:*** Of all the search results, 25 articles relating on various research subjects were deficient in chronic energy. 4 articles examining HIV AIDS pregnant women, 9 article pregnant women, 1 post-neurosurgical surgery article, 3 hypo albumin patientS, 5 malnourished toddlers,2 hemodialysis patient,1 nephrotic syndrome toddler**.** ***Conclusion:*** There were 8 articles showing an increase in albumin level, 2 articles showed no change. 5 articles showed an increase in mid upper arm circumference, 1 article showed no increase, 3 articles showed an increase in BMI and 7 articles showed no increase.

Keywords: Fish, Pregnant women, chronic energy deficiency, levels albumin, mid upper arm circumference, Body mass index.

INTRODUCTION

In Indonesia, chronic energy deficiency (CED) is still a nutritional problem with anemia. The nutritional status of pregnant women greatly affects the development of the embryo and fetus as well as the health status of the mother. Fulfillment of nutrients that is less than optimal when pregnant women can cause chronic energy deficiency (CED) if the reduced nutritional intake of the form of energy and protein that lasts a long time, signs will appear, namely body weight looks thin or less than 40 kg and lower upper arm circumference 23.5 cm, and less body mass index [1].

According to the 2015-2019 National Medium-Term Development Plan (*RPJMN*) Policy, improving nutrition in the community must be accelerated by focusing on the first 1000 days of life. Based on Riskesdas 2018 data, the prevalence of CED in women of childbearing age (*WUS*) aged 15-19 years is 33.5% for those who are pregnant 36.3% for those who are not pregnant. 23.3% of those aged 20-24 were pregnant and 23.3% of those who were not pregnant were 16.7% for those who were pregnant and 13.5% for those who were not pregnant [2].

Efforts that have been carried out by the Government of the Ministry of Health of the Republic of Indonesia since 2012 in terms of preventive and promotive measures to cope with pregnant women in CED are using Health Operational Assistance (*BOK*) funds that are distributed to all Public Health Center for supplementary feeding (*PMT)* recovery activities for pregnant women in CED as an additional not for replacement food and supplementary feeding (*PMT)* provided are local materials adapted to the conditions of the place[3].

Research conducted by Pratiwi shows that pregnant women who experience chronic energy deficiency (CED) with mid upper arm circumference size less than 23, 5 cm have twice the risk of giving birth to LBW [4]. Another opinion of Hidayati, pregnant women who experience CED are 5 times more likely to have a baby with low birth weight compared to mothers who do not experience CED [5].

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MATERIALS AND METHODS

Search strategy

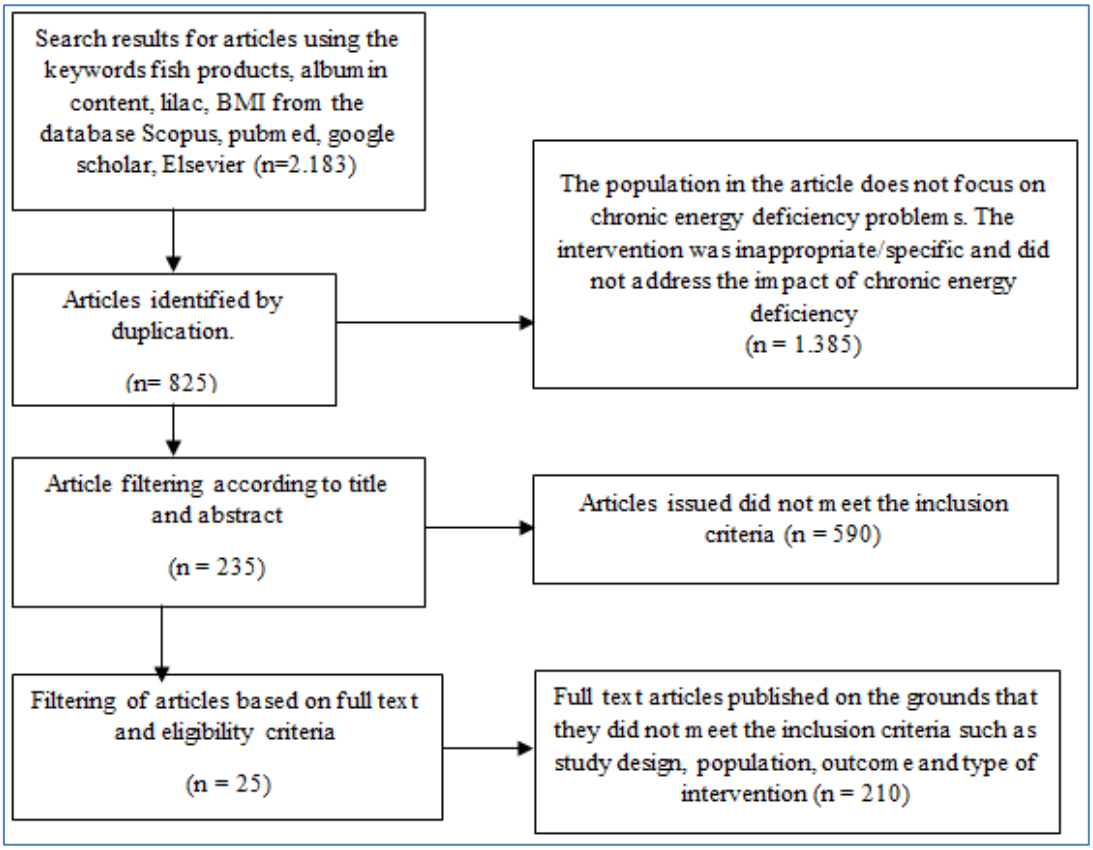
This review literature uses articles in various databases such as Google Scholar, Pubmed, Scopus, and, Elsevier Published 2015-2020. The keywords used are fish products, albumin levels, mid upper arm circumference, body mass index.

Inclusion and exclusion

The inclusion criteria used in this study were, using Indonesian and English, the journals used were 2015-2020, RCT research, experiments and cohort studies containing fish products, albumin levels, mid upper arm circumference, body mass index. Full article text. As for the exclusion criteria, the results of the study were incomplete meta-analysis.

Data Extraction

The author extracts the research articles obtained to be adjusted based on inclusion and exclusion criteria and detects duplication of research articles. The results of the extraction of research articles are presented in a table containing the article title, author's name, year, sample, and intervention.



RESULTS

Of the 25 studies that met the criteria for this systematic review. The results obtained were 12 randomized control trials (RCTs), 9 experimental experimental studies, 4 cohort study designs. The results of the study were grouped based on the determined variables, namely fish products, albumin content, mid upper arm circumference, BMI. The research obtained in this literature study is to determine whether there is a known influence of variables by calculating the effect size. Effect size is a measure of the practical significance of research results in the form of a measure of the magnitude of the correlation or difference, or the influence of a variable on other variables. This measure complements the analytical information provided by the significance test. Information about effect sizes can also be used for compare the effect of

Table-1: Effect Size

No.	*Author*	*Intervention Of*	Mean		Standar Deviation		*Effect size*
			Experiment	control	Experiment	control	
1	Warouw HN[6] (2016)	*Extract fish* (n E: 10 ; n K: 10)	24,40	22,40	0,89	0,89	0,01
		Levels albumin	3,24	3,72	0,21	0,25	-0,70
		BMI	24,62	22,14	1,50	2,62	0,47
2	Rosyidi RM [7](2019)	*Extract fish* (n E:21 n K:17)	4,46	4,40	0,257	0,201	0,26
3	Vandenberg [8] (2015)	*Fish* (n E:909)	2,6	-	2,6	-	-
4	Mulyana R [9] (2017)	Ekstrak ophiocephalus (nE14 nK:14)	3,59	3,25	0,59	0,71	0,52
5	MuryawanMH [10] (2019	Fish(nE:32 nK:28)	3,6	3,2	0,8	0,7	0,08
6	Rezeki S [11] (2015)	Albumin(nE :18 nK:18)	4,6	4,1	0,8	0,8	0,63
		IMT	19,6	3,8	20,1	2,9	-0,67
7	Zhang C [12] (2020)	Lila(nE: 32 nK:31)	221,4	206,5	16,7	10,5	1,07
		IMT	22,2	22,7	3,9	2,0	-2,07
8	Rashidi M [13] (2020)	Ekstrak fish gabus(nE:53 nK:51)	3,69	3,28	0,37	0,54	0,89
9	Vinding RK [14] (2018)	(nE:304 nK:301)	0,1	0,8	-0,1	0,8	-1,23
10	Borg B [15] (2020)	(nE : 76 nK :77)	14,3	14,1	1,2	1,1	-0,08
11	Lu Y [16] (2017)	(nE:60 nK:86)	23,83	22,57	4,15	3,82	0,32
12	He L [17] (2016)	(nE:19 nK:19)	0,3	-0,1	0,3	0,24	1,23
13	Muhlhausler BS [18] (2016)	(nE:6 nK:6)	0,51	0,97	0,48	0,95	-0,61

DISCUSSION

Fish as a food ingredient that contains high protein and contains essential amino acids needed by the body, besides that its biological value reaches 90%, with less binding tissue so that it is easier to digest. The price is much cheaper than the source of protein other. That is the most important thing is [19]. Protein in fish consists of amino acids contained in animal foods equal to the composition of amino acids in the human body, so that protein from fish has a high nutritional value [20]. Fish is a class source of animal protein. Two after meat, milk and eggs, fish to contain long chain fatty acids, namely omega 3 and omega 6 which are not widely found in products of animal and vegetable types [21].

Fish oil is rich in omega 3 fatty acids which participate in a number of metabolic events including anti-inflammatory, where the use of fish oil by patients on hemodialysis corrects protein deficiency [22]. The most common nutritional problems of children are lack of energy and protein. The low consumption of fish is very unfortunate, given the huge potential for fishery resources in Indonesia and is an alternative to overcoming nutritional problems with children under five [24].

According to Mulyana *et al*. giving 10 grams of ophiocephalus extracts can increase serum albumin levels, albumin levels from these fish can function as amino acids needed for albumin synthesis [9]. Head fish snack extracts can be used as an alternative source of protein albumin, which has high antioxidants which are serves as a radical binding agent, improves nutritional status, albumin levels, hemoglobin and CD4 levels in pregnant women with HIV [6]. According to other studies, the extract from Ophiocephalus stratius (OS) or snakehead fish can be a source of high protein oral nutrition, containing high levels of amino acids, fatty acids, minerals and vitamins so that has various benefits such as a high source of protein intake to synthesize albumin, antioxidant and anti-inflammatory functions [25, 26].

Research conducted by Kiboi *et al.,* Giving protein intake which was given from fish by 1.6% in a statistical test had a significant meaning where there was an increase in lila size of a p-value = <0.001 [27]. Meanwhile, according to Vinding RK *et al*. LCPUFA n-3 supplementation in pregnancy causes an increase in body mass index (BMI) with a statistical test value of p = 0.006 [14].

According to research by Strakis N *et al*. high fish intake during pregnancy, consumption of 3 times/week is associated with an increased risk of rapid growth during infancy and childhood, namely the addition of body mass index but not significant with p value = 0.10 [29]. Based on the study conducted by Nurjanah *et al*. it can be concluded that there is a relationship between fish consumption, nutrient intake and nutritional status [30].

CONCLUSION

Based on an analysis of 25 articles related to research on fish products of subjects with various diseases related to chronic energy deficiency, 9 articles showed an increase in albumin levels, 5 articles showed an increase in mid upper arm circumference, and 4 articles showed body mass index, in terms of effect size and p value. It can be concluded that fish products are effective againts increasing levels from albumin, mid upper arm circumference and body mass index.

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