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Safety and Efficacy of Different Types of Face Masks in Respiratory Viral Diseases: A PRISMA compliant Meta-Analysis

When it comes to occupational exposure among healthcare personnel (HCP), respiratory viruses, including SARS-Coronavirus-2019 and its emerging variants have highlighted needs for respiratory personal protective equipment. Conflicting opinions exist on the type of face protection that HCP should don to prevent and minimize spread of viral respiratory infections (RVI). We conducted a meta-analysis to statistically compare the effectiveness and role of different face masks in preventing transmission of respiratory viruses in healthcare settings. Researches (2003-June 2022) from various databases were chosen employing Preferred Reporting Items for Systematic Reviews and Meta-Analysis criteria; 12 studies qualified for inclusion. Data was pooled from in-vivo randomized control, case-control and observational studies dealing with relationships between mask use by patients/HCP and RVI prevention in healthcare setups.

The Fixed and random-effects model was carried out to determine odds ratios (OR) and their respective 95% confidence intervals (CI) (Figure-1). Results revealed: wearing face masks significantly reduced the risk of contracting respiratory viral illness in hospital settings, with pooled OR (95% CI) of 0.395 [0.140 to 1.114] ($P < 0.008$). N95 respirators provided higher protection against laboratory-confirmed RVI in comparison to surgical masks (N95 respirators: OR = 0.389; 95% CI: 0.152 to 0.994; Surgical masks: OR = 0.593; 95% CI: 0.404 to 0.870).

Our meta-analysis concluded: masks can minimize majority of RVI transmissions in hospitals. Compared to surgical masks, N95 respirator use was linked to less RVI transmission episodes among HCP. N95 respirators were the most effective in reducing COVID-19 transmission in hospitals, when compared to other evaluated viruses.

Figure-1: Forest plot of odds ratios of individual and Fixed/Random effects

