Protocol for the first cycle of the Collaborative Open Research Initiative Study (CORIS-1): An international survey of personnel in health professions schools in 16 countries

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ABSTRACT

The Collaborative Open Research Initiative Study (CORIS) is an inclusive and innovative international research project that welcomes contributors from across the globe. CORIS fosters a democratic and collaborative approach, shaping research actively and offering publication opportunities for newcomers in health professions education. In this protocol, we describe the aims and approach of CORIS, which is designed as an annual cross-sectional, web-based survey that seeks to explore critical topics in health professions education. The target population comprises faculty and staff in accredited, degree-granting medical, dental, nursing, pharmacy, and public health schools at undergraduate and postgraduate levels across 16 countries (n=14400). Collaborators within CORIS will actively engage in survey design, question formulation, and the entire research process.

The first iteration, CORIS-1, scheduled for 2024, covers themes such as post-COVID-19 patient care, epidemic preparedness, burnout, artificial intelligence, remote learning, conflict's impact on mental health, substance use, and workplace discrimination. Data will be collected on the Chisquares™ survey platform, and results, codebook, questionnaire, and methods report will be publicly accessible. No sensitive data or identifying information will be collected. CORIS-1 fosters diversity by letting contributors suggest survey questions, aiming to provide novel data, identify gaps, and influence health education policies. It provides an opportunity for early-stage researchers to engage in the research process from start to finish and to obtain publications. Contributors must meet ICMJE authorship criteria. Collaborators can also explore the collected data for their independent projects. CORIS redefines research, fostering open collaboration and meaningful contributions. Diverse perspectives and collaborators' contributions are expected to enhance the research process. Graduate students working on theses or dissertations can propose questions in CORIS-1, and early career professionals can also enroll as collaborators to gain a comprehensive understanding of the research process from start to finish.

INTRODUCTION

Health profession schools hold a strategic position as a significant source of the health workforce in any country[1-3]. The knowledge, attitudes, and perceptions of personnel in these institutions significantly impact the broader population[4]. This influence stems from their direct patient care, the generation of scientific knowledge, and their participation in developing clinical guidelines that may set

the standard of care. Academic healthcare institutions are well-positioned to provide interdisciplinary healthcare without barriers and to encourage community involvement in promoting a culture of health. These institutions are frequently at the forefront in delivering care to economically disadvantaged individuals, such as the uninsured or under-insured, the elderly, and those residing in healthcare shortage areas[5]. There are opportunities to leverage these interactions for health promotion and disease prevention[6]. The clinician-scientist workforce in academic institutions offers unique opportunities for collaborative projects focused on developing, testing, and evaluating novel approaches to improving health outcomes in the population[7,8]. The emphasis on health professions schools is further justified by the need for system changes, including education and curriculum development, to adapt healthcare systems to the new challenges posed by emerging and re-emerging infectious diseases, climate change, conflict, and the threat of conflict, and the opportunities and challenges presented by artificial intelligence[1]. Considering the critical role of healthcare professional school faculty and staff in providing instruction, training, and supervision to health professions students, the current and future cycles of CORIS will assess the knowledge, attitudes, and practices of personnel in health professions schools on various societal health-related matters.

The objective of this article is to provide a detailed description of the methodology of the CORIS-1 study, focusing on the survey's design, implementation, analysis, and reporting. We hypothesized that differences would exist among different types of health profession educational programs and across countries in the type and extent of unmet needs and reported challenges, as well as their impact on overall well-being.

CORIS-1, the inaugural iteration of the Collaborative Open Research Initiative Study, is driven by a multifaceted set of aims (Table 1). Specific aims are: 1) To assess the impact of the COVID-19 pandemic on patient care strategies

Table 1. Aims and objectives of CORIS-1

Topic area	Specific objectives
Patient care post-COVID-19	• Evaluate healthcare professionals' preparedness and strategies for providing patient care in the post-COVID-19 era. • Assess the impact of the COVID-19 pandemic on clinical practices and patient management. • Identify areas where healthcare providers may require additional support or training for post-pandemic patient care.
Epidemic preparedness	• Understand the level of epidemic preparedness among health professionals and institutions. • Identify gaps in knowledge and resources for responding to potential epidemics and pandemics. • Assess the readiness and capacity of healthcare facilities to manage epidemic situations effectively.
Burnout	• Measure the prevalence and contributing factors of burnout among healthcare personnel. • Explore the relationship between burnout and the quality of patient care. • Identify strategies and interventions that can mitigate burnout in healthcare settings.
Artificial Intelligence	• Gauge healthcare professionals' awareness and acceptance of artificial intelligence in clinical practice. • Assess the extent to which AI technologies are integrated into healthcare delivery. • Understand the potential benefits and challenges associated with AI adoption in patient care.
Climate change	• Estimate the percentage of respondents who believe climate change is a hoax or that it is not attributable to human activities. • Explore perceptions regarding individual and societal responsibilities towards curbing climate change.
Remote learning and online education	• Evaluate the effectiveness and satisfaction of healthcare professionals with remote learning and online education. • Identify the barriers and facilitators of online education in health professions. • Explore the future trends and preferences regarding remote learning in the field.
Impact of ongoing conflicts and wars on mental health	• Assess the mental health impact of ongoing conflicts and wars on healthcare personnel. • Examine coping mechanisms and support systems used by professionals in conflict-affected areas. • Gather insights for developing mental health interventions in crisis settings.
Substance use behaviors	• Investigate the prevalence and patterns of substance use among healthcare professionals. • Identify stressors and triggers contributing to substance use behaviors. • Inform interventions and support services aimed at addressing substance use issues among health workers.
Workplace discrimination	• Examine the experiences of healthcare professionals with workplace discrimination. • Assess the impact of discrimination on job satisfaction, mental health, and overall well-being. • Propose strategies and policies to promote diversity, equity, and inclusion in healthcare settings.

within health professions schools; 2) To evaluate the level of epidemic preparedness and readiness among personnel in health professions education; 3) To determine the prevalence and factors contributing to burnout among faculty and staff in health professions schools; 4) To explore the integration and utilization of artificial intelligence in healthcare education and practice; 5) To explore attitudes and perceptions towards climate change and the role of individuals and society in mitigating it; 6) To examine the effectiveness and challenges of remote learning and online education in schools for health professions; 7) To investigate the influence of ongoing conflicts and wars on the mental health of healthcare professionals; 8) To analyze substance use behaviors and their implications for personnel within health professions education; and 9) To assess experiences of workplace discrimination among faculty and staff in health professions schools.

METHODS

Study design, sampling and target population

This survey is a cross-sectional, web-based, self-administered questionnaire directed at staff and faculty members in the selected academic programs. We will employ stratified sampling to enhance statistical efficiency and precision and obtain adequate sample sizes for meaningful inter-group comparisons. The five distinct categories of schools will serve as the strata: 1) Dental schools, 2) Medical schools, 3) Nursing schools, 4) Pharmacy schools, and 5) Public health schools. The primary data collection targets faculty and staff in accredited, degree-granting medical, dental, nursing, pharmacy, and public health schools at the undergraduate and postgraduate levels. Medical schools are institutions offering medical professional degrees such as MD, MBBS, or MBChB. Dental schools grant dental professional degrees such as DMD, DDS, or BDS. Nursing schools provide degrees or certificates in nursing, including RN and BSc Nursing. Pharmacy schools offer pharmacy professional degrees, like BPharm or DPharm. Public health schools encompass programs with degrees related to public health practice or research, covering disciplines like epidemiology, biostatistics, health policy, environmental health, ethics, occupational health, global health, and others, including BSc, MPH, DrPH, and MSc.

CORIS-1 is designed to include participants from 16 countries, primarily due to logistical considerations. These countries are Australia, Brazil, Canada, Egypt, Greece, Japan, Jordan, Kuwait, Lebanon, Mexico, New Zealand, Saudi Arabia, South Africa, South Korea, the United States, and Turkey. Future waves of CORIS will consider including additional countries to increase the geographical coverage of the survey. Within each stratum, constructing a country-specific sampling frame for eligible study participants will involve two key steps: 1) A comprehensive enumeration of all eligible programs within the country; and 2) A comprehensive enumeration of all personnel within each

eligible program. The sampling frame will be compiled from the online directories of these programs, utilizing the email addresses listed for staff and faculty members. We can reasonably expect this sampling frame's completeness, currency, and accuracy as many post-secondary institutions in the selected countries typically publicly disclose specific student consumer information, including a listing of faculty and instructional personnel, which is often available in the school's online faculty/staff directory. This includes listing faculty and instructional personnel, often available in the school's online faculty/staff directory.

Inclusion and exclusion criteria

An accredited program is an institutional criterion for inclusion. An individual-level criterion for inclusion is being a faculty member or member of staff, including the following categories of personnel: full, associate, and assistant professors; adjunct/part-time/visiting faculty; clinical support staff; research fellows, program coordinators; and administrative staff.

Exclusion criteria for the study include: 1) Residents, teaching assistants, or work-study students who are currently under training; 2) Faculty and staff in post-graduate residency programs that are not degree-awarding; 3) Faculty and staff involved in allied programs, such as dental hygiene, dental assisting, dental technology, pharmacy technology, and medical assistant programs; and 4) Faculty members who are either not listed on the online directories of the respective programs or are listed without an email address.

Sample size calculation

The total sample size for this study encompassed 14400 respondents from all 15 countries and across all five school types combined. This was calculated using the formula[9]:

$$n = \frac{Z^2 \times p(1-p)}{\varepsilon^2}$$

where n represents the required sample size, Z is the critical z statistic, p is the prevalence, and ε denotes the margin of error. The sample size calculation was based on certain assumptions: 1) The target population in each country was divided into five strata; 2) An estimated 50% response rate is due to the online mode of data collection, which is known to have high rates of non-response; 3) A conservative prevalence of 50% for the primary outcome of interest; and 4) A 10% margin of error at a 95% confidence level.

Study questionnaire

CORIS-1 is designed to serve as a surveillance vehicle dedicated to monitoring the attitudes, knowledge, and behaviors of personnel in health profession schools regarding 'hot-button' issues of international concern, including those affecting clinical practice, emerging technology, and overall society. Accordingly, the topics

selected in CORIS-1 transcend national boundaries and focus on issues or themes likely to interest researchers in other nations. The topics likely to be covered in the final questionnaire are firmly anchored in a strategic policy and program context at the level of schools, regulatory or accreditation agencies, governments, or other relevant educational organizations.

The CORIS-1 questionnaire will consist of approximately 30 to 50 items, gathering information on sociodemographic, professional, and school-related characteristics. It will also inquire about attitudes, beliefs, and behaviors concerning various health-related topics and school policies, and curricula related to specific issues. Additionally, it will collect data on experiences delivering patient care for active clinicians who see patients. To ensure inclusivity, the survey will be translated into various languages, such as English, Greek, Portuguese, French, Arabic, Japanese, Korean, Turkish, and other languages relevant to the country of participation (Table 2).

The first iteration of CORIS (CORIS-1) will encompass themes related to patient care post-COVID-19, epidemic preparedness, burnout, artificial intelligence, climate change, remote learning, online education, the impact of ongoing conflicts and wars on mental health, substance use behaviors, and workplace discrimination. These topics represent contemporary issues of significant public health importance but are not addressed sufficiently by other surveillance systems. A better understanding of these issues can contribute to the national discourse and may inform tailored interventions at the institutional or population level.

Table 2. Survey language coverage by country

Country	Survey language
Australia	English
Brazil	Portuguese
Canada	English, French
Egypt	Arabic
Greece	Greek
Japan	Japanese
Jordan	Arabic
Kuwait	Arabic
Lebanon	Arabic
Mexico	Spanish
New Zealand	English
Saudi Arabia	Arabic
South Africa	Afrikaans, English
South Korea	Korean
United States	English
Turkey	Turkish

The web questionnaire design will incorporate intelligence or logic checks. Skip patterns will ensure that only eligible individuals, as determined by specific screeners, are presented with certain questions. For instance, questions about patient care will only be directed to participants with a clinical background who are currently engaged in patient care, at least part-time. This approach is expected to reduce participant burden and enhance survey completion rates.

Interested investigators can contribute questions as collaborators. Upon registration, they gain access to the collaborator page for suggesting questions. The window for question submissions is two months, during which weekly virtual meetings will convene to review the current questionnaire through live sessions. Contributions received will be evaluated for scientific validity, appropriateness, and cultural sensitivity. Validity checks will include a careful review to ensure they align with the study's scope, avoid duplication, prevent double-barreled or leading questions, and feature mutually exclusive and collectively exhaustive response options while maintaining coherent flow as a unified instrument. The review will also identify and fill any gaps relevant to the study's aims. Subsequently, an extra month will be allocated for instrument validation, testing, finalization, and translation into the target languages for the survey.

Ethical considerations and approval
Participants are selected without regard to race, ethnicity, pregnancy status, sex, disability, religion, or sexual orientation. Vulnerable groups, such as children and prisoners, are not included in the target population. The study does not involve sensitive or invasive procedures, nor does it collect personally identifiable information from participants. Participants are offered no financial incentives or direct benefits, but the study aims to generate generalized knowledge on the assessed topics. The surveys present minimal risks to participants and involve no procedures necessitating written consent outside the research context. There is a very small but non-zero risk of re-identification of study participants. To reduce the likelihood of this occurring, the following steps have been taken: 1) No identifying information is being collected, such as name, social security numbers, or physical addresses (including zip codes); 2) Data are not collected on name or address of institution to reduce the probability of identification; and 3) Potentially identifying data such as age or educational credentials (i.e. type of clinical specialty) are categorized to avoid the possibility of identifying outlying or unique responses.

Since the study is conducted online, investigators will not obtain face-to-face consent from participants. When participants click the survey link in their email, they will be presented with a consent form explaining the study's purpose, procedures, and their rights as research participants. They can then choose to participate by clicking the 'Agree' button, proceeding to the survey questions, or

decline participation by clicking the 'Disagree' button, in which case the study will terminate. Participation is entirely voluntary, and respondents may choose to leave the study at any point. Participants can also choose to skip any questions they find uncomfortable. This study does not collect any protected personal information, and the self-administration of web questionnaires enables participants to complete the surveys in private settings. We will apply to a central institutional review board (IRB) for ethical review and approval of the entire study; we will also get local approvals in individual countries if required. The Principal Investigator (IA) is responsible for promptly detecting, documenting, and reporting any unanticipated problems and protocol deviations to the central IRB, ensuring that this information is provided in writing within a maximum of 7 days following the event.

Survey administration
CORIS-1 will be conducted as a web survey, with participants receiving invitations via their program's directory-listed email addresses. The invitations will contain a link to the online questionnaire, and responses provided by study participants will be separated from their email addresses, for privacy. Respondents will have the flexibility to complete the survey on various electronic devices such as computers, smartphones, or tablets. Furthermore, they can choose to complete the survey in one session or save their progress and resume later. The estimated time required to answer all survey questions is no more than 30 minutes. The survey will remain open for four months, after which data collection will conclude, and the survey link will be deactivated. There are no financial incentives for participating in the survey.

Data collection for this study will take place on the Chisquares™ survey platform[10], chosen for its advanced features that are tailored to international research (Figure 1). These features include the platform's capability to translate surveys into numerous languages using methods like Crowd Translate™, AI translation, or manual translation. Furthermore, the Chisquares™ survey platform offers industry-standard data encryption for collected information and features quota assignment capabilities. It operates collaboratively, enabling real-time teamwork and cooperation.

Quality assurance (QA)
Logic checks and skip patterns will be integrated into the web survey to ensure each participant views only relevant questions, reducing the risk of erroneous responses. Pretesting, which involves cognitive testing and piloting, will assess question clarity, conciseness, ambiguity, and framing neutrality. Piloting the survey with a small group of individuals who are part of the target population will also verify the functionality of skip patterns and the survey's overall length, diminishing the likelihood of measurement errors. During the study, several strategies will be implemented to bolster survey response rates as part of QA.

Figure 1. Setting up a new survey on the Chisquares Survey Platform
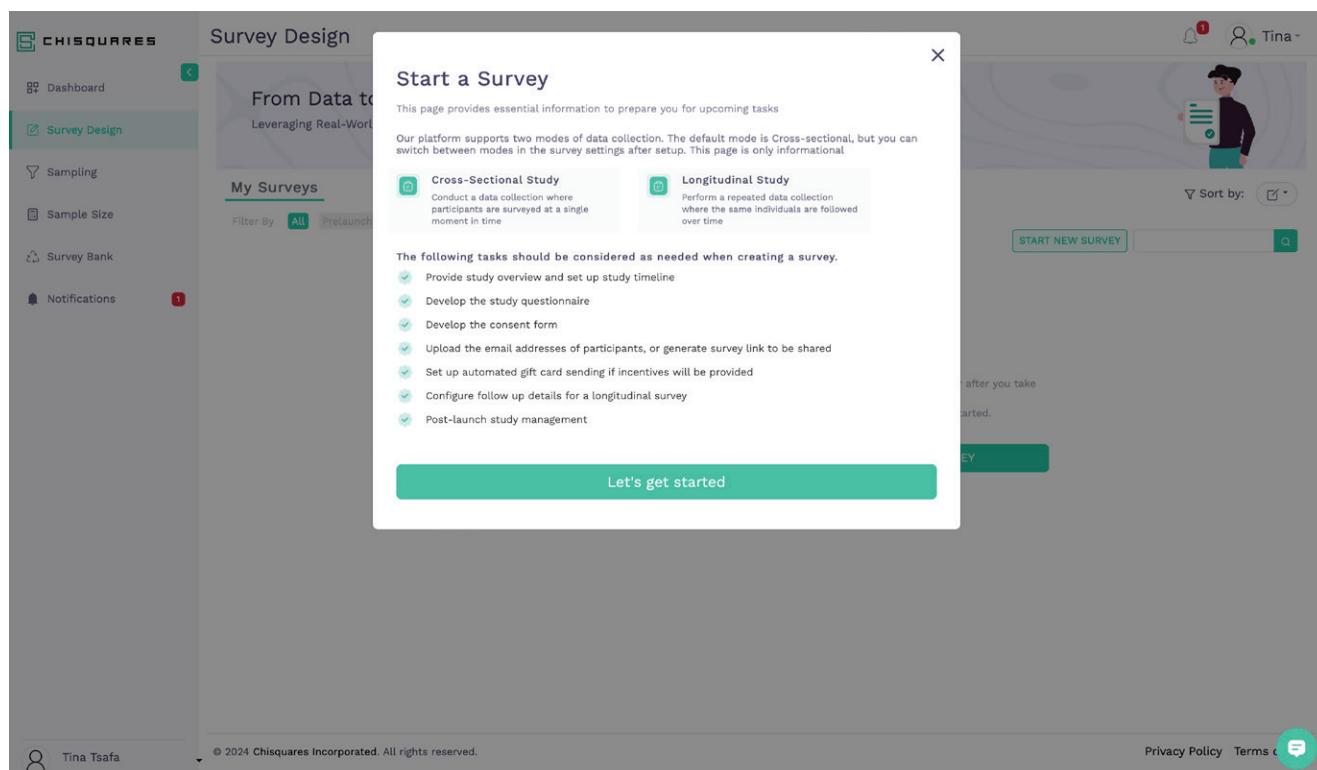
Respondents will receive personalized email links, ensuring a personalized connection. Following the study, we will review each respondent's data quality score, which is automatically generated by the Chisquares™ platform.

The data quality score on the Chisquares platform is derived from a comprehensive evaluation of four distinct indicators. The first indicator, 'Suspected duplicate' assesses records that exhibit significant similarities with other entries in the dataset. This is determined by examining various criteria such as browser/device information, IP addresses, survey completion duration, and patterns of missing values; when three or more of these criteria are met, the record is flagged for potential duplication. The second indicator, 'Straight lining', identifies instances where a participant consistently selects the same letter option within the questionnaire. The third indicator, 'Large-volume missingness', focuses on participants who have not answered ≥10% of the questions for which they were eligible. Lastly, the fourth indicator, 'Speeder', identifies participants who complete the survey at an exceptionally fast rate, classifying as speeders those in the top 5th percentile for the shortest completion times. These four indicators together contribute to the calculation of the data quality score, providing a valuable metric for assessing the quality of responses. Individuals with ≥3 of these suspected problems present will be flagged for manual inspection of all their answers to ensure the integrity of the dataset.

Data management, analysis and publication plan

Upon completion of the study, the data will undergo a thorough cleaning process and be prepared for analysis alongside the codebook and methodology report, which are automatically generated by the Chisquares™ survey platform. All of these materials will be made readily accessible to the public. A steering committee will be established to determine research priorities for publication and share this list with the entire network. Individual collaborators are encouraged to propose additional publication topics in the priority list. The steering committee will conduct a meticulous review to avoid redundant or fragmented research topics. Collaborators will be invited to select their top three publications for potential collaboration. Each identified research title will be assigned a senior researcher who will mentor and guide the collaborative research process towards the successful completion of the manuscript. Periodic live sessions will be conducted to allow those new to research to observe the entire process of developing a scientific article from its inception. All contributors must meet the authorship criteria recommended by the International Committee for Medical Journal Editors (ICMJE)[11].

The collected data will be analyzed in accordance with the objectives developed for the various priority projects. Descriptive analysis will be performed to explore distributions and patterns of responses; counts, means, medians, and percentages will be used. Multivariable analysis will also be performed to explore adjusted relationships between various exposures and outcomes of interest.

Like questionnaire development, manuscript writing will take place on a collaborative platform, facilitating real-time changes by all co-authors and mitigating version control issues. We aim to publish the completed work in peer-reviewed scientific journals, preferably with open-access publishing, aligning with the project's overarching principles. Beyond the identified priority topics, individual collaborators can explore the data for their independent research projects. We will publish the main results from CORIS-1 as a special issue in a peer reviewed journal.

DISCUSSION

CORIS holds importance as it seeks to provide novel data on a wide array of critical issues from personnel in health professions schools internationally. These data have the potential to pinpoint knowledge and practice gaps within the health education sector that require strengthening, encompassing aspects like curriculum, practice, and policy. By exploring these issues, the study seeks to contribute to the broader national and international discourse, fostering tailored interventions and evidence-based decision-making and empowering the next generation of healthcare providers with the knowledge and skills needed to meet the challenges of our rapidly evolving healthcare landscape.

CORIS offers a unique opportunity for experiential learning, particularly beneficial for early career researchers. Engaging in CORIS allows individuals to participate in the complete research process, from sample size calculation and sampling to the iterative journey of questionnaire design, analysis, and manuscript writing. This immersive experience encourages discussions, and dialogues, fostering a comprehensive understanding of study design, implementation, and analysis. While efforts to involve the public in surveys are not entirely new[12], CORIS sets itself apart by soliciting input at the pre-questionnaire stage on a global scale, in real-time, and with an educational focus. Recognizing that survey design, implementation, and analysis are integral to public health that is not always comprehensively taught, CORIS aims to bridge this educational gap. The survey also provides graduate students with the opportunity to add questions to the survey for analysis in their theses or dissertations, thus overcoming a major hurdle related to data access[13-15]. It provides hands-on experience in all aspects of surveys, making it a valuable learning opportunity for early career collaborators.

Limitations

Despite its significance, it is important to note that this study has certain limitations. It is limited in scope, encompassing only 16 countries that may not be entirely representative of their respective regions. Additionally, the line listing of faculty and staff based on school directories may not be entirely complete, correct, or current, which could

potentially introduce non-coverage bias. Additionally, the study's reliance on a web-based format could impede its generalizability. Specifically, data collected via the Internet may exhibit biases favoring demographics more prone to Internet access, such as younger individuals and those with higher socioeconomic status. Moreover, reliance on self-reported outcomes may introduce the potential for misclassification bias.

CONCLUSIONS

CORIS represents an inclusive, innovative research initiative, embracing contributors worldwide to enrich the survey of personnel in health professions schools with diverse perspectives. The currently planned and future cycles of CORIS will assess the knowledge, attitudes, and practices of personnel in health professions schools on various societal health-related matters. Moreover, the CORIS approach is collaborative and offers opportunities for early career researchers to contribute to the mapping of the needs and advancements in health professions education.

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