

# APPLICATION OF PROPENSITY SCORE MATCHING FOR ANALYZING FACTORS CONTRIBUTING TO PRE-DIABETES

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## ABSTRAK

OKTAVIANI AISYAH PUTRI. Penerapan Propensity Score Matching untuk Analisis Faktor yang Memengaruhi Pre-Diabetes. Dibimbing oleh ANWAR FITRIANTO dan AAM ALAMUDI.

Perbandingan yang tidak tepat antara kelompok kontrol dan kelompok perlakuan dapat disebabkan oleh faktor yang saling tumpah tindih atau biasa disebut sebagai *confounder*. Metode *Propensity Score Matching* memungkinkan peneliti untuk mengurangi bias akibat dari *confounder* yang diukur dalam *single score* berdasarkan probabilitas bersyarat dari perlakuan. Regresi logistik biner akan digunakan untuk memperkirakan skor probabilitas dan mengidentifikasi faktor risiko yang secara signifikan memengaruhi kadar glukosa darah tidak normal. Penelitian ini menggunakan *Nearest Neighbor Matching* (NNM) dan kombinasi *caliper* serta urutan berbeda untuk mengetahui kombinasi yang terbaik dalam mereduksi bias. Hasil penelitian menunjukkan bahwa jenis kelamin merupakan peubah pembaur (*confounder*). Urutan pada *propensity score* memengaruhi hasil bias yang dapat tereduksi namun *caliper* yang paling efektif dalam mereduksi bias. Kombinasi dengan urutan *propensity score* acak dan dengan *caliper* mampu mereduksi bias sebesar 99,93 persen. *Average Treatment and Treated* (ATT) juga menunjukkan bahwa jenis kelamin berpengaruh signifikan terhadap gula darah puasa. Selain itu, berdasarkan data hasil matching dengan kombinasi terbaik dalam mereduksi bias, didapatkan bahwa peubah usia, jabatan akademik, jabatan struktural, pendidikan terakhir, dan beban kinerja dosen (BKD) tidak berpengaruh signifikan terhadap gula darah puasa.

Kata kunci: *caliper*, gula darah puasa, peubah pembaur (*confounder*), *Propensity Score Matching* (PSM) Regresi Logistik Biner, jabatan struktural

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## ABSTRACT

OKTAVIANI AISYAH PUTRI. Application of Propensity Score Matching for Analyzing Factors Contributing to Pre-Diabetes. Supervised by ANWAR FITRIANTO and AAM ALAMUDI.

Inappropriate comparisons between the control group and the treatment group can be caused by overlapping factors, usually call confounders. Propensity score methods allow researchers to reduce bias from measured confounding by summarizing the distributions of many measured confounders in a single score based on the probability of receiving treatment. Binary logistic regression will be use to estimate the probability score and identify risk factors that significant influence complications in fasting blood sugar (FBS). This study uses Nearest Neighbor Matching (NNM) in several combinations of caliper and different order to know which is the best to reduce bias. The research results indicate that gender becomes a confounding variable. The order of propensity scores appears to affect the outcome of the matching analysis, also caliper is effective in reducing bias. The condition with random order propensity scores with caliper is the best compared to other matching conditions, with 99,93 percent reduction bias. The significance of the average treatment effect for treated (ATT), all different condition order with caliper indicates that gender have a positive relationship and significantly affects fasting blood sugar (FBS). Also, based on the matching results with the best combination, it was found that the variables of age, academic position, structural position, education level, and lecturer performance do not have an influence on abnormal fasting blood sugar (FBS).

*Keywords:* caliper, confounder, fasting blood sugar (FBS), Propensity Score Matching (PSM) Regresi Logistik Biner, structural positions



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# **APPLICATION OF PROPENSITY SCORE MATCHING FOR ANALYZING FACTORS CONTRIBUTING TO PRE-DIABETES**

**OKTAVIANI AISYAH PUTRI**

Undergraduate Thesis  
as a partial fulfilment for the Bachelor degree  
in  
Statistics and Data Science

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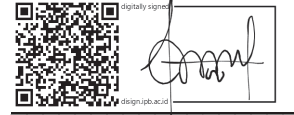




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Bogor, July 2024

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