



Theory-driven, rapid formative research on quality improvement intervention for critical care of patients with COVID-19 in Argentina

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Javier Roberti^{1,2} , Facundo Jorro¹, Viviana Rodríguez¹,
María Belizán¹, Pilar Arias³, María Elena Ratto³, Rosa Reina³,
Natalí Ini^{1,2}, Cecilia Loudet³, and Ezequiel García-Elorrio¹

Abstract

The challenges of implementing interventions in healthcare settings have been more apparent during the COVID-19 pandemic. This pre-implementation evaluation used a rapid qualitative approach to explore barriers and facilitators to an intervention in intensive care units in Argentina, aimed to promote the use of personal protection equipment, provide emotional support for professionals, and achieve patient flow goals. Data were collected using semi-structured interviews with health professionals of 15 public hospitals in Argentina. Normalization Process Theory was used to guide content analysis of the data. Participants identified potential barriers such as the incorporation of non-specialist staff, shortage of resources, lack of communication between groups and shifts. Potential facilitators were also identified: regular feedback and communication related to implementation, adequate training for new and non-specialist staff, and incentives (e.g., scholarships). The immediacy of the pandemic demanded rapid qualitative research, sharing actionable findings in real time.

Keywords

Rapid response research, qualitative research, critical care, intensive care units, COVID-19, Evidence-based practice, Argentina

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Introduction

When implementing interventions in healthcare settings with the objective of improving care processes, achieving compliance remains a challenge (Borgert et al., 2015). This was especially apparent during the SARS-COV2 pandemic, which required multiple new working methods and created exceptional demands that exceeded the capacity and resources of hospital systems (Kandel et al., 2020). Intensive care units (ICUs) have seen the greatest cost of resource use; indeed, the ICU community has been making efforts to care for an overwhelming surge of patients (Phua et al., 2020). In a recent international survey of ICU workers during the COVID-19 pandemic, shortages of resources, distress and burnout among healthcare workers (HCWs) were reported; also, participants acknowledged that there had been changes in the practices partly because resource availability and concerns about their own health and their families' health (Wahlster et al., 2020). Key care processes are necessary to sustain the institutional performance, for example preventing

infection among HCW and promoting their emotional well-being (Kandel et al., 2020).

With the objective of overcoming some of the negative effects of the COVID-19 pandemic on HCWs of ICUs, we developed a multi-component intervention, embedded in an implementation study to improve healthcare. This intervention seeks to promote the correct use of personal protection equipment (PPE), support HCWs mental health, and improve patient safety. In this study, we used a rapid pre-implementation

¹Institute for Clinical Effectiveness and Health Policy, (IECS), Buenos Aires, Argentina

²Centre for Research in Epidemiology and Public Health at National Scientific and Technical Research Council (CIESP – CONICET), Buenos Aires, Argentina

³Argentine Society of Intensive Care (SATI), Buenos Aires, Argentina

Corresponding Author:

Javier Roberti, Institute for Clinical Effectiveness and Health Policy, (IECS), Ravignani 2024, Buenos Aires, C1056ABH, Argentina.
Email: jroberti@iecs.org.ar



Setting

This pre-implementation evaluation is part of a quality improvement project of the Institute for Healthcare Improvement. The planned intervention consists of the following components: (a) Training on the correct use of PPE, based on instructional videos, direct observation, and feedback; (b) Systematic monitoring of mental health status of ICU HCWs, counseling interventions based on digital application (“Ser + contra Covid-19”) and a 24-hour psychological support hotline; (c) A daily safety goal reminder for eight care processes during morning rounds to improve flow and maintain patient safety indicators.

Fifteen ICUs of public hospitals were selected in Argentina. Inclusion criteria were: public sector, referral center for patients with COVID-19, more than eight beds (not expanded by the epidemic), highest qualification awarded by the National Ministry of Health, a history of occupancy to meet the reporting targets, having reported to proprietary databases for more than 1 year; written commitment to ensure implementation and data collection; and the head of ICU unit had to be a member of Argentine Society of Intensive Care. The 15 ICUs had in average 22 physicians, 50 nurses, and 20 beds for COVID-19 patients.

Participants

A purposeful sample of key informants were recruited from the participating ICUs. We limited recruitment to site coordinators at each participating hospital because they had received information about proposed quality improvement project and were familiar with the functioning of the ICUs at their respective sites. All of the coordinators accepted the invitation to participate. The resulting sample included 15 participants; 14 were physicians representing different specialties and 1 participant was a registered nurse. The majority of participants ($n = 14$) were women.

Data Collection

The interviews were conducted 2 weeks before the implementation of the intervention, during 1 week in July 2020, either by telephone or online, and audio recorded. We tried to reduce research burden on participants, kept interviews short, about 20 minutes, and made sure they were carried out at the most convenient time for participants (Johnson & Vindrola-Padros, 2017; Vindrola-Padros et al., 2020). The interview guide was informed by Normalization Process Theory (NPT) constructs, described under *Theoretical framework* below, previous research on evaluating barriers and facilitators for complex interventions using NPT (Olajide et al., 2017; Scantlebury et al., 2017) and the NPT toolkit published online (May et al., 2020). The main points were compiled with notes and later summarized. Some of the questions were “*What information do you have of the intervention proposed?*,” “*Which specific tasks or roles have*

been assigned to you in relation to this intervention?,” “*How do you think this intervention will affect your work?*.” The original interview guide is included as supplementary file.

Theoretical Framework

To help identify barriers and facilitators from the interviews, the Normalization Process Theory (NPT) was used. NPT is a mid-level theory that can be used to describe, assess and enhance implementation potential through identifying factors that promote and inhibit the incorporation of interventions into everyday practice (May & Finch, 2009; May et al., 2018). The theory focuses on the individual and organizational work done to embed and sustain a new practice in everyday practice (May & Finch, 2009; May et al., 2018). The four constructs of the NPT (Coherence, Cognitive Participation, Collective Action and Reflexive Monitoring) are generative mechanisms of social action, different types of work that people do in relation to a new set of practices; each construct comprises four subcomponents each. *Coherence* and *Cognitive Participation* relate to the planning stages of the intervention, while *Collective Action* and *Reflective Monitoring*, to the experiences once the intervention has been implemented. *Coherence* refers to how and to what extent actors make sense of the intervention, differentiating it from previous practices, ascribing value, and understanding its objectives. *Cognitive Participation* refers to how actors engage themselves and enroll others in driving the intervention forward. *Collective Action* refers to how actors enact the intervention and how this relates to skills, resources, practices, and rules. *Reflective Monitoring* refers to how actors assess the intervention consequences, both individually and collectively, and how assessments may lead to reconfigurations of the intervention (May & Finch, 2009; May et al., 2018).

Data Analysis

We performed a qualitative content analysis (Graneheim & Lundman, 2004), initially with a deductive approach, evaluating the correspondence of units of meaning against the framework developed using NPT (Vaismoradi et al., 2013). The framework underpinned by NPT included a set of codes developed a priori which corresponded to main constructs and subthemes in each construct (May et al., 2018). Two researchers (JR, NI) independently coded data and later compared the coding for agreement; disagreements were resolved with the assistance of other researchers (EGE, MB). We ensured reflexivity through discussions and reflections on the theoretical coding framework, on extracted and coded data as well as on the development of the findings and recommendations. To speed-up the analysis process, interviews were not transcribed; instead, audio files were directly uploaded to qualitative data management software Atlas.ti v8.4 to facilitate the data coding process (Friese, 2014). Data were anonymized, coded, and stored securely.

Ethical Aspects

The implementation study (protocol HSMLP2020/0024), including this formative research phase, was approved by Bioethics and Research Committees in each participating hospital (Approval number 8649/2020, 2020-47, and letters). Informed consent was obtained before commencing the interviews, participants had received an information sheet with the description of the study and their rights; before the interviews, objectives of formative research phase and participants' rights were explained and verbal informed consent was obtained.

Results

We present our findings data using the main four NPT dimensions of implementation.

Coherence

This refers to how people understand the intervention. Participants described that the intervention, as far as what they had been informed, would be an opportunity to improve quality of care and patients' safety processes, and that this would have a positive impact on nosocomial infection rates, mortality rates and costs of care. Importantly, most participants found it difficult to fully differentiate the new practices proposed by the intervention and the somehow similar practices that had already been implemented because of the pandemic. In addition, most participants identified benefits for the ICU team, for example the timely reporting of results required in the implementation study would lead to a better structuring and systematization of work in the unit, and a greater commitment to work. Most participants also mentioned the benefits of training of HCWs.

Participants expressed that the proposed intervention would fit well into the current work methods and that it would not be perceived as a disruptive change. Indeed, they noted that the change in practices in ICU had been already established because of the COVID-19 pandemic. They also highlighted that the intervention could support positive changes in practices by introducing new protocols in ICUs. The external viewpoint offered by the intervention was an opportunity to correct errors in practices which were otherwise difficult to point out among colleagues. Participants stressed the need for the intervention because there were errors in the use of PPE and because there was no emotional support for HCWs; indeed, participants confirmed that most HCWs were overwhelmed by the pandemic and suffering from burnout. The emotional care intervention component was an innovation for ICU.

Cognitive Participation

This describes how participants relate to each other to implement the intervention. In their role of study coordinators for

the implementation study, participants described how they perceived colleagues' willingness to participate. In most cases, they described that they had talked about the intervention with HCWs and they were willing and motivated to participate. However, most coordinators acknowledged that some teams refused to participate, such as nurses in some sites and, less frequently, some experienced physicians. Participants acknowledged that the observational phase of the study aimed to assess baseline data related to those outcomes that the intervention would impact had less acceptance than the idea of starting the intervention itself, such as receiving training on PPE use. On the other hand, participants reported that the emotional support components of the planned intervention had the highest acceptance among ICU staff. One participant admitted that a top-down approach may be necessary to impose the intervention in the teams, at least until all HCWs understood the benefits.

Participants said that they had made a careful selection of key professionals that would participate in the implementation of the intervention, considering their motivation, rapport with other team members, schedules across shifts, previous training, and experience. Some participants also noted that they believed there could be some conflicts if groups of physicians were assessed by nurses with no specific roles in infection control. In this regard, they noted the importance of distributing roles among all subgroups (nurses, physicians, physical therapists) and shifts. They also pointed out that if problems were observed, they would change HCWs roles. About the specific tasks that the participants identified for their own roles as site coordinators, they mentioned holding regular meetings with the research group, collecting informed consent forms, holding discussions with working groups and potential participants, serving as a liaison with teaching departments and ethics committees of the institutions. More generally, they perceived their role was to advocate for the intervention and implementation study in order to facilitate approvals from hospital management and promote participation among ICU HCWs.

Collective Action

This refers to the allocation of tasks and how these are performed. To maintain the intervention, participants unanimously agreed that the research group had to provide frequent feedback to all participants, independently of their roles in the implementation study, about interim findings and the overall development of the intervention. They pointed out the importance of constant training for participants but without them having to do unpaid overtime for the implementation study. To maintain motivation, regular communication between all participants was perceived as important to strengthen commitment. In addition, participants stressed the importance of incentives such as free training and scholarships for ICU HCWs to incentivize participation in the implementation project and to recognize HCWs efforts to improve quality of care.

Table 1. Barriers and Facilitators to Implementing the Quality Improvement Intervention Identified by Participants.

Barriers	Facilitators
Delays in protocol approval by ethics committees.	Training; this would lead to greater motivation.
Lack of commitment in some groups, the one most often mentioned was the nursing group. High turnover of HCW, especially nurses.	Support of Argentine Society of Intensive Care (Sociedad Argentina de Terapia Intensiva).
Incorporation of non-specialist HCWs in intensive care because of the pandemic.	Follow-up weekly meetings.
Resistance of some groups to being observed, especially experienced nurses and doctors.	Regular feedback to participants.
Interpersonal conflicts due to the tasks assigned for the implementation.	Use of virtual platform to facilitate communication.
Possible shortage of resources due to pandemic.	Interest in the emotional support component.
Lack of communication between shifts.	
Use of complex forms.	
Inadequate internet connection on the sites.	

Participants believed it was necessary to maintain quality standards in health care, especially in the context of the pandemic, and that this justified the intervention and the extra work for its implementation. While some participants perceived that the implementation study was different from the typical research protocols they had worked with in the past, they acknowledged this intervention would lead to positive and noticeable changes in ICU practice. They also recognized the lack of tools or programs for the emotional care of HCWs.

Reflexive Monitoring

This refers to how people assess the impact of an intervention. Participants identified that beyond the positive effects that the intervention would bring, no negative effects on workload were expected. While recognizing that the workload was higher because of the COVID-19 pandemic, participants anticipated that the intervention would be feasible because it consisted of a set of already known practices and that no intensive training was necessary. The implementation study would also provide a structure and systematization of practices that, in part, had been tried or adopted because of the pandemic. However, they highlighted that to prevent negative effects on workload, activities could not extend beyond the normal working hours and that HCWs from different shifts had to be included. Information and training were the two key resources needed. A few coordinators mentioned that some of the computers needed new or updated software and that a virtual classroom-type platform could simplify communication between participants from different shifts and groups.

When asked how they imagined that the successful implementation of the intervention could be assessed, participants explained that, at an individual level, an anonymous survey could be used. At a higher level, the success of the intervention could be measured by the number of COVID-19 cases

among HCWs, the level of occupational stress and the number of infected patients at ICUs. They also pointed out that receiving feedback on preliminary results would allow for improvement and corrections.

Table 1 shows a summary of the main barriers and facilitators, identified by the participants, to implementing the quality improvement intervention.

Recommendations

Based on findings of this formative research, we made recommendations for adaptation of the quality improvement intervention and for additional actions to increase its acceptability. Table 2 shows these recommendations. The main recommendations were related to giving comprehensive information about the intervention, differentiating its components from comparable practices already in place, providing regular feedback on implementation of the intervention to all participants, and ensuring appropriate training of new HCWs, including non-specialist staff, to meet staffing needs associated with rotation of HCWs, staff turnover, and staff shortages.

Discussion

The findings of this study point to potential barriers and facilitators for the implementation of quality improvement interventions when the capacity of clinical services is strained. Projected barriers included high rates staff changes, shortage of resources, and communication challenges; and main facilitators included regular feedback and communication related to implementation, adequate training for new and non-specialist staff, and incentives (e.g., scholarships). The COVID-19 pandemic has been placing extraordinary demands on critical care services; it is important to maintain services for non-COVID-19 patients, protect workers, and consider the moral and social implications of triaging during

Table 2. Recommendations for the Quality Improvement Intervention and the Implementation Study.

Recommendations
Provide information about the implementation study, differentiating objectives of each phase and the interventions. This information should be shared with all participants.
Provide information aimed at differentiating the new practices in the intervention components and practices already in place.
Take measures to anticipate change of roles in case of COVID-19 cases among participants.
Ensure constant feedback to all participants.
Provide guidance for the inclusion of HCWs from different subgroups and shifts, considering lack of contact between groups because of pandemic protocols.
Consider possible changes in HCWs, for example, training for new staff.
Avoid extending the study-related tasks beyond working hours.
Emphasize scholarships and training for participants.
Incorporate virtual platforms for communication between working groups in each of the sites.
Use an application for offline data management.

a crisis (Goh et al., 2020). Our findings clearly reflect HCWs' concerns in the context of the pandemic; as those reported in a recent global survey (Wahlster et al., 2020). Health care workers are exposed to high infection risks and death, excessive workloads as well as moral dilemmas related to resource allocations; therefore, interventions to reduce psychological problems could prevent adverse implications (Cabarkapa et al., 2020). In a recent Argentine study performed during the pandemic, it was found that, for local HCWs, the availability of PPE was a major concern and that institutional resources were inadequate (Ortiz et al., 2020). Moreover, consistent institutional communication was one of the main demands (Ortiz et al., 2020).

Participants found it difficult to differentiate the components included in the quality improvement intervention. In addition, the practices proposed in this intervention were not clearly distinguished from the practices that had been implemented some months before as a result of the pandemic. This finding has important implications designing communications for HCWs about the intervention as well as plans for evaluation. Several other factors related to the pandemic also point to the importance of well planned and executed communications about quality improvements interventions. As an effect of COVID-19 cases among HCWs, new and untrained staff will be hired and participate in the intervention and will require orientation to the intervention and its implementation. In addition, HCWs will need access to tools such as virtual platforms to receive regular communications concerning the intervention given reductions in-person interactions. The findings indicate that HCWs' motivation to participate in implementing this quality improvement intervention may be challenged by workload and when staff have more than one job. Based on our findings, it appears critically important that management engage with HCWs directly and frequently throughout the implementation process to address any concerns participants raise and support them in implementing the qualitative improvement practices during difficult circumstances such as those related to the pandemic.

These findings could contribute to the design and implementation of multi-component interventions, in which nurses are very often at the forefront. It is essential that nurses and nurse scientists lead and contribute to research teams advancing quality improvement interventions, given their unique clinical role and affinity for interdisciplinary collaboration (Boehm et al., 2020). Specifically, nurses need advanced knowledge of barriers and facilitators that affect the implementation of evidence-based practices (Boehm et al., 2020). The factors identified here and the recommendations made may inform implementation initiatives in comparable settings; also, the rapid qualitative research approach used in this study (Vindrola-Padros et al., 2020) could benefit research in contexts of health emergencies, such as the COVID-19 pandemic.

Some limitations should be acknowledged. Our study design was instrumental, seeking to produce rapid results which could be translated into changes in the proposed intervention. The most important limitation of this formative research was that we could only interview one participant from each site, although not all participants belonged to the same cadre, because when performing the interviews only one professional at each site had sufficient information on the intervention to be implemented in the following weeks. Also, at the final phase of the implementation study, we expect to interview participants from different cadres to investigate to what extent the intervention was implemented. Another limitation was that we have not evaluated organizational characteristics of each facility due to logistic limitations resulting from the pandemic and this health emergency also limited the possibility of participant observations. The use of rapid qualitative methods could be interpreted as a limitation; however, the immediacy of the COVID-19 pandemic demanded this approach to share actionable findings through recommendations in real time (Vindrola-Padros et al., 2020). This study was conducted over 1 week, with remote brief interviews and no transcribed data. However, the quality of research should not be assessed solely on time

spent in the field as this could limit the contributions to emergency response efforts (Johnson & Vindrola-Padros, 2017).

Our study contributes to the literature on formative research of a proposed multi-component intervention in ICUs in the context of a pandemic, using rapid qualitative methods and normalization process theory. Our theory informed formative research offered qualitative knowledge by the identification of key drivers and challenges that influence the implementation of an intervention in ICUs; on the other hand, the utilization of rapid qualitative methods helped to produce timely and actionable findings in the extreme pressures of a pandemic.

Declaration of Conflicting Interests

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ORCID iD

Javier Roberti  <https://orcid.org/0000-0002-4285-5061>

Supplemental Material

Supplemental material for this article is available online.

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Author Biographies

Javier Roberti, LCP, PhD, is researcher at IECS, CIESP, CONICET on health and social sciences.

Facundo Jorro MD is a specialist in paediatric emergency medicine, and researcher at IECS Health Care Quality and Patient Safety department.

Viviana Rodríguez MD, PhD is coordinator of Health Care Quality and Patient Safety department at IECS, and of Patient Safety at German Hospital, Argentina.

María Belizán MSc is coordinator of the IECS Qualitative Research Unit.

Pilar Arias MD is a member of Argentine Society of Intensive Care.

María Elena Ratto MD is a member of Argentine Society of Intensive Care.

Rosa Reina MD, is the President of Argentine Society of Intensive Care.

Natalí Ini is a PhD student, performs research on health and social science.

Cecilia Loudet MD is the Secretary of Argentine Society of Intensive Care.

Ezequiel García-Elorrio MD, MSc, PhD is the Director of Health Care Quality and Patient Safety department at IECS.