Studies from several countries suggest that COVID-19 vaccination rates are lower among migrants compared to the general population. Urgent calls have been made to improve vaccine outreach to migrants, however, there is limited evidence on effective approaches, especially using social media. We assessed a targeted, low-cost, Facebook campaign disseminating COVID-19 vaccine information among Arabic, Turkish and Russian speakers in Germany (N = 888,994). As part of the campaign, we conducted two randomized, online experiments to assess the impact of the advertisement (1) language and (2) depicted messenger (government authority, religious leader, doctor or family). On average, 2.3 individuals accessed the advertised COVID-19 vaccination appointment tool for every euro spent on the campaign. Migrants were 2.4 (Arabic), 1.8 (Russian) and 1.2 (Turkish) times more likely to click on advertisements translated to their native language compared to German-language advertisements. Furthermore, findings showed that government representatives can be more successful in engaging migrants online compared to other messengers, despite common claims of lower trust in government institutions among migrants.