

A methodological framework for risk assessment of Covid-19 in the workplace to guide the prevention strategies in Italy

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Abstract

Introduction

The work dimension has been recognized as a key determinant in the COVID-19 pandemic (1). Several types of working conditions have been reported at risk of infection worldwide and the study of transmission dynamics was a challenge for occupational health (2). Different indicators have been proposed for the identification of occupational groups at risk for Sars-CoV-2 infection such as workers compensation claims (3), specific surveillance systems (4) or cluster analysis (5).

Italy was the first among western countries to face the spread of the pandemic. The number of hospital admissions for COVID-19 has considerably challenged the national health system's capacity with particular reference to the availability of intensive care unit beds. Starting from March 2020, the Italian government has progressively adopted several containing measures until the first lockdown period when non essential businesses were temporary suspended. This resulted in a 75% reduction in the number of workers present in their workplaces (including also remote workers).

The national lockdown has been successful in achieving a major slowdown in the spread of the virus in terms of epidemiological effectiveness (6).

To face the second COVID-19 wave in autumn 2020, the Italian government introduced a system of physical distancing measures organized in progressively restrictive tiers (coded as yellow, orange, and red) imposed on a regional basis according to real-time epidemiological risk assessments (7).

Since 2021 a new phase of the Covid-19 pandemic started with the beginning of the vaccination campaign which was rolled out in progressive phases through various priority groups. Elderly people, residents and personnel of long-term care facilities, healthcare workers, social care personnel, and people with comorbidities were primarily prioritized. As of October 5, 2021 more than 85 million doses have been administered and almost 43 million people (80% of the population over 12 years of age) received two doses of vaccine (8).

In this background the present study describes the methodological framework for assessing the risk of SARS-CoV-2 infection in the workplace developed in Italy by the National Workers' Compensation Authority (INAIL). It has been adopted by the National Governmental Authorities for action-oriented policy to determine priority and interventions during the different phases of COVID-19 emergency.

Methods

The methodology proposed for assessing the risk of SARS-CoV-2 infection in the workplace includes the combination of three parameters: 1. the proximity between employees; 2. the exposure related to the type of activity; 3. the involvement of third parties in work processes with consequent social aggregation connected to the job.

Quantitative values have been associated to each parameter, to obtain a classification by activity sector (according to the NACE classification) into four different risk levels: Low $R < 2$; Medium-Low $2 < R < 4$; Medium-High $4 < R < 8$; High $R > 8$.

INAIL receives claims for occupational injuries and diseases ensuring coverage with the public insurance system to about 85% of the national workforce. As of August 31, 2021 INAIL received 179.992 compensation claims for COVID-19 work related infections, 747 of which with fatal outcome. We classified these compensation claims data by productive sector and compared them with the calculated risk class in order to validate the risk assessment methodology.

Furthermore, the work dimension offered a real contribution to improve the vaccination campaign, taking into account that 15 million workers are covered by the National health prevention system, corresponding to 65% of the working population. In this context, a vaccination program in the workplace has been launched in Italy starting from June 2021, engaging companies and their occupational health services as additional vaccination sites. With the aim to make effective this campaign, the INAIL methodological framework was also used to define criteria for the prioritization of vaccination campaign in the workplace.

Results

The results of Covid-19 risk classification by economic sector showed that 'Human health and social work activities' sector resulted at higher average risk; 'Activities of households...' and 'Public administration and defence...' were at medium-high risk; 'Education', 'Arts, entertainment and recreation' and 'Other services' at medium-low risk, while for all other sectors the average risk was classified as low (9).

The occupational risk level was integrated in the National epidemiological surveillance model to highlight the impact of the modular reopening of work activities for a safe reactivation of businesses after the first lockdown period in May 2020. By this simulation the impact of reopening activities on the reproduction number in different scenarios was estimated showing that the strategy to

reactivate selected production sectors between May 4 and May 18 by lifting most of the lockdown restrictions, maintained the reproduction number at low levels (10).

The comparative analysis between the economic sectors most involved in the risk of infection and the insurance figures demonstrated that the proposed risk classification was coherent with the distribution of compensation claims for COVID-19 infections with occupational origin by economic sectors. In particular, the economic sectors at high or medium-high risk of COVID-19 infection (i.e. 'Human health and social work activities', 'Public administration' and 'Activities of households...') included 82% of compensation claims, although they represented about 25% of those workers who remained active during the lockdown period (11).

Finally, two quantitative indicators allowed the prioritization of the workplace vaccination strategy taking into account the risk specific to different productive sectors: (i) the estimated "a priori" risk class by economic sector; (ii) the incidence of compensation claims for work-related COVID-19 infection by economic sector. According to this model, a priority classification by activity sectors into different tiers (from one to three in order of priority) has been proposed, taking into account also the relevant working population potentially involved. Health, education and defense workers (partly already vaccinated) have been identified as the main priorities, but food processing industry, transport workers, farmers (particularly seasonal workers), and the workers of entertainment sector have been also highlighted as a substantial concern (12-13).

Conclusions

National strategies for prevention and containment of Sars-CoV-2 pandemic should necessarily encompass the work dimension. In this respect, the development of a methodological approach based on quantitative indicators obtained from available data and epidemiological surveillance systems in the occupational setting represented an added value to address all related preventive measures to mitigate Covid-19 impacts in Italy. The proposed strategy contributed to reconsider the organization of work in the SARS-CoV-2 pandemic context, also to include innovation and integration with the OSH system at national level. At the same time, it allowed the opportunity to extend the benefits of workplace management policies to the community at large, as part of a progressive "exit strategy" from Covid-19 pandemic.

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