Insights in vaccination intentions of healthcare workers

Title

COVID-19 vaccination intentions amongst care-professionals in the field of intellectual disability: a scoping review

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Abstract

Background: A worldwide vaccination program is the chosen strategy against the COVID-19 pandemic. Vaccine hesitancy however, forms a threat because vaccine uptake is voluntary in most countries. Care-professionals of people with intellectual disabilities are exposed to greater risks than other healthcare workers due to the vulnerable group they attend to and the assisted-living facilities in which they often work. Little is still known of the reasons for vaccine hesitancy in this specific group in contrast to those of other healthcare workers.

Objective: To provide insight in the intentions and attitudes on COVID-vaccination of healthcare workers, including those who care for people with intellectual disabilities, by means of a scoping review.

Methods: The databases that were searched for papers are CINAHL, APA PsycArticles, APA PsycInfo, Web of Science, Semantic Scholar, Prospero, Outbreak Science, Cochrane and Scopus. The search was broadened to healthcare workers in general because only two papers were found on those caring for people with intellectual disabilities. A total of 26 papers were identified concerning the vaccine intentions of 43,199 healthcare workers worldwide. Data were gathered both quantitatively and qualitatively. The papers

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were analysed for all themes regarding vaccine willingness and vaccine hesitancy.

Results: The themes that came to light included: percentages of vaccine willingness, predictors of willingness differentiated by 11 sub-themes (mainly profession, age, gender and past vaccine behaviour), attitudes of willingness and hesitancy differentiated by 19 sub-themes (perceived COVID treat and protecting others for willingness, concerns on vaccine safety and efficacy for hesitancy), sources of vaccination information, contextual factors and changes in COVID-19 vaccine acceptance over time and finally, future strategies for interventions.

Conclusions: There was overlap in the percentages of vaccination, predictors of vaccine willingness and the attitudes of vaccine willingness and hesitancy between healthcare workers and those caring for people with intellectual disabilities. Vaccine safety and efficacy are the most prominent concerns with regard to vaccine hesitancy. Therefore, future strategies for interventions should address vaccine safety and efficacy. Furthermore, interventions are recommended to be interactive in order to facilitate exchange. Discussion groups that are able to address specific concerns and personal experiences, show to be effective in addressing vaccine hesitancy. Accurate information can also be made more accessible to target groups by promoting video's on social media platforms. Hence, further research is necessary to specify more precisely the attitudes of healthcare workers caring for people with intellectual disabilities and in more countries worldwide.

Tweetable abstract:

Vaccine hesitancy within care-professionals is inspired by trust related issues and influenced by contextual factors and information sources

Keywords

COVID-19, Health Personnel, Intellectual Disability, Vaccination Attitudes, Vaccination Hesitancy, Vaccination Intention

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What is already known

- Worldwide vaccination programs are the primary strategy to overcome the COVID-19 pandemic, but vaccine hesitancy stands in the way of a high degree of vaccination.
- Healthcare workers caring for people with intellectual disabilities face heightened risks during the COVID-19 pandemic above and beyond the risks other healthcare workers face, but limited literature is available concerning the attitudes on COVID-vaccination of this specific group.

What this paper adds

- This paper provides insights into the key themes in the available research on COVID-19 vaccine intentions of healthcare workers, and those caring for people with intellectual disabilities, which are: percentages of vaccine willingness, predictors of willingness, attitudes of willingness and hesitancy, sources of vaccination information, contextual factors and changes in COVID-19 vaccine acceptance over time and finally, future strategies for interventions.
- Predictors of COVID-19 vaccine willingness among all healthcare workers were profession, age, gender and past influenza vaccine behaviour; drivers of vaccine hesitancy for COVID-19 in this group were concerns on vaccine side-effects, vaccine safety (e.g. pregnancy related concerns), vaccine efficacy and speed of vaccine development, but more research is necessary on healthcare workers that care for people with intellectual disabilities and on healthcare workers in continents such as Africa, South America and Australia.
- Suggestions are made for future interventions in order to improve vaccination intention worldwide and addressing trust related issues of the vaccination programs, such as especially focussing on vaccine safety and efficacy, and addressing concerns of those that are hesitant by making interventions more interactive as well as by increasing information quality on social media platforms.

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Background

Vaccination campaigns against COVID-19 started worldwide in December 2020 and are the primary strategy to tackle the pandemic. Along with vulnerable population groups, such as the elderly and individuals with vulnerable health, healthcare workers were prioritised to be vaccinated for several reasons. One reason is the heightened occupational risk healthcare workers are exposed to because they care for vulnerable population groups (Giubilini et al., 2020), who are more prone to COVID infections. Consequently, healthcare workers are at greater risk of direct exposure to the virus. Other reasons to prioritise healthcare workers are to prevent them from infecting the patients they care for, and to keep healthcare workers fit to work where they are most needed as frontline workers (Giubilini et al., 2020).

Healthcare workers who care for people with intellectual disabilities face a heightened risk due to the group they attend to and the specific conditions in which this group lives. Some studies have reported excess mortality rates among people with intellectual disabilities (Joy et al., 2020; Landes et al., 2020; Williamson et al., 2021). In the Netherlands, for example, Koks-Leensen et al. (2021) found that while 1.3% of the general population who contracted a COVID infection have died, the figure for people with intellectual disabilities is far higher: 4.6%. Besides showing that people with intellectual disabilities who contract COVID-19 have higher death rates, these studies (Joy et al., 2020; Koks-Leensen et al., 2021; Landes et al., 2020) also show that people with intellectual disabilities are vulnerable as they often have multiple additional medical comorbidities (Courtenay & Cooper, 2021). Furthermore, people with intellectual disabilities have a higher chance of infection (Gleason et al., 2021) as they often stay in assisted-living facilities throughout their lives, where they, depending on the severity of their disability, are cared for by a large number of healthcare workers. The higher the number of individuals you are in contact with, the higher the risk for infection. Thus, healthcare workers who care for people with intellectual disabilities could face a higher risk of contracting COVID than other healthcare workers.

According to Randolph and Barreiro (2020), group immunity is achieved when 67% of the population is vaccinated, but other research states that group immunity thresholds are difficult to determine (Kadkhoda, 2021). It is even likely that group immunity for COVID-19 may not be possible due to new and upcoming virus variants. Since vaccine uptake is generally voluntary, vaccine willingness plays a vital role in a successful vaccination campaign. Vaccine willingness is often influenced by attitudes, beliefs and opinions on vaccination, with low vaccine willingness being related to vaccine hesitancy (Gagneux-Brunon et al., 2021). Therefore, it is important to investigate the reasons and arguments for vaccine uptake or refusal. This is especially true of healthcare workers caring for people with intellectual disabilities, given the heightened risk they face. Several studies have investigated the factors influencing vaccine willingness and vaccine hesitancy, such as beliefs and attitudes towards vaccination. The systematic review on vaccine willingness by Sallam (2021), reports on a total of 60 surveys taken from 31 published papers. These studies were carried out globally in the general population and in different target population groups like healthcare workers, students and parents. The surveys analysing the general population (N=47) found the highest vaccine willingness rates in Ecuador (97%) and the lowest in Kuwait

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(23.6%). The surveys analysing healthcare workers (N=8) found the highest vaccine willingness in Israel (78.0%) and the lowest in the Democratic Republic of Congo (DRC, 27.7%). Hence, a review study examining the arguments for vaccine willingness and hesitancy of healthcare workers, especially in the care of people with intellectual disabilities, can provide important information for policy makers in order to reach the highest vaccination degree possible among healthcare workers providing care for this specific group of people.

To date, however, very few studies have explored the vaccine willingness and hesitancy of healthcare workers in care for people with intellectual disabilities and their attitudes towards COVID-19 vaccination. This review aims to better understand vaccine willingness and hesitancy among healthcare workers who care for people with intellectual disabilities by identifying key themes in the available research. The research question is: What factors contribute to vaccination hesitancy or willingness? Are influencing factors of vaccine willingness and hesitancy of healthcare workers who care for people with intellectual disabilities different from those of other healthcare workers? The current study assesses these questions by conducting a scoping review: thus, gathering all themes related to vaccine willingness and hesitancy from the reviewed articles.

Methods

Design & Protocol

This scoping review aims to identify key themes in the literature concerning vaccination hesitancy and willingness among healthcare workers who care for people with intellectual disabilities. The 12-step guideline by Kable et al. (2012) was used during the search strategy.

Eligibility criteria

Papers focused on COVID-19 vaccination willingness and hesitancy amongst healthcare workers were included. Initially, the search focused on healthcare workers who care for people with intellectual disabilities, but very few papers met this criterium. Therefore, the scope was broadened to healthcare workers in general. Pre-printed and published qualitative, quantitative and commentary papers were included. There was no language exclusion. There was no eligibility criterium for year of publication or timeframe of data collection, but only papers dating from 2020 and 2021 were available due to the search topic. Papers were excluded if they did not focus on vaccination hesitancy or willingness amongst healthcare workers and their corresponding attitudes, beliefs, perceptions or views.

Information sources, search strategy and selection process

The second author conducted the search on April 4th, 2021, in the following databases: CINAHL, APA PsycArticles and APA PsycInfo (via the EBSCO host), Web of Science, Semantic Scholar, Prospero, Outbreak Science, Cochrane and Scopus. The following search terms (or an adjusted

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version) were used: “Wuhan coronavirus*” OR “COVID19*” OR “COVID-19*” OR “COVID-2019*” OR “coronavirus disease 2019” OR “SARS-CoV-2” OR “2019-nCoV” OR “2019 novel coronavirus” OR “severe acute respiratory syndrome coronavirus 2” OR “2019 novel coronavirus infection” OR “coronavirus disease 2019” OR “coronavirus disease-19” OR “SARS-CoV-2019” OR “SARS-CoV-19” AND “vaccine” OR “immunisations” OR “vaccination” OR “vaccination schedule” AND “healthcare prof*” OR “healthcare work*” OR “health personnel” OR “healthcare staff” OR “caregiver” AND “intellectual disability” OR “learning disability” AND “belief” OR “perceptions” OR “views” OR “attitudes” OR “opinions” OR “knowledge”. An initial search on all databases included all search terms, however the Semantic Scholar database was the only database that yielded results with the search terms “intellectual disability” OR “learning disability”. Therefore, the search was broadened and excluded these search terms in all other databases. A second search was conducted in Semantic Scholar. This resulted in the identification of articles related to healthcare worker perceptions.

A total of 176 articles were identified in the database search, of which 166 remained after excluding duplicates. Three review rounds took place after the initial search was completed. During the first round, a title screening identified 82 relevant articles. The second round consisted of the abstract screening and yielded 44 eligible articles. The final full article screening resulted in a remainder of 27 articles, because three articles were excluded based on relevance and 14 were unavailable for full-text review. Of the final selection of 27 articles, only two covered the beliefs of healthcare workers of individuals with intellectual disabilities. After critical appraisal by the first author, one more article was excluded, resulting in a final number of 26 articles (see Figure 1).

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Figure 1 – Flowchart of identification and selection process

Data synthesis and analysis

Microsoft Excel was used for the following steps. First, the purpose of each of the studies was extracted from the introduction texts. If present, hypotheses were also extracted. Second, the methodology of each of the

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studies was extracted, including the type of research (cross-sectional survey/qualitative appraisal/ systematic review) and the survey topics (e.g. sociodemographic characteristics, vaccination intent, reasons for vaccine hesitancy, etc.). Third, the samples of the studies were described: sample sizes, type of participants/respondents (healthcare workers, general population, students), group sizes and descriptors of participants (e.g. gender, profession, age, level of education). Fourth, countries and time frame of data collection were extracted. Time frame of data collection is important in this case because vaccination willingness/hesitancy may change over the course of the pandemic. Finally, the results and/or conclusions of the studies were gathered and organised in themes and sub themes. These themes are (1) percentages of vaccine willingness, (2) predictors of willingness differentiated by 11 sub themes, (3) attitudes of willingness and hesitancy differentiated by 19 sub-themes and (4) sources of vaccination information. Two more themes that will be discussed directly in the discussion section of this review are (5) contextual factors and changes in COVID-19 vaccine acceptance over time and (6) future strategies for interventions.

After the second author conducted the search, the first author independently reviewed all 27 papers in the final selection for eligibility by making a full-text screening. Nioi et al. (2020) was omitted from the final selection after consultation with all authors, resulting in the final number of 26 papers. Although this paper covers future challenges in the vaccination campaign specifically towards healthcare workers because there is no current data on its long-term safety, it does not cover vaccine hesitancy or willingness amongst healthcare workers and their attitudes on the subject. Because Sallam (2021) is a systematic review, the results of the current review will be compared to those found by Sallam (2021) in the discussion section of this paper. The commentary by Gur-Arie et al. (2021) discusses vaccine hesitancy among healthcare workers and the ethical issues of mandatory COVID-19 vaccination and will also be reviewed in the discussion section.

Next, all the themes extracted from the papers by the second author, were reviewed by the first author. All authors came to a consensus about the themes identified. There was one alteration of a category: *Contextual Factors* now also includes *Changes in COVID-19 Vaccine Acceptance over Time*. Two attitudes were merged and one theme was rearranged in order to make a more concise overview of themes.

Results

First, the results section will describe the general characteristics of the literature. Then, a more precise description will follow of the vaccination intention across samples in the literature. Next, the predictors of vaccine willingness will be discussed: the socio-demographical characteristics of respondents. Finally, the attitudes on vaccine willingness and hesitancy will be discussed. These *attitudes* are different from the *predictors* because they are not demographical characteristics: attributes that are descriptors of the respondents. The attitudes on vaccination intention are better described as thoughts, beliefs, or opinions: attributes that are susceptible to change.

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Characteristics of the literature

The screening for papers on the topic of COVID-19 vaccination willingness and hesitancy amongst healthcare workers yielded a total of 26 articles that mainly consisted of cross-sectional surveys (n=22). The remaining four papers were respectively, a report of cross-sectional qualitative meetings¹, a commentary⁷, a rapid qualitative appraisal¹⁴, and a systematic review²¹. Characteristics of the papers included in this review are presented in Table 1. Referencing numbers in the running text correspond with papers in all tables. The data contained in the included papers had been gathered in 16 different countries worldwide, spread out over the continents of Africa, Asia, Europe, North America, or a combination of two continents. The time frame of data collection of these papers was between February 2020 and March 2021. Sample sizes ranged from 24 respondents in the rapid qualitative appraisal¹⁴ to 16,158 respondents in the cross-sectional survey¹⁵. These samples were split into the following groups of respondents: Healthcare workers (HCW), Healthcare workers op people with intellectual disabilities (HCW ID), Family of people with intellectual disabilities (Family ID), General Population and Medical Students; followed by the percentage of that group willing to be vaccinated. Additionally, in 12 papers^{2,3,4,5,9,11,17,18,19,22,23,26} the group of healthcare workers was differentiated by health professions within the health care system, as can be seen in the *Respondents* column. Their corresponding vaccine willingness is also shown in Table 1.

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Table 1 – Characteristics of selected papers

No.	Reference	Type of Research	Country of Sample	Continent	Date of Sample	Sample Size	Respondents	Willing*	Undecided*	Hesitant*
1	Berry et al., 2021	Cross Sectional Qualitative meetings	USA	North America	December 2020 to January 2021	193	HCW	n/a		
2	Di Gennaro et al., 2021	Cross-sectional Survey	Italy	Europe	October to November 2020	1723	HCW Total [1723]	67.0%	26.0%	7.0%
							Specialized Medical Doctor [337]	69.0%		
							Medical Resident [259]	79.0%		
							Medical Doctor [544]	76.0%		
							General Practitioner [135]	63.0%		
							GP Trainee [70]	77.0%		
							Non-MD health professional [378]	43.0%		
3	Dror et al., 2020	Cross-sectional Survey	Israel	Western Asia	March to April 2020	1941	Doctors [338]	78.0%		
							Nurses [211]	62.0%		
							General Population Total [1112]	75.0%		
4	Eguia et al., 2021	Cross-sectional Survey	Spain	Europe	September to November 2020	731	HCW & General Population Total [731]	77.56%		
							Medicine [274]	82.5%		
							Nursing [51]	65.4%		
							Other HCW [37]	68.5%		
							Non-HCW [166]	76.1%		
							Unemployed [39]	79.6%		
5	Gagneux-Brunon et al., 2021	Cross-sectional Survey	France	Europe	March to July 2020	2047	HCW Total [2047]	76.9%		
							Physicians [431]	92.1%		
							Pharmacists [501]	88.8%		
							Nurses [371]	64.7%		
							Assistant nurses [218]	60.1%		
							Midwives [37]	70.3%		
							Physiotherapists [24]	95.8%		
							Other [465]	67.1%		
6	Gakuba et al., 2021	Cross-sectional Survey	France	Europe	February 2021	61	HCW	56.0%		
					February 2021 ^a	61	HCW	82.0%		
7	Gur-Arie et al., 2021	Commentary	N/A	N/A	n/a		HCW	n/a		
8	Iadarola et al., 2021 [†]	Cross-sectional Survey	USA	North America	January to February 2021	825	HCW ID [258]	76.0%		
							Person with ID [91]	83.5%		

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No.	Reference	Type of Research	Country of Sample	Continent	Date of Sample	Sample Size	Respondents	Willing*	Undecided*	Hesitant*
9	Kabamba Nzaji et al., 2020	Cross-sectional Survey	Congo	Africa	March to April 2020	613	Family ID [358]	73.5%		
							Combi HCW & Family [91]	80.2%		
							Other [27]	74.1%		
							HCW Total [613]	27.7%		
							Doctors [167]	37.7%		
10	Kasozi et al., 2021	Cross-sectional Survey	Uganda	Africa	September to October 2020	260	Nurses & other HCWs [446]	24.0%		
							HCW	n/a		
11	Kose et al., 2020	Cross-sectional Survey	Turkey	Europe/Asia	September 2020	1138	HCW Total [1138]	68.6%	19.9%	11.4%
							Physicians [53]	50.9%	30.2%	18.9%
							Nurse/Midwife [306]	65.4%	20.9%	13.7%
							Student (Medicine&Nurse) [694]	72.3%	18.0%	9.7%
							Other [80]	61.3%	26.3%	12.5%
12	Kwok et al., 2021	Cross-sectional Survey	China	Asia	March to April 2020	1205	HCW Nurses	63.0%		
13	Lunsky et al., 2021	Cross-sectional Survey	Canada	North America	January to February 2021	3371	HCW ID	82.0%		
14	Manby et al., 2021 ^u	Rapid Qualitative Appraisal	UK	Europe	December 2020 to March 2021	24, 24	HCW, Policies	n/a		
15	Meyer et al., 2020 ^u	Cross-sectional Survey	USA	North America	December 2020	16158	HCW	55.0%	28.5%	16.4%
16	Mohamed-Hussein et al., 2021 ^u	Cross-sectional Survey	Egypt	Africa	December 2020 to January 2021	496	HCW	45.9%	13.2%	40.9%
17	O'Brien et al., 2021 ^u	Cross-sectional Survey	USA	North America	October 2020	2070	HCW Total [2070]	54.2%		
							Paramedic/EMT [1449]	68.9%		
							Physicians [467]	64.0%		
							Other Practitioner [206]	53.9%		
							PA/NP [145]	49.7%		
					December 2020 ^b	1541	Nurse [586]	46.6%		
							HCW Total [1541]	76.2%		
							Paramedic/EMT [1043]	75.0%		
							Physicians [318]	90.5%		
							Other Practitioner [149]	73.8%		
							PA/NP [106]	78.3%		
							Nurse [430]	66.9%		

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No.	Reference	Type of Research	Country of Sample	Continent	Date of Sample	Sample Size	Respondents	Willing*	Undecided*	Hesitant*
18	Oliver et al., 2021 ^u	Cross-sectional Survey	USA	North America	December 2020 to February 2021	1933	HCW Total [1933]	81% got. 11% plan to get.		
							Physicians [268]	95.0%		
							Research & Education [421]	92.0%		
							Advanced Practice Providers [87]	92.0%		
							Other Health Professionals [448]	78.0%		
							Nursing [265]	72.0%		
							Environmental Services [31]	58.0%		
							Administration, Logistics, Management [399]	71.0%		
							Community based Providers [14]	29.0%		
19	Pădureanu et al., 2020	Cross-sectional Survey	Romania	Europe	April to May 2020	529	HCW Total [529]	69.0%		
							Physicians [344]	70.0%		
							Pharmacists [84]	53.0%		
							Nurses [31]	61.0%		
							Medical Students [66]	77.0%		
20	Qattan et al., 2021	Cross-sectional Survey	Saudi Arabia	Western Asia	December 2020	673	HCW	50.52%		
21	Sallam, 2021	Systematic Review	Worldwide	33 countries worldwide	February to December 2020	31 studies: 60 surveys per country/target population	HCW [8 surveys], General Population [47 surveys], Parents/Guardians [3 surveys], UNI students [2]	n/a		
22	Shekhar et al., 2021	Cross-sectional Survey	USA	North America	October to November 2020	3479	HCW Total [3479]	36.0%	56.0%	8.0%
							Direct Patient Care Providers [1573]	27.0%	62.0%	12.0%
							Direct Medical Providers [1207]	49.0%	48.0%	2.5%
							Administrative Staff [295]	34.0%	58.0%	8.5%
							Others without Direct Patient Contact [404]	45.0%	57.0%	9.2%
23	Szmyd et al., 2021 (a)	Cross-sectional Survey	Poland	Europe	December 2020 to January 2021	2300	HCW Total [387. Inc.: MD & HA]	82.95%	5.94%	17.05%
							Medical Doctors (MD) [252]	94.44%	1.19%	5.56%
							Healthcare Assistants (HA) [135]	61.48%	14.81%	38.52%
							General Population Total [1913]	54.31%	19.86%	45.64%
24	Szmyd et al., 2021 (b)	Cross-sectional Survey	Poland	Europe	December 2020	1971	Medical Students MS [687]	91.99%	3.93%	4.08%
							Non-medical Students NMS [1284]	59.42%	18.85%	21.73%

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No.	Reference	Type of Research	Country of Sample	Continent	Date of Sample	Sample Size	Respondents	Willing*	Undecided*	Hesitant*
25	Verger et al., 2021	Cross-sectional Survey	Belgium, France & Canada	Europe & North America	October and November 2020	2678	HCW Total [2678]	72.4%		
			Belgium	Europe			HCW Belgium [414]	76.03%		
			France				HCW France [1209]	75.36%		
			Canada	North America			HCW Canada [1055]	70.41%		
26	Yurttas et al., 2021	Cross-sectional Survey	Turkey	Europe/Asia	January 2021	1815	HCW Total [320]	52.5%	26.6%	20.9%
							Physicians [152]	68.4%	20.4%	11.2%
							Nurses & medical/non-medical personnel [168]	38.1%	32.1%	29.8%
							Patients with RD Total [732]	34.6%	42.1%	23.3%
							General Population Total [763]	29.2%	51.8%	19.0%

Papers with multiple rows are banded according to respondents sample range: dark rows are total samples; light rows are sub samples. Dotted lines mark a sample range change within the paper: total sample row or sub sample row.

* Percentage is only noted if reported in paper.

μ Paper is a preprint.

† Paper is in press.

α Repeated measure with the same sample after an intervention.

B Repeated measure with smaller sample after two months.

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The difference in vaccine willingness across samples

Only two papers^{8,13} reported about healthcare workers in the care for people with intellectual disabilities. In both papers, healthcare workers showed a comparable percentage of vaccination intention; 76% and 82%. Iadarola et al. (2021)⁸ focused not only on healthcare workers who care for people with intellectual disabilities, but also individuals diagnosed with intellectual disabilities and family members of people with intellectual disabilities (e.g., individuals who spend time with people with intellectual disabilities and make decisions for them). Vaccine intentions did not significantly vary across these three groups.

A total of 21 papers reported percentages representing vaccine willingness amongst healthcare workers. These percentages differed drastically across papers, ranging from only 27.7% in one paper⁹ to 82.95% in another²³. The 13 papers that differentiated vaccine willingness across various health professions will be further explained in the following section *predictors of vaccine willingness*.

Not all papers reported exclusively on vaccine willingness of healthcare workers, but also included the willingness of other populations^{3,4,8,21,23,26}. Of the papers that reported about healthcare workers in comparison to the general population, some mentioned significantly higher vaccination willingness percentages for healthcare workers compared to the general population^{23,26}, while others found no statistically significant difference between these groups^{4,8} and one found that doctors and the general population were more willing to get vaccinated than nurses³. In an additional paper²⁴, the vaccination willingness of medical students (i.e. future healthcare workers) was compared to that of non-medical students, with significantly higher percentages for the medical students.

Predictors of vaccine willingness

The theme *predictors of vaccine willingness* was split into 13 different sub-themes, presented in Table 2; socio-demographical characteristics of respondents that predict vaccine willingness. Not all sub-themes are a statistically significant predictor in each paper, as can be seen in Table 2. *Profession, age, past vaccine behaviour* and *gender* are statistically significant predictors in eight papers or more. The predictors will be described in order of frequency, but only statistically significant predictors in at least five papers. Sub-themes that were statistically significant predictors in less than five papers were not discussed. These include *comorbidities, education, ethnicity, mental well-being, COVID self-history, geographical location, COVID-family-history, income, and political orientation*.

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Table 2 – Socio-demographical predictors of vaccine willingness

	1 ¹ Bery et al. (2021)	2 ² Di Gennaro et al. (2021)	3 ³ Dror et al. (2020)	4 ⁴ Eguia et al. (2021)	5 ⁵ Gagneux-Brunon et al. (2020)	6 ⁶ Gakuba et al. (2021)	7 ⁷ Gur-Arie et al. (2021)	8 ⁸ Iadarola et al. (2021)	9 ⁹ Kabamba Nzaji et al. (2020)	10 ¹⁰ Kasozi et al. (2021)	11 ¹¹ Kose et al. (2020)	12 ¹² Kwok et al. (2021)	13 ¹³ Lunskey et al. (2021)	14 ¹⁴ Manby et al. (2021)	15 ¹⁵ Meyer et al. (2020)	16 ¹⁶ Mohamed-Hussein et al. (2021)	17 ¹⁷ O'Brien et al. (2021)	18 ¹⁸ Oliver et al. (2021)	19 ¹⁹ Pădureanu et al. (2020)	20 ²⁰ Qattan et al. (2021)	21 ²¹ Sallam (2021)	22 ²² Shekhar et al. (2021)	23 ²³ Szmyd et al. (2021) (a)	24 ²⁴ Szmyd et al. (2021) (b)	25 ²⁵ Verger et al. (2021)	26 ²⁶ Yurtas et al. (2021)	N=*	N=●
Profession		●*	●*	●*	●*	●		●	●*	●	●*		●		●	●	●*	●*	●*			●*	●*			●*	12	18
Age		●*	●	●	●	●		●*	●*	●	●*	●*	●*			●*	●	●*	●	●		●*	●	●	●	●*	10	21
Past vaccine behaviour		●*	●*		●*						●*	●		●		●		●*		●*		●*	●*	●*	●*		10	13
Gender		●	●*	●	●*	●		●	●*	●	●*	●	●			●	●	●*	●	●*		●*	●	●	●	●*	8	21
Comorbidities	●	●*		●*	●						●	●				●*				●		●				●	3	10
Education										●*			●			●				●		●*		●		●	2	7
Ethnicity								●					●	●	●		●	●*				●*					2	7
Mental well-being																							●*	●*		●	2	3
COVID self-history				●												●		●		●						●*	1	5
Geographical		●	●					●												●	●	●*					1	6
COVID family-history		●*																									1	1
Income																●			●			●*	●				1	4
Political orientation																						●*					1	1

● item was asked/questioned

* Relation to vaccine willingness is statistically significant

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Type of profession was questioned in 18 papers and significantly predicted vaccine willingness in 12 papers^{2,3,4,5,9,11,17,18,19,22,23,26}. Physicians or medical doctors had higher vaccine willingness than other healthcare worker staff in 11 of those papers. Szmyd et al. (2021 (a)³) reported vaccine willingness as high as 94.44% among physicians (MD), whereas only 61.48% of administrative healthcare assistants (HA) were willing to get vaccinated. One paper¹¹ differed from the rest of the results: physicians were associated with lower vaccine willingness than nurses, other healthcare workers and students, as shown in Table 1.

Age also significantly predicted vaccine willingness. Age was questioned in 21 papers, and was a statistically significant predictor in ten papers^{2,8,9,11,12,13,16,18,22,26}. Older age predicted higher vaccine willingness in most papers^{8,9,13,16,22,26}, but not all. Three papers^{2,11,12} reported younger age to predict vaccine willingness. Finally, vaccination intention was highest in age groups under 40 and over 60 years old in one paper¹⁸.

Both past vaccine behaviour and gender predicted vaccine willingness frequently and consistently. A total of 10 papers^{2,3,5,11,18,20,22,23,24,25} out of 13 reported that past influenza vaccine behaviour predicted vaccine willingness significantly; having received the influenza vaccine corresponded with higher vaccine intentions. A total of eight papers^{3,5,9,11,18,20,22,26} out of 21 reported that gender predicted vaccine willingness; being male corresponded with higher vaccine intentions.

Attitudes on vaccine willingness and hesitancy

Eighteen different subthemes focusing on the attitudes related to vaccine willingness and hesitancy have been extracted from the 26 selected papers. As shown in Table 3, all attitudes corresponded either with vaccine willingness or hesitancy and were categorised into five overarching themes: health factors, ethics, trust related issues, information, and practical factors.

Attitudes or beliefs that consistently corresponded with vaccine willingness were (1) threat of COVID, (2) desire to protect family members, (3) vaccination should be mandatory, (4) vaccination is a collective responsibility and (5) vaccination being part of one's profession. These attitudes fall under the themes of *Health Factors* and *Ethics*. The most frequently occurring attitude in favour of vaccine willingness was the perceived COVID threat: fifteen different papers reported that an increased perception of COVID threat was associated with higher vaccine willingness. Six papers reported that attitudes toward protecting family members, vaccination being part of the job, and collective responsibility were associated with vaccine willingness. Finally, the belief that vaccination should be mandatory was measured and linked to vaccine willingness in two papers. Here, healthcare workers were more willing to get vaccinated than other groups of participants and thought more often that vaccination should be mandatory.

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Table 3 – Attitudes on vaccine willingness and vaccine hesitancy

	Theme	Attitudes	1 Bery et al. (2021)	2 Di Gennaro et al. (2021)	3 Dror et al. (2020)	4 Eguia et al. (2021)	5 Gagneux-Brunon et al. (2020)	6 Gakuba et al. (2021)	7 Gur-Arie et al. (2021)	8 Iadarola et al. (2021)	9 Kabamba Nzaji et al. (2020)	10 Kasozi et al. (2021)	11 Kose et al. (2020)	12 Kwok et al. (2021)	13 Lunsky et al. (2021)	14 Manby et al. (2021)	15 Meyer et al. (2020)	16 Mohamed-Hussein et al. (2021)	17 O'Brien et al. (2021)	18 Oliver et al. (2021)	19 Pădureanu et al. (2020)	20 Qattan et al. (2021)	21 Sallam (2021)	22 Shekhar et al. (2021)	23 Szmyd et al. (2021) (a)	24 Szmyd et al. (2021) (b)	25 Verger et al. (2021)	26 Yurttas et al. (2021)	N
Attitudes on Willingness	Health factors	COVID Threat		•	•		•				•			•	•		•		•	•	•		•	•	•	•	•	•	15
	Ethics	Protect family members													•				•					•	•				4
		Mandatory vaccination																			•						•		2
		Collective responsibility											•																1
		Vaccination is part of job													•														1
Attitudes on Hesitancy	Trust related issues	Side effects	•	•	•	•		•		•			•	•	•	•	•		•		•		•	•	•		•	•	17
		Safety	•	•	•	•				•					•	•	•		•		•		•				•	•	14
		Speed of development	•		•					•		•			•	•	•		•		•		•				•		12
		Efficacy	•	•	•	•		•						•		•		•				•		•				•	11
		Distrust	•	•						•		•	•	•					•				•				•	•	10
		Anti-vax & conspiracy	•	•							•						•		•					•	•		•		8
		Distrust because minority / ethnicity	•							•		•				•			•										5
		Fertility	•													•			•										3
	Information	Lack of information / misinformation	•	•							•		•			•		•						•				•	9
	Practical factors	Alternative treatments									•	•															•		3
		Impact on other precautions	•																										1
		Logistics to get vaccinated													•														1
		Spirituality / religion	•																										1

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Attitudes or beliefs that consistently correspond with vaccine hesitancy can also be seen in Table 3. Eight of the 13 attitudes that corresponded with hesitancy fall under the theme *Trust related issues*, one under the theme *Information* and four under the theme *Practical factors*. The attitude associated with hesitancy most often was fear of short or long-term side effects; this was the case in 17 papers. Additional concerns reported in ten or more papers that fall under the category Trust related issues were the vaccine's safety, speed of development, and efficacy. Distrust was observed in several forms: distrust of the vaccine itself, distrust of the government, of the pharmaceutical companies or distrust of health authorities/officials. Another attitude associated with vaccine hesitancy was lack of information or misinformation; this was the case in nine papers. Examples of where information was lacking were (1) the vaccine in general¹⁴, (2) the benefits of vaccination²⁶, (3) on vaccine development^{2,18}, (4) on the financial interest of pharmaceutical companies¹¹ and (5) on vaccine side effects¹¹. The spread of misinformation across traditional and social media was established in three qualitative papers^{1,14,23} and three quantitative papers^{9,16,26}. Finally, four attitudes that corresponded with vaccine hesitancy fall under the theme of Practical factors. The attitude of favouring alternative (herbal or organic) treatments over vaccination was linked to hesitancy in three papers. Impact on other precautions, logistics to get vaccinated, and spirituality/religion were all linked to hesitancy once.

Information sources of COVID-19 and vaccination

In some papers, vaccination distrust and vaccine hesitancy were linked to the sources used by respondents for COVID-19 vaccination information. For instance, Di Gennaro et al. (2021) reported that the use of Facebook as a primary source of information on COVID-19 vaccination was a statistically significant predictor for higher vaccine hesitancy. In Mohamed Hussein et al. (2021) the prime sources of information of respondents were social media (77%) and television (40%), and according to the authors this was a reason for the low percentage of vaccine willingness in their sample, which was 45.9%. Additionally, a positive relation between vaccine hesitancy and distrusting the ministry of health was found by Verger et al. (2021). They reason this distrust to be a major problem since the ministry of health is the primary information source of COVID-vaccination to both healthcare workers as the general population.

Other sources of information on COVID-19 than Facebook or social media were linked to vaccine willingness. Attending lectures/discussions about COVID-19 and using official websites were, amongst other variables, significantly associated with COVID-19 vaccine acceptance in Kabamba Nzaji et al. (2020). Similarly, Yurttas et al. (2021) describe that although social media and television were the most common information sources in both the general population and in healthcare workers, healthcare workers also frequently consulted institutional declarations and medical literature, which might have caused their higher vaccine acceptance.

Discussion

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This scoping review aimed to examine the key themes in the available research on COVID-19 vaccine willingness and hesitancy in healthcare workers, including those who care for people with ID, with a specific interest in their arguments, beliefs and attitudes on vaccination. A total of 26 papers were selected and analysed, focusing on the socio-demographical predictors of vaccine willingness and the attitudes that inspire vaccine hesitancy in healthcare workers. Only two papers were found that focussed on healthcare workers working with individuals with intellectual disabilities (Iadarola et al., 2021; Lunskey et al., 2021). Vaccine willingness percentages were comparable between the respondents of these two papers and within the subgroups of these papers.

In the two papers that describe vaccine hesitancy in healthcare workers that care for people with intellectual disabilities (Iadarola et al., 2021; Lunskey et al., 2021), the main socio-demographical predictor of willingness was age, with younger people being more hesitant for vaccination. Other socio-demographical characteristics like profession, gender, ethnicity, education and geographical location were not statistically significant predictors of vaccine willingness. In Iadarola et al. (2021), there was however an interaction effect between age and ethnicity: in both Black and White respondents, those over the age of 50 were less vaccine hesitant than their younger counterparts. In Asian and Latin/Hispanic respondents this age difference was less strong. The respondents that were hesitant to get vaccinated in Iadarola et al. (2021) were most concerned by the possible side effects of the vaccine and its fast development. Not wanting to be an experiment and not trusting the government were the follow-up reasons for vaccine hesitancy, and these opinions were strongest in Black respondents. The respondents that were hesitant to get vaccinated in Lunskey et al. (2021), believed more strongly than those willing to get vaccinated, that 'a vaccine was unnecessary because of good health', but also distrusted the vaccine because of its fast development and potential side effects. Alternatively, these respondents believed less strongly than those willing to be vaccinated, that they were at risk to get COVID, that a vaccine would protect their family or clients, or that vaccination was a part of their job. Comparing the outcome measures of these two papers reveals the similarities between the respondents: age being the sole predictor of vaccine willingness and concerns of the vaccines' side effects and its fast development inspiring vaccine hesitancy.

As a result of the limited literature available on healthcare workers that work with people with intellectual disabilities, the scope of this review was broadened to all healthcare workers. As a result, in the following steps the analyses included healthcare workers of any kind. First, the predictors of vaccine willingness in all 26 papers were analysed. This analysis revealed that profession, age, gender, and past-vaccine behaviour were the most powerful predictors of the willingness to be vaccinated: medical doctors, people of older age, men, and those previously vaccinated with the influenza vaccine were most likely to also receive the COVID-vaccine. Our findings suggest that nursing staff, people of younger age, women, and those not previously vaccinated are the target populations when aiming to inform healthcare workers of the benefits of vaccination. The results of this review partly support those found in the rapid systematic review by Robinson et al.

(2021): people of younger age and women were more hesitant towards vaccination in the general population. Additionally, Robinson et al. (2021) reported higher vaccination hesitancy in people with lower income, people with lower education and people belonging to an ethnic minority group. These last three respondent groups were statistically significant predictors in only one (income) or two (education and ethnicity) papers in this review.

Next, all COVID vaccine attitudes were categorized: firstly in theme, secondly according to whether they contributed to either vaccine willingness or vaccine hesitancy. Attitudes promoting vaccine willingness fit within the themes of *Health factors* and *Ethics*. Some examples are the COVID threat to oneself or the desire to protect family members or other persons. Attitudes promoting vaccine hesitancy fit within the themes of *Trust related issues* and *Information*. Examples of trust related issues are concerns on both short and long-term side effects, the safety of the vaccine, efficacy and the speed of development of the vaccine. Other examples are lack of information or misinformation on the vaccine. This suggests that the themes that need to be covered when providing interventions to inform healthcare workers about vaccination are *Trust related issues* and *Information*. The findings of this review complement those of earlier studies. Robertson et al. (2021) report in the UK Household Longitudinal Study with over 12,000 participants, that the main reason for vaccine willingness is reducing the risk of being infected by COVID or getting ill from it (54.6%) while the main impediment to vaccination is worries about the unknown future effects of the COVID vaccine (42.7%). Interestingly, this paper also reported responses about persuasion. Factors that would increase the likelihood of getting vaccinated according to participants were knowing a vaccine reduced their risk of COVID-19 infection (67.8%); knowing a vaccine reduced the risk of being seriously ill (63.7%); and knowing the vaccine was proven to be safe (59.8%). In other words, respondents expressed the need for more information on vaccine safety and efficacy.

Finally, an analysis was done of the information sources used on COVID-19 vaccination and their connection to vaccine willingness and hesitancy. What sources are used to inform oneself on COVID-19 vaccination can be of influence in deciding whether to get vaccinated or not. It seems that sources like Facebook and other forms of social media are a breeding ground for misinformation and even conspiracy theories, which in turn could lead to vaccine hesitancy. Misinformation is often the basis on which distrust of the vaccine is formed. Berry et al. (2021) explicitly state: "During town hall meetings with 193 frontline staff from the skilled nursing facility workforce, misinformation through social media was common: rapid vaccine development and infertility and pregnancy related concerns were among the most frequent raised." They even state that the concerns raised are more pervasive than some national polls might suggest. Thus, the spread of misinformation through social media platforms, in both the general population and healthcare workers, should be taken very seriously and could be counterbalanced by targeted interventions such as information sessions on actual vaccine information as well as the spread of more informative videos on social media. Even though social media is the main source for misinformation, this platform can also be used to make more accurate

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information, in easy to understand language, accessible to our target group, and to the public in general.

It is important to note that vaccine intentions may not be stable over time. Some papers collected data on the opinions of healthcare workers before the distribution of vaccines worldwide in December 2020. Other papers started collecting data after the onset of the mass vaccination program. Contextual factors could have affected the vaccine willingness of respondents. For example, O'Brien et al. (2021) collected data from healthcare workers in the USA using a brief survey sent out in October 2020 (N=2070) and again in December 2020 (N=1541). The vaccine willingness of respondents increased more than 20% over these two measurements. This increase is in part due to the 998 participants that contributed to both measurements and changed their vaccine intention between these two time points: 2.9% changed from willing to hesitant, and 13% from hesitant to willing. In these months two events occurred which may have had implications on the respondents' vaccine willingness. The first event was the USA presidential election which took place on November 3rd, 2020. The second event was the release of phase III clinical trial results by two vaccine manufacturers, after which both vaccines were approved for Emergency Use Authorization (EUA). Similar results were found by Meyer et al. (2020): an increase in daily recorded cases of vaccine willingness was reported after the EUA release.

Besides the rise of vaccination intentions over time, it is also possible that these intentions could decline. In Qattan et al. (2021), low rates are explained by a decline in daily recorded COVID-infections, resulting in alleviated worries. Similarly, Kwok et al. (2021) speculates that the relatively low vaccination intentions in their participants are "in part explained by the successful crisis response on the COVID-19 epidemic in Hong Kong". In other words, there might be less feeling of urgency for vaccination among these healthcare workers if alternative measures combat the pandemic well. These results suggest that examining the population's vaccine willingness and hesitancy is an ongoing matter, at least as long as the COVID-19 pandemic has not ended. In addition, when running vaccine information campaigns, contextual factors should be taken into account - e.g. new virus variants, research related to this virus and 'booster' vaccine campaigns.

One interesting topic for future research is the difference between vaccine intentions and actual vaccine receipt, as this would shed light on the efficacy of vaccination campaigns. Most papers in this review report the opinions of healthcare workers prior to the worldwide rollout of vaccines December 2020, while others begin after the start of the mass vaccination program. Because data collection by Oliver et al. (2021) started after December 2020 in the USA actual vaccination uptake could indeed be measured. Results show that 81% of responding healthcare workers had received the vaccine at the time of survey, with an additional 11% of respondents that planned to get vaccinated. Unfortunately, in Iadarola et al. (2021) positive and negative answers were merged to *Intend/Got* and *Do not intend/Don't know* answers. Thus, even though some respondents had already received the vaccine, actual receipt numbers could not be obtained. It would be interesting to investigate if vaccine receipt numbers differed from vaccine intention percentages.

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Although investigating the difference between vaccine intentions and vaccine receipt was beyond the scope of the current paper, it does shed some light onto the difference in being *unwilling* and *undecided* about vaccine receipt. Some papers reviewed here not only gathered information about vaccination willingness, but also specified what portion of the sample was unwilling and what portion was undecided about vaccination intent. This is presented in the final two columns of Table 1. In the paper by Di Gennaro et al. (2021) for example, it becomes apparent that although vaccination intent was not very high amongst healthcare workers (67%), vaccination non-intent was only 7%. Thus, a substantial percentage of the sample could be persuaded by appropriate interventions.

Two papers included in this review explicitly describe interventions that were held to inform healthcare workers about COVID-19 vaccination. First, online town hall meetings were organized by Berry et al. (2021) where moderators and doctors met with the skilled nursing facility (SNF) workforce to discuss COVID-19 vaccination. The qualitative report sheds light on the concerns and questions of 193 healthcare workers on vaccination and presents examples of the suggested answers by the moderators and doctors. What is interesting about their approach is that these answers were personal stories and experiences whenever possible, instead of data-focused answers. Berry et al. (2021) conclude that “sharing positive emotions and stories may be more effective than sharing data when attempting to reduce vaccine hesitancy in SNF staff”. This may be due to the fact that these stories are more relatable than statistics. This should also be taken into account in future campaigns. Interventions should provide information in such a manner that your target group can relate to it and make the idea of getting a vaccine less clinical. Second, Gakuba et al. (2021) investigated the impact of a vaccine information session on the willingness to get vaccinated among healthcare workers. A 45-minute information session on the COVID-19 vaccine and vaccine hesitancy, followed by a question-and-answer session, was delivered by intensivists to 61 non-medical healthcare workers. Participants were questioned about their vaccine willingness before and after the information session: acceptance rates increased drastically from 56% to 82%. Both papers address the importance of appropriate interventions that inform healthcare workers and moreover, facilitate exchange with healthcare workers, to improve their vaccination intent.

Another way of improving the vaccination rates among healthcare workers worldwide could be to make vaccination mandatory, either for all adults or just healthcare workers, as is already the case in some countries (Stokel-Walker, 2021). Only one paper advocated for mandatory vaccination and bases this solely on low vaccination intentions of certain respondents, but not on ethical argumentation (Pădureanu et al., 2020). The question arises if mandatory vaccination will solve the problem of low vaccination, or if this would not merely increase distrust in vaccine hesitant healthcare workers. Instead, Gur-Arie et al. (2021) argue to promote voluntary vaccination by improving trust between healthcare workers and health institutions and governments. To force individuals to vaccinate for COVID-19 when their reasons not to vaccinate are due to safety concerns of the vaccine itself, could have the opposite effect and could even lead to essential staff quitting their jobs. Therefore, addressing the concerns raised would be a better way to

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build trust. One paper investigated which initiatives would increase vaccination intentions for COVID-19 among their healthcare worker respondents (Di Gennaro et al., 2021). These were: “increasing information quality about the vaccine (40%)”, “increasing information quality about vaccine development (28%)”, “implementing an economic incentive (21%)” and “making vaccination mandatory (11%)”. Clearly, mandatory vaccination was the least appealing option. Increasing information quality about the vaccine and its development is mentioned in several papers that were analysed in this review (Eguia et al., 2021; Iadarola et al., 2021; Kwok et al., 2021; Lunskey et al., 2021; Mohamed Hussein et al., 2021; Qattan et al., 2021; Yurttas et al., 2021). Increasing information quality can be achieved by interventions such as lectures, information sessions, focus groups or online interactive meetings. Increasing information quality can also be done in the form of spreading more informative videos on social media: that is where most misinformation is spread and where vaccine hesitant individuals get information (Eguia et al., 2021; Kwok et al., 2021; Mohamed Hussein et al., 2021; Yurttas et al., 2021). It seems that mandatory vaccination would not be ethically justifiable until all other means have been tried and failed.

When looking at the different countries and continents where data was collected in the selected articles of this review, it becomes apparent that vaccine willingness among healthcare workers is lowest in Africa. Here, average vaccine willingness was only 36%, while that of Asia, Europe and North America ranged between 62% and 70%. Unfortunately, no papers were included in this review with vaccine acceptance rates of healthcare workers in South America or Australia. In the systematic review by Sallam (2021), Africa is also among the regions with the lowest vaccine acceptance, together with the Middle East and some European countries. A limitation of both this review and that of Sallam (2021) is that only two surveys were found with vaccine acceptance rates from the African continent. It is clear that more research is necessary to investigate vaccine intentions of healthcare workers across the globe to attain more insights in cultural differences, mainly in continents such as Africa, South America and Australia.

In the results section of this review, we confined ourselves in describing the socio-demographical predictors of vaccine willingness that were statistically significant in at least five papers. Thus, the predictors that were not described are comorbidities, education, ethnicity, mental well-being, COVID self-history, geographical location, COVID-family-history, income, and political orientation. Although these predictors were not significant very often, some of these were not questioned in the selected papers. These predictors may turn out to be statistically significant more often, if they were investigated thoroughly. In order to examine the predictors of vaccine willingness, future research should include possible parameters like mental well-being, COVID family-history and political orientation, as these were statistically significant most often in relative terms.

Strengths and Limitations

Strengths of this paper include the large number of healthcare workers in the selected papers. The number of participants was 49,775 in all papers, of which 43,199 participants were healthcare workers, spread out over 16

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different countries worldwide. An additional strength was the inclusion of both quantitative and qualitative papers. This resulted in both statistically comparable figures as well as more in-depth insights into the attitudes of vaccination hesitancy worldwide. A limitation of this scoping review is the small number of papers found on the attitudes of vaccine hesitancy of healthcare workers caring for people with intellectual disabilities. An alternative would have been to broaden the search to long-term care for the elderly in addition to people with intellectual disabilities, as healthcare workers in these facilities generally share characteristics in terms of type and level of education, organization of care, focus on quality of life. It would be interesting to compare the similarities and differences of attitudes on COVID vaccination between these groups. Another limitation is how the studies compared healthcare workers to the general population. When predictors were identified, it cannot be determined whether this was within healthcare workers population alone or whether all respondents were merged (incl. general population) in the statistics of the papers. Related to this, for predictors it could be counted how often each factor was statistically significant. For the attitudes this was unfortunately not the case. Finally, this paper reviews papers that were found in April 2021. Given the variable nature of vaccine intentions, the development of different COVID-variants and worldwide 'booster' vaccination programs, new research should be done quickly and continuously on this matter.

Conclusions

In summary, it appears that vaccine hesitancy varies in healthcare workers and is affected by contextual factors. We are led to the conclusion that target populations to be addressed within the healthcare worker population are nursing staff, people of younger age, women, and those not previously vaccinated, due to their high levels of vaccine hesitancy. In order to reach the highest degree of vaccination worldwide, it is vital to address the problem of COVID vaccine hesitancy more effectively by providing personal stories and experiences and by addressing vaccine concerns and questions. Interventions in the form of information sessions (e.g. meetings, webinars, discussion groups) concerning trust related issues of the vaccination programs are highly recommended. Furthermore, the spread of more reliable and accurate information about COVID-19 vaccination across social media platforms in an attempt to decrease misinformation is also suggested. Additional research is needed to specify more precisely the attitudes of healthcare workers caring for people with intellectual disabilities in general and in different continents more specifically.

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Conflict of interest

The authors have no conflict of interest to declare.

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