

The Relationship between Vitamin B6 Level With Depression to the Hormonal Contraception Acceptors of Depo Medroxyprogesterone Acetate (Dmpa) For 2 Years

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Abstract

Background: Dmpa Is Hormonal Contraception Has High Effectiveness In Controlling Birth. Dmpa Utilization For Long Term Period May Cause Many Side Effects, One Of Them Is Mood Disorder Of Depression. Progestin Used Periodically Or For Long Term Period May Disrupt Formation Process Of Vitamin B6 In The Body. Vitamin B6 Is Essential Vitamin In The Brain Due To It Is Necessary To Convert Tryptophan To Be Serotonin And If It Is Used In The Long Term Period, Then Progestin May Decrease Serotonin Level Which Lead To Depression.

Objective: Assess The Relationship Between Vitamin B6 Level With Depression To The Hormonal Contraception Acceptors Of Depo Medroxyprogesterone Acetate (Dmpa) For 2 Years.

Method: This Research Was Cross Sectional Study Conducted In Department Of Obstetrics And Gynecology, Faculty Of Medicine, University Of Sumatera Utara (Usu), Provincial Public Hospital (Rsup) Of H. Adam Malik Medan, And Clinic Of Helvetia Medan On August 2017. The Research Subject Given By Interview By Assessing Scale Of Depression Score From **Hamilton Depression Rating Scale (Hrds)** And Blood Sample Taking From Median Cubital Vein For 3 Cc In Order To Observe Vitamin B6 Level. While, Statistical Analysis In This Research Used Chi-Square Test. The Confidence Interval Was 95% And $P < 0.05$ Means Statistically.

Result: From 51 research Subjects, It Was Obtained That Most Of Dmpa Users Are Normal (90.2%) And 5 Research Subjects Have Mild Depression (9.8%). In Which, Among 3 Research Subjects Who Have Mild Depression Have Normal Vitamin B6 Level. There Is No Significant Relationship Between Vitamin B6 Level With Depression Level ($P > 0.05$).

Conclusion: There Is No Significant Relationship Between Vitamin B6 Level With Depression To The Hormonal Contraception Acceptors Of Depo Medroxyprogesterone Acetate (Dmpa) For 2 Years ($P = 0.133$).

Keywords: Depo Medroxyprogesterone Acetate, Vitamin B6 Level, Depression.

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I. Background

Contraception Is Birth Control Method Has Many Methods, Where In General, It Is Divided Into Hormonal Contraception And Non-Hormonal Contraception. Hormonal Contraception Can Be Divided Into Contraception Of Estrogen And Progesterone Combination Or Single Hormonal Contraception Contains Synthetic Progesterone. One Of These Contraception Device Types Is Injection Contraception Of Depo Medroxy Progesterone Acetate (Dmpa). Injection Contraception Is Popular Contraception Method In Indonesia Due To Injection Contraception Has Long Term Period, No Need Daily Utilization, And Reversible. Dmpa Has High Effectiveness In Controlling Birth. For Long Term Utilization Of Dmpa, It May Cause Many Side Effects Such As Mood Disorder Of Depression.

Depression Is One Condition Of Mental Disorder That Usually Occurred In Depressed Mood, Losing Interest Or Happiness, Feeling Guilty Or Inferiority Or Useless, Sleeping And Eating Disorder, Less Energy, And Bad Concentration. Many Users Reported That Depression Is One Of Side Effects From Dmpa Utilization. In A Study About Dmpa Utilization For Long Term Period More Than Two Years, It Might Cause Psychological Disorder For 96.3% From The Studied Sample. Progestin Used Periodically Or For Long Term Period May Disrupt Formation Process Of Vitamin B6 In The Body.

Vitamin B6 Is Essential Vitamin In The Brain Due To It Is Necessary To Convert Tryptophan To Be Serotonin And If It Is Used In The Long Term Period, Then Progestin May Decrease Serotonin Level Which Lead To Depression. In A Study Conducted By Dewi Et Al., It Was Found That There Is Significant

Relationship Between Age, Education, And Duration Of Dmpa Utilization Towards Depression Trend To The Contraception Acceptors In Clinic Of Summersari, Jember.

II. Method

This Research Was Observational Analytical Research With Cross Sectional Research Design Aims To Know Depression Related To The Dmpa Utilization For 2 Years. The Research Subject Was 51 Patients Use Dmpa Contraception In Clinic Of Helvetia, Medan That Meet Inclusion Criteria.

The Research Result Presented In Frequency Distribution Table. In Order To Assess Frequency Distribution Of Research Sample Characteristic Based On Age And Parity, It Was Conducted By Using Univariate Statistical Analysis. While, To Assess Relationship Between Serum Of Vitamin B6 Level From Dmpa Acceptors With Depression, It Was Conducted By Bivariate Statistical Analysis. This Research Used Confidence Interval Of 95%.

III. Result

Characteristic From Research Subject According To The Age, Education, And Parity Group Can Be Seen In The Table Below:

Table 1. Characteristic From Research Subject According To The Age, Education, And Parity

Characteristic	Total (N)	Percentage (%)
Umur		
20-29 Years Old	3	5.9
30-39 Years Old	38	74.5
≥ 40 Years Old	10	19.6
Parity		
Primipara	3	5.9
Multipara	47	92.1
Grande Multipara	1	2
Education		
Elementary School	3	5.9
Junior High School	8	15.7
Senior High School	40	78.4
Higher Education	0	0
Total	51	100.0

Tabel 1 Shows That The Largest Proportion Of Dmpa User Is In The Age Group Of 30-39 Years Old For 38 Individuals (74.5%), Followed By Age Group Of ≥ 40 Years Old For 10 Individuals (19.6%), And Age Group Of 20-29 Years Old For 3 Individuals (5.9%). Based On Parity, Most Of Dmpa Users Are Multipara For 47 Individuals (92.1%), Then Sekundipara For 1 Individual (2%), And Primipara For 3 Individuals (5.9%). Based On Education, Proportion Of The Research Subject Is 3 Individuals With Elementary School Graduate (5.9%), 8 Individuals With Junior High School Graduate (15.7%), And 40 Individuals With Senior High School Graduate (78.4%).

From 51 Subjects Use Dmpa, They Who Have Mild Depression Are 5 Individuals (9.8%), While The Rest Of 46 Individuals (90.2%) Are In Normal Condition.

Table 2. Distribution Of Dmpa Users Based On Depression Level

Depression Level	N	%
Normal	46	90.2
Mild Depression	5	9.8
Moderate Depression	0	0
Severe Depression	0	0
Acute (Major) Depression	0	0
Total	51	100

From 51 Subjects Use Dmpa, The Average Vitamin B6 Level Is 81.55 ± 35.24 Nmol / L With Minimum Vitamin B6 Level Is 13.00 Nmol / L And Maximum Is 135.80 Nmol / L.

Table 3. Vitamin B6 Level To The Dmpa Users

Vitamin B ₆ Level (Nmol/L)	
Mean	81.55
Median	89.90
Sd	35.24
Min	13.00
Max	135.80

Most Of Women With Dmpa Have Normal Vitamin B6 Level, Which Is 46 Individuals (89.1%) And They Who Have Abnormal Vitamin B6 Level Are 5 Individuals (10.9%). Women With Dmpa, Have Mild Depression, And Have Normal Vitamin B6 Level In This Research Are 3 Individuals (60%), While They Who Have Abnormal Vitamin B6 Level Are 2 Individuals (40%).

From The Research Result, There Is No Significant Relationship With P Value = 0.133 In Which The Value Is Larger Than 0.05. Therefore, It Can Be Concluded That There Is No Significant Relationship Between Depression Level And Vitamin B6 Level.

Table 4. The Relationship Between Vitamin B6 Level And Depression Level

Depression Level	Vitamin B ₆						P Value*
	Normal		Abnormal		Total		
	N	%	N	%	N	%	
Normal	41	89.1%	5	10.9%	46	100.0%	0.133
Mild Depression	3	60.0%	2	40.0%	5	100.0%	
Total	44	86.3%	7	13.7%	51	100.0%	

*Fisher Exact

IV. Discussion

Table 1 Shows That Most Of Dmpa Users Found In The Age Group Of 30-39 Years Old For 38 Individuals (74.5%). Age Is One Factor Affects One's Behavior Including Contraception Utilization Where The Elders Are Less In Contraception Utilization Than Young People. However, The Increase Of Age Is Not Main Reason For One To Use Contraception Due To Number Of Children Also Becomes One Important Consideration To Use Contraception.

This Research Result Is Similar With Study Conducted By Dewi Et Al., Where The Study Showed That The Largest Proportion For Age Group Of Dmpa Acceptors Is In 31-35 Years Old (43.3%). Based On The Research Result By Magas Et Al., (2016), It Showed That The Most Frequent For Age Group Of Dmpa Acceptors Is 20-35 Years Old, Which Is 44 Individuals (68.8%).

Table 1 Also Shows That Most Of Dmpa Acceptors Are Multipara For 29 Individuals (56.9%). This Research Result Is Similar With Study Conducted By M Alamsyah Et Al., (2017) Where It Showed That Most Of Dmpa Users Have Parity > 1 (96.87%). However, This Research Result Is Different With Study Conducted By Magas Et Al., Where The Study Obtained That The Most Of Dmpa Acceptors Found In Women With Parity Number ≤ 2.9.

Contraception Utilization Is Increase In Line With Number Of Alive Children Owned. Contraception Utilization Is About 7% Among Women With No Children To The 70% Among Women With Three Or Four Alive Children, Then It Is Decrease To Be 52% For Women With Five Or More Alive Children.

In The Table 1 Above, It Is Also Found That 40 Individuals (78.4%) Of Dmpa Acceptors Are Senior High School Graduate. Respondent's Education Level Involved In The Selection Of Contraception Method. It Is Due To Education Level Will Make One Thinks Logically And Responsively To Many Gained Information.

The Research Result Showed That Most Of Dmpa Acceptors In Normal Condition Are 46 Individuals (90.2%) And They Who Have Mild Depression Are 5 Individuals (9.8%). Many Users Reported That Depression Is One Of Side Effects From Dmpa. In A Study About Dmpa Utilization For Long Term Period (More Than Two Years), It Might Cause Psychological Disorder For 96.3% From The Studied Sample. The Other Research Had Reported That Dmpa Utilization For Long Term Period Might Cause Many Side Effects Such As Mood Disorder Of Depression.

About 1-10% Dmpa Acceptors Have Central Nervous System Symptoms Like Headache, Vertigo, And Depression (Sharts-Hopko, 1993). Depression, Fatigue, And Libido Decrease Had Reported To The Dmpa Acceptors In West Community. In A Study Conducted By Salmalian Et Al., It Was Found That Dmpa Injection Is Not Only Increase Depression Symptoms, But Also Decrease Symptoms In Many Case Studies (Mean = 6.5 ± 8.2, Non-Depression 71.9%, And Depression 28.1%), While In Post Injection The Result Was Mean = 4.5 ± 6.6, Non-Depression 84.4%, And Depression 15.6%. In 2008, Berenson And His Workers Observed Their Case For Two Years (Evaluated Every 6 Months) And The Result Showed That Depression Symptoms And Mood Fluctuation Are Less For Dmpa If It Is Compared With Others Who Do Not Use Contraception (P < 0.05).

Many Studies Had Reported That Dmpa Does Not Cause Depression And Depression Record Or History Cannot Be Considered As Absolute Contradiction To The Dmpa Utilization. However, Due To Progesterone May Cause Depression, Then It Will Be Better To Be Careful In Dmpa Utilization For Patients With Depression History. The Elders Will Have Neuropsychological Control Decrease, Including Attention Loss, Memory Processing, Information Processing Speed, And The Whole Cognitive Functions Related To The Motivation Change Such As Less Interest, Losing Energy, Concentration Difficulties And Depression Onset.

Table 3 Shows That Average Vitamin B6 Content To The Dmpa Acceptors Is 81.55 ± 35.24 Nmol / L With Minimum Vitamin B6 Level Is 13.00 Nmol / L And Maximum Is 135.80 Nmol / L. Based On The

Research Result, It Was Found That Most Of Women With Dmpa, No Depression And Have Normal Vitamin B6 Level Are For 46 Individuals (89.1%) And They With Dmpa, Mild Depression Level, And Have Normal Vitamin B6 Level Are 3 Individuals (60%). From The Research Result, It Is Obtained P Value = 0.133 Means There Is No Significant Relationship Between Depression Level And Vitamin B6 Level.

In A Study Conducted By Hvas Et Al., It Was Found That 18 (13%) From 140 Individuals With Depression Caused By Low Vitamin B6 Level In The Blood Plasma (P = 0.002) Have Significant Relationship With Depression Score. In Which, Individuals With Vitamin B6 Level Lower Than 30 Nmol / L (N = 48) Have Depression Symptoms Than Others. In A Study Conducted By Merete Et Al., (2008), It Showed That Vitamin B6 Consumption Has No Correlation Significantly To The Decrease Of Depression Symptoms (P > 0.05). Many Literatures Also Show That Contraception May Increase Depression Symptoms. However, By Giving Vitamin B6, Then It Can Decrease Depression Symptoms. It Is Proven In The Study Conducted By Weizman Et Al., (2000).

V. Conclusion

1. Most Of Dmpa Users In This Research Are In Group Range Of 30-39 Years Old (74.5%), Multipara (56.9%), Senior High School Graduate (78.4%), And Non-Depression (90.2%).
2. Average Vitamin B6 Level To The Dmpa Users In This Research Is 81.55 ± 35.24 Nmol / L.
3. From 51 Research Subjects, 5 Of Them Have Mild Depression (9.8%), And Among Them 3 Subjects Have Normal Vitamin B6 Level, While Most Of Dmpa Users (46 Individuals) Are In Normal Condition (90.2%).
4. There Is No Significant Relationship Between Depression Level And Vitamin B6 Level (P > 0.05).

Suggestion

It Is Necessary To Conduct Prospective Study By Controlling Other Factors Affect Depression, Thus It Can Be Assessed Clearly About Vitamin B6 Effects To The Depression.

Reference

- [1]. Africander, Dj. Comparative Study Of The Molecular Mechanism Of Action Of The Synthetic Progestins, Medroxyprogesterone Acetate, And Norethisterone Acetate. Stellenbosch University 2010
- [2]. Gbarbea, Eshere. Contraception: Past, Present, And Future. Boston University 2015
- [3]. Bagade, Et Al. Increasing Use Of Long Acting Reversible Contraception: Safe, Reliable, And Cost Effective Birth Control. World Journal Of Pharmacy And Pharmaceutical Sciences 2014;3(10):364-392
- [4]. Lisa, Welling. Psychobehavioral Effects Of Hormonal Contraceptive Use. Evolutionary Psychology 2013;11(3):718-742
- [5]. Spevack E. The Long-Term Health Implications Of Depo- Provera. Integrative Medicine 2013;12(1):27-34
- [6]. Bhowmik, Kumar, Srivastava, Paswan, And Dutta. Depression: Symptoms, Causes, Medications, And Therapies. Thepharmajournal 2012;1(3)
- [7]. Dewi, Mardijana, Srisurani. Pengaruh Usia, Pendidikan, Dan Lama Penggunaan Kontrasepsi Suntik Dmpa Terhadap Kecenderungan Depresi Pada Akseptor Kb Di Puskesmas Sumbersari Jember. Artikel Ilmiah Hasil Penelitian Mahasiswa 2015
- [8]. Chandra,A., Manan, H., Tjekyan, R.M.S. Karakteristik Demografi Akseptor Kontrasepsi Suntik *Depo Medroxyprogesterone Acetate* Di Puskesmas Merdeka Palembang Periode Januari-Desember 2012. Mks, 47 (2) : 1-5.
- [9]. Magas *Et Al*, 2016. Perbedaan Siklus Menstruasi Ibu Pengguna Kontrasepsi Suntik *Cyclofem* Dengan *Depo Medroxy Progesterone Asetat* Di Wilayah Kerja Puskesmas Bontang Utara 1. Jurnal Keperawatan, 4 (1) : 1-8.
- [10]. Alamsyah, *Et Al*, 2017. "Correlation Between Depomedroxyprogesterone Acetate (Dmpa) Use And Bone Mineral Density In Reproductive Women Age", 10(1) : 356-366.
- [11]. Miguel, Hendricks, Aguirre, Et Al. Dendritic Cell Activation And Memory Cell Development Are Impaired Among Mice Administered Medroxyprogesterone Acetate Prior To Mucosal Herpes Simplex Virus Type 1 Infection. The Journal Of Immunology 2012;189:3449-3461.
- [12]. Turner, Loftis, Blackwell. Serotonin A La Carte: Supplementation With The Serotonin Precursor 5-Hydroxytryptophan. Pharmacology & Therapeutics 2005.
- [13]. Borgelt, L.M., 2010. Women's Health Across The Lifespan : A Pharmacotherapeutic Approach. American Society Of Health-System Pharmacists, 2(2) : 256-267.
- [14]. Cowen, Browning. What Has Serotonin To Do With Depression?. World Psychiatry 2015;14:2
- [15]. Merete, C., *Et Al*, 2008. Vitamin B6 Is Associated With Depressive Symptomatology In Massachusetts Elders. J Am Coll Nutr, 27(3) : 421-427.
- [16]. De Souza M, Walker A, Robinson P, Bolland K. A Synergistic Effect Of A Daily Supplement For 1 Month Of 200 Mg Magnesium Plus 50 Mg Vitamin B6 For The Relief Of Anxiety-Related Premenstrual Symptoms: A Randomized, Double-Blind, Crossover Study. J Womens Health Gend Based Med 2000;9:131-139.
- [17]. Watts, Morrison, Davis, Barman. Serotonin And Blood Pressure Regulation. The American Society For Pharmacology And Experimental Therapeutics Pharmacol Rev 2012;64:359-388.
- [18]. Arreola, Becerril-Villanueva, Cruz-Fuentes, Et Al. Immunomodulatory Effects Mediated By Serotonin. Journal Of Immunology Research 2015.
- [19]. Young, Sn. The Effect Of Raising And Lowering Tryptophan Levels On Human Mood And Social Behaviour. Phil Trans R Soc B 2013;368:20110375.
- [20]. Jenkins, Nguyen, Polglaze, Bertrand. Influence Of Tryptophan And Serotonin On Mood And Cognition With A Possible Role Of The Gut Brain Axis. Nutrients 2016;8:56.
- [21]. O'mahony, Clarke, Borre, Dinan, Cryan. Serotonin Tryptophan Metabolism And The Brain Gut Microbiome Axis. Behavioural Brain Research 2015;32-48.
- [22]. Keszhelyi, Troost, Jonkers, Et Al. Does Acute Tryptophan Depletion Affect Peripheral Serotonin Metabolism In The Intestine?. Am J Clin Nutr 2012;95:603-8.

- [23]. Best, Nijhout, Reed. Serotonin Synthesis Release And Reuptake In Terminals: A Mathematical Model. *Theoretical Biology And Medical Modelling* 2010;7:34.
- [24]. Gauthier, Hassler, Mattar, Et Al. Symptoms Of Depression And Anxiety In Anorexia Nervosa: Links With Plasma Tryptophan And Serotonin Metabolism. *Psychoneuroendocrinology* 2014;39:170-178.
- [25]. Muller, Jacobs. *Handbook Of The Behavioral Neurobiology Of Serotonin*. Elsevier 2010:183.
- [26]. Upadhyay, Sn. Serotonin Receptors Agonists And Antagonists. *Ijnm* 2003;18(1&2):1-11.
- [27]. Torrente, Gelenberg, Vrana. Boosting Serotonin In The Brain: Is It Time To Revamp The Treatment Of Depression. *Journal Of Psychopharmacology* 2012;26(5):629-635.
- [28]. Thomas, Sr. L-Tryptophan As An Antidepressive Agent In The Management Of Treatment Resistant Unipolar Depression In Borderline Personality Disorder: Three Case Reports. *Advances In Integrative Medicine* 2015;2:68-71.
- [29]. Sachs, Ni, Caron. Brain 5-Ht Deficiency Increases Stress Vulnerability And Impairs Antidepressant Responses Following Psychosocial Stress. *Pnas* 2015;112(8):2557-2562.
- [30]. Messripour, Mesripour. Age Related Interaction Of Dopamine And Serotonin Synthesis In Striatal Synaptosomes. *Biocell* 2013;37(2):17-21.
- [31]. Hvas Am, Juul S, Bech P, Nexø E. Vitamin B6 Level Is Associated With Symptoms Of Depression. *Psychother Psychosom* 2004; 73:340-343.

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