

# Characterization of mental health issues in the region of Aveiro — A retrospective analysis

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## Introduction:

The world has acknowledged the important role of mental health. However, in the last decade, mental health disorders increased by 13%, being Depression and Anxiety the most common issues [1]. Portugal has Europe's 2nd-highest prevalence of psychiatric illnesses and further studies show that 57% of the Portuguese population presents psychological distress [2,3]. This study was conducted to investigate the registered psychological problems between 2009 and 2021 in the region of Aveiro.

## Methods:

Data was imported to RStudio with 5 common variables: County, Sex, GroupAge, ICPC and Problem. The remaining record the number of registered psychological problems in each year. All data was filtered according to ICPC variable and lines with a psychological ICPC2 code below 70 were deleted as they represent signs and symptoms. The GroupAge variable was aggregated to obtain 5 groups (0-14, 15-24, 25-44, 45-65, +65 years). All 11 counties from ACeS Baixo Vouga were present. Columns concerning the number of reported problems per year were merged, lines reporting 0 problems were deleted, data was aggregated to sum the total of problems of duplicated entries and the Year variable was created. To study Cancer, Obesity and Diabetes, counts of registered psychological problems in the presence of these comorbidities were imported and processed as described. To obtain the final dataset, columns referring to the number of reported psychological problems in the presence of each comorbidity were added to the first one. Exploratory data analysis began with the number of problems per year, comparing it to the number of problems for each comorbidity. Secondly, the number of problems per year for each county, gender, age group and for each psychological problem was accessed. Further analysis was only conducted with the County variable. To visually compare the number of registered problems, interactive maps of the district of Aveiro were built, where the counties belonging to the ACeS Baixo Vouga were colored through a gradient coded in parallel with the number of issues registered; a standardization was performed according to the number of resident populations. Clusters analysis was performed to find which counties were similar. Ward's method was used, Spearman correlations were calculated and turned into a dissimilarity measure. To assess the association between psychological problems and its occurrence in the counties (two nominal variables), Cramer's V measure was used.

## Results:

A total of 1092760 psychological problems were reported between 2009 and 2021 in the ACeS Baixo Vouga. Of all years, 2021 had more reports and this number has been increasing. Women had more than twice as many problems compared to men (Figure 1). The county with the most psychological problems registered in 2021 was Ovar; Anadia stands out because it reported the least psychological problems per 100000 habitants. Figure 2 shows that the most reported problems were Depressive and Anxiety Disorders. Figure 3 shows the result of a cluster analysis between counties for the time considered; Murtosa, Ovar, Estarreja and Anadia formed one cluster, and Sever do Vouga, Oliveira do Bairro, Ílhavo, Aveiro, Albergaria-a-Velha, Vagos and Águeda formed another. The silhouette coefficient of 0.5 revealed a reasonable structure. The results of the association between psychological issues and its occurrence in the counties reveal that Somatization has the highest association with a Cramer's V value of 0.11.

### Keywords:

Mental health services; health promotion; regional differences; ACeS Baixo Vouga.

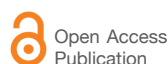
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### Conflict of interest:

The authors declare no conflict of interests.

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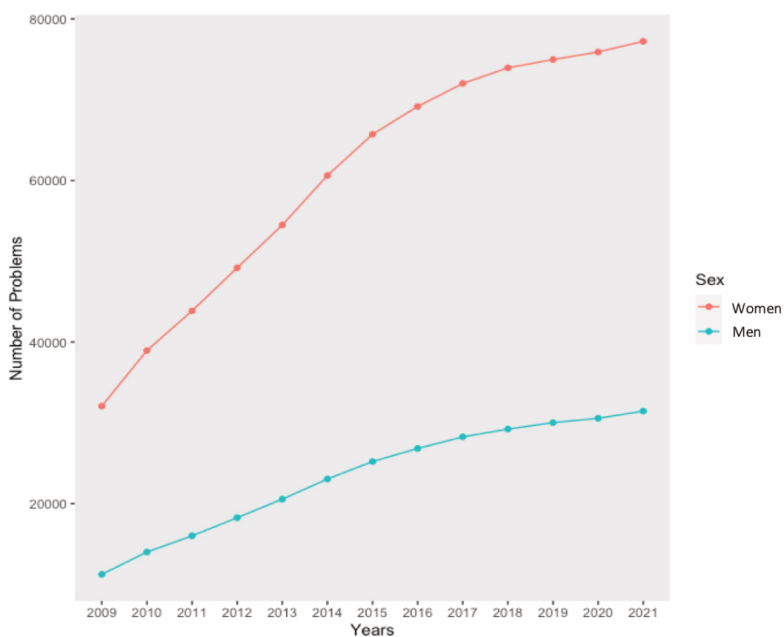


Figure 1 - Line graph showing the number of problems reported by males and females over the years.

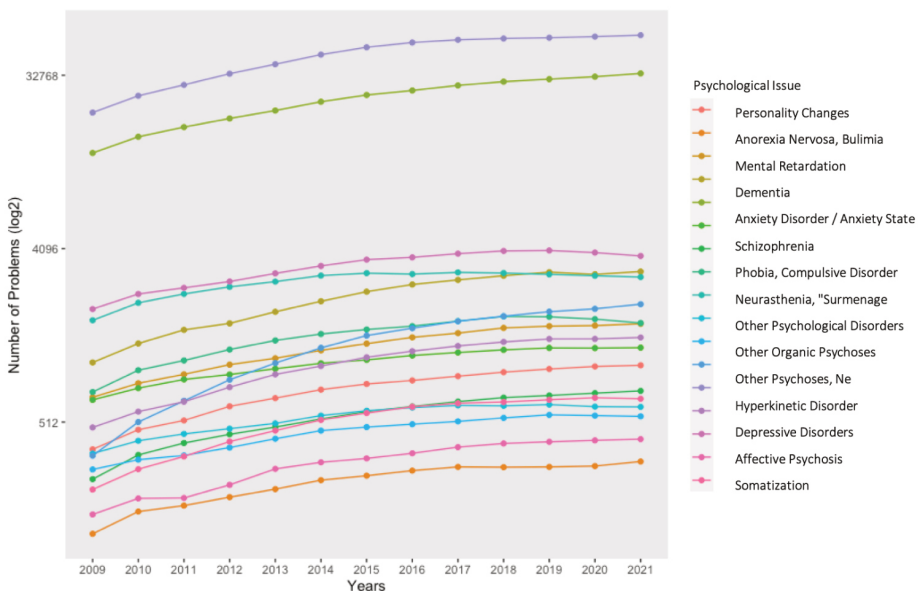


Figure 2 - Line graph showing the number of problems reported by type of psychological issue over the years, with a log2 transformation in the y axis.

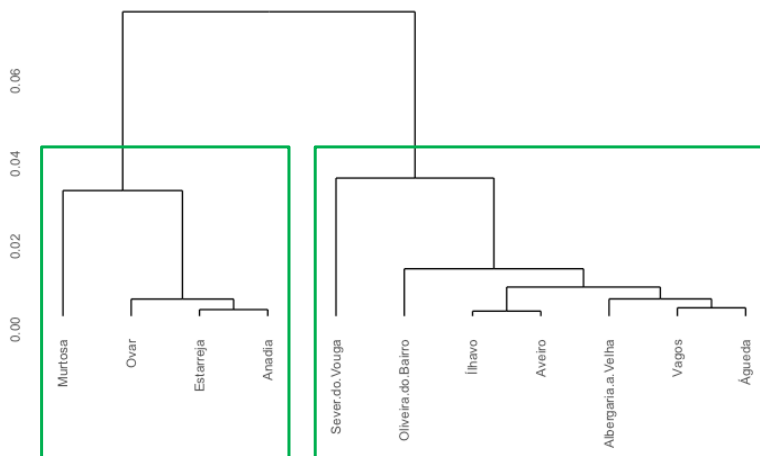


Figure 3 - Result of the cluster analysis performed for the County variable.

**Discussion:**

This study showed that some counties behave similarly when taking the report of psychological problems into account. Cluster analysis results are supported by the grouping of the counties with more reported psychological problems, which might be explained by a greater presence of the elderly population or better primary care services. In Portugal, there's still mental health stigma and discrimination [4] and this might explain men's lack of reported issues. Anxiety and Depression are the most reported issues in the Aveiro region. These results are consistent with country and world's results. The weak, although significant association of Somatization with the County variable could be related to genetic influence. The importance of mental health is highlighted in the main mental health strategies and action plans. However, interventions in the area are done in isolation and are not sustained over time [4]. This study might alert the population and its doctors to be more aware of the Portuguese's needs. These findings could help doctors identify mental health issues' risk factors and act to prevent them in time. This study revealed limitations as only aggregated data was studied, where duplicates are present but impossible to resolve.

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**References:**

1. Mental health. World Health Organization. 2022.
2. Baltazar, C. Mental healthcare in Portugal. *Expatica*. 2022.
3. Frade F, Jacobsohn L, Gómez-Salgado J, Martins R, Allande-Cussó R, Ruiz-Frutos C, et al. Impact on the Mental and Physical Health of the Portuguese Population during the COVID-19 Confinement. *J Clin Med*. 2021 Sep 28;10(19):4464. <https://doi.org/10.3390/jcm10194464>
4. Leite A, Augusto G, Alves J. Sem mais tempo a perder – Saúde mental em Portugal: um desafio para a próxima década. Conselho Nacional de Saúde. 2019.