Resilience in healthcare during the COVID-19 pandemic: A protocol for a qualitative systematic literature review

Background

The 12th of March 2020, The World Health Organization announced the novel Coronavirus disease (COVID-19) a pandemic due to the growing numbers of countries affected by the viral respiratory infection (WHO, 2020a). The virus was discovered in December 2019 after an accumulation of patients with viral pneumonia in the city of Wuhan, People's Republic of China (WHO, 2020b). By 8th of February 2021, there were reported over 100 million confirmed cases of COVID -19 infections worldwide, with over 2 million confirmed deaths (Worldometer, 2021), and these numbers are still increasing. The pandemic has caused great challenges for healthcare systems worldwide (Khalid & Ali, 2020) including limited resources (e.g. lack of equipment, staff or physical space), a surge of patients needing healthcare services, and the need to reorganize parts of the healthcare system to maintain infection control. Additionally, healthcare workers have been forced to handle new work-tasks, master new equipment and new technical procedures (Liu et al., 2020). All these aspects have forced healthcare personnel to make major adjustments to changes induced by the pandemic, both on organizational- and individual-levels.

Resilience in Healthcare (RiH) is about maintaining stability in the face of expected or unexpected changes (e.g. changes induced by the Covid-19 pandemic) and the systems' or the individual's ability to adjust or adapt to these changes or disturbances, and return to a stable state (Wiig & Fahlbruch, 2019). In this perspective the ability healthcare workers have, to adjust to the situation they are in (e.g. master new equipment in a short time), are what makes the healthcare system function, both during normal operation and under special circumstances. The ability to adjust to expected and unexpected events is called performance variability, and is according to RiH, crucial to ensure adequate performance, and maintain patient safety, due to the complex and everchanging nature of the healthcare system (Hollnagel, 2015; Hollnagel et al., 2015). An important aspect of RiH is further, to observe and understand the thing that goes well when everyday adaptations are being made. This is needed to understand the things that do not go well (e.g. adverse events), which is a different perspective than traditional patient safety work, were the main focus has been on the thing that goes wrong (Jeffcott et al., 2009).

In the context of the COVID-19 pandemic, which brought with it a cascade of changes and new challenges (e.g. pressured resources, increased patient flow, unknown medical procedures), performance variability is about making adjustments to the current situation and keep the healthcare services running in a safe and professional manner, despite these changes and subsequent challenges (Jovanović et al., 2020).

Despite the novelty of the COVID-19 pandemic, large amounts of research on the topic has already been conducted. This includes research on healthcare personnel's experiences during the pandemic (Chamboredon et al., 2020; Halcomb et al., 2020; Xu et al., 2020), infection control and implications for healthcare quality (Coma et al., 2020; Kirkevold et al., 2020) recommended and executed

measures related to the pandemic (Krist et al., 2020; Mills et al., 2020; Morreel et al., 2020) and studies about physical and psychological outcomes of COVID-19 patients (Carfì et al., 2020; Sahoo et al., 2020; Wang et al., 2020). There are in other words much evidence on the different aspects of the pandemic, and how it affects the healthcare service, healthcare professionals and patients. As of our knowledge, limited research have, however, directly targeted health personnel's ability to adapt (c.f. Resilience in Healthcare) to the changes induced by the COVID-19 pandemic. Moreover, RiH's positive outlook on how health professionals handle challenges in the delivery of healthcare (focusing on the things that goes well, rather than focusing on the things that do not work), is an important perspective to illuminate in a time where health personnel's efforts has been extraordinary. Lastly, increased knowledge on how health personnel handled, and adjusted to, changes induced by the COVID-19 pandemic situation is useful in understanding how patient safety is being maintained in unanticipated situations and can be beneficial in handling future similar situations.

The aim of the study is to identify and review qualitative studies focusing on healthcare personnel's adaptations to changes and challenges resulting from the COVID-19 pandemic. Moreover, the systematic review aims to identify what adaptations are being executed and why, from the perspectives of health personnel's experiences.

Methods and design

This protocol was developed in accordance with the Preferred Reporting Items for Systematic review and Meta-Analysis—Protocols (PRISMA-P) 2015 checklist (Moher et al., 2015). The protocol will be registered with the Open Science Framework (OCF) when approved by all authors.

Review question

The review will be conducted as a qualitative systematic review to answer the research question:

What kind of adaptation were required from healthcare professionals during the COVID-19 pandemic? What kind of performance variation did healthcare professionals experience resulted from these adaptations?

The components of PICO are as following:

Participants: Healthcare professionals

Interventions/Exposures: The COVID-19 pandemic

Comparators: Performance variation before the pandemic

Outcomes: Healthcare personnel's experience of performance variations during the COVID-19 pandemic

Qualitative systematic reviews integrate or compare findings from qualitative studies, and further, look for themes or constructs in and across individual studies (Booth et al., 2016). A qualitative systematic review design will allow for the identification of a wide range of valuable experiences of adaptations in response to the COVID-19 pandemic, as qualitative research is used to explore meanings of social phenomena (changes induced by the COVID-19 outbreak) as experienced by individuals (healthcare professionals) in their natural context (the healthcare services) (Malterud, 2001). This will enable us to provide an in-depth understanding of the meanings health professionals assign to changes induced by the pandemic and the required adjustments to these changes

(Holloway & Galvin, 2017). Synthesizing qualitative evidence, further, provides an opportunity for interpretating and identifying new knowledge of subjectivity and meaning in qualitative studies (Malterud, 2017), implying that interpretation of existing qualitative data will provide an opportunity to find other meanings i.e., finding data about performance variation (c.f. resilience in healthcare) in studies not necessarily having this as the main focus.

Eligibility criteria

All primary, qualitative studies coved by the selection criteria (Table I. Selection criteria) will be eligible for inclusion. Quantitative studies are considered non-eligible in this review due to their inability to cover the "outcome" (i.e., identify in-depth information about health personnel's experiences) and because quantitative studies limit the possibility for new interpretations of health professionals experiences, and the possibility to identify data about adaptive capacity in studies with other main focuses'. Studies conducted before 2019 will not be eligible as the "exposure" (COVID-19), cannot be addressed. Grey literature, including reviews, commentaries, editorials or other non-empirical materials will not be included. Eligible study populations will include healthcare professionals within the definition stated below. hospital Studies concerning health personnel not providing direct formal care (e.g., policy makers, hospital managers), other personnel working in hospitals/the primary healthcare service (e.g., porters or cleaning staff) or patients and their next of kin will not be included in the review. Studies written in other languages than English, Norwegian, Swedish, or Danish will not be included as these are the languages mastered by the research team.

Clarification of central concepts

A healthcare professional is in this context defined as a person who maintain human's health through applying principles and procedures of evidence medicine and caring. Health professionals provide advice and apply preventive and curative measures (WHO, 2013). Examples of healthcare professionals are: nurses, hospital physicians, general practitioners (GPs), certified nurse assistants (CNA), healthcare assistants, nursing home physicians, pharmacists, physiotherapists, licensed practical nurses (LPNs), bioengineers, occupational therapists, health secretaries, midwifes, clinical nutritionists and radiographs (Health Personnel Act, 2020). Although health personnel working in psychiatric healthcare services are included in the healthcare professional definition, they will not be included in this review as the focus here is on somatic healthcare settings (healthcare related to the body as distinguished from the psyche) (Shiel, 2018).

RiH Quality and Resilience Trigger tool will help circling eligible studies involving adaptations cf. Resilience in Healthcare. This tool was developed by Aase et al., (2020) to screen research projects for RiH relevance as a part a large longitudinal, cross country study. RiH is in this context, connected to actions, activities, and processes (resilience as a verb). RiH trigger tool, consist of a double screening process, were the first part involve identifying on or more of the four quality dimensions (patient experiences, patient safety, clinical effectiveness and care coordination) and the second part involve identifying eventual resilience triggers such as:

- Adaptation
- Variation
- trade-offs
- Development
- Improvement
- success

- improvisation
- response
- complexity
- Individual capacity (knowledge, competence, learning, personal characteristics, cognitive, behavioral strategies)
- Team/unit capacity (communication, collaboration, learning)
- Organizational capacity (resources, organization, culture)
- Larger system capacity (infrastructure, regulation, framework conditions)
- Changes
- Challenges
- Disruption
- enhancement
- growth
- Recovery
- Transformation
- Collaborative learning
- work practice
- teamwork
- problem solving
- interaction
- Stakeholder actions
- knowledge-brokering
- co-creation
- contribution
- information
- engagement

Table I. Selection criteria

Criteria Grouping	Inclusion criteria	Exclusion criteria
Participants/ context	Studies involving healthcare professionals (as defined above) in somatic clinical settings e.g., hospitals, home care services, nursing homes, General practitioners (GP) offices.	Studies involving psychiatric wards/institutions.
	Studies involving nurses, certified nurse assistants (CNA), healthcare assistant, nursing home physicians, pharmacists, physiotherapists, assistants, Licensed practical nurses (LPNs), or other healthcare personnel working in clinical settings	Studies involving healthcare personnel not providing direct formal care (e.g., hospital management, policy makers, ward leaders)
		Studies involving other personnel working in healthcare settings providing other services than direct formal care (e.g., porters, cleaning staff, management)
		Patients, aged care residents, service users (e.g., people receiving home care services), their next of kin or other informal care givers (neighbors, friends)

Exposure	Studies investigating the COVID-19 pandemic	Studies not concerning the COVID-19 pandemic
		Studies investigating previous pandemics/epidemics (e.g., H1N1, Ebola, Zika)
Outcome	Studies including resilience triggers on a micro-level e.g., individual capacity (knowledge, competence, learning, behavioral strategies) and team/unit capacity (communication, collaboration and learning) and triggers on macro-levels e.g., organizational capacity (resources, organization, culture) Examples of triggers related to the above are: healthcare personnel's adaptions to changes in work routines, tasks or work environment/work groups, handling challenges, finding solutions to problems, coping with staffing difficulties, equipment shortage, or lack of competence/knowledge	Studies investigating Larger systems' adaptation capacity (infrastructure, regulation, framework)
		Psychological (individual) resilience or lack of resilience, such as psychological or physical difficulties experienced by healthcare personnel (e.g., sleep deprivation, tiredness, difficulties with protective gear), or healthcare personnel's professional identity.
		Medical perspectives such as COVID-19 treatment regimes

		Studies not involving adaptive capacity such as studies only focusing on barriers and challenges (not solutions)
Language and year of publication	English, Norwegian, Danish or Swedish Studies published between 2019 and 2021	Other languages Studies published before 2019
Method	Studies applying qualitative methods that are published in peer-reviewed scientific journals	Studies applying quantitative methods. Grey literature, e.g., editorials, comments, non-scientific publications

Data sources, search terms and search strategy

The search strategy will involve searches in the databases: Academic Search Elite, CINAHL, MEDLINE, PubMed, Science direct and Scopus using the key words and MESH terms listed in Table II. These were identified through the National Library of Medicine's (NIH) Medical Subject Headings (MeSH) browser, an electronic thesaurus (www.thesaurus.com, 2021), through years of studying RiH literature, and initial searches conducted by MKN (Fig 1. provides an example of a possible eligible study identified in the initial searches). After conducting searches in the listed databases, secondary searches will be conducted in the included articles (a review of the reference list of included articles in the search for eligible articles), and moreover, hand searches will be conducted in current journals (current journals will be identified through the included articles).

Available Medical Subject Headings (MeSH) terms will be applied to simplify and ensure accurate searches in current databases (e.g. to cover all versions of the term COVID-19). In Ovid platforms, MeSH-terms is shown with a "/ "after the term. In CINAHL and on the EBSCO platform, "MH" is used to indicate the search of a subject heading. Where MeSH terms are not available, relevant key words linked to the research question at hand will be applied. On the OVID platform, key words will search across a range of fields including title, abstract and subject heading words while in the CINAHL platform, the keyword search is in the abstract, title and subject heading fields. Truncations (*) will be applied on relevant search words (e.g., challenge, issue, problem) to retrieve any alternative endings e.g., singular and plurals of words. The use of truncations is, however, not recommended in PubMed and may disturb the identification of subject headings (this will be taken into account). Phrase searching (e.g., performance variability, assisted living) will be completed by using quotation marks "…" to ensure that keywords are searched as phrases. Boolean operators AND and OR will be used to combine the search words to widen or broaden the searches. For example: COVID-19 AND Safety II OR Safety-II AND "Primary healthcare service" AND challenge* (LibGuides, 2021)

Searches compromising all possible combinations of the three clusters will systematically be conducted. An overview of all conducted searches in all databases will be provided as a supplementary file.

Table II. Key word clusters

Cluster I	Cluster II	Cluster III	Cluster IIII
1. COVID-19/ MH	2. "Resilience in healthcare" 3. "safety II" 4. "Safety-II" 5. adaptation* 6. adjustment* 7. re-organization 8. Re-organisation 9. trade-off* 10. "performance variability" 11. variation* 12.improvisation* 13. response* 14. complexity	15. "primary health care services" 16. Primary healthcare/ MH 17. "Primary health-care" 18 "Primary care" 19. "Primary healthcare" 20 "Primary health-care" 21 "Care homes" 22 "Residential aged care" 23 "Long-term care" 24 "Long term care" 25. "nursing homes" 26. "assisted living" 27. "facility retirement" 28. "facility home care" 29. "home care services" 30. "Home care" 31. "home based care" 32.Hospital* 33."Emergency room"* 34 Emergency service/MH 35. Clinic*	36. Challenge* 37. Issue* 38. problem* 39. Concern* 40. Difficulty* 41. Constraint* 42. Obstacle* 43. Hindrance* 44. Barrier* 45. Problem solving 46. Maintain 47. solution* 48. Manage (ing) Managed 49. Handle (ing) 50. Cope (ing) 51. endure 52. coordinate (ing) 53.Organize (ing)/ 54.Organise (ing)

Fig. 1 Example of eligible article

Example of possible eligible article

The experiences of health-care providers during the COVID-19 crisis in China: a qualitative study Liu et al, 2020). https://www.thelancet.com/journals/langlo/article/PIIS2214-109X(20)30204-7/fulltext

Examples of relevant findings

- Physicians and nurses followed the diagnosis and treatment guidelines released by the National Health Commission, while drawing on previous clinical experience and learning through exploration
- They discussed the guidelines with other colleagues to understand their experience in treating patients with COVID-19, then transformed this knowledge and experience to use in patient care
- Many wards that were not designed for infectious diseases were modified into isolation wards within a short period of time
- They needed to learn and master new technical procedures in a short time
- They had to rapidly find ways to work together efficiently

Selection of eligible studies

Identified studies will be managed in the reference manager Zotero 5.0. Duplicates will be removed and references uploaded in Rayyan QCRI, which is an application that enable all researchers of the study to review abstracts and titles, and select articles for inclusion (Ouzzani et al., 2016). Abstracts will be screened against the selection criteria and studies assed for inclusion. Full text articles will be uploaded in Zotero 5.0, a tool for collection, organizing, citing and sharing research (*Zotero*, 2021).

Quality assessment

Each study will be assessed for quality using the Clinical Appraisal Skills Program (CASP) for qualitative studies (Clinical Apprasial Skills Programme, 2018). CASP enables a systematic assessment of the trustworthiness, relevance and results of published articles. It consists of ten yes/no questions, with additional prompts, reminding the reviewer of the importance of each question. If the answer

to the first two questions[1] are "no", the study will be assessed as biased, and will not be included in the review (Clinical Apprasial Skills Programme, 2018). The CASP tool do not include a scoring system (where low scores exclude articles), but do however, guide each reader to appropriate assessments of the quality of each study. In other words, the reader needs to individually assess the studies based on the control questions. Relevant experience within qualitative research will, in this case, be an advantage.

Data extraction and synthesis

The following data will be extracted from included articles: details about the variation in performance (cf. resilience in healthcare); how adaptations were executed; reasons for adaptation execution. Study characteristics (e.g., title, year, method, setting, informants) will be extracted and listed in a table to provide an overview of included studies. The qualitative analysis tool NVivo Pro will be use to facilitate a thematic analysis and synthesis as described by Thomas & Harden (2008). The studies' results will be uploaded into Nvivo or entered into the program verbatim. Further, the text will be coded inductively, sentence by sentence, according to its meaning and context by two researchers. The codes will be structured in a three form (hierarchical structure) to display the relationship between different codes. Codes with similar meaning will be assembled under broader categories (going through several phases of organization and reorganization to ensure accurate placement). Lastly themes will be developed based on the content of the different codes, and their descriptive, and possible, latent (analytic) meanings (Ring et al., 2011; Thomas & Harden, 2008). To ensure accurate themes, they will be discussed among the researchers.

Strategy for presentation of the results

The search strategy will be presented in the protocol as an attachment. The PRISMA flow diagram will be used to provide an overview of the study selection and review process. A summary of the included studies will be provided as a table along with an excerpt of the analysis. The results will, in the protocol, be presented theme by theme (in the order of the identified themes of the analysis).

Researchers

The research team comprise researchers with experience from a variety of relevant fields within health services research:

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[1] 1. Was there a clear statement of the aims of the research?
2. Is a qualitative methodology appropriate

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Work distribution and schedule

Table III. Schedule, tasks and work distribution (inspired by Nelson, 2014)

Time	Task	Work distribution
January - February	**Develop project protocol (defining the purpose, topic, scope, research question(s) and analytic framework, determining inclusion/exclusion criteria)**	MKN with input from EA, SW, DB and KL
	Identify eligible researchers/ build a team	MKN & EA Do Siri have any suggestions from UIS?
	Finalize scope	MKN, EA, SW
	Preliminary literature searches	MKN
February- April	**Main Searches, including hand searches and secondary searches**	MKN
	Reference management	MKN
	Study selection	MKN, EA & KL (?)
May - July	**Quality assessment** **Data extraction**	MKN, EA & KL with input from SW and DB

	Qualitative analysis	
July - September	**preparing the report**	MKN (full draft), EA, KL, SW & DB
September/October	**Article Submission**	

***MKN= Malin Knutsen Glette, SW= Siri Wiig, DB = David Bates, KL= Kristina Ludlow, EA= Elizabeth Austin**

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