

# Demographic Factors and Structure of Vaccination Attitudes During the COVID-19 Pandemic in the Czech Republic

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**Abstrakt** Předchozí výzkum odhalil několik souvislostí mezi demografickými proměnnými a postoji k očkování. V této studii jsme zkoumali postoje k očkování během pandemie COVID-19 na vzorku 692 dospělých Čechů pomocí upravené verze Škály zkoumání postojů k očkování. Konkrétně bylo cílem studie 1) ověřit psychometrické charakteristiky škály a 2) ověřit souvislosti mezi dimenzemi Škály zkoumání postojů k očkování a vybranými demografickými charakteristikami. Zjistili jsme, že čtyři dimenze Škály zkoumání postojů k očkování spolu silně korelují a že nejlépe odpovídá adaptované škále pro COVID-19 v našem souboru hierarchická struktura se samostatným faktorem prvního řádu Výhody a faktorem druhého řádu Váhavost, který kombinuje faktory prvního řádu Obavy z budoucích dopadů, Obavy z komerčního zneužití a Preference přirozené imunity. Jak faktor Výhody, tak faktor Váhavosti se lišily mezi více demografickými skupinami. Další studium povahy a prediktorů seskupení různých postojových zdrojů váhavosti vůči očkování by mohlo vnést více světla do způsobů, jakými mohou lidé z různých sociodemografických a sociokulturních kontextů přijímat různá typy přesvědčení o očkování.

**Klíčová slova:** COVID-19 očkování, váhavost vůči očkování, postoje vůči očkování, demografické faktory, Škály zkoumání postojů k očkování

**Extended abstract** Vaccine hesitancy, defined as delay in acceptance or refusal of vaccination despite availability, emerged as a major public health challenge during the COVID-19 pandemic, fuelled by mistrust, misinformation and sociocultural factors. Understanding the structure and demographic predictors of vaccination attitudes is essential for designing effective communication strategies. This study examined attitudes toward COVID-19 vaccination in a representative sample of 692 Czech adults aged between 18 and 86 years ( $M = 45.2$ ,  $SD = 16.8$ ; 56.5% women) using an adapted Vaccination Attitudes Examination (VAX) scale. The Vaccination Attitudes Examination scale assesses four dimensions: Perceived vaccine benefits, Worries about unforeseen side effects, Concerns about commercial profiteering, and Preference for natural immunity. The scale was modified to refer specifically to COVID-19 vaccination. The main objectives of the study were 1) to validate the psychometric characteristics of the scale (internal consistency, factorial structure and measurement invariance) and 2) to examine the associations between Vaccination Attitudes Examination scale dimensions and selected demographic characteristics (age, gender, education, parental status, religion, vaccination status, and perceived physical health). Confirmatory factor analysis supported a hierarchical structure of the Vaccination Attitudes Examination scale: three dimensions (Worries about side effects, Commercial profiteering, and Preference for natural immunity) formed a second-order factor of Hesitancy, distinct from Perceived vaccine benefits. This structure demonstrated very good model fit, high internal consistency and scalar measurement invariance across gender, age, education, parenthood status, and religious affiliation, but not vaccination status, indicating that the structure of vaccination attitudes differs significantly between vaccinated and unvaccinated individuals. Demographic differences were mostly small but significant: group comparisons revealed that hesitancy was higher among people with children, people with less education and individuals without religious affiliation. Vaccinated participants reported greater perceived benefits and lower hesitancy than unvaccinated ones, with large effect sizes. Younger adults (18-29 years) showed the lowest hesitancy; and education level emerged as a consistent predictor on both perceived benefit and hesitancy scales. Perceived physical health had only a weak relationship with attitudes toward vaccination. These findings reflect universal and context-specific trends and underscore the importance of cultural, educational, and ideological factors in shaping vaccination attitudes. Tailored public health strategies should focus on increasing trust in vaccine safety and efficacy, especially among groups showing higher hesitancy. Efforts should include transparent communication, culturally sensitive messages, and education-based interventions to improve scientific literacy. The validated Czech version of the Vaccination Attitudes Examination scale offers a reliable tool for further cross-cultural and longitudinal research on vaccine acceptance.

**Keywords** COVID-19 vaccination, vaccine hesitancy, vaccination attitudes, demographics, Vaccination Attitudes Examination scale (VAX)