

# Hubungan antara konsentrasi SHBG (Sex Hormone Binding Globulin) serum dengan asupan makronutrien, testosteron dan Body Mass Index(BMI) pada pria dewasa pegawai negeri sipil golongan I

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## Abstrak

Dalam rangka pengembangan kontrasepsi pria, penggunaan kombinasi testosteron enantat (TE) dan progesteron pada orang Kaukasia hanya mencapai azoospermia 70% sedangkan orang Asia mencapai 100% azoospermia (Moeloe, 1998). Faktor yang mungkin dapat menimbulkan perbedaan dalam menekan produksi sperma diduga disebabkan oleh faktor genetik dan faktor lingkungan antara lain perbedaan asupan makanan antara orang Kaukasia dan orang Asia. Adapun ciri makanan negara Barat mengandung lemak dan protein tinggi sedangkan karbohidrat rendah. Sebaliknya untuk orang Asia mengandung lemak dan protein rendah, namun kandungan karbohidratnya tinggi. Dari penelitian dilaporkan bahwa asupan makanan seperti karbohidrat, lemak dan protein mempengaruhi konsentrasi SHBG (Sex Hormone Binding Globulin). SHBG adalah glikoprotein plasma, diproduksi oleh sel hati, mempunyai afinitas yang tinggi terhadap dihidrotestosteron (DI-FT) dan juga mengikat estrogen tetapi daya ikatnya lebih rendah. Dari hasil penelitian yang dilakukan oleh Sutyarso, 1997 pada hewan coba (*Macaca Fascicularis*) dengan memberikan model makanan orang Asia yaitu karbohidrat 70%, protein 15% dan lemak 15%. Hasil yang diperoleh kadar testosteron bebas pada hewan coba tersebut lebih tinggi dibandingkan dengan hewan coba yang diberi makanan lemak dan protein tinggi. Oleh karena itu kami merasa perlu mengadakan penelitian pada kelompok masyarakat Pegawai Negeri Sipil Golongan I yang mengkonsumsi karbohidrat tinggi namun protein dan lemak rendah. Pengukuran konsentrasi SHBG menggunakan ImmunoRadiometric Assay (IRMA). Untuk mengetahui asupan makronutrien yaitu karbohidrat, protein dan lemak dilakukan pencatatan makanan (Food recall) selama tiga hari berturut-turut. Pengukuran kadar testosteron total dan kadar testosteron bebas menggunakan RadioImmuno Assay (RIA). Penelitian yang telah dilakukan Longcope dkk, 2000 pria dewasa di AS Body Mass Index (BMI) merupakan faktor yang dapat untuk memperkirakan (prediktor) konsentrasi SHBG di dalam tubuh.

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Hasil penelitian menunjukkan bahwa konsentrasi SHBG 41,76 nmol/L. Asupan makronutrien yaitu karbohidrat 256,28 gram (56,24%), protein 43,92 gram(9,68%) dan lemak 69,28 gram (34,08%), kadar testosteron total 6,43 ng/mL, kadar testosteron bebas 22,39 pa/mL, Body Mass Index (BMI) 21,69 kg/m<sup>2</sup>. Dengan menggunakan "Pearson Correlation Coefficient" antara konsentrasi SHBG dengan karbohidrat ( $r=0,093$ ), lemak ( $r=0,051$ ), protein( $r=0,002$ ), kadar testosteron bebas ( $r=0,256$ ), kadar testosteron total, ( $r=0,518$ ) dan Body Mass Index(BMI)( $r=-0,519$ ) mempunyai hubungan. Hasil analisis Regresi Ganda antara konsentrasi SHBG dengan BMI dan kadar testosteron total mempunyai hubungan yang erat dengan tingkat signifikan 0,000 ( $P<0,05$ ).

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The Relationship Between Sex Hormone Binding Globulin (SHBG) Serum Concentration With Diet Macronutrient Testosterone and Body Mass Index (BMI) in Man of Civil Servant of Grade I  
The development of male contraception, the combination of using Testosterone Enantate (TE) and progestogen

to Caucasian people was only have azoospermia 70% whereas Asian people only have 100% azoospermia (Moeloe, 1998). The factor which might be raised the different in emphasizing the production of sperm is caused by genetic factor and environment factor are the different of food construction between Caucasian people and Asian. The food characteristic in west country contain fat and high protein but low carbohydrate. On the other hand Asian people contain fat and low protein but high carbohydrate. From the study is reported that the food component like carbohydrate, fat and protein was effecting the SHBG concentration. SHBG (Sex Hormone Binding Globulin) is glikoprotein plasma, produced by cell liver, having a high affinities to dihydrotestosterone (DHT) and also bounding estrogen but the bounding was to low. From the study research by Sutjarso, 1997 to the experiment animal (*Macaca fascicularis*) by giving the food model of Asian people like carbohydrate 70%, protein 15% and fat 15%. The report that can get is the degree of free testosterone to experiment animal 15 more higher than the experiment animal who giving a food such as fat and high protein. Because of that we feel need to do research to people who work as Civil Servant of Grade I who had consumption high carbohydrate whereas protein and fat low. The measuring of SHBG concentration is using Immuno Radidmetric Assay (IRMA). To know the composition macronutrient like carbohydrate, fat and protein is doing the food registration (food recall) during continuously three days. The measuring of total testosterone concentration and free testosterone concentration are using Radioimmuno Assay (RIA).

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The study research by Long cope et at, 2000 male in USA Body Mass Index (BMI) is factor how to predict the concentration of SHBG in body. The research result showed the value average of SHBG concentration 41,76 nmole/L. The composition macronutrient like carbohydrate 256,28 gram (56,24%), protein 43,92 gram(9,68%) and fat 69,28 gram(34,08%), total testosterone 6,43 ng/mL, free testosterone 22,39 pq/mL, Body Mass Index (BMI) 21,69 kg /m<sup>2</sup>. By using "Pearson Correlation Coefficient" between SHBG concentration with carbohydrate ( $r=0,093$ ), fat ( $r=0,051$ ), protein ( $r=0,002$ ), free testosterone ( $r=0,256$ ), total testosterone ( $r=0,518$ ) and Body Mass Index (BMI)( $r=-0,519$ ) have relationship. The result of analysis double regression between SHBG serum concentration with Body Mass Index (BMI) and total testosterone have bight relationship with signification level 0,000 ( $P<0,05$ ).