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Association Between Indices of Social Disadvantage and Rate of COVID-19 Vaccination Booster Dose

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INTRODUCTION

Adherence to COVID-19 vaccination has declined with the decrease in epidemic waves, despite the clearly higher risk of infection and hospitalization among the unvaccinated. Misinformation, cognitive biases, and other not always measurable factors have contributed to vaccine refusal. Although some studies have explored the causes of vaccine hesitancy, the knowledge of the effect of socio-cultural and economic conditions are still limited.

OBJECTIVE

This analysis aims to evaluate the association between adherence to the first COVID-19 vaccine booster dose (3rd dose) and available deprivation indices (Caranci index and ISTAT's social and material vulnerability index), to understand whether the social context influences the population's vaccination behaviour.

METHODS

A retrospective observational study was conducted on the population residing in Apulia eligible for the first COVID-19 vaccine booster dose between January 1, 2021, and December 31, 2022. Demographic data were obtained from ISTAT [1], while vaccination status information was retrieved from the regional vaccination registry (GIAVA) in aggregated form (number of vaccinated individuals) by municipality of residence, sex, and age. The social and material vulnerability index (ISMV), provided by ISTAT [2], consists of a score with a reference value of 100 (higher values indicate greater vulnerability) determined by seven vulnerability indicators (single-parent households, large household size, illiteracy, elderly members, unemployment, economic hardship). The Caranci deprivation index (ID) [3] is also calculated using census data and is based on five indicators: poor education, job shortages, poor housing, and family conditions.

The applied model is a multivariable Poisson regression, with the number of individuals vaccinated with the booster dose as the dependent variable, and ISMV (or ID), sex, and age group as independent variables. Additionally, the COVID-19 case rate was considered as an adjustment variable.

RESULTS

The percentage of residents in Apulia who received the booster dose progressively decreases from 75% among individuals with ISMV <99 to 70% among those with ISMV >102, with no significant differences by sex. The age-stratified analysis (<60 and ≥60 years) has shown, among individuals aged ≥60, a slight reduction in the percentage who received the booster dose from 81% (ISMV <99) to 74% (ISMV >102), while the decline is more pronounced in the population <60 years, dropping from 70% with ISMV <99 to 63% with ISMV >102. All factors included in the model are statistically significant, in both model with the ID or the ISMV. The model with ISMV (Figure 1) has shown that in the ISMV >102 class the acceptance of the vaccination is lower compared to classes with lower vulnerability, with rate ratios of 0.97 (0.95–0.99), 0.97 (0.95–0.99), 0.95 (0.93–0.97), and 0.94 (0.92–0.96) for the 101–102, 100–101, 99–100, and <99 classes, respectively.

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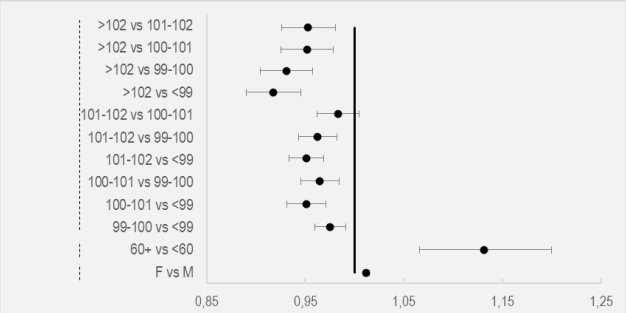
Figure 1. Estimated Rate Ratios and corresponding 95% confidence intervals from the multivariable Poisson regression model for the Social and Material Vulnerability Index (ISVM), age, and sex. The confidence interval for the variable Sex is not visible due to scale



CONCLUSIONS

The analysis revealed a significant association between socioeconomic deprivation and lower adherence to the third dose of the COVID-19 vaccine. The decline is more pronounced among individuals under 60 with high levels of vulnerability, while no significant differences emerged with respect to gender.

A limitation of the study is the use of aggregated data, which does not allow for in-depth individual-level analysis and may lead to a generalization of the results (a possible "ecological fallacy"). Nevertheless, the findings suggest that in specific social contexts, there are groups—defined by age and vulnerability status—that could benefit from targeted communication strategies aimed at increasing awareness and addressing vaccine hesitancy.

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