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Complete List of Authors:	Montagna, Erik; Centro Universitário Saúde ABC, Faculdade de Medicina do ABC (FMABC) Donohoe, Jessica; University College Cork, School of Medicine Zaia, Victor; FMABC Duggan , Eileen ; University College Cork, O'Leary, Paula; University College Cork, School of Medicine Waddington, John; Royal College of Surgeons in Ireland, School of Pharmacy and Biomolecular Sciences; Soochow University, Jiangsu Key Laboratory of Neuropsychiatric Diseases and College of Pharmaceutical Sciences O'Tuathaigh, Colm; University College Cork, School of Medicine
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TRANSITION TO CLINICAL PRACTICE DURING THE COVID-19 PANDEMIC: A QUALITATIVE STUDY OF YOUNG DOCTORS' EXPERIENCES IN BRAZIL AND IRELAND

Erik Montagna [1], Jessica Donohoe [2], Victor Zaia [1], Eileen Duggan [3], Paula O'Leary [2], John Waddington [4, 5], Colm MP O'Tuathaigh [3]

[1] Faculdade de Medicina do ABC (FMABC), Centro Universitário Saúde ABC, Brazil.

[2] School of Medicine, University College Cork, Cork, Ireland.

[3] Medical Education Unit, School of Medicine, University College Cork, Cork, Ireland.

[4] School of Pharmacy and Biomolecular Sciences, Royal College of Surgeons in Ireland, Dublin 2, Ireland.

[5] Jiangsu Key Laboratory of Neuropsychiatric Diseases and College of Pharmaceutical Sciences, Soochow University, Suzhou, Jiangsu, 215123, China.

Address for Corresponding Author:

Dr Colm O'Tuathaigh, Medical Education Unit, School of Medicine, University College Cork, Cork, Ireland. Email: c.otuathaigh@ucc.ie

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ABSTRACT

Objectives: To explore and compare the transition experiences of medical students in Ireland and Brazil during the Covid-19 pandemic, with the aim of identifying better ways to support students as they assume their new professional role.

Design: 27 semi-structured interviews. Transcripts were analysed using qualitative thematic analysis. Cruess' framework of professional socialisation in medicine supported the interpretation of these data.

Setting: Public health hospitals across four Brazilian states (Santa Catarina, São Paulo, Ceará, Paraíba) and County Cork in the South of Ireland.

Participants: Twenty-seven male and female medical junior doctors who had graduated between November 2019-April 2020.

Results: Fourteen Brazilian and 13 Irish junior doctors were interviewed for this study. Entry to clinical practice during the pandemic had a significant impact on factors influencing the professional socialisation of junior doctors. This impact was reflected across the following six thematic areas: lack of preparedness; disrupted trajectory of role adaptation; fewer opportunities for experiential learning; altered interactions with health professionals and patients; challenges to health and wellbeing.

Conclusions: Transition to clinical practice is an important stage in junior doctors' professional socialisation and identity formation. The Covid-19 pandemic created the opportunity for medical students to enter the workforce earlier than usual. Entering the workforce during this period created a lack of confidence among junior doctors concerning the boundaries of their new role and responsibilities, while simultaneously disrupting their social integration. Priorities to mitigate the impact of Covid-19 and future pandemics on this transition are presented.

STRENGTHS AND LIMITATIONS OF THIS STUDY

- This is the first study to employ a detailed and comprehensive qualitative approach to compare the impact of the Covid-19 pandemic on factors influencing the professional socialisation of junior doctors entering clinical practice across two international locations

- Use of a retrospective design precludes any conclusions about the long-term effects of the pandemic on these doctors' professional identity formation

- The study design does not allow us to fully disambiguate transitional challenges unrelated to the current pandemic which are experienced by new medical graduates, relative to concerns which might be exacerbated by Covid-19

INTRODUCTION

Coronavirus disease 2019 (Covid-19) was declared a pandemic by the World Health Organisation (WHO) on March 11th, 2020. It quickly escalated into a global health crisis, prompting an unprecedented emergency public health response from governments worldwide. Such changes have also impacted on delivery of healthcare, including a shift to telehealth for primary care, deferral of scheduled elective procedures, and restructuring of clinical teams. [1]

The first confirmed cases of Covid-19 in the state of São Paulo in Brazil and Ireland were confirmed on February 26th and 29th 2020, respectively. In both locations, the number of confirmed cases grew in a classical exponential curve, with a rapid rate per day (~25%), comparable to that observed in other countries internationally. [2] Within 23 days of the first case, emergency public health decisions were taken in both locations to protect the vulnerable, minimise its impact on health care and reduce community transmission. [3, 4]

Medical education has also been severely impacted by Covid-19, requiring substantive immediate and longer-term adjustments. In line with other University courses, the pandemic gave rise to the closure of medical school campuses and a rapid switch to online-based teaching and assessment. [1, 5] In both Brazil and Ireland students had clinical placements interrupted or cancelled, with many of these activities adapted to virtual learning environments. [6-8] The scale of the public health crisis prompted many medical schools to bring forward graduation, to allow graduates to enter the workforce months earlier than usual. [9-11] Continued provision of medical education in the ongoing pandemic environment has necessitated radical restructuring of curricula and assessment. [9, 12]

The transition from medical school to clinical practice is a time of uncertainty for the medical graduate. How new doctors experience the transition can affect their developing professional

identity [13-15] and these issues can persist beyond the immediate transition period. [16, 17] Assuming the role of junior doctor requires a shift in perspective from the predominant position of observer to that of active participant, adapting to workplace demands and taking on independent responsibility for patient care. [18] A recent study of newly graduated Irish doctors revealed a complex picture of the hopes and fears of medical students at the threshold of clinical practice. [19] The experience of anticipation of transition was characterised by expectation of an abrupt transition, mixed feelings regarding commencing practice and a key role for the hidden curriculum in shaping participants' understanding of what was expected of them. [19] This account is consistent with the theoretical framework proposed by Cruess and colleagues [20, 21], where the transition journey from medical student to doctor is described as one of professional socialisation. This process involves adaptive integration of work-based norms, values, knowledge and expected roles. Therein, significant factors influencing professional socialisation include role models, clinical experience, features of the clinical learning environment, attitudes of colleagues and peers and interactions with patients. [20]

Despite ongoing uncertainty regarding the remaining duration of this pandemic and its sequelae, it is recognised that measures such as social distancing and quarantine periods are likely may be in place for an extended period [22] and that these necessitate exploration and discussion of how best to manage transition to clinical practice under these conditions. [1] Lack of pandemic preparedness may leave students vulnerable to negative physical and mental health outcomes, a particularly relevant challenge for those transitioning from student to doctor. [9] Consequently, examination of the transition experience of junior doctors during public health restrictions, which can vary between countries, is necessary to devise better ways to support students as they assume their new professional role. The specific aim of this study was to explore and compare Brazilian and Irish doctors' expectations and experiences

of entering clinical practice during the Covid-19 pandemic. The results are discussed in the context of Cruess's conceptual framework of medical graduates' professional socialisation.

METHODS

Study Design and Setting

Individual semi-structured interviews with junior doctors who had graduated during either late 2019 or 2020 addressed their experiences of the transition from medical student to junior doctor. This study adopted the Consolidated criteria for reporting qualitative research (COREQ). [23]

Participants were selected through a purposive sampling method. Junior doctor participants were recruited by E.M. (Santo André, Brazil) and J.D. (Cork, Ireland), with the aim of obtaining a gender-balanced sample of junior doctors. Brazilian interviewees comprised recently qualified doctors (2-10 months since graduation) working in the public health service of four different states [Santa Catarina (SC), São Paulo (SP), Ceará (CE), Paraíba (PB)]. Irish interviewees comprised a sample of new medical graduates (< 2 months since graduation) working at Cork University Hospital, a public hospital that is academically affiliated with University College Cork School of Medicine. All participants were approached to participate *via* email or face-to-face, and none of those approached refused to participate or dropped out. Interviews were conducted until thematic saturation was achieved. Neither interview transcripts not thematic results were returned to participants for comment or feedback. E.M. is a non-clinical lecturer in medical education based in the Faculty of Medicine at Centro Universitário Saúde ABC. J.D. is a medical graduate and clinical researcher who commenced her medical internship during May 2020.

Undergraduate medical education programmes in Brazil are typically delivered across three two-year cycles over a six-year period characterised by early emphasis on preclinical science training and at least two years of clerkship rotating across major specialties [24]; the last two years are called the cycle internship (ciclo do internato), where students focus on clinical practice through training in teaching hospitals and clinics. New graduates are permitted to work in general practice and can apply to undertake postgraduate training (i.e. residency). Residency is not mandatory and some medical doctors begin work immediately after medical school, usually in emergency or primary care settings, where many will simultaneously apply to enter residency programmes in specific specialties. In April 2020, in recognition of the pressure on health and care sectors due to Covid-19, the Education Ministry of the Brazilian government issued an ordinance authorizing federal universities to fast-track graduation of medical students who had completed 75% of their internship credits. [25]

Medical education in Ireland begins with a four- to six-year undergraduate university programme. For programmes that are five or six years in length, entry is based on secondary school qualifications, while programmes that are four years in length require previous university degrees. The first two years consists almost entirely of biomedical science subjects and clinical skills teaching, followed by integration of clinical training in the affiliated teaching hospitals and primary care centres during the remaining years in a spiral approach. In contrast to Brazil, where doctors are fully registered upon graduating from medical school, Irish medical school graduates receive only provisional registration and one year of postgraduate experience (internship) in hospital-based medicine is necessary to obtain definitive registration. During April 2020, Irish medical schools expedited graduation of medical students to allow them to start their internship posts early in May 2020. [26]

Data Collection and Analysis

J.D. conducted all Irish interviews and E.M. conducted all Brazilian interviews, each of which were took place in-person (and without others present) in a workplace setting and ranged in duration from 20 to 40 minutes. The interviews were audio-recorded. Irish interview data were transcribed using the Otter (otter.ai) transcription app and C.O.T. reviewed the transcripts against the audio to ensure their accuracy. Brazilian interview data were digitally transcribed using Microsoft Word © and this transcription was then reviewed by E.M. to verify accuracy. The Brazilian-Portuguese transcript was then translated to English using the Google Translate (translate.google.com) service. Finally, each English translation was then jointly reviewed and finalised by C.O.T. and E.M., addressing both grammatical errors and issues related to idioms and expressions. Each transcript was allocated a unique identifier (Cork [CK] 1-13; Brazil [BR] 1-14) according to the order in which the interviews were completed.

A series of questions was developed (based on previous qualitative investigation of the transition to clinical practice [19]) that would allow us to compare both the expectations of junior doctors prior to commencing work and their experiences following one month of practice. The interview guide outlined this study purpose to participants and invited them to reflect on four areas: 1) their expectations concerning transition to clinical practice and how these were influenced by entering the workforce during the Covid-19 pandemic; 2) their experiences at work during the initial month of clinical practice and how these were impacted by working in a pandemic environment; 3) the impact of working as a junior doctors during a pandemic on life outside of the hospital; 4) strategies employed to manage stress in a pandemic working environment.

Interview data was analysed using Braun & Clarke's thematic analysis approach [27], a method for identifying, analysing and reporting themes within qualitative data. Firstly, E.D. and C.O.T. completed an independent analysis of all 27 transcripts using open coding to assign inductive, content-driven labels to interview extracts. C.O.T. reviewed all coded transcripts and created a single, final document that reflected the complete coding scheme. Both researchers (C.O.T., E.D.) met regularly to discuss the initial codes, identify the codes that addressed the research questions, discover relationships across the relevant codes and organize them into themes. Any discrepancies were discussed until consensus was reached. During the final stage of data analysis, meetings were held to review the analyses and to develop the final list of six themes. Throughout, researchers wrote conceptual memos about the initial codes and finalised codes being developed. With respect to reflexivity, both E.D. (with a professional clinical background in midwifery) and C.O.T. (a non-clinical lecturer with a background in translational neuroscience) have worked for many years in medical education, with a particular focus on students in the clinical years of the undergraduate programme. This experience influenced their interpretation of interview data collected here.

Patient and Public Involvement

It was not appropriate or possible to involve patients or the public in the design of this research.

RESULTS

Fourteen Brazilian and 13 Irish junior doctors were recruited and interviewed. In the Brazilian sample, most of the participants were female (8/14, 57%), with an average of 27.4 years (range: 24-35) and the majority (9/14) commenced their post-graduate training during February 2020. In the Irish sample, most of the participants were male (7/13, 54%), with an

average age of 24.9 years (range: 23-32), and all commenced their hospital internship posts during May 2020. Demographic and educational details for participants are available in supplementary table 1.

Six overarching themes emerged from the analysis: lack of preparedness; disrupted trajectory of role adaptation; impact on opportunities for experiential learning; solidarity and isolation; altered interactions with patients; challenges to health and wellbeing. Direct quotes are used to support the interpretations as evidence that they are grounded in the data. Illustrative quotations are provided in Tables 1-6 for each of the themes.

Lack of preparedness

When asked to outline expectations regarding the first two months as a qualified and practicing junior doctor, interviewees reported a strong perception of lack of preparedness (see Table 1 for illustrative comments; C1). Unrelated to the public health situation, their concerns were based on a lack of confidence around managing clinical uncertainty, absence of familiarity with hospital systems (e.g. IT, ordering investigations, etc.), as well as a sharp appreciation of the challenge of translation of theoretical knowledge into practice as a responsible physician (C2, C3). These anxieties were heightened by their expectations concerning starting work during the Covid-19 pandemic, where they reported additional trepidation related to early and abrupt entry to the workforce, lack of preparedness of health systems for the pandemic and a general sense of being "thrown in at the deep end" (C4, C5). When asked to reflect on their first month in the role of junior doctor, lack of preparedness was again cited as a significant factor; this was centred on increased responsibility for patient care and included day-to-day challenges related to case, task and time management, as well as working within hospital systems. Among Brazilian interviewees, these challenges were worsened by the re-organisation of hospital services in response to Covid-19, leading to a

reduction in time available with, and clinical supervision from, senior colleagues (C6). Among Irish interviewees, these challenges were ameliorated by the presence and support provided by senior interns (C7, C8). All respondents confirmed that the undergraduate curriculum could not have better prepared them for their roles as junior doctors working during Covid-19, given its unprecedented nature. However, they recommended that early patient exposure and a greater focus on the practicalities of the professional duties of a junior doctor would lessen the impact of the perceived abruptness of the transition.

Disrupted trajectory of role adaptation

Professional socialisation involves adaptation as junior doctors move from "legitimate peripheral participation" in medicine's community of practice to full participation; this represents a gradual process of acquiring the identity of members of the community. [21] Junior doctors expressed anxiety and a lack of confidence concerning the expectations and boundaries of their new professional role and the added independent responsibility of care (in domains of clinical decision-making, avoidance of medical error), and they expected a trajectory of adaptation to new role and responsibilities (see Table 2 for illustrative comments; C1-6). Both sets of interviewees acknowledged the expectation that confidence would increase with experience and support from senior colleagues, but also expressed concern that this trajectory would be disrupted by reduced clinical opportunities and supervision due to Covid-19 (C7-9). At the end of the first month in their current position, they reported a partial sense of adaptation to the demands of their new role, with anxiety giving way to reassurance based on both increased knowledge and experience, as well as use of evidence-based medicine skills to manage unfamiliar clinical scenarios (C10-11). Negative influences on this process of adaptation were confirmed to include less clinical exposure during the pandemic, due to cancellation of elective procedures and out-patient surgeries, as well as absence of information related to management of Covid-19 patients (C12). Their

concerns extended to training opportunities available during the months ahead. Among both groups, there were concerns that limited clinical exposure and Covid-19-related disruption to medical research (including conduct of research and presentation opportunities; C13) would reduce the competitiveness of their applications to residency or postgraduate training posts. Additionally, they noted that early entry of graduates into the health workplace during 2020, as well as the increase in the number of returning overseas medical graduates, would translate into increased competition for future specialty training positions (C14).

Impact on experiential learning opportunities

Unrelated to the public health situation, interviewees expected an overwhelming workload, long hours and the challenge of managing complex clinical situations (see Table 3 for illustrative comments; C1-3); these concerns were heightened by entering the workforce during Covid-19. They expected "wartime conditions", including long shifts and increased stress related to management of serious Covid-19-related emergencies, yet simultaneously fewer opportunities for gaining clinical experience in preferred areas (C4-5). In particular, the experiences of Brazilian interviewees during the first month reflected these concerns, especially as they relate to Covid-19 adding to case complexity; this added challenge was enhanced by the lack of information around the management of this new diagnosis and the requirement for training in relevant procedural skills (C6-7). In contrast, Irish trainees highlighted that fewer non-Covid-19 patients in hospital during this period meant more time for clinical teaching and closer supervision from senior colleagues (C8-9). Both groups noted that while their undergraduate curriculum provided strong grounding for a generalist, further training in management of complex emergency cases (potentially using simulation methods) and increased training in Covid-19 relevant procedural skills (e.g. intubation), would be beneficial.

Solidarity and isolation

Young doctors' professional socialisation is guided not only by experiential learning opportunities but also by interactions with other doctors and health professionals Here, medical graduates expected that increased independence and responsibilities would be accompanied by support from colleagues when required, especially in relation to managing uncertainty in clinical situations (see Table 4 for illustrative comments; C1). At the same time, they noted that one of the biggest challenges expected of their role would involve working as part of a clinical team and securing the support of senior colleagues (C2). Irish interviewees expected that early entry to the workforce during Covid-19 would be accompanied by extra support from senior colleagues and doctors in internship from the previous year's graduating class who were still in post (C3). Brazilian and (to a lesser extent) Irish doctors noted great camaraderie among medical colleagues, as well as more knowledge-sharing across specialities and additional collaboration during a period of "shared adversity" in that first month of practice (C4-6). They experienced significant inter-professional collaboration and a greater appreciation of the distinct contribution of other hospital-based health professionals. At the same time, both hospital and wider infection control measures, as well as fears regarding contracting Covid-19, meant fewer opportunities for socialisation among trainee peers and for the integration and teamwork that can lead to professional trust (C8-9). Irish doctors also noted the hindrance effect of personal protective equipment (PPE) on inter-professional communication.

Outside of the working environment, both groups noted the isolating effects of working in a hospital with Covid-19 patients, where the obligation to reduce social contact and associated social distancing requirements may reduce social support (including the opportunity to share concerns with peers) during a particularly stressful time (C10).

Altered interactions with patients

In advance of starting work in hospitals, both groups noted that one of the challenges of working with patients during the Covid-19 pandemic would include both interacting with patients in an infection control environment and attempting to give evidence-based information regarding transmission risk and management of Covid-19 to patients in the absence of definitive evidence (see Table 5 for illustrative comments; C1-2). Following one month in post, junior doctors highlighted the disruptive impact of PPE and other infection control measures on doctor-patient communication, as well as other important aspects of clinical interactions (C3). They noted significant patient distrust and anxiety towards the hospital environment (manifesting as avoidance of hospital appointments and investigations) due to fear of contracting Covid-19 from other patients or healthcare workers (C4-5). On the other hand, both sets of interviewees reported hastier functional examinations and less physical examination, to reduce patient time in the clinical area (C6). They also reported greater difficulty in establishing rapport and building empathy with patients and highlighted the need for doctors to focus their efforts on empathic communication in order to allay patients' anxieties and fears, build trust and foster relationships (C7-8). PPE, especially masks, were reported to have a particularly negative impact on communication with elderly and hard-of-hearing patients (C9).

Challenges to health and wellbeing

A sense of personal well-being and the support of family and friends are among the most important influences on a smooth transition to clinical practice and commencement of the professional socialisation process. [28, 29] Both groups reported feelings of generalised anxiety, stress, and insecurity in advance of commencing their first post (see Table 6 for illustrative comments; C1-2). These concerns were in part focused on the personal health risks of

working in a clinical environment during the Covid-19 pandemic and the same comments were recorded following one month of practice (C3). Approximately half of interviewees expressed fears about contracting Covid-19 and three volunteered that they had indeed contracted the disease. Those who reported no fears of contracting the virus or who reported a reduction in their concerns over time emphasised either that they were taking all precautions or that their concerns were assuaged due to nascent understanding of risk stratification for severe Covid-19 illness (C4-5). Brazilian doctors felt adequately protected by available PPE, despite initial access limitations and the variable quantity and quality of PPE during the early stages of the pandemic (C6). While Irish interns confirmed that PPE was available, they noted instances of poor adherence to infection control measures in the clinical areas and highlighted the necessity for senior clinicians to embody such measures so as to constitute appropriate role models (C7). Both groups noted that their undergraduate curriculum had prepared them for working in infection control environments (e.g. gowning, aseptic and handwashing techniques).

Nearly all participants expressed concerns about transmission of infection to family or household members and several interviewees had moved away from home and/or avoided contact with friends or family to mitigate such risk (C8). Those who were not concerned lived alone and/or did not live near family members or have parents/siblings/housemates who also worked in health settings. Two doctors expressed concerns regarding housemates (also doctors) who were either interacting with teams having multidisciplinary contact or based in several different clinical settings (C9). While the majority of interviewees (16/27) across both groups were aware of mental health supports available to junior doctors, those who indicated awareness also stated that they would not be interested in availing of such supports.

DISCUSSION

Here we demonstrate in both Brazil and Ireland that entry to clinical practice during the Covid-19 pandemic impacts adversely on several factors that are known to influence smooth transition, commencement of professional socialisation and professional identity formation in young doctors. The trajectory of professional socialisation is characterised by initially tentative and peripheral participation, followed by progressively fuller engagement via social interactions, during which the doctor's identity aligns with the community's values and norms. [29] Our analysis reveals that the transition into practice during Covid-19 was perceived as more abrupt and stressful than it might otherwise have been, principally due to feelings of being 'thrown in at the deep end' during a period of re-organisation of hospital services, disruption of normal patterns of clinical supervision and fewer experiential learning opportunities, as well as insecurity due to lack of information about transmission and management of Covid-19 and its effect on non-Covid-19 case complexity. Communication with both other health professionals and patients was also judged to be impaired during the Covid-19 pandemic, with quality of communication degraded due to the use of PPE and imposition of other infection control measures. Additionally, typical rapport and empathic communication with patients was replaced by feelings of mutual distrust, as well as a shift towards reduced consultation time with the patient.

Difficulties in adapting to this early period of professional socialisation can result in anxiety, stress, and feelings of burnout among young doctors. [20] Importantly, young doctors are already known to exhibit elevated levels of stress [30, 31] and burnout [32-34], as well as anxiety and/or depression [35, 36] during more typical circumstances. That these symptoms are most pronounced during the immediate period of transition from medical student to doctor [37-40] may increase vulnerability to adversity when making that transition during the Covid-19 pandemic.

Junior doctors across both locations reported increased anxiety during this period due to fears of contracting the virus or passing it on to friends/family. This led many to effectively isolate from their social support networks during what is already a typically stressful period in their training. Congruent with previous reports [18], while interviewees reported a limited awareness of mental health supports and services available to junior doctors, none indicated that they had sought assistance. Indeed, one interviewee commented: "I believe that the professionals, some professionals even feel a little ashamed to say that they follow [attend] these programs" (BR1). While recognising potential stigma associated with accessing help, interviewees paradoxically advised future graduates in the importance of self-care and support-seeking (e.g. "… because if you don't think about yourself, you won't be able to help other people"; BR1).

Our findings elaborate previous reports by identifying many of the transitional challenges experienced by new medical graduates while also identifying Covid-19-related exacerbation of associated concerns. A recent qualitative examination of transition to residency in a sample of US medical school students revealed a similar constellation of themes centered around individual and contextual aspects of the transition experience. [41] These themes described abrupt entry into a busy and unstructured clinical environment that was characterised by ongoing challenges during their interactions with patients and health care team members. Feelings of lack of preparedness and a sense of being "thrown in at the deep end" are also recurring themes in related studies. [18, 19] A recent survey of final year medical students in the UK indicated that almost 60% of students were lacking in confidence and perceived preparedness going into their first intern post during the Covid-19 pandemic. [5] It has been suggested that expedited graduation and placement at the frontline may have exacerbated this transition anxiety. [11] Heightened anxiety at the prospect of transitioning during Covid-19

chimes with anecdotal reports of increased stress among medical graduates starting work during this pandemic. [42]

Clinical experiences with patients and relatives are important in professional socialisation, contributing to the junior doctor's emergent clinical confidence and understanding of the values and behaviours expected in their professional role. [28] The present study reports a decrease in the quantity and quality of such junior doctor-patient interactions. This finding is in line with reports of disrupted doctor-patient communication during the pandemic, where it was noted that "the barrier of isolation has impacted patients and patient care, and has also affected the experience of the physician". [43] Here, interviewees noted that their interactions with elderly and hard-of-hearing patients were particularly affected by PPE measures and similar concerns have been documented elsewhere (e.g. [44]).

Development of strategies for minimising the impact of pandemic-related changes in the clinical environment on the transition experience must focus on areas most affected. These include preparedness for practice, doctors' health and wellbeing, communication with colleagues and patients and experiential learning opportunities. Choi et al. [5] reported that the provision of "student assistantship" rotations offered by selected UK medical schools, where medical students are better integrated within a clinical team so as to develop both their clinical and practical skills, played a key role in enhancing preparedness for medical student transitioning during Covid-19. Reconfiguration of such initiatives could be effective in addressing the needs of junior doctors graduating and transitioning during the Covid-19 (or indeed another) pandemic. Notably, in the present setting Irish junior doctors stated that the acute challenge of adapting to workplace demands following early entry to practice was lessened by the overlapping presence of the previous year's graduates, confirming the value of near-peer support and supervision in facilitating successful transition to practice. [45]

Our data suggest that approaches to promoting resilience in such cohorts must incorporate individual, organisational and cultural commitment to the wellbeing of junior doctors. [46] Resilience-promoting programmes for doctors working during this and other pandemics should specifically focus on enhancing adaptive strategies for coping and building self-efficacy. [9] Interventions targeting any one of these areas can impact in a positive sense across other related domains. For example, it has been noted that activities designed to enhance professional identity formation can build a strong sense of shared social identity that buffers against adverse influences on mental well-being. [28, 47]

Use of a retrospective, qualitative design precludes any conclusions about the long-term effects of transitioning during the pandemic on these doctors' professional identity formation. Additionally, during the timeframe of this study, the impact of the Covid-19 pandemic on healthcare systems was more pronounced in Brazil than in Ireland. The daily number of Covid-19-related hospitalisations and intensive care unit cases across Irish hospitals was in steady decline during the time when Irish doctors were commencing practice. [48] In contrast, the daily number of such Covid-19-related cases in Brazil was rapidly rising during the corresponding period. [49] Thus, although interviewees have identified commonalities across both groups with respect to their transition experiences, these were manifested on a background of differences between the study locations in relation to patterns of Covid-19 transmission and their impacts on health systems during this period.

In summary, optimising the preparation and graduation of qualified doctors is needed now more than any time in living memory. The impact of Covid-19 on undergraduate medical education and preparation for clinical practice is likely to be long-lasting and significant. We have demonstrated in an international sample of young doctors that entering clinical practice during the Covid-19 pandemic affected several factors that influence the process of professional socialisation. The insights arising from this study are expected to inform

undergraduate and postgraduate curricular design and the implementation of appropriate interventions to support transition during the current pandemic.

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DECLARATION OF COMPETING INTERESTS

The authors report no declarations of interest.

CONTRIBUTORS

COT and EM developed the premise of the work. COT, ED, JD, and VZ developed the interview guide, recruited participants, and collected the data. COT, ED, EM, JW, and VZ completed the data analysis. COT, EM, JW, and POL wrote the first draft of the article. All authors edited and commented on multiple drafts of this article and approved the final version of the manuscript.

ETHICS STATEMENT

The Institutional Research Ethics Committee of Centro Universitário Saúde ABC and the Social Research Ethics Committee of University College Cork (07/20) gave approval for this study.

DATA AVAILABILITY STATEMENT

Data are available upon reasonable request. All data relevant to the study are included in the article or uploaded as supplemental information. The data including relevant quotations are contained within the manuscript file. Raw data are stored on an encrypted, secure University network and can be reproduced upon request.

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FIGURES AND TABLE LEGENDS

Table 1 Illustrative comments for the theme "Lack of preparedness"

Table 2 Illustrative comments for the theme "Disrupted trajectory of role adaptation"

Table 3 Illustrative comments for the theme "Impact on experiential learning opportunities"

Table 4 Illustrative comments for the theme "Solidarity and isolation"

Table 5 Illustrative comments for the theme "Altered interactions with patients"

Table 6 Illustrative comments for the theme "Challenges to health and wellbeing"

Table 1 Illustrative comments for the theme "Lack of preparedness"

Interviewee	Comment (C)	Extract
BR10	1	I felt that we left the college very theoretically very well, but that sometimes the practical part was impaired a little. I think that was it.
CK11	2	Will I be able to translate knowledge or whatever knowledge I have into actually being able to do the everyday tasks of the job? And so I think the first couple of months, I was expecting it to be very much kind of flying by the seat of my pants, figuring out things as I go along, hopefully getting better but also being very busy.
BR8	3	So, if you don't have the ability to handle everything at the same time, it's a little difficult at first. And in the beginning you don't know the extensions, who to call, you don't know everyone's name, so it's difficult sometimes. I don't like to call "nurse", I like to call by name. So, that thing of getting together, of making everything flow…
BR2	4	When it started (the pandemic) I was cautious with my choices as a doctor, because I didn't have complete practical experience...
CK7	5	We knew we were starting early. They did give us a lot of time. I suppose it was a bit of a shock. You know, that we're starting a bit earlier. And obviously, we didn't finish college. I suppose I was still as nervous if not more nervous.
BR2	6	Then Covid-19 started and began to separate the "normal" emergency unit and the "Covid-19" emergency unit, you know, that we talk about here. So, there were people who had trauma, only it was normal trauma, and it was possible to resolve it. Except there were people who had a trauma, but had a suspected Covid-19 diagnosis, and all of that changed everything.
CK3	7	I think it's hard to like gauge what you're supposed to be doing. People are telling you to do things that you're not comfortable with, you know, is this where I should be? And then realising no, actually, that's out of my comfort zone. I shouldn't be doing that…but I think I actually think there were less issues these days than there would have been before because I had the other (senior) interns to show us what to do.
CK3	8	It was mixed emotions because on the one hand, I felt that we were being thrown in the deep end...but at the same time, I think I felt a little bit more comfortable in the fact that we were starting early, because there are other interns there to help us and to kind of give us some guidance.

Table 2 Illustrative comments for the theme "Disrupted trajectory of role adaptation"

Interviewee	Comment (C)	Extract
BR9	1	Nervous because we were taking care of people's lives. So we were going to try to treat as best as possible, and we were afraid to do something, because I don't know ... to do something that didn't work out.
CK6	2	I thought I was going to have a lot of responsibility, but it was still a shock when I went in, and people were asking me questions.
BR8	3	That nervousness of responsibility. But, as everything was adjusting, I ended up liking it a lot, right?
CK8	4	I suppose not knowing what would be expected of you and like the limits to your job..and so I think, trying to know what your boundaries are and what you should and shouldn't be expected to do to, like, make sure you're not being taken advantage of kind of thing really.
CK2	5	I found it difficult to get used throughout to what was expected of me. I almost wish I had a job description.
BR3	6	Considering it is the first year, gaining confidence little by little. Taking it day by day.
BR13	7	I thought that at the beginning I would feel a little insecure, but that in the second, third week this security would be much greater…but that hasn't happened very much….I thought it would be really affected (by the pandemic). It was something that we had to work with, over these months, because we are never confident enough.
CK10	8	I seem to be learning a lot on the go, and there's a certain degree of stress associated with not being experienced and being the kind of lowest rung in the ladder but then that that would dissipate over a few months and you probably improve very quickly, hopefully.
CK4	9	Maybe that there would be less interaction with the other people in the team, that there might not be enough (other doctors), like if there was a surge there wouldn't be enough as many people working together, you might be a bit more on your own because there'll be like staffing issues.
BR9	10	Everything for me was new….so, at this point in the last month, I felt much more confident, taking action, discussing cases...in five months of residency it has really changed.
BR5	11	Professionally, today I feel much more secure than when I started. I already conduct myself more firmly in the hospital and have read the scientific articles. So, in this aspect of confidence, I think I have gained a lot of confidence.
BR4	12	I had to deal a lot with Covid-19. Specifically with uncertainty and how to deal with teamwork in the midst of that uncertainty. What was affected by Covid-19 was also the fact that it was a new disease and that I did not feel that I was firm in what I was meant to do.
CK6	13	I guess if you wanted to do any research this wouldn't be a great time for any presentation. There's not any conferences. So I guess that's kind of put on hold for a lot of people
CK4	14	There are so many interns and so many people that didn't get to emigrate that I just think that maybe next year, there might be a problem…I've heard about some interns this year that are finding it difficult to get training posts.

Table 3 Illustrative comments for the theme "Impact on experiential learning opportunities"

Interviewee	Comment (C)	Extract
BR5	1	I always had an idea that it would be quite "busy". I thought that I would be constantly going from one shift to another.
CK4	2	Being on call by yourself for the first time and knowing straightaway when there was a very sick patient that needed like greater attention than just the intern. And then as opposed to something you couldn't deal with, just recognizing initially that there's no time to waste, you know, just pondering over things.
BR8	3	I think the workload is very strenuous. But we know that, these are the years for you to be an expert in that. So you really have to dedicate a lot of hours of to study and work dedication, and this is how you will learn, but I think that nothing prepares you for the feelings.
BR3	4	We were thrown into a kind of war scenario, right? I had my graduation brought forward by almost two months, because I graduate in May, and we were forecasted to graduate in July….However, really, we were thrown into a very unfavorable scenario in terms of working conditions, right? Because they are hospitals, often field hospitals, with patients in a state of health that is often very serious.
CK4	5	I thought that maybe more will be expected of us in terms of how much like we'd have to help out or what new skills we would have to learn like maybe like using ventilators and things like that… like would we have to be trained and all that kind of thing, or was there anything new we needed to learn to be able to like help the patients that had Covid-19.
BR11	6	I think what really impressed me was really the realisation of a challenge that I feared, which was that of dealing with patients very different from what I was used to as an undergraduate student…look, I believe that the pandemic has resulted in patients with even more severe conditions. Despite my residency being in a surgical area, we see many patients with Covid-19 that arrived with conditions that needed surgery such as intestinal obstruction, arterial occlusion and these patients progressed very badly after the surgery because of the viral infection.
BR13	7	But, in relation to Covid-19, I certainly learned a lot in treatment, in decision making, in new therapies that at the beginning of the residency I thought I would not be able to achieve.
CK1	8	The team keeps saying that there's much fewer patients than what they would normally have to do deal with. The fact that we weren't as busy as they were expected gave them a lot of time to just show, like oh yeah this is how you do things.
CK3	9	Definitely as soon as I got in our first week was nice because all the staff were present. And the list wasn't too long. So we were learning things quite nicely, not under pressure.

Table 4 Illustrative comments for the theme "Solidarity and isolation"

Interviewee	Comment (C)	Extract
CK5	1	I kind of watched people in placement and stuff and thought, oh my God, that's, like, way more than I've ever done. A lot of responsibility is definitely scary...and I did kind of get the feeling that you're well supported in the hospitals, just from talking to other interns.
BR3	2	I imagined finding an environment much more, how can I say, aggressive when it comes to competition between colleagues. From what I heard in reports from some colleagues, a more competitive environment, right? And it is quite different from what I expected.
CK8	3	There's a bit of anxiety coming in, in terms of like Covid-19 being everywhere and you know, coming into work in a hospital, the plus side was that we did get all the extra time with the old interns..(we were not) under the stress that you'd normally be under if you're just thrown in the deep end on your own.
BR3	4	I imagined finding a much more competitive scenario, much less united. Perhaps the crisis had an impact on this aspect, bringing a feeling of greater unity between health professionals.
BR10	5	I think that at the time of Covid-19, this relationship became even stronger. I thought that the health professionals got together a lot. I realized that people who previously did not value the services of the nurse, the nursing technician, started to give credit...we take turns to have lunch to avoid crowding, so there was this social distance. But I think the teamwork was better.
CK11	6	I've had no issue, everyone's quite pleasant and nice and (they have) an understanding of our situation, that we're coming in during a time when everyone is quite under stress.
BR4	7	We are in the first year, right ?! We hear that people get to know each other, that they have more contact. I don't know many of my fellow first-year residents.
CK6	8	I think maybe there would be more of a social aspect in the hospital if there's wasn't this (Covid-19), and maybe you'd have a better relationship with your team members.
CK2	9	I do find that the masks definitely (impair communication), maybe with the doctors because you spend more time with them it's grand but like the nurses on the ward sometimes like because you can't be as warm with them, it can almost be like when you're asking them for something that you're telling them to do something.
CK3	10	So I couldn't see my friends as much as I would have liked to, couldn't talk to my friends as much as I would have liked to…. need to just figure it out on my own.

Table 5 Illustrative comments for the theme "Altered interactions with patients"

Interviewee	Comment (C)	Extract
CK11	1	I hadn't anticipated a challenge. That is, I wasn't quite sure how interactions with patients would go. No, because I suppose when we weren't in the hospital, we were sitting at home waiting to start, we didn't know what the story was with people wearing masks and what you do when you interact with a patient.
BR13	2	Because even today we don't know what really makes Covid-19 better, and many people talk about some medications that theoretically would improve it. But we continue research and see that they don't. In fact, they worsen the condition. That was a very big challenge. In this case, you also have to guide the population that what they are asking for is sometimes not the best for them.
BR9	3	It has totally changed, totally changed. We get there and don't even know who the person with the mask is, just see the eyes, have no idea, have no gestures, we can't see if it's pleasing.
CK4	4	I suppose a few patients have been wary of you coming, now it's more that I've got a few questions (from patients) asking have you seen any patients with Covid-19?
BR2	5	Now, first, that they are avoiding going to the emergency room, they don't want to ... they try their hardest not to go. And when they arrive, they arrive very, very anxious, very concerned. They all ask if it's coronavirus, if it's not. I try to explain that I can't make a diagnosis without having an exam, a swab test, a blood test etc. And then, my relationship with them is, sometimes, a difficult thing to try to calm the person down.
BR13	6	I think it was badly damaged (the relationship). We just say "hi, what's going on, I'm going to solve your problem, and bye", there is not much small talk, nor much time for you to discuss issues with the patient and to be a little more careful.
CK3	7	I feel like having my having the mask really affects how I deal with patients, like I feel like when I'm going to see them that I have the mask on they can't see me smiling at them so that they're not as comfortable as it normally would be with me.
BR12	8	I realised that, like this, it demanded more patience, to explain it better... sometimes the population is not sure about the information, they arrive with misconceptions, they arrive with demands, right? Things they're seeing on TV, they then get anxious, come with several demands.
BR5	9	For example, at the hospital there was a patient who was deaf and we ... I don't know sign language and I don't even know if he knew right, and then sometimes I had to take off my mask and talk to see if he did some lip reading. But that was difficult, this communication with him, and I think it was even more difficult due to Covid-19.

Table 6 Illustrative comments for the theme "Challenges to health and wellbeing"

Interviewee	Comment (C)	Extract
BR3	1	On the emotional side, I already imagined it would be quite tense, right? The first jobs, the first days, because it is ... there is an insecurity in relation to medical activity itself, in general, and especially when it comes to a newly graduated professional.
CK8	2	Yeah, with the old interns there, we weren't kind of like thrown in the deep end as you normally would be, but I think definitely…you'd feel kind of apprehensive and I was nervous.
CK4	3	(There are) patients with COVID-19 that like the team might be seeing. You're wary of like who's going into them, which day and then who had been exposed and kind of things like that.
CK5	4	Like at the start, I was definitely worried. But then I realised everyone was wearing masks, and we're all (practicing) very good hygiene. Yeah, so the risk was actually quite low.
BR3	5	I have to confess no. I try to guide myself like this ... based on scientific evidence, understanding that medicine is based on evidence and based on statistics, on scientific evidence of what we have today... the chance of me getting serious getting Covid-19 is very small, very limited.
BR12	6	At first I realised that the issue of PPE and the supply of PPE was very difficult. We had to use it more sparingly, with more care. We noticed that in some moments the quality of the materials would drop, or came from another supplier that was no longer so good.
CK12	7	When I came in first, like, everyone is in on top of each other trying to read charts and they were sitting in like, ICU, anyway, I mean, yeah, there's not much social distancing going on the hospital for sure.
BR7	8	At first I ended up getting away from the family. As I don't live with my parents at home, it made it easier for me. But, for sure, I reduced visits to family members and ended up walking away for fear of transmitting.
CK2	9	At the moment it's me and four other interns in our house but like the four of us work at three different hospitals so that's kind of scary that maybe one of us could give it to another and then bring it from one hospital into a different hospital.

Supplementary Table 1 Demographic characteristics of study participants

Participants	Gender	Age (years)	Home city	Date of Graduation	Date of Entry to Workforce
Brazil (*N* = 14)					
BR1	Male	26	São Paulo	Nov 2019	Feb 2020
BR2	Male	26	São Paulo	Nov 2019	Feb 2020
BR3	Male	35	Guarabira	May 2020	May 2020
BR4	Female	28	São Bernardo do Campo	Nov 2019	Feb 2020
BR5	Female	27	Aracaju	May 2020	May 2020
BR6	Female	25	São Paulo	July 2019	Aug 2019
BR7	Female	27	Rio do Sul	Dec 2019	Feb 2020
BR8	Female	26	Caxias do Sul	Dec 2019	Feb 2020
BR9	Male	33	Sobradinho	Dec 2019	Feb 2020
BR10	Female	26	Santo André	Dec 2019	Feb 2020
BR11	Female	24	Barbalha	Dec 2019	Feb 2020
BR12	Male	27	Natal	July 2019	Aug 2019
BR13	Female	26	Rio Verde	July 2019	Aug 2019
BR14	Male	27	Areado	Dec 2019	Feb 2020
Cork, Ireland (*N* = 13)					
CK1	Male	23	Cork	April 2020	May 2020
CK2	Female	23	Galway	April 2020	May 2020
CK3	Female	24	Cork	April 2020	May 2020
CK4	Female	32	Cork	April 2020	May 2020
CK5	Female	24	Cork	April 2020	May 2020
CK6	Female	25	Cork	April 2020	May 2020
CK7	Female	23	Cork	April 2020	May 2020
CK8	Male	26	Cork	April 2020	May 2020
CK9	Male	24	Cork	April 2020	May 2020
CK10	Male	23	Cork	April 2020	May 2020
CK12	Male	23	Cork	April 2020	May 2020
CK12	Male	27	Dublin	April 2020	May 2020
CK13	Male	27	Not specified, Saudi Arabia	April 2020	May 2020

COREQ (COnsolidated criteria for REporting Qualitative research) Checklist

A checklist of items that should be included in reports of qualitative research. You must report the page number in your manuscript where you consider each of the items listed in this checklist. If you have not included this information, either revise your manuscript accordingly before submitting or note N/A.

Topic	Item No.	Guide Questions/Description	Reported on Page No.
Domain 1: Research team and reflexivity			
Personal characteristics			
Interviewer/facilitator	1	Which author/s conducted the interview or focus group?	
Credentials	2	What were the researcher's credentials? E.g. PhD, MD	
Occupation	3	What was their occupation at the time of the study?	
Gender	4	Was the researcher male or female?	
Experience and training	5	What experience or training did the researcher have?	
Relationship with participants			
Relationship established	6	Was a relationship established prior to study commencement?	
Participant knowledge of the interviewer	7	What did the participants know about the researcher? e.g. personal goals, reasons for doing the research	
Interviewer characteristics	8	What characteristics were reported about the inter viewer/facilitator? e.g. Bias, assumptions, reasons and interests in the research topic	
Domain 2: Study design			
Theoretical framework			
Methodological orientation and Theory	9	What methodological orientation was stated to underpin the study? e.g. grounded theory, discourse analysis, ethnography, phenomenology, content analysis	
Participant selection			
Sampling	10	How were participants selected? e.g. purposive, convenience, consecutive, snowball	
Method of approach	11	How were participants approached? e.g. face-to-face, telephone, mail, email	
Sample size	12	How many participants were in the study?	
Non-participation	13	How many people refused to participate or dropped out? Reasons?	
Setting			
Setting of data collection	14	Where was the data collected? e.g. home, clinic, workplace	
Presence of non-participants	15	Was anyone else present besides the participants and researchers?	
Description of sample	16	What are the important characteristics of the sample? e.g. demographic data, date	
Data collection			
Interview guide	17	Were questions, prompts, guides provided by the authors? Was it pilot tested?	
Repeat interviews	18	Were repeat inter views carried out? If yes, how many?	
Audio/visual recording	19	Did the research use audio or visual recording to collect the data?	
Field notes	20	Were field notes made during and/or after the inter view or focus group?	
Duration	21	What was the duration of the inter views or focus group?	
Data saturation	22	Was data saturation discussed?	
Transcripts returned	23	Were transcripts returned to participants for comment and/or	

Topic	Item No.	Guide Questions/Description	Reported on Page No.
		correction?	
Domain 3: analysis and findings			
Data analysis			
Number of data coders	24	How many data coders coded the data?	
Description of the coding tree	25	Did authors provide a description of the coding tree?	
Derivation of themes	26	Were themes identified in advance or derived from the data?	
Software	27	What software, if applicable, was used to manage the data?	
Participant checking	28	Did participants provide feedback on the findings?	
Reporting			
Quotations presented	29	Were participant quotations presented to illustrate the themes/findings? Was each quotation identified? e.g. participant number	
Data and findings consistent	30	Was there consistency between the data presented and the findings?	
Clarity of major themes	31	Were major themes clearly presented in the findings?	
Clarity of minor themes	32	Is there a description of diverse cases or discussion of minor themes?	

Developed from: Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *International Journal for Quality in Health Care*. 2007. Volume 19, Number 6: pp. 349 – 357

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TRANSITION TO CLINICAL PRACTICE DURING THE COVID-19 PANDEMIC: A QUALITATIVE STUDY OF YOUNG DOCTORS' EXPERIENCES IN BRAZIL AND IRELAND

Erik Montagna [1], Jessica Donohoe [2], Victor Zaia [1], Eileen Duggan [3], Paula O'Leary [2], John Waddington [4, 5], Colm MP O'Tuathaigh [3]

[1] Faculdade de Medicina do ABC (FMABC), Centro Universitário Saúde ABC, Brazil.

[2] School of Medicine, University College Cork, Cork, Ireland.

[3] Medical Education Unit, School of Medicine, University College Cork, Cork, Ireland.

[4] School of Pharmacy and Biomolecular Sciences, Royal College of Surgeons in Ireland, Dublin 2, Ireland.

[5] Jiangsu Key Laboratory of Neuropsychiatric Diseases and College of Pharmaceutical Sciences, Soochow University, Suzhou, Jiangsu, 215123, China.

Address for Corresponding Author:

Dr Colm O'Tuathaigh, Medical Education Unit, School of Medicine, University College Cork, Cork, Ireland. Email: c.otuathaigh@ucc.ie

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ABSTRACT

Objectives: To explore and compare the perspectives of junior doctors in Brazil and Ireland regarding transition and professional socialisation during the Covid-19 pandemic, with the purpose of identifying better ways to support doctors as they assume their new professional role.

Design: 27 semi-structured interviews. Transcripts were analysed using qualitative thematic analysis. Cruess' framework of professional socialisation in medicine supported the interpretation of these data.

Setting: Public health hospitals across four Brazilian states (Santa Catarina, São Paulo, Ceará, Paraíba) and County Cork in the South of Ireland.

Participants: Twenty-seven male and female medical junior doctors who had graduated between November 2019-April 2020.

Results: Fourteen Brazilian and 13 Irish junior doctors were interviewed for this study. Entry to clinical practice during the pandemic had a significant impact on factors influencing the professional socialisation of junior doctors. This impact was reflected across the following six thematic areas: lack of preparedness; disrupted trajectory of role adaptation; fewer opportunities for experiential learning; altered interactions with health professionals and patients; challenges to health and wellbeing.

Conclusions: Transition to clinical practice is an important stage in junior doctors' professional socialisation and identity formation. The Covid-19 pandemic created the opportunity for medical graduates to enter the workforce earlier than usual. Entering the workforce during this period created a lack of confidence among junior doctors concerning the boundaries of their new role and responsibilities, while simultaneously disrupting their

social integration. Priorities to mitigate the impact of Covid-19 and future pandemics on this transition are presented.

STRENGTHS AND LIMITATIONS OF THIS STUDY

- This is the first study to employ a detailed and comprehensive qualitative approach to compare the impact of the Covid-19 pandemic on factors influencing the professional socialisation of junior doctors entering clinical practice across two international locations

- Use of a retrospective design precludes any conclusions about the long-term effects of the pandemic on these doctors' professional identity formation

- The study design does not allow us to fully disambiguate transitional challenges unrelated to the current pandemic which are experienced by junior doctors, relative to concerns which might be exacerbated by Covid-19

INTRODUCTION

Coronavirus disease 2019 (Covid-19) was declared a pandemic by the World Health Organisation (WHO) on March 11th, 2020. It quickly escalated into a global health crisis, prompting an unprecedented emergency public health response from governments worldwide. Such changes have also impacted on delivery of healthcare, including a shift to telehealth for primary care, deferral of scheduled elective procedures, and restructuring of clinical teams. [1]

The first confirmed cases of Covid-19 in the state of São Paulo in Brazil and Ireland were confirmed on February 26th and 29th 2020, respectively. In both locations, the number of confirmed cases grew in a classical exponential curve, with a rapid rate per day (~25%), comparable to that observed in other countries internationally. [2] Within 23 days of the first case, emergency public health decisions were taken in both locations to protect the vulnerable, minimise its impact on health care and reduce community transmission. [3, 4]

Medical education has also been severely impacted by Covid-19, requiring substantive immediate and longer-term adjustments. In line with other University courses, the pandemic gave rise to the closure of medical school campuses and a rapid switch to online-based teaching and assessment. [1, 5] In both Brazil and Ireland students had clinical placements interrupted or cancelled, with many of these activities adapted to virtual learning environments. [6-8] The scale of the public health crisis prompted many medical schools to bring forward graduation, to allow graduates to enter the workforce months earlier than usual. [9-11] Continued provision of medical education in the ongoing pandemic environment has necessitated radical restructuring of curricula and assessment. [9, 12]

The transition from medical school to clinical practice is a time of uncertainty for the new doctor. How they experience the transition can affect their developing professional identity [13-

[15] and these issues can persist beyond the immediate transition period. [16, 17] Assuming the role of junior doctor requires a shift in perspective from the predominant position of observer to that of active participant, adapting to workplace demands and taking on independent responsibility for patient care. [18] A recent study of newly graduated Irish doctors revealed a complex picture of the hopes and fears of medical students at the threshold of clinical practice. [19] The experience of anticipation of transition was characterised by expectation of an abrupt transition, mixed feelings regarding commencing practice and a key role for the hidden curriculum in shaping participants' understanding of what was expected of them. [19] This account is consistent with the theoretical framework proposed by Cruess and colleagues [20, 21], where the transition journey from medical student to doctor is described as one of professional socialisation. This process involves adaptive integration of work-based norms, values, knowledge and expected roles. Therein, significant factors influencing professional socialisation include role models, clinical experience, features of the clinical learning environment, attitudes of colleagues and peers and interactions with patients. [20]

Despite ongoing uncertainty regarding the remaining duration of this pandemic and its sequelae, it is recognised that measures such as social distancing and quarantine periods are likely to be in place for an extended period [22, 23] and that these necessitate exploration and discussion of how best to manage transition to clinical practice under these conditions. [1] Lack of pandemic preparedness may leave medical students vulnerable to negative physical and mental health outcomes, a particularly relevant challenge for those transitioning from student to doctor. [9] Consequently, examination of the transition experience of junior doctors during public health restrictions, which can vary between countries, is necessary to devise better ways to support doctors as they assume their new professional role.

Due to broad similarity in terms of the standardised undergraduate medical curriculum in both countries, as well as the public health circumstances which lead to early entry to frontline service for both sets of medical graduates, we sought to explore and compare Brazilian and Irish doctors' expectations and experiences of entering clinical practice during the Covid-19 pandemic. Specifically, the aim of this study was to examine and compare for the first time the perceptions of junior doctors in both countries regarding the impact of Covid-19 on the transition and professional socialisation process. The results are discussed in the context of Cruess's conceptual framework of junior doctors' professional socialisation.

METHODS

Study design and setting

A descriptive qualitative design was adopted. Individual semi-structured interviews with junior doctors who had graduated during either late 2019 or 2020 addressed their experiences of the transition from medical student to junior doctor. This study adopted the Consolidated criteria for reporting qualitative research (COREQ). [24]

Participants were selected through a purposive sampling method. Junior doctor participants were recruited by E.M. (Santo André, Brazil) and J.D. (Cork, Ireland). All participants were approached to participate via email or face-to-face based on the personal networks of E.M. and J.D. Former students/peers who were asked to distribute the invitation to participate to eligible junior doctors with the aim of obtaining a gender-balanced sample of junior doctors. Additionally, for the Brazilian sample, researchers also sought to recruit a geographically diverse sample including representatives from different regions of Brazil. The only inclusion criteria was that all participants were required to have entered clinical practice during 2019/2020. Two of the Irish junior doctors approached were unable to contribute due to

clinical commitments but none of those approached refused to participate or dropped out. Interviews were conducted until data saturation was achieved. All Brazilian and Irish participants were working in teaching hospitals and clinics at the time of the study. Brazilian interviewees comprised recently qualified doctors (2-10 months since graduation) working in the public health service of four different states [Santa Catarina (SC), São Paulo (SP), Ceará (CE), Paraíba (PB)]. Irish interviewees comprised a sample of new doctors (< 2 months since graduation) working at Cork University Hospital, a public hospital that is academically affiliated with University College Cork School of Medicine.

Undergraduate medical education programmes in Brazil are typically delivered across three two-year cycles over a six-year period characterised by early emphasis on preclinical science training and at least two years of clerkship rotating across major specialties [25]; the last two years are called the cycle internship (ciclo do internato), where students focus on clinical practice through training in teaching hospitals and clinics. Newly qualified doctors are permitted to work in general practice and can apply to undertake postgraduate training (i.e. residency). Residency is not mandatory and some medical doctors begin work immediately after medical school, usually in emergency or primary care settings, where many will simultaneously apply to enter residency programmes in specific specialties. In April 2020, in recognition of the pressure on health and care sectors due to Covid-19, the Education Ministry of the Brazilian government issued an ordinance authorizing federal universities to fast-track graduation of medical students who had completed 75% of their internship credits. [26]

Medical education in Ireland begins with a four- to six-year undergraduate university programme. For programmes that are five or six years in length, entry is based on secondary school qualifications, while programmes that are four years in length require previous university degrees. The first two years consists almost entirely of biomedical science subjects

and clinical skills teaching, followed by integration of clinical training in the affiliated teaching hospitals and primary care centres during the remaining years in a spiral approach. In contrast to Brazil, where doctors are fully registered upon graduating from medical school, Irish medical school graduates receive only provisional registration and one year of postgraduate experience (internship) in hospital-based medicine is necessary to obtain definitive registration. During April 2020, Irish medical schools expedited graduation of medical students to allow them to start their internship posts early in May 2020. [27]

Data collection

A series of questions was developed (based on previous qualitative investigation of the transition to clinical practice [19]) that would allow us to compare both the expectations of junior doctors prior to commencing work and their experiences following one month of practice. The interview guide outlined this study purpose to participants and invited them to reflect on four areas: 1) their expectations concerning transition to clinical practice and how these were influenced by entering the workforce during the Covid-19 pandemic; 2) their experiences at work during the initial month of clinical practice and how these were impacted by working in a pandemic environment; 3) the impact of working as a junior doctors during a pandemic on life outside of the hospital; 4) strategies employed to manage stress in a pandemic working environment.

J.D. conducted all Irish interviews and E.M. conducted all Brazilian interviews, each of which took place in-person (and without others present) or online (using Skye, Zoom, or Facetime) in a workplace setting and ranged in duration from 20 to 40 minutes. All face-to-face interviews were conducted in compliance with ongoing public health measures which were in force during the pandemic at the time of data collection, the most prominent of which

were 2-metre social distancing and mask wearing. Previous studies have suggested that in in-person study interviews are comparable in terms of quality of data collected using video calls.[28] Neither interview transcripts not thematic results were returned to participants for comment or feedback. E.M. is a non-clinical lecturer in medical education based in the Faculty of Medicine at Centro Universitário Saúde ABC. J.D. is a medical graduate and clinical researcher who commenced her medical internship during May 2020.

The interviews were audio-recorded. Irish interview data were transcribed using the Otter (otter.ai) transcription app and C.O.T. reviewed the transcripts against the audio to ensure their accuracy. Brazilian interview data were digitally transcribed using Microsoft Word © and this transcription was then reviewed by E.M. to verify accuracy. The Brazilian-Portuguese transcript was then translated to English using the Google Translate (translate.google.com) service. E.M. and V.Z are Portuguese-English speakers, and they checked the translation accuracy and performed a back translation of the interviews. Finally, each English translation was then jointly reviewed and finalised by C.O.T. and E.M., addressing both grammatical errors and issues related to idioms and expressions. Each transcript was allocated a unique identifier (Cork [CK] 1-13; Brazil [BR] 1-14) according to the order in which the interviews were completed.

Data analysis

Interview data was analysed using Braun & Clarke's thematic analysis approach [29, 30], a method for identifying, analysing and reporting themes within qualitative data. Firstly, E.D. and C.O.T. completed an independent analysis of all 27 transcripts using open coding to assign inductive, content-driven labels to interview extracts. C.O.T. reviewed all coded transcripts and created a single, final document that reflected the complete coding scheme. Both researchers (C.O.T., E.D.) met regularly to discuss the initial codes, identify the codes

that addressed the research questions, discover relationships across the relevant codes and organize them into themes. Any discrepancies were discussed until consensus was reached. During the final stage of data analysis, meetings were held to review the analyses and to develop the final list of six themes. Throughout, researchers wrote conceptual memos about the initial codes and finalised codes being developed.

With respect to reflexivity, both E.D. (with a professional clinical background in midwifery) and C.O.T. (a non-clinical lecturer with a background in translational neuroscience) have worked for many years in medical education, with a particular focus on students in the clinical years of the undergraduate programme. This experience influenced their interpretation of interview data collected here. Additionally, both researchers have previous experience of conducting thematic analysis on semi-structured interview data. [31-33] This experience influenced their interpretation of interview data collected here.

The theoretical lens

The theoretical framework of professional identity formation (PIF) in medical doctors proposed by Cruess and colleagues [20, 21] describes the transfomation from medical student to doctor as one of professional socialisation, where professional identity is a representation of the integration of work-based norms, values, beliefs, knowledge and expected roles. Here, identity formation is affected by several factors including role models, clinical experience, clinical learning environment features, attitudes of colleagues and peers, and interactions with patients (Figure 1). These factors interact with existing traits and support networks to influence the development of a professional identity. [34] This framework [20] was used to inform the interpretation and discussion of study findings. It did not inform the design or development of the interview guide; rather, we conducted a primary level thematic analysis to

determine and identify themes, and, we used Cruess' framework as a conceptual lens for a theory-driven interpretation of the study findings.

Patient and public involvement

It was not appropriate or possible to involve patients or the public in the design of this research.

RESULTS

Fourteen Brazilian and 13 Irish junior doctors were recruited and interviewed. In the Brazilian sample, most of the participants were female (8/14), with an average of 27.4 years (range: 24-35) and the majority (9/14) commenced their post-graduate training during February 2020. In the Irish sample, most of the participants were male (7/13), with an average age of 24.9 years (range: 23-32), and all commenced their hospital internship posts during May 2020. Demographic and educational details for participants are available in supplementary table 1.

Six overarching themes emerged from the analysis: lack of preparedness; disrupted trajectory of role adaptation; impact on opportunities for experiential learning; solidarity and isolation; altered interactions with patients; challenges to health and wellbeing. Direct quotes are used to support the interpretations as evidence that they are grounded in the data. Illustrative quotations are provided in Tables 1-6 for each of the themes.

Lack of preparedness

When asked to outline expectations regarding the first two months as a qualified and practicing junior doctor, interviewees reported a strong perception of lack of preparedness (see Table 1 for illustrative comments; C1). Unrelated to the public health situation, their

concerns were based on a lack of confidence around managing clinical uncertainty, absence of familiarity with hospital systems (e.g. IT, ordering investigations, etc.), as well as a sharp appreciation of the challenge of translation of theoretical knowledge into practice as a responsible physician (C2, C3). These anxieties were heightened by their expectations concerning starting work during the Covid-19 pandemic, where they reported additional trepidation related to early and abrupt entry to the workforce, lack of preparedness of health systems for the pandemic and a general sense of being "thrown in at the deep end" (C4, C5). When asked to reflect on their first month in the role of junior doctor, lack of preparedness was again cited as a significant factor; this was centred on increased responsibility for patient care and included day-to-day challenges related to case, task and time management, as well as working within hospital systems. Among Brazilian interviewees, these challenges were worsened by the re-organisation of hospital services in response to Covid-19, leading to a reduction in time available with, and clinical supervision from, senior colleagues (C6). Among Irish interviewees, these challenges were ameliorated by the presence and support provided by senior interns (C7, C8). All respondents confirmed that the undergraduate curriculum could not have better prepared them for their roles as junior doctors working during Covid-19, given its unprecedented nature. However, they recommended that early patient exposure and a greater focus on the practicalities of the professional duties of a junior doctor would lessen the impact of the perceived abruptness of the transition.

Disrupted trajectory of role adaptation

Junior doctors expressed anxiety and a lack of confidence concerning the expectations and boundaries of their new professional role and the added independent responsibility of care (in domains of clinical decision-making, avoidance of medical error), and they expected a trajectory of adaptation to new role and responsibilities (see Table 2 for illustrative comments; C1-6). Both sets of interviewees acknowledged the expectation that confidence

would increase with experience and support from senior colleagues, but also expressed concern that this trajectory would be disrupted by reduced clinical opportunities and supervision due to Covid-19 (C7-9). At the end of the first month in their current position, they reported a partial sense of adaptation to the demands of their new role, with anxiety giving way to reassurance based on both increased knowledge and experience, as well as use of evidence-based medicine skills to manage unfamiliar clinical scenarios (C10-11). Negative influences on this process of adaptation were confirmed to include less clinical exposure during the pandemic, due to cancellation of elective procedures and out-patient surgeries, as well as absence of information related to management of Covid-19 patients (C12). Their concerns extended to training opportunities available during the months ahead. Among both groups, there were concerns that limited clinical exposure and Covid-19-related disruption to medical research (including conduct of research and presentation opportunities; C13) would reduce the competitiveness of their applications to residency or postgraduate training posts. Additionally, they noted that early entry of graduates into the health workplace during 2020, as well as the increase in the number of returning overseas medical graduates, would translate into increased competition for future specialty training positions (C14).

Impact on experiential learning opportunities

Unrelated to the public health situation, interviewees expected an overwhelming workload, long hours and the challenge of managing complex clinical situations (see Table 3 for illustrative comments; C1-3); these concerns were heightened by entering the workforce during Covid-19. They expected “wartime conditions”, including long shifts and increased stress related to management of serious Covid-19-related emergencies, yet simultaneously fewer opportunities for gaining clinical experience in preferred areas (C4-5). In particular, the experiences of Brazilian interviewees during the first month reflected these concerns, especially as they relate to Covid-19 adding to case complexity; this added challenge was

enhanced by the lack of information around the management of this new diagnosis and the requirement for training in relevant procedural skills (C6-7). In contrast, Irish junior doctors highlighted that fewer non-Covid-19 patients in hospital during this period meant more time for clinical teaching and closer supervision from senior colleagues (C8-9). Both groups noted that while their undergraduate curriculum provided strong grounding for a generalist, further training in management of complex emergency cases (potentially using simulation methods) and increased training in Covid-19 relevant procedural skills (e.g. intubation), would be beneficial.

Solidarity and isolation

Young doctors' professional socialisation is guided not only by experiential learning opportunities but also by interactions with other doctors and health professionals Here, junior doctors expected that increased independence and responsibilities would be accompanied by support from colleagues when required, especially in relation to managing uncertainty in clinical situations (see Table 4 for illustrative comments; C1). At the same time, they noted that one of the biggest challenges expected of their role would involve working as part of a clinical team and securing the support of senior colleagues (C2). Irish interviewees expected that early entry to the workforce during Covid-19 would be accompanied by extra support from senior colleagues and doctors in internship from the previous year's graduating class who were still in post (C3). Brazilian and (to a lesser extent) Irish doctors noted great camaraderie among medical colleagues, as well as more knowledge-sharing across specialities and additional collaboration during a period of "shared adversity" in that first month of practice (C4-6). They experienced significant inter-professional collaboration and a greater appreciation of the distinct contribution of other hospital-based health professionals. At the same time, both hospital and wider infection control measures, as well as fears regarding contracting Covid-19, meant fewer opportunities for socialisation among trainee

peers and for the integration and teamwork that can lead to professional trust (C8-9). Irish doctors also noted the hindrance effect of personal protective equipment (PPE) on inter-professional communication.

Outside of the working environment, both groups noted the isolating effects of working in a hospital with Covid-19 patients, where the obligation to reduce social contact and associated social distancing requirements may reduce social support (including the opportunity to share concerns with peers) during a particularly stressful time (C10).

Altered interactions with patients

In advance of starting work in hospitals, both groups noted that one of the challenges of working with patients during the Covid-19 pandemic would include both interacting with patients in an infection control environment and attempting to give evidence-based information regarding transmission risk and management of Covid-19 to patients in the absence of definitive evidence (see Table 5 for illustrative comments; C1-2). Following one month in post, junior doctors highlighted the disruptive impact of PPE and other infection control measures on doctor-patient communication, as well as other important aspects of clinical interactions (C3). They noted significant patient distrust and anxiety towards the hospital environment (manifesting as avoidance of hospital appointments and investigations) due to fear of contracting Covid-19 from other patients or healthcare workers (C4-5). On the other hand, both sets of interviewees reported hastier functional examinations and less physical examination, to reduce patient time in the clinical area (C6). They also reported greater difficulty in establishing rapport and building empathy with patients and highlighted the need for doctors to focus their efforts on empathic communication in order to allay patients' anxieties and fears, build trust and foster relationships (C7-8). PPE, especially

masks, were reported to have a particularly negative impact on communication with elderly and hard-of-hearing patients (C9).

Challenges to health and wellbeing

Both groups reported feelings of generalised anxiety, stress, and insecurity in advance of commencing their first post (see Table 6 for illustrative comments; C1-2). These concerns were in part focused on the personal health risks of working in a clinical environment during the Covid-19 pandemic and the same comments were recorded following one month of practice (C3). Approximately half of interviewees expressed fears about contracting Covid-19 and three volunteered that they had indeed contracted the disease. Those who reported no fears of contracting the virus or who reported a reduction in their concerns over time emphasised either that they were taking all precautions or that their concerns were assuaged due to nascent understanding of risk stratification for severe Covid-19 illness (C4-5). Brazilian doctors felt adequately protected by available PPE, despite initial access limitations and the variable quantity and quality of PPE during the early stages of the pandemic (C6). While Irish interns confirmed that PPE was available, they noted instances of poor adherence to infection control measures in the clinical areas and highlighted the necessity for senior clinicians to embody such measures so as to constitute appropriate role models (C7). Both groups noted that their undergraduate curriculum had prepared them for working in infection control environments (e.g. gowning, aseptic and handwashing techniques).

Nearly all participants expressed concerns about transmission of infection to family or household members and several interviewees had moved away from home and/or avoided contact with friends or family to mitigate such risk (C8). Those who were not concerned lived alone and/or did not live near family members or have parents/siblings/housemates who also worked in health settings. Two doctors expressed concerns regarding housemates (also

doctors) who were either interacting with teams having multidisciplinary contact or based in several different clinical settings (C9). While the majority of interviewees (16/27) across both groups were aware of mental health supports available to junior doctors, those who indicated awareness also stated that they would not be interested in availing of such supports. One interviewee commented: "I believe that the professionals, some professionals even feel a little ashamed to say that they follow [attend] these programs" (BR1). While recognising potential stigma associated with accessing help, interviewees paradoxically advised future graduates in the importance of self-care and support-seeking (e.g. "… because if you don't think about yourself, you won't be able to help other people"; BR1).

DISCUSSION

Here we demonstrate in both Brazil and Ireland that entry to clinical practice during the Covid-19 pandemic impacts adversely on several factors that are known to influence smooth transition, commencement of professional socialisation and professional identity formation in young doctors. Cruess and colleagues have noted that the trajectory of professional socialisation is characterised by initially tentative and peripheral participation, followed by progressively fuller engagement via social interactions, during which the doctor's identity aligns with the community's values and norms. [34]

Impact of Covid-19 on the transition and professional socialisation of junior doctors

Our analysis reveals that the transition into practice during Covid-19 was perceived as more abrupt and stressful than it might otherwise have been, principally due to feelings of being 'thrown in at the deep end' during a period of re-organisation of hospital services, disruption of normal patterns of clinical supervision and fewer experiential learning opportunities, as well as insecurity due to lack of information about transmission and management of Covid-

19 and its effect on non-Covid-19 case complexity. Communication with both other health professionals and patients was also judged to be impaired during the Covid-19 pandemic, with quality of communication degraded due to the use of PPE and imposition of other infection control measures. Additionally, typical rapport and empathic communication with patients was replaced by feelings of mutual distrust, as well as a shift towards reduced consultation time with the patient.

Our findings elaborate previous reports by identifying many of the transitional challenges experienced by junior doctors while also identifying Covid-19-related exacerbation of associated concerns. A recent qualitative examination of transition to residency in a sample of US doctors revealed a similar constellation of themes centered around individual and contextual aspects of the transition experience. [35] These themes described abrupt entry into a busy and unstructured clinical environment that was characterised by ongoing challenges during their interactions with patients and health care team members. Feelings of lack of preparedness and a sense of being "thrown in at the deep end" are also recurring themes in related studies. [18, 19] A recent survey of final year medical students in the UK indicated that almost 60% of students were lacking in confidence and perceived preparedness going into their first intern post during the Covid-19 pandemic. [5] It has been suggested that expedited graduation and placement at the frontline may have exacerbated this transition anxiety. [11] Heightened anxiety at the prospect of transitioning during Covid-19 chimes with anecdotal reports of increased stress among new doctors starting work during this pandemic. [36]

Professional socialisation involves adaptation as junior doctors move from "legitimate peripheral participation" in medicine's community of practice to full participation [37]; this represents a gradual process of acquiring the identity of members of the community. [21] Cruess's model posits that clinical experiences with patients and relatives are important in professional socialisation, contributing to the junior doctor's emergent clinical confidence

and understanding of the values and behaviours expected in their professional role. [38] The present study reports a decrease in the quantity and quality of such junior doctor-patient interactions. This finding is in line with reports of disrupted doctor-patient communication during the pandemic, where it was noted that "the barrier of isolation has impacted patients and patient care, and has also affected the experience of the physician". [39] Here, interviewees noted that their interactions with elderly and hard-of-hearing patients were particularly affected by PPE measures and similar concerns have been documented elsewhere (e.g. [40]).

Exacerbation of transition-related anxiety during the pandemic

A sense of personal well-being and the support of family and friends are among the most important influences on a smooth transition to clinical practice and commencement of the professional socialisation process. [21, 34] Difficulties in adapting to this early period of professional socialisation can result in anxiety, stress, and feelings of burnout among young doctors. [20] Importantly, young doctors are already known to exhibit elevated levels of stress [39, 40] and burnout [41-43], as well as anxiety and/or depression [44, 45] during more typical circumstances. That these symptoms are most pronounced during the immediate period of transition from medical student to doctor [46-49] may increase vulnerability to adversity when making that transition during the Covid-19 pandemic.

Junior doctors across both locations reported increased anxiety during this period due to fears of contracting the virus or passing it on to friends/family. This led many to effectively isolate from their social support networks during what is already a typically stressful period in their training. In a quantitative survey of palliative care health workers, we have recently demonstrated the profound impact of Covid-19 on personal and professional wellbeing of patient-facing clinicians. [50] Similar to that observed in the current study, among the highest-rated sources of stress were fear of contracting Covid-19 or transmitting it to friends/family,

and reduced social interaction with colleagues. Congruent with previous reports [18], interviewees in the present study reported a limited awareness of mental health supports and services available to junior doctors, none indicated that they had sought assistance. Previous research has also revealed a reluctance among junior doctors to admit to feeling over-stressed, or to access support services, for fear of professional repercussions e.g. they would be perceived as less competent or employable. [51]

Strategies for managing impact of pandemic on the transition experience

Development of strategies for minimising the impact of pandemic-related changes in the clinical environment on the transition experience must focus on areas most affected. These include preparedness for practice, doctors' health and wellbeing, communication with colleagues and patients and experiential learning opportunities. A review of the literature on transition interventions has noted the paucity of rigorous and outcome-focused studies looking at educational interventions targeting areas of unpreparedness. [52] Choi et al. [5] reported that the provision of "student assistantship" rotations offered by selected UK medical schools, where medical students are better integrated within a clinical team so as to develop both their clinical and practical skills, played a key role in enhancing preparedness for medical student transitioning during Covid-19. Reconfiguration of such initiatives could be effective in addressing the needs of junior doctors graduating and transitioning during the Covid-19 (or indeed another) pandemic. Notably, in the present setting Irish junior doctors stated that the acute challenge of adapting to workplace demands following early entry to practice was lessened by the overlapping presence of the previous year's medical graduates, confirming the value of near-peer support and supervision in facilitating successful transition to practice. [53] This is an area which merits further research.

Our data suggest that approaches to promoting resilience in such cohorts must incorporate individual, organisational and cultural commitment to the wellbeing of junior doctors. [54] Resilience-promoting programmes for doctors working during this and other pandemics should specifically focus on enhancing adaptive strategies for coping and building self-efficacy. [9] Interventions targeting any one of these areas can also impact in a positive sense across other related domains. For example, it has been noted that activities designed to enhance professional identity formation can build a strong sense of shared social identity that buffers against adverse influences on mental well-being. [34, 55] Another review of the efficacy of intervention for preventing burnout in junior doctors suggested that structural and organisational strategies (e.g. restrictions in working hours) might also be effective for improving wellbeing of new doctors. [56]

Use of a retrospective, qualitative design precludes any conclusions about the long-term effects of transitioning during the pandemic on these doctors' professional identity formation. Additionally, during the timeframe of this study, the impact of the Covid-19 pandemic on healthcare systems was more pronounced in Brazil than in Ireland. The daily number of Covid-19-related hospitalisations and intensive care unit cases across Irish hospitals was in steady decline during the time when Irish doctors were commencing practice. [57] In contrast, the daily number of such Covid-19-related cases in Brazil was rapidly rising during the corresponding period. [58] Thus, although interviewees have identified commonalities across both groups with respect to their transition experiences, these were manifested on a background of differences between the study locations in relation to patterns of Covid-19 transmission and their impacts on health systems during this period. For example, as outlined in the results section under the "Challenges to health and wellbeing" theme, we note that Brazilian interviewees highlighted the impact of PPE shortages during the early stage of the pandemic crisis, whereas PPE availability was not cited as an issue by our Irish interviewees.

This is because PPE availability for Irish healthcare staff was perceived to be sufficient at the time of data collection (October 2020) compared to earlier in the pandemic (March-April 2020). [59] The cross-sectional design of the study precluded a more nuanced examination of the challenges faced by junior doctors which would likely fluctuate across the phases of the COVID-19 pandemic.

Limitations

One of the limitations of the study is that it may be assumed that the specific work context would have influenced the young doctors' experience during the pandemic, but this factor was not explored in the current analysis. The current sample were based (and in some case rotated through several) across diverse range of hospital-based clinical settings, and previous studies have shown that those with greater direct exposure to Covid-19 patients in terms of proximity and time reported greater levels of stress and anxiety during the first six months of the pandemic. [50] Additionally, the study design does not allow the distinction to be made between transitional challenges unrelated to the current pandemic which are experienced by new medical graduates, relative to concerns which might be exacerbated by Covid-19. This would highlight the need for longitudinal studies which may inform on the professional identity formation of these junior doctors, and the long-term psychological sequelae and supports required. Lastly, despite the identification of common themes across both groups, socio-cultural differences across both locations might have contributed to the results in a manner not measurable using the present design.

Conclusions

In summary, optimising the preparation and graduation of qualified doctors is needed now more than any time in living memory. The impact of Covid-19 on undergraduate medical education and preparation for clinical practice is likely to be long-lasting and significant. We

have demonstrated in an international sample of young doctors that entering clinical practice during the Covid-19 pandemic affected several factors that influence the process of professional socialisation. The insights arising from this study are expected to inform undergraduate and postgraduate curricular design and the implementation of appropriate interventions to support transition during the current pandemic.

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DECLARATION OF COMPETING INTERESTS

The authors report no declarations of interest.

CONTRIBUTORS

COT and EM developed the premise of the work. COT, ED, JD, and VZ developed the interview guide, recruited participants, and collected the data. COT, ED, EM, JW, and VZ completed the data analysis. COT, EM, JW, and POL wrote the first draft of the article. All authors edited and commented on multiple drafts of this article and approved the final version of the manuscript.

ETHICS STATEMENT

The Institutional Research Ethics Committee of Centro Universitário Saúde ABC (CAAE: 40227120.1.0000.0082) and the Social Research Ethics Committee of University College Cork (07/20) gave approval for this study.

DATA AVAILABILITY STATEMENT

Data are available upon reasonable request. All data relevant to the study are included in the article or uploaded as supplemental information. The data including relevant quotations are contained within the manuscript file. Raw data are stored on an encrypted, secure University network and can be reproduced upon request.

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FIGURES AND TABLE LEGENDS

Table 1 Illustrative comments for the theme "Lack of preparedness"

Table 2 Illustrative comments for the theme "Disrupted trajectory of role adaptation"

Table 3 Illustrative comments for the theme "Impact on experiential learning opportunities"

Table 4 Illustrative comments for the theme "Solidarity and isolation"

Table 5 Illustrative comments for the theme "Altered interactions with patients"

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Figure 1 Schematic representation of factors influencing the process of junior doctors' professional socialisation in identity formation, as described in Cruess's conceptual framework [20]

Table 1 Illustrative comments for the theme "Lack of preparedness"

Interviewee	Comment (C)	Extract
BR10	1	I felt that we left the college very theoretically very well, but that sometimes the practical part was impaired a little. I think that was it.
CK11	2	Will I be able to translate knowledge or whatever knowledge I have into actually being able to do the everyday tasks of the job? And so I think the first couple of months, I was expecting it to be very much kind of flying by the seat of my pants, figuring out things as I go along, hopefully getting better but also being very busy.
BR8	3	So, if you don't have the ability to handle everything at the same time, it's a little difficult at first. And in the beginning you don't know the extensions, who to call, you don't know everyone's name, so it's difficult sometimes. I don't like to call "nurse", I like to call by name. So, that thing of getting together, of making everything flow…
BR2	4	When it started (the pandemic) I was cautious with my choices as a doctor, because I didn't have complete practical experience...
CK7	5	We knew we were starting early. They did give us a lot of time. I suppose it was a bit of a shock. You know, that we're starting a bit earlier. And obviously, we didn't finish college. I suppose I was still as nervous if not more nervous.
BR2	6	Then Covid-19 started and began to separate the "normal" emergency unit and the "Covid-19" emergency unit, you know, that we talk about here. So, there were people who had trauma, only it was normal trauma, and it was possible to resolve it. Except there were people who had a trauma, but had a suspected Covid-19 diagnosis, and all of that changed everything.
CK3	7	I think it's hard to like gauge what you're supposed to be doing. People are telling you to do things that you're not comfortable with, you know, is this where I should be? And then realising no, actually, that's out of my comfort zone. I shouldn't be doing that…but I think I actually think there were less issues these days than there would have been before because I had the other (senior) interns to show us what to do.
CK3	8	It was mixed emotions because on the one hand, I felt that we were being thrown in the deep end...but at the same time, I think I felt a little bit more comfortable in the fact that we were starting early, because there are other interns there to help us and to kind of give us some guidance.

Table 2 Illustrative comments for the theme "Disrupted trajectory of role adaptation"

Interviewee	Comment (C)	Extract
BR9	1	Nervous because we were taking care of people's lives. So we were going to try to treat as best as possible, and we were afraid to do something, because I don't know ... to do something that didn't work out.
CK6	2	I thought I was going to have a lot of responsibility, but it was still a shock when I went in, and people were asking me questions.
BR8	3	That nervousness of responsibility. But, as everything was adjusting, I ended up liking it a lot, right?
CK8	4	I suppose not knowing what would be expected of you and like the limits to your job..and so I think, trying to know what your boundaries are and what you should and shouldn't be expected to do to, like, make sure you're not being taken advantage of kind of thing really.
CK2	5	I found it difficult to get used throughout to what was expected of me. I almost wish I had a job description.
BR3	6	Considering it is the first year, gaining confidence little by little. Taking it day by day.
BR13	7	I thought that at the beginning I would feel a little insecure, but that in the second, third week this security would be much greater…but that hasn't happened very much….I thought it would be really affected (by the pandemic). It was something that we had to work with, over these months, because we are never confident enough.
CK10	8	I seem to be learning a lot on the go, and there's a certain degree of stress associated with not being experienced and being the kind of lowest rung in the ladder but then that that would dissipate over a few months and you probably improve very quickly, hopefully.
CK4	9	Maybe that there would be less interaction with the other people in the team, that there might not be enough (other doctors), like if there was a surge there wouldn't be enough as many people working together, you might be a bit more on your own because there'll be like staffing issues.
BR9	10	Everything for me was new….so, at this point in the last month, I felt much more confident, taking action, discussing cases...in five months of residency it has really changed.
BR5	11	Professionally, today I feel much more secure than when I started. I already conduct myself more firmly in the hospital and have read the scientific articles. So, in this aspect of confidence, I think I have gained a lot of confidence.
BR4	12	I had to deal a lot with Covid-19. Specifically with uncertainty and how to deal with teamwork in the midst of that uncertainty. What was affected by Covid-19 was also the fact that it was a new disease and that I did not feel that I was firm in what I was meant to do.
CK6	13	I guess if you wanted to do any research this wouldn't be a great time for any presentation. There's not any conferences. So I guess that's kind of put on hold for a lot of people
CK4	14	There are so many interns and so many people that didn't get to emigrate that I just think that maybe next year, there might be a problem…I've heard about some interns this year that are finding it difficult to get training posts.

Table 3 Illustrative comments for the theme "Impact on experiential learning opportunities"

Interviewee	Comment (C)	Extract
BR5	1	I always had an idea that it would be quite "busy". I thought that I would be constantly going from one shift to another.
CK4	2	Being on call by yourself for the first time and knowing straightaway when there was a very sick patient that needed like greater attention than just the intern. And then as opposed to something you couldn't deal with, just recognizing initially that there's no time to waste, you know, just pondering over things.
BR8	3	I think the workload is very strenuous. But we know that, these are the years for you to be an expert in that. So you really have to dedicate a lot of hours of to study and work dedication, and this is how you will learn, but I think that nothing prepares you for the feelings.
BR3	4	We were thrown into a kind of war scenario, right? I had my graduation brought forward by almost two months, because I graduate in May, and we were forecasted to graduate in July….However, really, we were thrown into a very unfavorable scenario in terms of working conditions, right? Because they are hospitals, often field hospitals, with patients in a state of health that is often very serious.
CK4	5	I thought that maybe more will be expected of us in terms of how much like we'd have to help out or what new skills we would have to learn like maybe like using ventilators and things like that… like would we have to be trained and all that kind of thing, or was there anything new we needed to learn to be able to like help the patients that had Covid-19.
BR11	6	I think what really impressed me was really the realisation of a challenge that I feared, which was that of dealing with patients very different from what I was used to as an undergraduate student…look, I believe that the pandemic has resulted in patients with even more severe conditions. Despite my residency being in a surgical area, we see many patients with Covid-19 that arrived with conditions that needed surgery such as intestinal obstruction, arterial occlusion and these patients progressed very badly after the surgery because of the viral infection.
BR13	7	But, in relation to Covid-19, I certainly learned a lot in treatment, in decision making, in new therapies that at the beginning of the residency I thought I would not be able to achieve.
CK1	8	The team keeps saying that there's much fewer patients than what they would normally have to do deal with. The fact that we weren't as busy as they were expected gave them a lot of time to just show, like oh yeah this is how you do things.
CK3	9	Definitely as soon as I got in our first week was nice because all the staff were present. And the list wasn't too long. So we were learning things quite nicely, not under pressure.

Table 4 Illustrative comments for the theme "Solidarity and isolation"

Interviewee	Comment (C)	Extract
CK5	1	I kind of watched people in placement and stuff and thought, oh my God, that's, like, way more than I've ever done. A lot of responsibility is definitely scary...and I did kind of get the feeling that you're well supported in the hospitals, just from talking to other interns.
BR3	2	I imagined finding an environment much more, how can I say, aggressive when it comes to competition between colleagues. From what I heard in reports from some colleagues, a more competitive environment, right? And it is quite different from what I expected.
CK8	3	There's a bit of anxiety coming in, in terms of like Covid-19 being everywhere and you know, coming into work in a hospital, the plus side was that we did get all the extra time with the old interns..(we were not) under the stress that you'd normally be under if you're just thrown in the deep end on your own.
BR3	4	I imagined finding a much more competitive scenario, much less united. Perhaps the crisis had an impact on this aspect, bringing a feeling of greater unity between health professionals.
BR10	5	I think that at the time of Covid-19, this relationship became even stronger. I thought that the health professionals got together a lot. I realized that people who previously did not value the services of the nurse, the nursing technician, started to give credit...we take turns to have lunch to avoid crowding, so there was this social distance. But I think the teamwork was better.
CK11	6	I've had no issue, everyone's quite pleasant and nice and (they have) an understanding of our situation, that we're coming in during a time when everyone is quite under stress.
BR4	7	We are in the first year, right ?! We hear that people get to know each other, that they have more contact. I don't know many of my fellow first-year residents.
CK6	8	I think maybe there would be more of a social aspect in the hospital if there's wasn't this (Covid-19), and maybe you'd have a better relationship with your team members.
CK2	9	I do find that the masks definitely (impair communication), maybe with the doctors because you spend more time with them it's grand but like the nurses on the ward sometimes like because you can't be as warm with them, it can almost be like when you're asking them for something that you're telling them to do something.
CK3	10	So I couldn't see my friends as much as I would have liked to, couldn't talk to my friends as much as I would have liked to…. need to just figure it out on my own.

Table 5 Illustrative comments for the theme "Altered interactions with patients"

Interviewee	Comment (C)	Extract
CK11	1	I hadn't anticipated a challenge. That is, I wasn't quite sure how interactions with patients would go. No, because I suppose when we weren't in the hospital, we were sitting at home waiting to start, we didn't know what the story was with people wearing masks and what you do when you interact with a patient.
BR13	2	Because even today we don't know what really makes Covid-19 better, and many people talk about some medications that theoretically would improve it. But we continue research and see that they don't. In fact, they worsen the condition. That was a very big challenge. In this case, you also have to guide the population that what they are asking for is sometimes not the best for them.
BR9	3	It has totally changed, totally changed. We get there and don't even know who the person with the mask is, just see the eyes, have no idea, have no gestures, we can't see if it's pleasing.
CK4	4	I suppose a few patients have been wary of you coming, now it's more that I've got a few questions (from patients) asking have you seen any patients with Covid-19?
BR2	5	Now, first, that they are avoiding going to the emergency room, they don't want to ... they try their hardest not to go. And when they arrive, they arrive very, very anxious, very concerned. They all ask if it's coronavirus, if it's not. I try to explain that I can't make a diagnosis without having an exam, a swab test, a blood test etc. And then, my relationship with them is, sometimes, a difficult thing to try to calm the person down.
BR13	6	I think it was badly damaged (the relationship). We just say "hi, what's going on, I'm going to solve your problem, and bye", there is not much small talk, nor much time for you to discuss issues with the patient and to be a little more careful.
CK3	7	I feel like having my having the mask really affects how I deal with patients, like I feel like when I'm going to see them that I have the mask on they can't see me smiling at them so that they're not as comfortable as it normally would be with me.
BR12	8	I realised that, like this, it demanded more patience, to explain it better... sometimes the population is not sure about the information, they arrive with misconceptions, they arrive with demands, right? Things they're seeing on TV, they then get anxious, come with several demands.
BR5	9	For example, at the hospital there was a patient who was deaf and we ... I don't know sign language and I don't even know if he knew right, and then sometimes I had to take off my mask and talk to see if he did some lip reading. But that was difficult, this communication with him, and I think it was even more difficult due to Covid-19.

Table 6 Illustrative comments for the theme "Challenges to health and wellbeing"

Interviewee	Comment (C)	Extract
BR3	1	On the emotional side, I already imagined it would be quite tense, right? The first jobs, the first days, because it is ... there is an insecurity in relation to medical activity itself, in general, and especially when it comes to a newly graduated professional.
CK8	2	Yeah, with the old interns there, we weren't kind of like thrown in the deep end as you normally would be, but I think definitely…you'd feel kind of apprehensive and I was nervous.
CK4	3	(There are) patients with COVID-19 that like the team might be seeing. You're wary of like who's going into them, which day and then who had been exposed and kind of things like that.
CK5	4	Like at the start, I was definitely worried. But then I realised everyone was wearing masks, and we're all (practicing) very good hygiene. Yeah, so the risk was actually quite low.
BR3	5	I have to confess no. I try to guide myself like this ... based on scientific evidence, understanding that medicine is based on evidence and based on statistics, on scientific evidence of what we have today... the chance of me getting serious getting Covid-19 is very small, very limited.
BR12	6	At first I realised that the issue of PPE and the supply of PPE was very difficult. We had to use it more sparingly, with more care. We noticed that in some moments the quality of the materials would drop, or came from another supplier that was no longer so good.
CK12	7	When I came in first, like, everyone is in on top of each other trying to read charts and they were sitting in like, ICU, anyway, I mean, yeah, there's not much social distancing going on the hospital for sure.
BR7	8	At first I ended up getting away from the family. As I don't live with my parents at home, it made it easier for me. But, for sure, I reduced visits to family members and ended up walking away for fear of transmitting.
CK2	9	At the moment it's me and four other interns in our house but like the four of us work at three different hospitals so that's kind of scary that maybe one of us could give it to another and then bring it from one hospital into a different hospital.

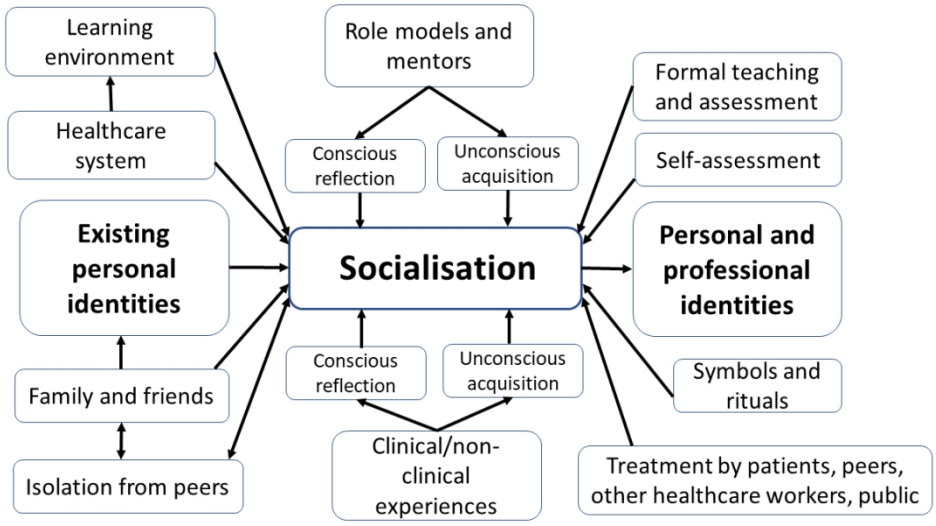

Figure 1 Schematic representation of factors influencing the process of junior doctors' professional socialisation in identity formation, as described in Cruess's conceptual framework [20]

338x190mm (96 x 96 DPI)

Supplementary Table 1 Demographic characteristics of study participants

Participants	Gender	Age Range (years)	Date of Graduation	Date of Entry to Workforce
BR1	Male	25-30	Nov 2019	Feb 2020
BR2	Male	25-30	Nov 2019	Feb 2020
BR3	Male	30-35	May 2020	May 2020
BR4	Female	25-30	Nov 2019	Feb 2020
BR5	Female	25-30	May 2020	May 2020
BR6	Female	25-30	July 2019	Aug 2019
BR7	Female	25-30	Dec 2019	Feb 2020
BR8	Female	25-30	Dec 2019	Feb 2020
BR9	Male	30-35	Dec 2019	Feb 2020
BR10	Female	25-30	Dec 2019	Feb 2020
BR11	Female	20-25	Dec 2019	Feb 2020
BR12	Male	25-30	July 2019	Aug 2019
BR13	Female	25-30	July 2019	Aug 2019
BR14	Male	25-30	Dec 2019	Feb 2020
CK1	Male	20-25	April 2020	May 2020
CK2	Female	20-25	April 2020	May 2020
CK3	Female	20-25	April 2020	May 2020
CK4	Female	30-35	April 2020	May 2020
CK5	Female	20-25	April 2020	May 2020
CK6	Female	25-30	April 2020	May 2020
CK7	Female	20-25	April 2020	May 2020
CK8	Male	25-30	April 2020	May 2020
CK9	Male	20-25	April 2020	May 2020
CK10	Male	20-25	April 2020	May 2020
CK12	Male	20-25	April 2020	May 2020
CK12	Male	25-30	April 2020	May 2020
CK13	Male	25-30	April 2020	May 2020

Interview Guide

Expectations of Internship/Residency during Covid-19

Prior to starting work as an intern/resident, what did you think it would be like during the first couple of months working as an intern/resident?

To what extent were your expectations affected by the fact that you were starting work during the Covid-19 public health situation?

How did you expect you would be spending the working day?

How confident did you expect to feel in your work?

Probe: Do you think that confidence was affected by the circumstances of starting work during Covid-19?

Unrelated to the public health situation, what were the biggest challenges you expected to encounter as an intern/resident? In the weeks before you started, did you anticipate any new challenges related to Covid-19?

How well do you feel the undergraduate curriculum has prepared you for internship/residency during the Covid-19 pandemic?

Perceptions of First Month Working as an Intern/Resident

Looking back on your first month in the role of intern/resident, what were the biggest challenges you faced initially? how many of those do you think were related to working during the Covid-19 health crisis?

Probe: What kind of challenges did you encounter?

How did the experience of the last month compare to your expectations of starting as an intern/resident in the time of Covid-19?

What kind of work did you spend your time doing during the past month?

How were your relationships with other doctors and allied healthcare professionals, and do you think that the Covid-19 crisis has impacted upon those interactions?

Probe: Have infection control measures including social distancing affected those relationships and interactions?

How were your interactions with patients during the past month, and do you think that the Covid-19 crisis has impacted upon those interactions?

Probe: Have infection control measures including social distancing affected those relationships and interactions?

Have you had any concerns in relation to contracting Covid-19 yourself working in the healthcare setting?

Were you concerned about the possible transmission of Covid-19 to family/household members?

Have you felt protected with adequate protective measures and supplies working during the Covid-19 pandemic?

Preparing Doctors to Work in a Pandemic

How could the undergraduate curriculum have prepared you better to work in a pandemic environment?

Do you have any concerns regarding training opportunities available to you as an intern/resident during the months ahead?

Are you aware of mental health supports available to interns/residents?

What would you tell a medical student a few weeks from graduation if they asked you for advice about how to prepare for internship/residency in the current Covid-19 environment?

COREQ (COnsolidated criteria for REporting Qualitative research) Checklist

A checklist of items that should be included in reports of qualitative research. You must report the page number in your manuscript where you consider each of the items listed in this checklist. If you have not included this information, either revise your manuscript accordingly before submitting or note N/A.

Topic	Item No.	Guide Questions/Description	Reported on Page No.
Domain 1: Research team and reflexivity			
Personal characteristics			
Interviewer/facilitator	1	Which author/s conducted the interview or focus group?	
Credentials	2	What were the researcher's credentials? E.g. PhD, MD	
Occupation	3	What was their occupation at the time of the study?	
Gender	4	Was the researcher male or female?	
Experience and training	5	What experience or training did the researcher have?	
Relationship with participants			
Relationship established	6	Was a relationship established prior to study commencement?	
Participant knowledge of the interviewer	7	What did the participants know about the researcher? e.g. personal goals, reasons for doing the research	
Interviewer characteristics	8	What characteristics were reported about the inter viewer/facilitator? e.g. Bias, assumptions, reasons and interests in the research topic	
Domain 2: Study design			
Theoretical framework			
Methodological orientation and Theory	9	What methodological orientation was stated to underpin the study? e.g. grounded theory, discourse analysis, ethnography, phenomenology, content analysis	
Participant selection			
Sampling	10	How were participants selected? e.g. purposive, convenience, consecutive, snowball	
Method of approach	11	How were participants approached? e.g. face-to-face, telephone, mail, email	
Sample size	12	How many participants were in the study?	
Non-participation	13	How many people refused to participate or dropped out? Reasons?	
Setting			
Setting of data collection	14	Where was the data collected? e.g. home, clinic, workplace	
Presence of non-participants	15	Was anyone else present besides the participants and researchers?	
Description of sample	16	What are the important characteristics of the sample? e.g. demographic data, date	
Data collection			
Interview guide	17	Were questions, prompts, guides provided by the authors? Was it pilot tested?	
Repeat interviews	18	Were repeat inter views carried out? If yes, how many?	
Audio/visual recording	19	Did the research use audio or visual recording to collect the data?	
Field notes	20	Were field notes made during and/or after the inter view or focus group?	
Duration	21	What was the duration of the inter views or focus group?	
Data saturation	22	Was data saturation discussed?	
Transcripts returned	23	Were transcripts returned to participants for comment and/or	

Topic	Item No.	Guide Questions/Description	Reported on Page No.
		correction?	
Domain 3: analysis and findings			
Data analysis			
Number of data coders	24	How many data coders coded the data?	
Description of the coding tree	25	Did authors provide a description of the coding tree?	
Derivation of themes	26	Were themes identified in advance or derived from the data?	
Software	27	What software, if applicable, was used to manage the data?	
Participant checking	28	Did participants provide feedback on the findings?	
Reporting			
Quotations presented	29	Were participant quotations presented to illustrate the themes/findings? Was each quotation identified? e.g. participant number	
Data and findings consistent	30	Was there consistency between the data presented and the findings?	
Clarity of major themes	31	Were major themes clearly presented in the findings?	
Clarity of minor themes	32	Is there a description of diverse cases or discussion of minor themes?	

Developed from: Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *International Journal for Quality in Health Care*. 2007. Volume 19, Number 6: pp. 349 – 357

Once you have completed this checklist, please save a copy and upload it as part of your submission. DO NOT include this checklist as part of the main manuscript document. It must be uploaded as a separate file.