Mapping and optimising infection prevention and control in long-term and primary care

Summary

The (re)emergence of infectious diseases and antimicrobial resistance presents risks to patient safety, necessitating adequate infection prevention and control (IPC) to minimise the transmission risk in healthcare settings. Despite previous research and IPC promotion in hospital settings, similar efforts are lacking in long-term and primary care settings.

Effective implementation of IPC is crucial for optimal IPC practices. IPC implementation depends on individual behavioural change, organisational facilitation, and policies and regulatory frameworks that direct IPC strategies. In recognising the interplay and dynamic relationships of various influences across micro, meso, and macro levels, this thesis adopts a **systems perspective**.

The studies described in this thesis examined the status of IPC in long-term and primary care settings and identified factors that hinder or facilitate its implementation, to provide valuable insights for the development and implementation of evidence-based strategies to improve and sustain IPC.

For this thesis, a **mixed methods research approach** was employed, including qualitative studies (section 1) and quantitative studies (section 2). All studies in this thesis considered the input of professionals **(professional assessment)**, which enhances the potential for success of future IPC improvement strategies as they align with the needs of the workplace.

Section 1: Qualitative studies

Institutional care environments, such as residential care facilities for individuals with intellectual and developmental disabilities (IDDs) (hereafter referred to as disability care facilities to improve readability) or psychiatric institutions, are high-risk settings for the emergence and spread of infections and antimicrobial-resistant agents. This underscores the importance of IPC.

Chapter 2 presents a qualitative study (before the COVID-19 pandemic) examining barriers and facilitators to IPC in ***disability care facilities*** through a theory-informed approach. Findings revealed barriers and facilitators on multiple levels, with a preliminary need for tailored IPC guidelines, attitude shifts among professionals, and organisational prioritisation to improve IPC implementation. The findings highlighted the need for tailored IPC improvement strategies, given the

heterogeneous character of disability care (different professionals, clients, and care needs). Based on these qualitative findings and existing behaviour change and implementation science theories, we proposed an integrated theoretical framework to identify barriers and facilitators to IPC implementation within healthcare facilities.

In **Chapter 3**, we examined barriers and facilitators to IPC in ***psychiatric institutions*** through a qualitative study (before the COVID-19 pandemic), employing a similar theoretical framework as in Chapter 2. Findings indicated that psychiatric institutions face challenges in IPC implementation, influenced by patient behaviour, professional knowledge gaps, and financial and material resource limitations at the organisational level. The findings emphasised the importance of striking a balance between IPC requirements and mental health care to sustain IPC in these settings. To facilitate this, an initial recommendation is to appoint a professional responsible for IPC and coordinate its sustained implementation.

Adequate IPC in general practices is important to safeguard healthcare workers (HCWs) and patients from infections and ensure high-quality care delivery. In **Chapter 4**, we addressed behavioural determinants shaping IPC behaviour in ***general practices***, including pre-, during, and post-COVID-19 pandemic reflections. Findings demonstrated heightened awareness of the importance of IPC during the pandemic compared to the pre-pandemic period. HCWs see IPC as part of their professional responsibility, yet acknowledge the need to balance it with other aspects of patient care. The decision to adhere to IPC is dependent on the individual general practitioner (GP) and is influenced by various infection transmission risk assessments and sustainability considerations. Main barriers to IPC included resource and material availability (e.g., shortage of personal protective equipment, especially during the first wave of the pandemic), and the GP practice building and layout (e.g., lack of separate entrances and exits to regulate patient flow). The social environment can reinforce IPC behaviours (e.g., exemplary behaviour). Recommendations to enhance IPC in general practices are to implement continuous education, integrate IPC in work routines and organisational workflows, refine existing IPC protocols by incorporating decision-making tools for HCWs, foster a culture of IPC through knowledge-sharing and teamwork, and address barriers in the GP practice physical environment and IPC resources.

During the COVID-19 pandemic, general practices re-evaluated their organisation and implementation of IPC. In **Chapter 5**, we examined HCWs' experiences and perspectives on the implementation and organisation of IPC in ***general practices*** before and during the COVID-19 pandemic, and addressed its implications for post-pandemic IPC implementation. Findings suggested a shift towards comprehensive IPC implementation and organisation during the pandemic compared to before the pandemic. With the emergence of the Omicron variant, some general practices retained a broad range of IPC measures, while others released most measures. HCWs had varying expectations regarding post-pandemic IPC implementation, with some anticipating returning to the pe-pandemic standard, while others expecting IPC to be structurally scaled up during respiratory epidemics. The findings underscore lessons learned from the pandemic, advocating for the strengthening of collaboration within primary care, and interdisciplinary collaboration between primary care, public health, and secondary care.

Section 2: Quantitative studies

Individuals with intellectual and developmental disabilities (IDDs) are at an increased risk of contracting infections due to their susceptibility and the care environment in which they reside, including close staff-patient contact and close living conditions. Compliance of HCWs with IPC is crucial to protect this vulnerable patient population. However, no previous study examined HCWs' compliance with IPC in a disability care setting. In **Chapter 6**, we assessed levels of self-reported compliance with IPC among HCWs in ***disability care facilities*** during the COVID-19 pandemic. Results of our online questionnaire demonstrated suboptimal compliance levels, with only ~30% of HCWs having sufficient compliance (defined as compliance with ≥80% of IPC practices). Non-medical professionals complied with IPC less frequently (social workers, 24.2%; behavioural specialists, 12.9%) than medical professionals (47.4%) ($p<0.001$). Since IPC compliance varies among professionals, it is recommended to 1) implement tailored education and training programmes, and 2) pursue a facility-wide minimum required IPC compliance. Implementing and communicating a minimum set of IPC procedures – including hand hygiene, personal hygiene, and clothing requirements – applying to all professionals is important to minimise the infection transmission risk in disability care facilities.

As HCWs' compliance with IPC in ***disability care facilities*** is reported to be suboptimal (Chapter 6), in **Chapter 7**, we examined psychosocial determinants associated with IPC non-compliance in this setting, to inform IPC policy and promotion programmes for adequate IPC behaviour. Results from our online questionnaire indicated that women (OR: 3.57; 1.73-7.37) and non-medical professionals had increased odds of non-compliance (social workers, OR: 2.83; 1.65-4.85; behavioural specialists, OR: 6.09; 1.98-18.72). Perceived inadequate education/training (aOR: 1.62; 1.15-2.27) and perceived time constraints/competing priorities (aOR: 1.43; 1.03-1.98) were also associated with increased odds of non-compliance, independent of sociodemographic variables. In contrast, the belief that the supervisor complies with IPC (descriptive norm supervisor) was associated with decreased odds of non-compliance (aOR: 0.60; 0.41-0.88). These findings suggest that tailored and structural IPC education and training programmes (e.g., on-the-job training) should be implemented to increase HCWs' capabilities and bridge the IPC compliance gap between medical and non-medical professionals. Furthermore, role models — particularly supervisors — are crucial for promoting IPC behaviour. It is recommended that facilities create a culture of IPC compliance by norm-setting, acting on, and modelling IPC behaviours at all levels of the organisation (management, medical, and non-medical staff).

Adequate IPC implementation requires more than individual behaviour change. Effective IPC implementation is influenced by factors on various levels, including client, interpersonal, organisational, care sector, and policy factors. In **Chapter 8**, we assessed perceived multilevel barriers to and facilitators of IPC in ***disability care facilities***, along with recommendations to improve IPC, to inform the development of targeted interventions. The findings of our online questionnaire revealed the following most important barriers: the client group (e.g., lack of hygiene awareness) (63%), competing values between IPC and the home-like environment (42%), high work pressure (39%), and the overwhelming quantity of guidelines/protocols (33%). Most reported facilitators included perceived social support between professionals and from supervisors (90% and 80%, respectively), procedural clarity of guidelines (83%), and the sense of urgency for IPC in the organisation (74%). Main recommendations reported by professionals included the implementation of clear IPC policies and regulations (86%), the development of a practical IPC guideline (84%), and the introduction of structural education and training programmes (for new staff members) (85%). Professionals also emphasised the need for IPC improvement efforts to be tailored to the local care context, and to involve clients

and their relatives. It is recommended for IPC improvement strategies to involve clients (and relatives), develop a practical and context-specific IPC guideline, encourage social support among colleagues through interprofessional coaching, reduce workload, and foster an IPC culture including shared responsibility within the organisation.

Long-term care facilities (LTCFs) have been disproportionately impacted by COVID-19. To prevent and control future outbreaks and protect the vulnerable elderly population, it is essential to understand which factors contribute to the spread of infectious diseases, including COVID-19, in LTCFs. **Chapter 9** presents the findings of a retrospective cohort study that assessed facility-and ward-level factors associated with SARS-CoV-2 outbreaks among residents in ***LTCFs***. The findings of our multilevel analyses suggested that structural organisation characteristics — such as mechanical recirculation of air, large ward size, the ward type of psychogeriatric care — and the transmission risk by HCWs contribute to outbreak occurrences. Recommended strategies to mitigate facility and local infection transmission include the implementation of policies and protocols on reducing resident density, staff movement, and mechanical recirculation of air. Additionally, targeted strategies aimed at psychogeriatric residents are recommended to reduce the increased infection risk this group faces.

Lastly, in **Chapter 10**, we emphasised the need to improve IPC from a systems perspective, acknowledging the interconnectedness of IPC across individual behaviour, social influences, organisational dynamics, care sector-specific characteristics, and societal/policy contexts. Moreover, we highlighted the need for IPC improvement strategies to be sector-specific and context-sensitive. We formulated sector-specific recommendations to promote and sustain IPC in long-term and primary care settings. Integration of IPC into organisational quality improvement cycles and policy frameworks — including input from professionals — is crucial for sustainable and effective IPC implementation.