Enhancing Dementia Care Through Matched Case-Control Analysis

Keywords: Data-driven Healthcare | Long-term Care Evaluation | CBS Microdata | Matched Case-Control Analysis | Platform Analytics

As the population ages, the prevalence of dementia is rising, placing increasing strain on healthcare systems. The "Sociale Benadering Dementie" (SBD) program was initiated in the Netherlands as a paradigm shift aimed at improving the quality of life for individuals with dementia by focusing on their social environment, addressing their personal needs, and helping them stay connected to the community. Researchers, Professor Isabelle Fabbricotti and Dr. Mathilde Strating, wished to improve the robustness and power of existing SBD effectiveness analyses, as there is a shift from disease-focused models to person-centred ones.

Erasmus Data Collaboratory | House of AI support

EDC was asked to provide the necessary analytical framework as well as expert consulting to evaluate the program's effectiveness and how improved analyses would support the program's goals. The research project posed questions related to the cost efficiency of SBD and for which population it is the most effective. A data scientist of EDC's data lab team utilised matched case-control analyses and leveraged advanced statistical methods within a secured microdata environment provided by CBS (Centraal Bureau voor de Statistiek). Run in IBM SPSS, this 1:n case-control matching technique involves matching each case in the study to multiple controls based on matching criteria, allowing for some degree of similarity rather than an exact match. This type of matching leads to more robust results and reinforces the validity of initial findings. The matching technique was combined with a detailed statistical analysis implemented in Python to identify how age, gender, living situation, diagnosis, hospital admissions, and case/control status influence the usage of formal care types and the associated costs. To run these analyses, EDC's

data lab team created a custom Python pipeline, which automates the analysis and allows for extensive outputs.

Impact

The outcomes following these statistical analyses include actionable insights into the effectiveness of dementia interventions, offering a robust framework for evidence-based policy and clinical decision-making. The extensive methodology and the reusable Python pipeline developed by EDC serve as a powerful template for future research. This framework can be readily adapted to evaluate other complex healthcare interventions, particularly those involving case-control designs within sensitive and restricted data environments like CBS microdata. On a societal level, the findings from this research directly inform policymakers and healthcare providers about the effectiveness and cost-efficiency of a more social, person-centered approach to dementia care, potentially guiding future investments and improving the lives of thousands.

Stakeholders: Isabelle Fabbricotti | Mathilde Strating | Erasmus School of Health Policy and Management (ESHPM | Erasmus University Rotterdam | Sociale Benadering Dementie (SBD) | Centraal Bureau voor de Statistiek (CBS) | Healthcare providers | Policymakers
Specific EDC expertise used: Secured Microdata | Matched Case-Control Analysis | Platform Analytics | Python | Statistical Analysis
Tech/Tools Used: IBM SPSS | Python

Further reading:

- https://socialebenadering.nl/ (Dutch)
- CBS Microdata
- Matching in case control studies

Testimonial by researcher Mathilde Strating (ESHPM): "Working together with the Erasmus Data Collaboratory team on this project was a very pleasant experience. They were instrumental in restructuring and enriching the data and the subsequent transformation to SPSS. Also, discussing and reflecting upon the quality of the data, going back and forth between theoretical research questions and statistical methodology was an interesting journey. In the end, it helped us to investigate our research questions in a scientifically sound manner based upon robust analyses"

Case-Control Study