

Critical appraisal of individual studies [1]

| Study and setting | Sample size (n) | Sample design | Sampling frame | Measures | Unbiased assessors | Response rate and refusers | Prevalence rates | Score and limitations |
|--------------------------------------|-----------------|--|---|--|--------------------|---|--|---|
| Aldosary (2021) [2], Saudi Arabia | 334 | Target population: All nurses working in the government hospital and governmental primary health care centres in Ar-Rass | All nurses registered in general authority for statistics The data collection period was from 27/11/2020 to 7/12/2020 | online self-administered questionnaire Cronbach's alpha: 0.754 | No | 71.4% Refusers not described | Active nurses 78.7% of participants agree with COVID-19 mandatory vaccinations once available No Confidence Intervals provided | Score: 5 Biased sampling frame (there is no description of how the HCWs were contacted) Refusers not described No unbiased assessor No Confidence Intervals provided |
| Aloweidi (2021) [3], Jordan | 646 | Target population: "Medical field workers from Jordan University Hospital with direct contact with patients at inpatient or outpatient departments" | Sampling frame not described The survey was conducted between 22 January 2021 and 28 February 2021 | online structured self-administered questionnaire Cronbach's alpha value was 0.76 | No | 82% Refusers not described | Medical field HCWs 25.4% acceptance for COVID-19 vaccine mandates in schools, universities, and workplaces 33.1% acceptance for COVID-19 vaccine mandates for travelling No Confidence Intervals provided | Score: 5 Refusers not described No unbiased assessor No Confidence Intervals provided Only HCWs in direct contact with patients included |
| Arif (2022) [4], Saudi Arabia | 529 | Target population: All HCWs at King Saud University Medical City Purposive sample | "Online questionnaire distributed through social networking sites such as WhatsApp, Google, and Twitter between May 1 and September 30, 2021" | Online questionnaire No assessment of the internal consistency of the measurement | No | Response rate not described Refusers not described | Active HCWs 27% decreased odds of vaccine acceptance when COVID-19 vaccine was a mandate No Confidence Intervals provided No Confidence Intervals provided | Score: 3 Biased sampling frame (social network list) Response rate not described No assessment of the internal consistency of the measurement |

| | | | | | | | | |
|------------------------------------|-----|--|---|---|----|--|---|--|
| | | | | | | | | <p>Refusers not described</p> <p>No unbiased assessor</p> <p>No Confidence Intervals provided</p> |
| Badahdah (2022) [5], Oman | 346 | Target population not described | Samling frame not described | <p>Web-based survey</p> <p>Cronbach's alpha coefficient was 0.87</p> | No | <p>Response rate not described</p> <p>Refusers not described</p> | <p>Unvaccinated physicians and nurses working in Oman</p> <p>Male and young HCWs more prone to accept COVID-19 vaccine mandates F (1, 341) = 5.77; p = 0.020, F (1, 341): 5.71; p = 0.020</p> <p>No Confidence Intervals provided</p> | <p>Score: 3</p> <p>Target population not described</p> <p>Samling frame not described</p> <p>No unbiased assessor</p> <p>Refusers not described</p> <p>Response rate not described</p> <p>No Confidence Intervals provided</p> |
| Casey (2022) [6], USA | 209 | "English-speaking, at least 18 years old, and worked in healthcare during the COVID-19 pandemic" | "The survey was distributed using the snowball sampling method, where Advisory Board members and the study team shared the survey link with potential participants from their networks" | <p>Web-based survey</p> <p>"The survey was pilot tested by 8 healthcare workers and revised before dissemination"</p> | No | <p>Response rate not described</p> <p>Refusers not described</p> | <p>"English-speaking, at least 18 years old, and worked in healthcare during the COVID-19 pandemic"</p> <p>COVID-19 vaccine mandates in healthcare settings: 91.9% agree (full or under conditions support)</p> <p>No Confidence Intervals provided</p> | <p>Score: 3</p> <p>Sample size < 300</p> <p>Biased sampling frame (personal contacts)</p> <p>No unbiased assessor</p> <p>Refusers not described</p> <p>Response rate not described</p> <p>No Confidence Intervals provided</p> |
| Ciliberti (2022) [7], Italy | 240 | Target population: All students who were enrolled in the third year of the School of Medicine, on a core lecture | "The questionnaire was administered via the e-learning platform of Genoa University (AulaWeb) during December 2021" | <p>online, anonymous questionnaire</p> <p>Cronbach's Alpha of 0.777</p> | No | <p>240 out of 284 (84%)</p> <p>Refusers not described</p> | <p>Medical students</p> <p>students believed that: "COVID-19 vaccine mandates should be made obligatory for the whole community" and for "all students",</p> | <p>Score: 5</p> <p>sample size < 300</p> <p>No unbiased assessor</p> <p>Refusers not described</p> <p>No Confidence Intervals</p> |

| | | | | | | | | |
|-------------------------------|-------|--|--|---|----|---|--|---|
| | | | | | | | and even that “those who refuse vaccination against COVID-19 should be excluded from university”, 8-10 (Likert-type answers medians)” | provided |
| | | | | | | | No Confidence Intervals provided | |
| Constantino (2022) [8], Italy | 1,450 | Target population: All Pharmacists of the Palermo Province Pharmacists’ Order | “The administration of the two questionnaires took place through dedicated links created on the Google Documents® platform, with access reserved for CPs on the restricted area of the website of the Palermo Province Pharmacists’ Order” | Online questionnaire Cronbach’s alpha was 0.87 | No | 83.5% Refusers not described | Community Pharmacists 64.3% of those who changed their opinion regarding Covid-19 vaccination, they did it due to vaccines mandates No Confidence Intervals provided | Score: 6 No unbiased assessor Refusers not described No Confidence Intervals provided |
| Craxi (2021) [9], Italy | 465 | All HCWs of the University Hospital P. Giaccone of Palermo | Access to a web-based simulation platform provided by the Hospital information system | Web-based questionnaire No assessment of the internal consistency of the measurement | No | 465 out of 2068 (22.5%) Refusers not described | Active HCWs Preferred vaccination strategy for healthcare workers: mandatory answered vaccination 229 out of 465 No Confidence Intervals provided | Score: 4 Inadequate response rate (< 70%) Refusers not described No unbiased assessor No Confidence Intervals provided No assessment of the internal consistency of the measurement |
| Elbadawi (2022) [10], Sudan | 930 | Target population: All healthcare workers who were working at hospitals in Sudan | “The questionnaire was distributed as a Google Form document through multiple social media platforms (Facebook, Twitter, WhatsApp, Telegram), non-governmental organizations (NGOs) and academic | Web-based questionnaire Cronbach’s alpha: 0.790 | No | Response rate not described Refusers not described | Active HCWs Acceptance of mandatory vaccinations for the general population: 470/852 and for HCWs: 636/852 | Score: 4 Biased sampling frame (social network contacts) No unbiased assessor Response rate not |

| | | | | | | | | |
|--------------------------------------|-------|--|---|---|----|---|---|--|
| | | | institutions” | | | | No Confidence Intervals provided | described Refusers not described No Confidence Intervals provided |
| Fotiadis (2021) [11], Greece | 1,456 | Target population: All HCWs in Greek public hospitals Random-geographically stratified sampling | Questionnaires were disseminated proportionally in each hospital (20 hospitals in total) in May 2021 | Anonymized paper-based Cronbach’s alpha value of 0.70 | No | 41% Refusers not described | Active HCWs COVID-19 mandatory vaccination acceptance for HCWs: proportional ratio 1.56 (1.47–1.65) | Score: 5 Sampling frame not described in detail (how and when the questionnaire was disseminated?) No unbiased assessor Inadequate response rate (< 70%) |
| Ghirotto (2022) [12], Italy | 4,677 | Target population: HCWs who were practicing a health profession recognized by the Italian State as subject to mandatory vaccination. Actively working in public or private healthcare structures | “Authors disseminated the link to the questionnaire among their professional contacts (also via social networks), The Italian Order of Doctors, Surgeons, and Orthodontists disseminated the questionnaire to their associates” | Online questionnaire No objective assessment of the measurement | No | Response rate not described Refusers not described | Active HCWs mandatory vaccination helpful for making your workplace safer for everyone: 3,705/4,071 mandatory vaccination helpful for protecting public health: 3,773/4,071 No Confidence Intervals provided | Score: 3 Biased sampling frame (social network and personal contacts) No objective assessment of the measurement No unbiased assessor Response rate not described Refusers not described No Confidence Intervals provided |
| Giannakou (2022) [13], Cyprus | 504 | Target population: “Greek-Cypriot HCWs working in either public or private service provision, aged 18 years old and above, and living in the five government-controlled municipalities of the | “The online questionnaire was administered using Google Forms and dispersed using instant messaging apps, social media platforms, and social networking sites” | Online questionnaire Cronbach’s alpha coefficient ranged between 0.63 and 0.96 | No | Response rate not described Refusers not described | Active HCWs COVID-19 vaccination should be mandatory for healthcare professionals: agree 247/504 No Confidence Intervals provided | Score: 4 Non-probability sampling Biased sampling frame (social network contacts) No unbiased assessor Response rate not described |

| | | | | | | | | |
|------------------------------------|-------|---|---|--|----|---|---|--|
| | | Republic of Cyprus” Non probability convenience sampling | | | | | | Refusers not described No Confidence Intervals provided |
| Gönüllü (2021) [14], Turkey | 506 | Target population: All HCWs in The Turkish Pediatric Workshop group in Telegram app | Google Forms link was sent to the members of Turkish Paediatric Workshop group | Online questionnaire No objective appraisal of the measurement tool | No | 22% Refusers not described | Active HCWs COVID-19 vaccine should be mandatory: 303/506 No Confidence Intervals provided | Score: 3 Biased sampling frame (selection bias – HCWs not in the telegram group were excluded) No objective appraisal of the measurement tool No unbiased assessor Inadequate response rate (< 70%) Refusers not described No Confidence Intervals provided |
| Grabert (2022) [15], USA | 1,047 | Target population: US PCPs who were members of a standing national panel maintained by a survey research company | The survey company emailed invitations to panel members | Online questionnaire No objective appraisal of the measurement tool | No | 61% Refusers not described | Primary Care HCWs No. of PCPs who supported Covid-19 vaccine mandates: 871/1,047 No Confidence Intervals provided | Score: 4 Biased sampling frame (only HCWs of the national panel were included) No objective appraisal of the measurement tool Inadequate response rate (< 70%) No unbiased assessor Refusers not described No Confidence Intervals provided |
| Jain (2021) [16], India | 1,068 | Target population: All medical students in India Respondent-driven | “The link was shared by the student investigator within the social media network of medical student | Online questionnaire No objective appraisal of the | No | Response rate not described Refusers not described | Medical students COVID-19 vaccine should be made mandatory for the | Score: 3 Biased sampling frame (students without this particular social media |

| | | | | | | | | |
|--|-------|---|---|--|----|---|---|---|
| | | sampling strategy | The students further circulated it among their acquaintances within the same medical college” | measurement tool | | | health care workers: 800/1068 No Confidence Intervals provided | network?) Non random sampling No objective appraisal of the measurement tool No unbiased assessor Response rate not described Refusers not described No Confidence Intervals provided |
| Jankowska-Polanska (2022) [17], Poland | 497 | Target population not described | Not described | Online questionnaire Pre-validated Cronbach’s alpha coefficient 0.75 | No | 71% Refusers not described | workers in a medical centre or medical students Do you think healthcare professionals should be compulsorily vaccinated against COVID-19: agree median 4 Q3–5 No Confidence Intervals provided | Score: 3 Sampling population not descibed Samping frame not described No unbiased assessor Response rate not described Refusers not described No Confidence Intervals provided |
| Janssen (2021) [18], France | 4,349 | Target population: Healthcare workers of 21 French institutions (public and private hospitals, and nursing homes) | “The institutions sent e-mail notification to their stuff, advertised posters within the institution, or added an advertising notice to the monthly pay slip” | Online self-questionnaire It was pilot tested for clarity, length, and validity with 20 healthcare workers. | No | 4,349/44,975 (9.7%) Refusers not described | Active HCWs COVID-19 vaccination should be mandatory for healthcare workers: 1,138/4,349 COVID-19 vaccination should be mandatory for general population: 787/4,349 No Confidence Intervals provided | Score: 5 No unbiased assessor Inadequate response rate (<70%) Refusers not described No Confidence Intervals provided |
| Kalucka (2022) | 1,080 | Target population: | 1,200 questionnaires were | paper-based | No | 90% | Vaccinated healthcare | Score: 5 |

| | | | | | | | | |
|---------------------------------------|-------|--|---|---|----|---|--|--|
| [19], Poland | | Healthcare professionals (doctors, nurses, midwives) working in the academic centres (hospitals and clinics), and students majoring in medicine, nursing, and midwifery studying in Lodz | distributed from 15 May to 15 July 2021 | questionnaire One month before the main study, a pilot study that analyzed 100 randomly selected healthcare workers was conducted The questionnaires were validated on the basis of standard procedures | | Refusers not described | workers If the COVID-19 vaccination was recommended to be taken every year, should it be obligatory for the health professionals in your opinion? Agree: 760/1051 No Confidence Intervals provided | Sampling frame not described (how and when were the questionnaires distributed?) No unbiased assessor Refusers not described No description of the measurement assessment No Confidence Intervals provided |
| Kashif (2021) [20], Pakistan | 208 | Target population: HCWs aged 18 years and above, residing in Pakistan Convenience sampling | A self-administered questionnaire distributed via social media platforms and direct e-mail solicitation | online questionnaire The draft questionnaire was pilot tested among 30 participants | No | Response rate not described Refusers not described | Active HCWs Willingness to get COVID-19 vaccine if it's mandatory in profession: 185/208 No Confidence Intervals provided | Score: 2 Inadequate sample size Biased sampling frame (excluded nonusers of social media platforms) Not objective assessment of the measurement No unbiased assessor Response rate not described Refusers not described No Confidence Intervals provided |
| Kaufman (2021) [21], Australia | 3,074 | Target population: HCWs living in Victoria Snowballing recruitment | "Research advertisements across health services, clinical colleges, councils, associations, unions, networks, and Facebook were used to recruit participants between 12 February and 26 March 2021" | Online questionnaire | No | Response rate not described Refusers not described | Active HCWs living in Victoria COVID-19 vaccination should be mandated for all healthcare workers: agree 1,544/3,061 | Score: 4 No unbiased assessor Response rate not described Refusers not described No Confidence Intervals |

| | | | | | | | | |
|--|-----|---|--|---|----|---|--|--|
| | | | | | | | No Confidence Intervals provided | provided |
| Kavanagh (2022) [22], Australia | 252 | Target population: Disability support workers across Australia, 18 years of age or older | Link to the survey sent by disability services, unions and disseminated via social media. “The survey was in English and administered online via the RedCap platform and participants were entered into a prize draw” | Online questionnaire Measurement tool not objectively assessed (validity, reliability) | No | Response rate not described Refusers not described | Active HCWs Mandating for DSWs: 109/252, 43.3% (95% CI: (37.2, 49.5) | Score: 3 Biased sampling frame (did all the DWS receive the link? prize draw) Inadequate sample size (<300) No unbiased assessor Measurement tool not objectively assessed (validity, reliability) Response rate not described Refusers not described |
| Kelekar (2021) [23], USA | 415 | Target population: students from 3 US dental schools and 1 US medical school | All students at these schools were e-mailed a link to the Qualtrics XM online survey | Online questionnaire Measurement tool not objectively assessed (validity, reliability) | No | Inadequate response rate (<70%) Refusers not described | Active HCWs The COVID-19 vaccination should be mandatory for the general public: 67.9% of MS and 40.3% of DS The COVID-19 vaccination should be mandatory for all HCPs 85.9% of MS and 53.9% of DS No Confidence Intervals provided | Score: 4 No unbiased assessor Measurement tool not objectively assessed (validity, reliability) Inadequate response rate (< 70%) Refusers not described No Confidence Intervals provided |
| Konje (2022) [24], Tanzania | 811 | Target population: Health professionals from 23 health facilities in five districts of Tanzania Convenience sample | Convenience sample of health professionals who were available at the health facility during data collection period responded to the structured questions The data collection procedure was conducted within the | Paper based questionnaire structured questionnaire that was adopted from the WHO vaccine | No | 811/2,500 Refusers not described | Active HCWs COVID-19 vaccine to be mandatory to all health professionals: 33.54% of HCWs agree No Confidence Intervals provided | Score: 4 Nonrandom sampling Inadequate response rate (<70%) No unbiased assessor Refusers not described |

| | | | | | | | | |
|--|--------|--|---|---|-------------|---|---|--|
| | | | health facility premises at different units/departments | acceptance scale | | | | No Confidence Intervals provided |
| Krishnamurthy (2021) [25], Barbados | 343 | Target population: HCWs of the Queen Elizabeth Hospital (QEH), Barbados Purposive sampling of all HCPs working at the QEH | Email invitations were sent to a Google Forms link to the survey during the period of February 14 to 27, 2021 | online questionnaire Measurement tool not objectively assessed (validity, reliability) | No | 343/850 Refusers not described | Active HCWs COVID-19 vaccination should be compulsory, once available: 101, 29.5% No Confidence Intervals provided | Score: 3 Biased sampling frame (which e-mail list was used?) Measurement tool not objectively assessed (validity, reliability) No unbiased assessor Inadequate response rate (<70%) Refusers not described No Confidence Intervals provided |
| Lee (2022) [26], USA | 12,875 | “Sample of The National Immunization Survey Adult COVID Module a nationally representative survey with approximately 60,000 adult respondents (aged 18 years and older)” HCWs from 50 states and the District of Columbia excluding Puerto Rico and the U.S. Virgin Islands | “Telephone interviews from a random digit dialled sample of cell telephone numbers stratified by state and the District of Columbia as well as Puerto Rico and the U.S. Virgin Islands” | telephone interviews Measurement tool not objectively assessed (validity, reliability) | Interviewer | 20.5% - 20.9% Refusers not described | 90.5% (95%CI 88.7 – 92.1) of HCWs who faced working requirements had been vaccinated against COVID-19, as compared to 73.3% (95%CI 71.1 – 75.3) of HCP without vaccination requirements (24% increased odds, 95%CI 1.19 – 1.28) | Score: 5 Measurement tool not objectively assessed (validity, reliability) Inadequate response rate (<50%) Refusers not described |
| Lucia (2021) [27], USA | 168 | Target population: Medical students at a single allopathic medical school in Southeast Michigan | Not described | online survey Measurement tool not objectively assessed | No | 34% Refusers not described | Active HCWs The COVID-19 vaccination should be mandatory for the public: agree 110 | Score: 2 Inadequate sample size Biased sampling (No description) |

| | | | | | | | | |
|-------------------------------------|-------|--|---|--|----|---|---|--|
| | | | | (validity, reliability) | | | (67.9%) The COVID-19 vaccination should be mandatory for all health care providers 140 (85.9%) | Not objective assessment of the measurement No unbiased assessor Inadequate response rate Refusers not described No Confidence Intervals provided |
| Maltezou (2021) [28], Greece | 1,571 | Target population: HCWs in eight tertiary-care hospitals across Greece | “A printed questionnaire (in Greek language) was distributed to HCP, regardless of their characteristics, during their work shift by the Infection Control nurses Committee of each hospital from September 1 through October 31, 2020” | Printed questionnaire Measurement tool not objectively assessed (validity, reliability) | No | 14.5% Refusers not described | Active HCWs HCWs who supported COVID-19 vaccine mandates for HCWs were more prone to get vaccinated (83.9%) against COVID-19 in relation to those who not supported COVID-19 vaccine mandates (19%) for HCWs No Confidence Intervals provided | Score: 4 Measurement tool not objectively assessed (validity, reliability) No unbiased assessor Inadequate response rate Refusers not described No Confidence Intervals provided |
| Maltezou (2022) [29], Greece | 134 | Target population: Undergraduate students at the Dental School of the University of Athens | “A web-based link was distributed to all undergraduate dental students via an inviting email sent from the Administration Office of the Dental School” | Online questionnaire Measurement tool not objectively assessed (validity, reliability) | No | 134/600 Refusers not described | Active HCWs 57.1% of the 123 students who favoured mandatory vaccinations for dentists, accepted COVID-19 vaccine mandates No Confidence Intervals provided | Score: 3 Inadequate sample size Measurement tool not objectively assessed (validity, reliability) No unbiased assessor Inadequate response rate Refusers not described No Confidence Intervals provided |
| Maltezou (2022) [30], Greece | 1,284 | Target population: HCWs in Eight tertiary-care hospitals across Greece | “The questionnaire was distributed to a total of 1,879 out of 9,356 HCP by the Infection Control Committees of participating hospitals” | Paper-based questionnaire Measurement tool not | No | 1,284/1,879 (68%) Refusers not described | Active HCWs Of the 1,051 HCPs who favoured mandatory vaccinations for HCP, | Score: 3 Non random sampling Measurement tool not |

| | | | | | | | | |
|-------------------------------------|-----|---|--|--|----|---|--|--|
| | | | | objectively assessed (validity, reliability) | | | 576 (54.8%) believed that all vaccinations should be mandatory for them, while 445 (42.3%) favoured mandatory vaccinations against specific VPDs. 63.5% of the 445 agreed with COVID-19 vaccine mandates No Confidence Intervals provided | objectively assessed (validity, reliability) No unbiased assessor Inadequate response rate (< 70%) Refusers not described No Confidence Intervals provided |
| Mascarenhas (2021) [31], USA | 248 | Target population: All dental students at three geographically distributed dental schools in Florida, Michigan, and Utah | The survey was administered anonymously online using qualtricsXM | Online questionnaire Measurement tool not objectively assessed (validity, reliability) | No | 18% Refusers not described | The COVID-19 vaccination should be mandatory for the public: 40% The COVID-19 vaccination should be mandatory for all health care providers: 53.5% No Confidence Intervals provided | Score: 2 Inadequate sample size Biased sampling (how were the participants informed? duplicates answers?) Not objective assessment of the measurement tool No unbiased assessor Inadequate response rate Refusers not described No Confidence Intervals provided |
| Masood (2022) [32], Pakistan | 331 | Target population: HCWs Departments of the Sindh Institute of Urology and Transplantation Proportionate probability sampling technique | Not described | "The questionnaire, in both Urdu and English languages, assessing determinants of hesitancy, was designed using the SAGE Vaccine Hesitancy | No | Response rate not described Refusers not described | Active HCWs 59% of the participants answered that official requirements are the reason of getting vaccinated against COVID-19 No Confidence Intervals provided | Score: 4 Biased sampling (how were the participants informed?) No unbiased assessor No response rate Refusers not described No Confidence Intervals |

| | | | | | | | | |
|--------------------------------------|-------|---|--|---|----|---|--|--|
| | | | | Matrix” “The questionnaire was pilot-tested on 30 individuals for validity, and was modified accordingly before administering them individually and in groups” | | | | provided |
| Mayan (2021) [33], USA | 1,899 | Target population: Students enrolled in a MD or DO program at a U.S. medical school | “Email was sent to the student affairs offices of all 212 U.S. medical schools with request to distribute the website link for the online survey to their students. Additional participation was recruited via medical students targeted social media” | Online questionnaire Measurement tool not objectively assessed (validity, reliability) | No | Response rate not described Refusers not described | Active HCWs Make healthcare worker receiving COVID-19 vaccine mandatory 1096/1,899 (57.71%) No Confidence Intervals provided | Score: 3 Biased sampling frame (how many participants received finally the invitation? social media contacts) Measurement tool not objectively assessed (validity, reliability) No unbiased ass6essor No response rate provided Refusers not described No Confidence Intervals provided |
| Mustapha (2021) [34], Nigeria | 440 | Target population: Health sciences students from four selected tertiary institutions in North-western Nigeria aged 18 years and above | “The participants were invited by sharing the hyperlink to the survey through emails, social media pages, and groups” A convenience sampling with a simplified snowball sampling technique was used to recruit the participants for this study | online self-administered survey Cronbach’s alpha, was found to be 0.88 “The study survey tool was developed | No | Response rate not described Refusers not described | Active HCWs 52.3 would get the Covid-19 vaccine if mandated by the heads of institution No Confidence Intervals provided | Score: 4 Biased sampling frame (social media contacts list) No unbiased ass6essor No response rate Refusers not described No Confidence Intervals |

| | | | | | | | | |
|---|-------|--|--|---|----|---|--|--|
| | | | | based on a validated vaccine hesitancy scale provided by the World Health Organization (WHO) Strategic Advisory Group of Experts on Immunization (SAGE) relevant literature search and discussion with experts" | | | | provided |
| Navarre (2021) [35], France | 1,964 | Target population: French HCWs in 11 AURA (Auvergne-Rhône-Alpes) hospitals | "The Human Resources Department of each facility sent the questionnaire to the professional e-mail addresses of all HCWs on December 7, 2020. A reminder was sent one week later" | Online questionnaire Measurement tool not objectively assessed (validity, reliability) | No | Response rate not described Refusers not described | Active HCWs 35.3% of respondents were in favour of mandatory vaccination No Confidence Intervals provided | Score: 4 Measurement tool not objectively assessed (validity, reliability) No unbiased assessor No response rates Refusers not described No Confidence Intervals provided |
| Noushad (2021) [36], SaudiArabia | 674 | Target population: HCWs in Saudi Arabia | "The survey questionnaire developed on Google Forms was distributed through WhatsApp in the months of February and March 2021" "Due to the greater number of HCWs in the central region, majority of the participants were from this region (Not geographically stratified, not representative sample)" | Online questionnaire Measurement tool not objectively assessed (validity, reliability) | No | 59.9% Refusers not described | Active HCWs I support a mandatory vaccination program for COVID-19: agree 58.7% No Confidence Intervals provided | Score: 3 Biased sampling frame (social media contact list) Measurement tool not objectively assessed (validity, reliability) No unbiased assessor Refusers not described No Confidence Intervals |

| | | | | | | | | |
|----------------------------------|-------|---|---|---|----|---|--|--|
| | | | | | | | | provided |
| Öncel (2022) [37], Turkey | 1,808 | Target population: Turkish health workers | “Contacted and invited, through the institutional electronic messaging system in a state university hospital by means of e-mail in two private hospitals and in the authors’ social network groups” | Online questionnaire Measurement tool not objectively assessed (validity, reliability) | No | Response rate not described Refusers not described | Active HCWs 1,052 (58.5%) of the HCWs thought vaccination against COVID-19 should not be mandatory. No Confidence Intervals provided | Score: 3 Biased sampling frame (What was the target population? What about those without social networks?) Measurement tool not objectively assessed (validity, reliability) No unbiased assessor Response rate not described Refusers not described No Confidence Intervals provided |
| Papini (2022) [38], Italy | 2,137 | Members of the national scientific society SIMPIOS (whole population) | “e-mail invitation containing the link to the anonymous and voluntary questionnaire was sent to hospital health departments, directorates of the main health structures of the National Health Service and Local Health Units asking to forward it to the HCWs” | Online questionnaire Measurement tool not objectively assessed (validity, reliability) | No | Response rate not described Refusers not described | Active HCWs 62.69% (1304/2080) of our respondents were in favor of mandatory vaccination against COVID-19 No Confidence Intervals provided | Score: 4 Measurement tool not objectively assessed (validity, reliability) No unbiased assessor Response rate not described Refusers not described No Confidence Intervals provided |
| Peirola [39], Switzerland | 776 | Target population: all employees of the Department of Paediatrics, Gynaecology and Obstetrics part of the University Hospitals of Geneva (whole population) | The online questionnaire was sent to all professional email addresses over a 4-week period | online questionnaire Measurement tool not objectively assessed (validity, reliability) | No | 43% Refusers not described | Active HCWs reasons that may change participants’ mind regarding COVID-19 vaccination: Mandatory vaccination for certain situation (e.g., travel) 11/79 | Score: 4 Measurement tool not objectively assessed (validity, reliability) No unbiased assessor Inadequate response rate |

| | | | | | | | | |
|---|-------|---|--|---|----|---|---|---|
| | | | | | | | (14%) No Confidence Intervals provided | Refusers not described No Confidence Intervals provided |
| Peruch (2022) [40], Italy | 130 | Target population: HCWs of a centre for maternal and child health | Invitation was sent containing the web link to access the questionnaire “The questionnaire was then uploaded to the intranet network of a center for maternal and child health from 4 to 31 March 2022” | online questionnaire Measurement tool not objectively assessed (validity, reliability) | No | 17.5% Refusers not described | Active HCWs Do you think that the mandatory vaccination of healthcare workers is right?: Yes 107 (82.3%) No Confidence Intervals provided | Score: 2 Biased sampling frame (how the invitations were sent?) Inadequate sample size (<300) Measurement tool not objectively assessed (validity, reliability) No unbiased assessor Inadequate response rate not described Refusers not described No Confidence Intervals provided |
| Poyiadji (2022) [41], USA | 1,506 | Target population: HFHS radiology department employees | - | Weekly time series vaccine compliance data | - | Response rate not described Refusers not described | Active HCWs A total of 14 (0.9%) radiology employees who either resigned or retired because of the vaccine mandate. Post-vaccine mandate noncompliance rates ranged from 0.5-7%. No Confidence Intervals provided | Score: 3 Biased sampling frame (no description of the data collection procedure) Unbiased assessor (?) Response rate not described Refusers not described No Confidence Intervals provided |
| Qattan (2021) [42], Saudi Arabia | 736 | Target population: HCWs 18 years or older and currently living in the KSA | Invitations to participate in the study were distributed to the respondents via Twitter and the WhatsApp communication platform | Online questionnaire Measurement tool not | No | Response rate not described Refusers not described | Active HCWs A COVID-19 vaccine should be compulsory for all citizens and | Score: 3 Biased sampling frame (Those without twitter and whatsApp?) |

| | | | | | | | | |
|-------------------------------------|-------|---|--|--|----|--|--|---|
| | | Simplified-snowball sampling technique | | objectively assessed (validity, reliability) | | | <p>residents inside Saudi Arabia: agree 248 (72.94%)</p> <p>No Confidence Intervals provided</p> | <p>Measurement tool not objectively assessed (validity, reliability)</p> <p>No unbiased assessor</p> <p>Response rate not described</p> <p>Refusers not described</p> <p>No Confidence Intervals provided</p> |
| Qunaibi (2021) [43], Arab Countries | 5,708 | <p>Target population: Arabic-speaking HCWs from all around the world.</p> <p>Convenience sample</p> | Social media platforms were used to conduct a digital campaign | <p>Online questionnaire</p> <p>Measurement tool not objectively assessed (validity, reliability)</p> | No | <p>Response rate not described</p> <p>Refusers not described</p> | <p>Active HCWs</p> <p>Only 16.2% of HCWs supported mandating the vaccine on some groups of people</p> <p>No Confidence Intervals provided</p> | <p>Score: 3</p> <p>Biased sampling frame (non-users of those platforms?)</p> <p>Measurement tool not objectively assessed (validity, reliability)</p> <p>No unbiased assessor</p> <p>Response rate not described</p> <p>Refusers not described</p> <p>No Confidence Intervals provided</p> |
| Regazzi (2022) [44], Italy | 2,142 | <p>Target population: Sample of Italian HCWs >18 years old</p> | <p>“Professional Associations and research hospitals in Northern Italy (the Maugeri Clinical Scientific Institutes), which disseminated the link to the survey through their official communication channels, such as newsletters and social media profiles. In addition, the link was disseminated through flyers during the national congress of the Italian Society of Hygiene, Preventive Medicine and Public Health.”</p> | <p>Online questionnaire</p> <p>Measurement tool not objectively assessed (validity, reliability)</p> | No | <p>Response rate not described</p> <p>Refusers not described</p> | <p>Active HCWs</p> <p>The COVID-19 vaccine should be made mandatory for healthcare professionals: agree 89.5 %</p> <p>No Confidence Intervals provided</p> | <p>Score: 4</p> <p>Measurement tool not objectively assessed (validity, reliability)</p> <p>No unbiased assessor</p> <p>Response rate not described</p> <p>Refusers not described</p> <p>No Confidence Intervals provided</p> |

| | | | | | | | | |
|--------------------------|-----|--|---|--|------------------------------|--|---|---|
| | | | The survey conducted between 22 July 2021, and 20 November 202 | | | | | |
| Ricco (2021) [45], Italy | 166 | Target population: Occupational Physicians who live and work in Italy | <p>“OPs participating in seven different private Facebook groups and four closed forums, focusing on occupational medicine”</p> <p>“To share the study invitation—the chief researcher contacted the administrators, requesting preventive authorization to post the questionnaire link, including a short description of the aims of the survey”</p> | Online questionnaire Measurement tool not objectively assessed (validity, reliability) | No | 8.2% Refusers not described | Active Occupational Physicians SARS-CoV-2 vaccine should be mandatory: 60.2% agree No Confidence Intervals provided | <p>Score: 2</p> <p>Inadequate sample size</p> <p>Sampling (social media contact list)</p> <p>Measurement tool not objectively assessed (validity, reliability)</p> <p>No unbiased assessor</p> <p>Inadequate Response rate</p> <p>Refusers not described</p> <p>No Confidence Intervals provided</p> |
| Ruf (2022) [46], Austria | 625 | Random sample for the telephone interviews, whole population for the e-mail invitation | <p>“A list provided by the employer with all 6,033 employee work telephone numbers.”</p> <p>Email invitation to all employees. E-mail list not described</p> | <p>36 persons completed the telephone interviews</p> <p>589 respondents completed the online survey</p> <p>Measurement tool not objectively assessed (validity, reliability)</p> | <p>Interviewer</p> <p>No</p> | <p>10% for the telephone interview</p> <p>Not described for the e-mail survey invitation</p> <p>Refusers not described</p> | <p>Nursing and social care employees</p> <p>296 (64.63%) of the vaccinated and 1 (1.23%) of the unvaccinated were in favour of COVID-19 vaccine mandates.</p> <p>No Confidence Intervals provided</p> | <p>Score: 4</p> <p>Sampling frame (e-mail list not described)</p> <p>Measurement tool not objectively assessed (validity, reliability)</p> <p>No unbiased assessor</p> <p>Inadequate response rate or not described</p> <p>Refusers not described</p> <p>No Confidence Intervals provided</p> |
| Schmidt (2022) [47], | 240 | Population: 2nd–5th year dentistry | Invitation to participate in the study and a link to the online | Online questionnaire | No | 66.9% | Dental students | Score: 4 |

| | | | | | | | | |
|---------------------------------|-------|--|---|--|----|---|---|--|
| Czech Republic | | students at Charles University, Faculty of Medicine in Hradec Kralove, and Faculty of Medicine in Pilsen (the academic year 2021/2022) | questionnaire were sent to student official e-mail addresses The online questionnaire in Google Forms could be completed from 23 May 2022 to 23 June 2022 | “The test reliability was evaluated through a group of volunteer students (n = 11) who filled in the questionnaire three times in 4 weeks. For COVID-19 prevalence and COVID-19 vaccination, the Cronbach Alpha internal consistency coefficients were 1.0.” | | Refusers not described | 75.4% of the students were in favour of vaccine mandates for the HCWs and 62.9% for the general population No Confidence Intervals provided | Inadequate sample size No unbiased assessor Inadequate response rate Refusers not described No Confidence Intervals provided |
| Shekhar (2021) [48], USA | 3,479 | A snowball sampling was utilized | “The survey tool was distributed via links posted on social media platforms in various HCW groups and distributed to administrative leaders at five major hospital systems, to disseminate among their employees” | Online questionnaire Measurement tool not assessment not adequately (validity, reliability) | No | Response rate not described Refusers not described | Active HCWs > 18 years old COVID-19 Vaccine for health care workers should be mandatory: agree 35.5% No Confidence Intervals provided | Score: 2 Non-random sample Biased sampling frame (social media platforms) Measurement tool not objectively assessed (validity, reliability) No unbiased assessor Response rate not described Refusers not described No Confidence Intervals provided |
| Singh (2021) [49], India | 254 | “The survey was circulated among a closed group of HCWs chosen randomly from selected medical | Not described | Online questionnaire. For those who were not comfortable attempting | No | Response rate not described Refusers not described | Active HCWs Attitude towards mandatory vaccination for HCWs: 103/254 agree | Score: 2 Sampling frame not described Inadequate sample size |

| | | | | | | | | |
|---|-------|---|---|---|-----------------|---|--|--|
| | | institutes of Uttar Pradesh “ | | online survey, printed copies of questionnaire were provided. Measurement tool not objectively assessed (validity, reliability) | | | No Confidence Intervals provided | Measurement tool not objectively assessed (validity, reliability) No unbiased assessor Response rate not described Refusers not described No Confidence Intervals provided |
| Temsah (2021) [50], Saudi Arabia | 1,285 | HCWs in Saudi Arabia Convenience sampling technique | “Participants were invited through various healthcare providers’ social media platforms, such as WhatsApp, Twitter, and emails between Dec 1 and 6, 2021” | Online questionnaire Measurement tool assessment not adequately described | No | Response rate not described Refusers not described | Active HCWs The COVID-19 vaccine should be mandatory for all adult populations: agree 82.2% No Confidence Intervals provided | Score: 2 Non-random sampling Biased sampling frame (social media platforms, only 6 days available) Measurement tool assessment not adequately described No unbiased assessor Response rate not described Refusers not described No Confidence Intervals provided |
| Tharwat (2022) [51], Egypt | 455 | Target population: HCWs in Egypt Data were gathered using convenience sampling | Early in the day, the interviewer visited the hospitals and spoke with as much HCWs as possible From August to September 2021 | “Face-to-face structured interviews were conducted by a single interviewer with each participant five medical staff members examined the questionnaire | The interviewer | 75.8% Refusers not described | Active HCWs Vaccination of COVID-19 should always be compulsory once it is available: 54.3% agree No Confidence Intervals provided | Score: 4 Non-random sampling Biased sampling frame (those in absence? August to September is a day-off period for many) Refusers not described No Confidence Intervals provided |

| | | | | | | | | |
|--|-------|--|--|--|----|---|---|--|
| | | | | design, content, wording, and simplicity of completion as part of a pilot study that validated the questionnaire” Cronbach’s alpha coefficient 0.85 | | | | |
| Turbat (2022) [52], Mongolia | 238 | Target population: HCWs above 18 years old and currently working in public hospitals Convenience sampling strategy | Survey invitations sent via their email and individual messaging programs (Facebook messenger) from 18 February to 23 April 2021 | Online survey Measurement tool not objectively assessed (validity, reliability) | No | 15% Refusers not described | Active HCWs Agree that a mandatory approach to vaccination for HCWs is needed: 223/238 agree No Confidence Intervals provided | Score: 2 Non-random sample Biased sampling frame (personal or working e-mail addresses? exclusion of those without social media) Measurement tool assessment not adequately described No unbiased assessor Response rate not described Refusers not described No Confidence Intervals provided |
| Ulbrichtova (2021) [53], Slovakia | 1,277 | Target population: all HCWs and non-HCWs belonging to hospitals and general and specialised outpatient healthcare clinics in northern Slovakia | “An anonymous questionnaire was distributed to individual e-mail addresses between 30 August and 30 September 2021” | Online survey Measurement tool not objectively assessed (validity, reliability) | No | 1,277/4,268=29.9% Refusers not described | Profession (being a physician) or/and vaccination status (being vaccinated) is an important factor towards accepting vaccine mandates No Confidence Intervals provided | Score: 3 Biased sampling frame (contact list not described) Measurement tool assessment not adequately described No unbiased assessor Inadequate response rate |

| | | | | | | | | |
|---|-------|--|--|--|----|---|--|--|
| | | | | | | | | Refusers not described No Confidence Intervals provided |
| Velikonja (2022) [54], Slovenia | 832 | Target population: HCWs Snowball sampling | “Initial group of respondents were contacted via professional (HCWs) of project members and the link to the survey was disseminated further via social network Facebook between 13 and 14 March 2020” | Online survey Measurement tool not objectively assessed (validity, reliability) | No | 7,764/18,760=41% Refusers not described | Health sector workers Vaccination should be mandatory for all: agree 30.6% of HCWs No Confidence Intervals provided | Score: 2 Non-random sampling Biased sampling frame (social networks and personal contacts) Online survey Measurement tool not objectively assessed (validity, reliability) No unbiased assessor Inadequate response rate Refusers not described No Confidence Intervals provided |
| Wong (2022) [55], Hong Kong, Nepal, and Vietnam | 3,396 | Target population: HCWs in Hong Kong, Nepal, Vietnam | “Two rounds of email invitations were disseminated to the HCWs through the health care professional bodies and unions in Hong Kong and to major hospitals and a network of HCW voluntary consult for COVID-19 patients in Vietnam and Nepal for the recruitment. The survey was contacted in Hong Kong from May 11 to June 23 (the fourth wave); in Nepal from August 10 to November 7 (the third wave); and in Vietnam from July 12 to November 20 (the fourth wave)” | Online survey Measurement tool not objectively assessed (validity, reliability) | No | Response rate not described Refusers not described | Nurses and doctors aged 18 and older, working in public or private health care settings on a full-time or part-time basis Given in good health, mandatory vaccination should be applied for healthcare or residential care workers: agree 52.8% No Confidence Intervals provided | Score: 3 Biased sampling frame (different sampling frames for assessing the same outcome, HCW volunteers more prone to agree with mandates) Online survey Measurement tool not objectively assessed (validity, reliability) No unbiased assessor Response rate not described Refusers not described |

| | | | | | | | | |
|--|-------|--|--|---|----|---|---|---|
| | | | | | | | | No Confidence Intervals provided |
| Woolf (2022) [56], United Kingdom | 3,235 | Target population: HCWs participants of the UK-REACH study | “E-mail invitations were sent to 17,891 UK HCWs recruited as part of a longitudinal cohort from across the UK who had previously responded to a baseline questionnaire (primarily recruited through email) as part of the United Kingdom Research study into Ethnicity And COVID-19 outcomes in Healthcare workers (UK-REACH) nationwide prospective cohort study between 21st April and 26th June 2021” | Online survey Questionnaire assessment described in study protocol: Woolf K, Melbourne C, Bryant L, Guyatt AL, McManus IC, Gupta A, et al. The United Kingdom Research study into Ethnicity And COVID-19 outcomes in Healthcare workers (UK-REACH): protocol for a prospective longitudinal cohort study of healthcare and ancillary workers in UK healthcare settings. BMJ Open [Internet]. 2021;11(9):e050647. Available from: https://bmjopen.bmj.com/content/bmjopen/11/9/e050647.full.pdf | No | 5,633/17,891=31% Refusers not described | Individuals aged 16 years or over, living in the UK and employed as clinical or ancillary workers in a healthcare setting and/or registered with one of seven UK professional regulatory bodies Favours mandatory vaccination for the general population: 377 (17.9%) and for HCWs: 201 (6%) Confidence intervals not provided (CI of OR provided but for the sum of HCWs' acceptance of COVID-19 vaccine mandates) | Score: 6 No unbiased assessor Inadequate response rate Refusers not described No Confidence Intervals provided |
| Yurttas (2021) [57], Turkey | 320 | Staff of university hospital (Istanbul University Cerrahpasa) | “A web-based survey link was sent out to the participants via WhatsApp link between 04 and 13 January, 2021” | Online survey Validated questionnaire | No | 22.9% | Vaccination should be mandatory: agree 35.3% Confidence intervals not provided | Score: 4 Biased sampling frame (what's up contacts) No unbiased assessor Inadequate response rate Refusers not described No Confidence Intervals provided |
| Zheng [58], China | 618 | Target population: “participants in a Jiangsu provincial symposium in obstetrics and gynaecology held in Nanjing city, the | “For the survey among the participants in the symposium, the questionnaire form was distributed to each of the participants when they entered the conference hall | Paper-based and online questionnaire Measurement tool not objectively | No | Response rate not described Refusers not described | HCWs at the age of 18– 60 years 2% of the vaccinated HCWs were unwilling to get vaccinated but followed the | Score: 3 Biased sampling frame (questionnaire available only six days for four hours. Were they informed about the |

| | | | | | | | | |
|--|--|---|--|----------------------------------|--|--|--|---|
| | | capital of Jiangsu province and HCWs in the department of obstetrics and gynecology, Nanjing Drum Tower Hospital” Convenience sampling | For the survey among HCWs at Nanjing Drum Tower Hospital, the questionnaire forms were distributed to each of the subjects at their convenience in the department and collected four hours later between April 5–11, 2021” | assessed (validity, reliability) | | | employers’ mandates Confidence intervals not provided | survey?) Measurement tool not objectively assessed (validity, reliability) Response rate not described Refusers not described Confidence intervals not provided |
|--|--|---|--|----------------------------------|--|--|--|---|

1. Loney PL, Chambers LW, Bennett KJ, Roberts JG, Stratford PW. Critical appraisal of the health research literature: prevalence or incidence of a health problem. *Chronic Dis Can* [Internet]. 1998 19(4):170–6. Available from: <https://pubmed.ncbi.nlm.nih.gov/10029513/>
2. Aldosary AH, Alayed GH. Willingness to vaccinate against Novel COVID-19 and contributing factors for the acceptance among nurses in Qassim, Saudi Arabia. *Eur Rev Med Pharmacol Sci*. 2021;25(20):6386-96.
3. Aloweidi A, Bsisu I, Suleiman A, Abu-Halaweh S, Almustafa M, Aqel M, et al. Hesitancy towards covid-19 vaccines: An analytical cross-sectional study. *International Journal of Environmental Research and Public Health*. 2021;18(10).
4. Arif SI, Aldukhail AM, Albaqami MD, Silvano RC, Titi MA, Arif BI, et al. Predictors of healthcare workers' intention to vaccinate against COVID-19: A cross sectional study from Saudi Arabia. *Saudi J Biol Sci*. 2022;29(4):2314-22.
5. Badahdah AM, Al Mahyijari N, Badahdah R, Al Lawati F, Khamis F. Attitudes of Physicians and Nurses in Oman Toward Mandatory COVID-19 Vaccination. *Oman Medical Journal*. 2022;37(5 C7 - e429).
6. Casey SM, Burrowes SAB, Hall T, Dobbins S, Ma M, Bano R, et al. Healthcare workers' attitudes on mandates, incentives, and strategies to improve COVID-19 vaccine uptake: A mixed methods study. *Hum Vaccin Immunother*. 2022;18(6):2144048.
7. Ciliberti R, Lantieri F, Barranco R, Tettamanti C, Bonsignore A, Ventura F. A Survey on Undergraduate Medical Students' Perception of COVID-19 Vaccination. *Vaccines (Basel)*. 2022;10(9).
8. Costantino C, Graziano G, Bonaccorso N, Conforto A, Cimino L, Sciortino M, et al. Knowledge, Attitudes, Perceptions and Vaccination Acceptance/Hesitancy among the Community Pharmacists of Palermo's Province, Italy: From Influenza to COVID-19. *Vaccines*. 2022;10(3).
9. Craxì L, Casuccio A, Amodio E, Restivo V. Who Should Get COVID-19 Vaccine First? A Survey to Evaluate Hospital Workers' Opinion. *Vaccines (Basel)*. 2021;9(3).
10. Elbadawi MH, Altayib LS, Birier ABG, Ali LE, Hasabo EA, Esmaeel MAM, et al. Beliefs and barriers of COVID-19 vaccination hesitancy among Sudanese healthcare workers in Sudan: A cross sectional study. *Hum Vaccin Immunother*. 2022;2132082.
11. Fotiadis K, Dadouli K, Avakian I, Bogogiannidou Z, Mouchtouri VA, Gogosis K, et al. Factors Associated with Healthcare Workers' (HCWs) Acceptance of COVID-19 Vaccinations and Indications of a Role Model towards Population Vaccinations from a Cross-Sectional Survey in Greece, May 2021. 2021; 18(- 19).
12. Ghirotto L, Díaz Crescitelli ME, De Panfilis L, Caselli L, Serafini A, De Fiore L, et al. Italian health professionals on the mandatory COVID-19 vaccine: An online crosssectional survey. *Frontiers in Public Health*. 2022;10 C7 - 1015090.
13. Giannakou K, Kyprianidou M, Christofi M, Kalatzis A, Fakonti G. Mandatory COVID19 Vaccination for Healthcare Professionals and Its Association With General Vaccination Knowledge: A Nationwide Cross-Sectional Survey in Cyprus. *Frontiers in public health*. 2022;10:897526.
14. Gönüllü E, Soysal A, Atıcı S, Engin M, Yeşilbaş O, Kasap T, et al. Pediatricians' COVID-19 experiences and views on the willingness to receive COVID-19 vaccines: a cross-sectional survey in Turkey. *Hum Vaccin Immunother*. 2021;17(8):2389-96.
15. Grabert BK, Gilkey MB, Huang Q, Yi Kong W, Thompson P, Brewer NT. Primary care professionals' support for Covid-19 vaccination mandates: Findings from a US national survey. *Preventive Medicine Reports*. 2022;28.
16. Jain J, Saurabh S, Kumar P, Verma MK, Goel AD, Gupta MK, et al. COVID-19 vaccine hesitancy among medical students in India. *Epidemiology and Infection*. 2021.
17. Jankowska-Polańska B, Sarzyńska K, Czwojdzński E, Świątoniowska-Lonc N, Dudek K, Piwowar A. Attitude of Health Care Workers and Medical Students towards Vaccination against COVID-19. *Vaccines (Basel)*. 2022;10(4).
18. Janssen C, Maillard A, Bodelet C, Claudel AL, Gaillat J, Delory T, et al. Hesitancy towards COVID-19 Vaccination among Healthcare Workers: A Multi-Centric Survey in France. *Vaccines (Basel)*. 2021;9(6).

19. Kashif M, Fatima L, Ahmed AM, Ali SA, Memon RS, Afzal M, et al. Perception, Willingness, Barriers, and Hesitancy Towards COVID-19 Vaccine in Pakistan: Comparison Between Healthcare Workers and General Population. 2021;- 13(- 10).
20. Kaufman J, Bagot KL, Hoq M, Leask J, Seale H, Biezen R, et al. Factors Influencing Australian Healthcare Workers' COVID-19 Vaccine Intentions across Settings: A CrossSectional Survey. *Vaccines (Basel)*. 2021;10(1).
21. Kavanagh A, Dickinson H, Dimov S, Shields M, McAllister A. The COVID-19 vaccine intentions of Australian disability support workers. *Australian & New Zealand Journal of Public Health*. 2022;46(3):314-21.
22. Kałucka S, Kusideł E, Głowacka A, Oczko P, Grzegorzczak-Karolak I. Pre-Vaccination Stress, Post-Vaccination Adverse Reactions, and Attitudes towards Vaccination after Receiving the COVID-19 Vaccine among Health Care Workers. *Vaccines*. 2022;10(3).
23. Kelekar AK, Lucia VC, Afonso NM, Mascarenhas AK. COVID-19 vaccine acceptance and hesitancy among dental and medical students. *J Am Dent Assoc*. 2021;152(8):596-603.
24. Konje ET, Basinda N, Kapesa A, Mugassa S, Nyawale HA, Mirambo MM, et al. The Coverage and Acceptance Spectrum of COVID-19 Vaccines among Healthcare Professionals in Western Tanzania: What Can We Learn from This Pandemic? *Vaccines*. 2022;10(9 C7 - 1429).
25. Krishnamurthy K, Sobers N, Kumar A, Ojeh N, Scott A, Cave C, et al. Covid-19 vaccine intent among health care professionals of queen elizabeth hospital, barbados. *Journal of Multidisciplinary Healthcare*. 2021;14:3309-19.
26. Lee JT, Sean Hu S, Zhou T, Bonner KE, Kriss JL, Wilhelm E, et al. Employer requirements and COVID-19 vaccination and attitudes among healthcare personnel in the U.S.: Findings from National Immunization Survey Adult COVID Module, August - September 2021. *Vaccine*. 2022.
27. Lucia VC, Kelekar A, Afonso NM. COVID-19 vaccine hesitancy among medical students. *Journal of Public Health*. 2021;43(3):445-9.
28. Maltezou HC, Pavli A, Dedoukou X, Georgakopoulou T, Raftopoulos V, Drositis I, et al. Determinants of intention to get vaccinated against COVID-19 among healthcare personnel in hospitals in Greece. *Infection, Disease and Health*. 2021;26(3):189-97.
29. Maltezou HC, Rahiotis C, Tseroni M, Madianos P, Tzoutzas I. Attitudes toward Vaccinations and Vaccination Coverage Rates among Dental Students in Greece. *International Journal of Environmental Research and Public Health*. 2022;19(5).
30. Maltezou HC, Tseroni M, Drositis I, Gamaletsou MN, Koukou DM, Bolikas E, et al. Vaccination coverage rates and attitudes towards mandatory vaccinations among healthcare personnel in tertiary-care hospitals in Greece. *Expert Review of Vaccines*. 2022;21(6):853-9.
31. Mascarenhas AK, Lucia VC, Kelekar A, Afonso NM. Dental students' attitudes and hesitancy toward COVID-19 vaccine. *Journal of Dental Education*. 2021;85(9):1504- 10.
32. Masood FB, Nasim A, Saleem S, Jafarey AM. COVID-19 vaccine hesitancy among health service providers: A single centre experience from Karachi, Pakistan. *Journal of the Pakistan Medical Association*. 2022;72(6):1142-7.
33. Mayan D, Nguyen K, Keisler B. National attitudes of medical students towards mandating the COVID-19 vaccine and its association with knowledge of the vaccine. *PLoS ONE*. 2021;16(12 December).
34. Mustapha M, Lawal BK, Sha'aban A, Jatau AI, Wada AS, Bala AA, et al. Factors associated with acceptance of COVID-19 vaccine among University health sciences students in Northwest Nigeria. *PLoS One*. 2021;16(11):e0260672.
35. Navarre C, Roy P, Ledochowski S, Fabre M, Esparcieux A, Issartel B, et al. Determinants of COVID-19 vaccine hesitancy in French hospitals. *Infectious Diseases Now*. 2021;51(8):647-53.
36. Noushad M, Nassani MZ, Alsalhani AB, Koppolu P, Niazi FH, Samran A, et al. COVID-19 Vaccine Intention among Healthcare Workers in Saudi Arabia: A CrossSectional Survey. 2021;- 9(- 8).
37. Öncel S, Alvr M, Çakıcı Ö. Turkish Healthcare Workers' Personal and Parental Attitudes to COVID-19 Vaccination From a Role Modeling Perspective. *Cureus*. 2022;14(2):e22555.
38. Papini F, Mazzilli S, Paganini D, Rago L, Arzilli G, Pan A, et al. Healthcare Workers Attitudes, Practices and Sources of Information for COVID-19 Vaccination: An Italian National Survey. *International Journal of Environmental Research and Public Health*. 2022;19(2).
39. Peirola A, Posfay-Barbe KM, Rohner D, Wagner N, Blanchard-Rohner G. Acceptability of COVID-19 Vaccine Among Hospital Employees in the Department of Paediatrics, Gynaecology and Obstetrics in the University Hospitals of Geneva, Switzerland. 2022;- 9.
40. Peruch M, Toscani P, Grassi N, Zamagni G, Monasta L, Radaelli D, et al. Did Italy Really Need Compulsory Vaccination against COVID-19 for Healthcare Workers? Results of a Survey in a Centre for Maternal and Child Health. 2022;- 10(- 8).
41. Poyiadji N, Tassopoulos A, Myers DT, Wolf L, Griffith B. COVID-19 Vaccine Mandates: Impact on Radiology Department Operations and Mitigation Strategies. *J Am Coll Radiol*. 2022;19(3):437-45.
42. Qattan AMN, Alshareef N, Alsharqi O, Al Rahahleh N, Chirwa GC, Al-Hanawi MK. Acceptability of a COVID-19 Vaccine Among Healthcare Workers in the Kingdom of Saudi Arabia. *Frontiers in Medicine*. 2021;8.
43. Qunaibi E, Basheti I, Soudy M, Sultan I. Hesitancy of Arab Healthcare Workers towards COVID-19 Vaccination: A Large-Scale Multinational Study. *Vaccines (Basel)*. 2021;9(5).
44. Regazzi L, Marziali E, Lontano A, Villani L, Paladini A, Calabrò GE, et al. Knowledge, attitudes, and behaviors toward COVID-19 vaccination in a sample of Italian healthcare workers. *Human Vaccines and Immunotherapeutics* C7 - 2116206. 2022.

45. Riccò M, Ferraro P, Peruzzi S, Balzarini F, Ranzieri S. Mandate or Not Mandate: Knowledge, Attitudes, and Practices of Italian Occupational Physicians towards SARSCoV-2 Immunization at the Beginning of Vaccination Campaign. *Vaccines (Basel)*. 2021;9(8).
46. Ruf AK, Völkl-Kernstock S, Eitenberger M, Gabriel M, Klager E, Kletecka-Pulker M, et al. Employer impact on COVID-19 vaccine uptake among nursing and social care employees in Austria. *Front Public Health*. 2022;10:1023914.
47. Schmidt J, Vavrickova L, Micopulos C, Suchanek J, Pilbauerova N, Perina V, et al. COVID-19 among Czech Dentistry Students: Higher Vaccination and Lower Prevalence Compared to General Population Counterparts. *Vaccines (Basel)*. 2022;10(11).
48. Shekhar R, Sheikh AB, Upadhyay S, Singh M, Kottewar S, Mir H, et al. COVID-19 vaccine acceptance among health care workers in the united states. *Vaccines*. 2021;9(2 C7 - 119):1-18.
49. Singh AK, Kumari R, Singh S, Kandpal SD, Kaushik A. The dilemma of COVID-19 vaccination among Health Care Workers (HCWs) of Uttar Pradesh. *Indian Journal of Community Health*. 2021;33(2):337-42.
50. Temsah MH, Aljamaan F, Alenezi S, Alhasan K, Alrabiaah A, Assiri R, et al. SARSCoV-2 Omicron Variant: Exploring Healthcare Workers' Awareness and Perception of Vaccine Effectiveness: A National Survey During the First Week of WHO Variant Alert. *Frontiers in public health*. 2022;10:878159.
51. Tharwat S, Nassar DK, Nassar MK, Saad AM, Hamdy F. Attitude towards COVID-19 vaccination among healthcare workers: a cross sectional study from Egypt. *BMC Health Serv Res*. 2022;22(1):1357.
52. Turbat B, Sharavyn B, Tsai FJ. Attitudes towards mandatory occupational vaccination and intention to get COVID-19 vaccine during the first pandemic wave among Mongolian healthcare workers: A cross-sectional survey. *International Journal of Environmental Research and Public Health*. 2022;19(1).
53. Ulbrichtova R, Svihrova V, Tatarkova M, Hudeckova H, Svihra J. Acceptance of covid-19 vaccination among healthcare and non-healthcare workers of hospitals and outpatient clinics in the northern region of slovakia. *International Journal of Environmental Research and Public Health*. 2021;18(23).
54. Velikonja NK, Hussein M, Verdenik I, Velikonja VG, Erjavec K. COVID-19 vaccination intention at the beginning of COVID-19 pandemic in Slovenia. *Zdravniški Vestnik*. 2022;91(1-2):22-31.
55. Wong EL, Qiu H, Chien WT, Wong JC, Chalise HN, Hoang HT, et al. COVID-19 Vaccine Willingness and Related Factors Among Health Care Workers in 3 Southeast Asian Jurisdictions. *JAMA Netw Open*. 2022;5(8):e2228061.
56. Woolf K, Gogoi M, Martin CA, Papineni P, Lagrata S, Nellums LB, et al. Healthcare workers' views on mandatory SARS-CoV-2 vaccination in the UK: A cross-sectional, mixed-methods analysis from the UK-REACH study. *EClinicalMedicine*. 2022;46:101346.
57. Yurttas B, Poyraz BC, Sut N, Ozdede A, Oztas M, Uğurlu S, et al. Willingness to get the COVID-19 vaccine among patients with rheumatic diseases, healthcare workers and general population in Turkey: a web-based survey. *Rheumatol Int*. 2021;41(6):1105-14.
58. Zheng YN, Shen P, Xu BY, Chen YY, Luo YQ, Dai YM, et al. COVID-19 vaccination coverage among healthcare workers in obstetrics and gynecology during the first three months of vaccination campaign: a cross-sectional study in Jiangsu province, China.