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Online Spaces and the control of communicable diseases: Implications for nursing practice

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Abstract
The digital revolution has significantly impacted healthcare and communicable disease control worldwide, with online spaces emerging as vital tools in managing and mitigating the spread of diseases. This article explores the role of online spaces, such as social media networks, forums, blogs, and telehealth services, in the prevention and control of communicable diseases and how these spaces relate to nursing practice.

Keywords: To be drawn from the Nursing Standard taxonomy

Introduction

The digital revolution has transformed various aspects of human life, and healthcare and has achieved penetration globally. According to Internetworldstats.com, a website which consolidates data indicating internet service usage from various national and international sources, an estimated 67.9% of the population globally are using the internet including 89.2% of Europeans with 95% of people in the UK using Facebook (data are estimates for 2023).

Online spaces, in the form of social media networks, forums, blogs, podcasts, apps and online information sources have emerged as powerful tools for managing and controlling communicable diseases. A recent review of the evidence on the use of social media for surveillance of communicable disease including seasonal influenza indicate it is an effective adjunct to traditional surveillance modalities (Pilipiec et al 2023). However, it was also observed during the COVID-19 pandemic that the proliferation of low-quality information sources, providing unreliable information related to healthcare can lead to an 'infodemic', defined by the World Health Organisation (2021) as *'too much information including false or misleading information in digital and physical environments during a disease outbreak*'. This

information is often shared via social media platforms such as Facebook, Twitter and Reddit and may have negative impacts on clinical outcomes and relationships between patients and healthcare professionals (Suarez-Lledo and Alvarez-Galvez 2021). The presence of clinicians in online spaces has also been reported to result in harassment, criticism for changing opinions shared online and undermining trust in professional opinion (Marcelin et al 2021). Crucially, the impacts of effective engagement with people and data available in online spaces may result in modifications in behaviour and therefore the transmission of communicable disease (Sooknanan and Comissiong 2020).

As frontline healthcare professionals, nurses play a critical role in addressing these diseases and must adapt to the ever-changing landscape of digital health. This article discusses the role of online spaces in the control of communicable diseases and how it relates to nursing practice. The article will cover the benefits, challenges, and ethical considerations of incorporating online spaces into nursing practice and outline recommendations for optimising their use.

1. Surveillance and Early Detection

The risk of epidemics and pandemics is increasing due to the combined impacts of globalisation, urbanisation and antimicrobial resistance (Bloom and Cadarette 2019). As such, efforts to detect and respond to outbreaks in a timely manner are crucial to limit harm to both patients and society. Traditionally, the surveillance of communicable disease has required the collection of microbiological samples followed by testing in a laboratory before trends can be identified within the data. However, with the availability of data on human information seeking online, it is now possible to track diseases using text data from online search queries and posts on social media sites. The most notable early example of this is the use of Google web search to detect influenza-like illness (ILI) (Ginsberg et al 2009). Within an early study by Ginsberg et al (2009) the use of Google search data (Google Flu

Trends- GFT) reportedly estimated ILI 1-2 weeks ahead of Center for Disease control surveillance reports. Whilst it is important to note that online data cannot determine the causative agent responsible for disease, it can be used by health professionals to instigate investigation of outbreaks of potentially novel pathogens (such as COVID-19) and to initiate pro-active health protection measures. However, due to the limitations of this approach to disease surveillance, evidenced by its poor predictive reliability over subsequent years, GFT was discontinued in 2015 (Ertem et al 2018). More recently, the use of richer sources of textual data shared via social media has been explored using natural language processing (NLP); which utilises complex text mining software and analysis processes to allow automated interpretation of big data gathered from social media sites (Collier 2012). A recent systematic review exploring the use of social media for surveillance of communicable disease reported that Twitter is the most frequently used source of user-generated health content and that data yielded from these sites is useful for real-time automated prediction of communicable disease worldwide (Pilipiec et al 2023). Ultimately, these novel approaches to surveillance and early detection are important for nurses to be aware of. This will allow exploitation of these technologies to enhance public health measures. It is also evident that patients should be encouraged to utilise these online spaces appropriately to help ensure data analysed using NLP is most likely to yield accurate and reliable indications of the spread of communicable disease to inform public health organisations.

2. Health Promotion and Education

Online spaces have become essential platforms for health promotion and education, empowering individuals to make informed decisions about their health. Online spaces create the potential for learning by both nurses and patients. By engaging with patients and the public online, nurses can potentially dispel misinformation, address concerns, and foster a culture of health literacy. This has been demonstrated in the context of human immunodeficiency virus (HIV) where the use of social media has been shown to increase

knowledge and improve medication adherence among other benefits in s systematic review by Taggart et al (2015). Notably the studies in this review were of mixed risk of bias. The studies reportedly used varying outcome measures and there was not attempt made by the researchers to determine if the information shared within these groups was itself of high quality. It was also notable that the ability to communicate anonymously was highlighted as an important feature of these online communities within many of the studies. A later review indicated that rates of HIV testing can be improved by providing 'social media interventions' including dissemination of information, community building, testing kit delivery and to develop materials for promoting HIV services (Cao et al 2017). This proactive approach to health promotion can contribute to the overall reduction of communicable disease transmission. Recent studies have indicated both the importance of behaviour change (e.g. observance of hand washing or respiratory hygiene) in relation to disease transmission, and the significant impact that exposure to information via social media can have on behaviour (Sookanan and Commision 2020). However, the use of online spaces, and social media in particular, as sources of information related to infectious disease can be complex. During the COVID-19 pandemic the impact of social media algorithms creating 'echo chambers' for misinformation was highlighted (Gisondi et al 2022). This is further compounded by the presence of online 'bots' (fake accounts) which can be used by malign actors to further perpetuate misinformation related to politically contested issues.

A recent review of the literature on bots by Himelein-Wachowiak et al (2021) highlights several of their unique features. The authors reported that 33% of top sharers of information from low-credibility sources are bots. They also report however, that bots are used to share credible information when used by benevolent actors. Due to the volume of data associated with bot activity online it remains unclear precisely what impact these have on the sharing of information and subsequent changes in human behaviour due primarily to pragmatic challenges associated with verifying the veracity of information shared by bots. Although it is pertinent to note that issues relevant to the control of communicable disease control are a

common subject of online misinformation campaign. Misinformation around vaccines was found in a recent systematic review to be the most prevalent subject of online misinformation, even when non-communicable diseases were included (Suarez-Lledo and Alvarez-Galvez 2021). Further complicating this issue, evidence indicates that false information is considerably more likely to be spread online than accurate information (Vosoughi et al 2018). While the exact reasons for this are not fully understood, it is thought that the novelty associated with false information, often inspiring strong emotional reactions, may be a causative factor according to Vosoughi et al (2018).

Gisondi et al (2022) provide some useful recommendations for health care providers to help balance the potentially harmful impacts of online misinformation with the benefits of mass communication it offers. These recommendations included some actions which nurses might take to address this challenge:

Recommendations for health care providers (Gisondi et al 2022)

- Engage patients on social media
- Commit to posting public health messaging online
- Identify and implement evidence-based interventions to combat health misinformation
- Provide expert advice to mass media outlets
- Personalise direct outreach to patients and communities
- Seek to understand patients with empathy before seeking behaviour change
- Empower patients to seek reliable health information and make informed choices
- Create synergistic partnerships with leaders in other disciplines

To empower patients to seek reliable health information, simple approaches to assessing the reliability of online health information can be used, such as the CRAP (Currency, Reliability,

Authority and Purpose) test (Kington et al 2021). This requires individuals, such as patients or health professionals, reviewing information online to consider four key features of the information. Firstly, currency, this involves assessing how contemporary the information is. In the context of communicable disease this may require further searching to determine if more recent evidence is available on an issue. Secondly, reliability, this involves assessing the nature of the information itself. For example, is it an opinion (less reliable) or is it findings from a research study (potentially more reliable). Third, authority is considered. For example, is the author a known expert in communicable disease or is it a lay person's personal experience? Finally, purpose, this involves assessing why the information exists. For example, has it been created by a public health service for improving health, a pharmaceutical company for promoting products or does the author appear to be promoting an agenda? Nurses can help patients to navigate online spaces and to utilise information related to communicable disease by providing guidance on tools such as CRAP (Davis 2023).

For nurses, online spaces offer many opportunities to keep up to date with contemporary evidence and to engage with patients online (Davis 2023). Some examples of useful sources of information online related to communicable disease can be seen in Table 1. Note this table is not exhaustive and there are many other potentially useful online spaces where information and engagement with patients and professionals can be achieved. In the case of chronic conditions such as HIV, online communities may develop independently of mainstream social media or information sources (Cao et al 2017). It is also important to note that different online spaces may have different functions, some may primarily be used for information sharing e.g. YouTube or the UK Health Security Agency (UKHSA) site. Whereas some online spaces are more conducive to dialogue and networking, for example Twitter, which is commonly used by patients, or a professional society such as the Infection Prevention Society (IPS) which is predominantly for health professionals including nurses.

Table 1. Online spaces where nurses may engage with other professionals and patients in relation to communicable disease

Site	Information provided
Social media sites: Facebook (https://en-gb.facebook.com/) YouTube (https://www.youtube.com/) Twitter (https://twitter.com) *Suggested accounts:* @outbreaksci @IPS_Infection @CDCgov @HIS_infection @ECDC_Outbreaks @MRC_Outbreak @UKHSA @jhieditor	• Current guidance on communicable disease control. • Recent academic publications related to communicable disease • Patients may share their personal experience of the impacts of communicable disease on themselves and their friends / families via sites such as YouTube, Facebook and Twitter. • Misinformation is most likely to be found on public social media sites.
World Health Organisation (WHO) (https://www.who.int/)	• Current guidance in an international context
National Institute for Health and Care Excellence (NICE) (https://www.nice.org.uk/)	• Evidence based guidelines for the treatment and prevention of communicable disease.
Centres for Disease Control (CDC) (https://www.cdc.gov/) / European CDC (https://www.ecdc.europa.eu/en)	• Information related to specific organisms and processes for communicable disease control.
Infection Prevention Society (IPS) (https://www.ips.uk.net/)	• Provides resources, education and networking opportunities related to communicable disease control
Healthcare Infection Society (HIS) (https://www.his.org.uk/)	• Provides resources, education and networking opportunities related to communicable disease control

3. Telehealth Services

The impacts of the COVID-19 pandemic have been profound both within healthcare and society more broadly. Notably, it has resulted in a rapid change in healthcare service delivery models towards telehealth (Wosik et al 2020). ‘Telehealth’ broadly refers to care delivered at a distance, these processes may utilise ‘internet of things IoT’ devices including laptops, tablets, smartphones or wearables to access care from clinicians or virtual agents (Wosik et al 2020). Whilst these changes in care delivery were catalysed by the acute pressures created by the pandemic, they have longer term implications for the safety of healthcare from a communicable diseases perspective. Inpatient facilities have long been known to create risks for healthcare acquired infection (HCAI) (Haque et al 2018). Issues related to colonisation with antimicrobial resistant (AMR) organisms present in inpatient facilities is also a risk which requires attention to help address the global burden of antimicrobial resistance (Haque et al 2018). It is clear that by providing care remotely within online spaces such as virtual clinics or via smartphone applications, care can potentially be de-risked in relation to the acquisition of infection or colonisation by AMR organisms. These benefits have already been realised in Italy, where a recent study found that communicable disease experts collaborating in virtual meetings to discuss the management of complex cases resulted in more prudent use of antibiotics, reduced incidence of hospital infections in critical care, reduced number of multi-drug resistant organisms isolated from patients and reduction in spending on antibiotics (Ceradini et al 2017). The authors also note the educational benefits to clinicians who could access these virtual meetings and observe the discussion. However, this was a small study in only one site and the demography of the multidisciplinary teams involved within the telemedicine clinics are not described. It is therefore unclear what, if any, the role of nurses in these clinics was in this case. It is necessary to note that there is no evidence that this is a prevalent approach to managing risks associated with AMR in the UK and the roles of nurses in these virtual spaces has yet to be fully developed. Nurses should consider the potential benefits of virtual service delivery

models and their potential benefits to the prevention of HCAI and management of risks created by AMR.

Digital Lens for Nursing (Wynn et al 2023)

Given that there is currently little literature exploring the roles of nurses in online spaces in the context of communicable disease control; to explore the potential roles and practices of nurses in this context, the Lens for Digital Nursing (LDN), developed by Wynn et al (2023) can be used. The LDN provides three broad mutually influencing concepts which were identified via the synthesis of eight different nursing practice theories related to the use of technologies by nurses. The three concepts explain, how, why and what nurses use digital technologies for. This includes ‘knowing the person’, this is the purpose of nurses’ interactions with technologies and seeks to understand the needs of the patient and guide clinical decision making. ‘Technology as agent’ considers the agency exerted as a result of the design of the technology, for example due to their networking effects and algorithms. This is considered to be the reason why nurses must engage with digital technologies. Finally, ‘technological competency’ relates to how nurses engage with technology to provide person-centred care including recognition of its limitations.

An application of the LDN in the context of communicable disease control is provided in Table 2, stratified by three different levels of practice i.e. ‘zoomed in / zoomed out’. The table indicates knowledge, skills and professional regulation considerations which apply to nursing practice in this context.

Table 2. The Lens for Digital Nursing applied to nursing in online spaces to control communicable disease.

Scale / LDN Concept	Knowing the person	Technology as agent	Technological competencies
Population	• Awareness of the use of NLP and social media data to understand trends in spread of communicable disease (Pilipiec 2023) • The use of online spaces to stay up to date with contemporary clinical evidence e.g. following specialist organisations / journals / clinicians (Davis 2023)	• Recognising the influence of misinformation in online spaces and its rapid dissemination (Vosoughi et al 2018) • Recognising the impacts of digital inequalities and how this may influence digital literacy and access to information and services by patients (Blank and Reisdorf 2023)	• Curation of accurate and helpful information related to the control of communicable disease (Davis 2023) • Interprofessional collaboration online to facilitate the sharing of knowledge, best practices and resources. • Digital professionalism considerations. Nurses should not share political or moral views inappropriately, spread misinformation and should respect people's right to privacy.
Community	• Understanding patients concerns by being active on social media using a professional account (Gisondi et al 2022) • Recognising the role of online communities in influencing health for patients with chronic communicable disease (Cao et al 2017)	• Recognise how platforms influence disease control / influence behaviour in different communities (Sooknanan and Comissiong 2020)	
Individual	• Speaking to patients to understand their use of online spaces and how they access and use information from online sources (Gisondi et al 2022)		• Competencies in the use of telehealth technology to minimise unnecessary in-person care which risks HCAI and AMR (Ceradini et al 2017, Wosik et al 2020).

Conclusion

The digital revolution has fundamentally altered the landscape of healthcare and communicable disease control. As frontline healthcare professionals, nurses play a pivotal role in addressing these challenges and opportunities. Online spaces offer a wealth of possibilities for early detection and surveillance, health promotion and education of both nurses and patients. In addition, telehealth services offer opportunities to reduce HCAI and mitigate the risks of AMR. However, it is essential to recognize and address the potential pitfalls and ethical concerns associated with the use of these spaces.

By utilising the Digital Lens for Nursing (Wynn et al., 2023), nurses can better understand the various dimensions of their engagement with digital technologies and online spaces. This understanding can inform and enhance their practice, ultimately contributing to improved patient care and the prevention and control of communicable diseases. Nurses must continually develop their technological competencies and adapt their practice to the rapidly changing digital landscape.

In order to optimise the use of online spaces in nursing practice, it is crucial to focus on evidence-based interventions and the dissemination of accurate, high-quality information. Nurses must be aware of the potential risks associated with online misinformation and engage with patients and the public to promote health literacy and foster trust in professional opinion. By embracing the potential of online spaces and integrating them into nursing practice, nurses can contribute to better health outcomes and play an essential role in the global effort to control and prevent communicable diseases. Further research is also needed to explore the impact and efficacy of online interventions by nurses for the purpose of communicable disease control.

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