Online networks facilitating multidisciplinary healthcare: a novel strategy to curb COVID-19

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ABSTRACT

Objectives Global spread of COVID-19 at an unprecedented speed has heavily strained healthcare systems worldwide, and reliable alternatives to analogue healthcare are urgently needed.

Methods During the first COVID-19 wave in the Netherlands, we launched six regional online networks and analysed the activity and content in a qualitative mixed-methods manner.

Results We observed continued activity and collaboration on the platform between healthcare professionals at the different levels of care.

Conclusion The networks described here were launched successfully and have the potential to optimise the COVID-19 response.

INTRODUCTION

In the Netherlands, national and regional public health offices are in charge of general COVID-19 guidelines, testing and contact tracing. With regard to treatment, general practitioners (GPs) provide primary care and function as gatekeepers to secondary and tertiary hospital care. GPs cover a large part of the COVID-19 care since the majority of patients do not need hospitalisation, yet SARS-CoV-2 expertise concentrates mostly in hospitals. To strengthen national healthcare infrastructure and optimise COVID-19 care, online networks were launched to facilitate rapid and reliable information exchange between providers of public, primary, secondary and tertiary healthcare.

METHODS

The networks were launched on Siilo, an encrypted messaging application freely available for medical professionals since 2016.1 In the Netherlands, ‘GGD GHOR Nederland’ is the association of Regional Public Health Services (GGD) and the Regional Medical Emergency Preparedness and Planning (GHOR) offices. In total, there are 25 GGD GHOR offices in the Netherlands. Networks on the platform are organised based on the area of coverage of these 25 offices. The first network (region 1) was set up by one of the authors (GH) together with Information Communication Technology (ICT) support from Siilo. It was launched in early March 2020, 2 weeks after the first confirmed COVID-19 case in the Netherlands. After a national call to join the platform by GH, fellow internist-infectiologists who expressed an interest teamed up with representative public health physicians and GPs from corresponding regions. With the help from a Siilo staff member, an additional five regional networks were launched in March 2020. Online supplemental appendix provides an overview of the area in the Netherlands covered by the six regions. Potential users were informed about the network via official
correspondence from the regional public health services and via the representative public health physicians, GPs and internist-infectiologists. After verification, users with a medical license could access the free app. Within each of the six networks, questions, patient consultations and clinically relevant information could be exchanged between GPs, infectious disease specialists and physicians at municipal health services. Since users could all post and reply to messages, content on the platform was both generated and verified by its users. Networks functioned independently without influence with respect to content or commitment to Siilo or other third parties.

Activity, content and feasibility of the six multidisciplinary networks was evaluated in a qualitative mixed-methods manner. During the first COVID-19 wave in the Netherlands (between 16 March 2020 and 30 June 2020), all 472 posts generated by the 1550 active users on the six COVID-19 networks were exported from Siilo, anonymised and entered into Atlas.ti, a program for qualitative data analysis. Two authors (IK and MB) who were not involved in the COVID-19 networks analysed data using a thematic content analysis. Codes were discussed during peer debriefing with the research group and recoded until consensus and a codebook was formulated. Next, network activity was analysed based on time between posts and first responses, number of post views, subject and complexity of a post, and user engagement statistics including daily, weekly and monthly active users (WAU, MAU, respectively). An online survey containing nine questions directed at users providing primary care (WAU, MAU, respectively). An online survey containing nine questions directed at users providing primary care was made available on the platform to evaluate the six networks (see online supplemental appendix).

Patient and public involvement

The analysis was a joint effort by a multidisciplinary group of professionals representing the interest of persons at risk for, with a current, or after a COVID-19 infection at the different levels of public, primary, secondary and tertiary healthcare. Patients were not directly involved in the design or conduct of this study, nor was any clinical data used. We intend to share these findings as widely as possible and seek patient and public involvement where necessary for follow-up studies.

RESULTS

Together, the six networks cover one fourth of the Dutch population (4.7 of 17 million). Approximately one-third of all GPs practising in the six regions were active users on the platform. In the different regional networks, participation rates on the platform among GPs practising in that region varied from 19% to 41%. Most posts on the platform were questions (n=295, 65%), or notifications and updates shared by users (n=177, 38%). The majority of questions were asked by GPs and were directed to specialists and public health officials. Median time to the first response to questions posted on the six networks was 49 min (IQR 12–212) and 19 hours (IQR 3–123) to the last response. Questions were answered by users from different specialties and most frequently centred around diagnostics, infection prevention and clinical presentation. Figure 1 shows patterns of WAU and total users per regional network since its launch.

In the first month, the percentage MAU reached >95% in all but one network (range 88%–99%) and the percentage WAU reached >97% in all but two networks (range 79%–99%). In all networks, the total number of users peaked within the first few weeks and subsequently reached a plateau. Overall response of platform users to the questionnaire was low (n=138). A clear majority of the respondents indicated that they were applying information retrieved from the platform in clinical practice (n=111, 80%) and considered this an improvement in the COVID-19 care they provided (n=106, 77%). Approximately half of the respondents (n=74, 54%) would be interested to also use the platform to optimise care for medical conditions other than COVID-19.

DISCUSSION

Our data show that six regional networks with over 1500 active users could be launched successfully within a short period of time. The networks were used by up to 40% of GPs practising in some regions, and we observed active and continued collaboration between public health officials, and primary, secondary and tertiary healthcare physicians. Comparable to other e-consultations,2 questions on the networks were answered within 1 day by users from different disciplines. Several themes emerged over time, ranging from diagnostic uncertainty in the earliest stages to questions about rehabilitation later on, reflecting the changing face of the pandemic. Limitations are the low number of respondents evaluating the platform and the absence of a clinical outcome that can be systematically objectified. Moreover, there was no uniform procedure according to which physicians were invited to the platform by the Regional Public Health Services, possibly resulting in different participation rates in the different regions, and to some professionals not being aware of the platform. Furthermore, the launch and activity on the regional networks depends solely on voluntary input by the physicians from different disciplines. Longevity beyond the use of early adopters remains to be demonstrated, and further studies are needed to evaluate the true impact in terms of patient related outcomes as well as possible reimbursement structures.3 Here, we share our first experiences and urge our colleagues in and outside academia to team up to launch similar initiatives to benefit patients in times of crises.4,5 To this day, health infrastructure is heavily dependent on in-person contact. If multidisciplinary online spaces continue to prove their worth, our future healthcare landscape will look different.
**CONCLUSION**

COVID-19 laid bare the vulnerability of analogue healthcare and accelerated the development of digital solutions. We show that within the context of a global emergency, the swift setup of a secure multidisciplinary regional networks was feasible and clinically relevant. Such online networks therefore present a valuable addition to the COVID-19 response, especially if users continue to be active, which is what we are currently observing during subsequent waves and vaccine rollout in the Netherlands.

**Figure 1**. Weekly active users (WAU) and total users per regional network since its launch. Bars represent WAU; solid black lines represent total number of users on each of the six networks. Online supplemental appendix lists which areas in the Netherlands are covered by the six regional networks.

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**Contributors** With assistance from Siilo GH launched the first network, and HP and CR launched the second network as well as the other four networks. IK collected data and performed data analysis with the help of MB. MB and HP wrote the manuscript which was revised by IK, GH and CR. MB and CR supervised the project.

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REFERENCES

APPENDIX

Region
1. Kennemerland
2. Rotterdam Rijnmond
3. Hart voor Brabant
4. Hollands Midden
5. Utrecht
6. Noord Limburg

Figure 2. Map showing the areas in the Netherlands covered by the six networks. Networks on the Silo platform were organized based upon the area of coverage of each regional public health service. In the Netherlands, “GGD GHOR Nederland” is the association of Regional Public Health Services (GGD) and the Regional Medical Emergency Preparedness and Planning (GHOR) offices. In total, there are 25 GGD GHOR offices in the Netherlands. Each colored area in the figure depicts one of the 25 regions. The six networks in this study were based on the following GGD GHOR regions: region 1) Kennemerland: coastal region in the northwest; region 2) Rotterdam Rijnmond: conurbation surrounding the city of Rotterdam located on the Rhine-Meuse-Scheldt delta; region 3) Hart voor Brabant: southern province; region 4) Hollands Midden: partly coastal region between Kennemerland, Utrecht and Rotterdam Rijnmond; region 5) Utrecht: central province; and region 6) Noord Limburg: northern part of the southernmost province.
Questionnaire Siilo platform users of COVID-19 networks

1. Did you use one of the COVID-19 networks?
   a. I asked questions myself
   b. I (mostly) read cases of colleague GPs
   c. I follow general messages on the networks

2. Answers by the medical specialists are generally useful to me
   1. Fully disagree
   2. Disagree
   3. Neutral
   4. Agree
   5. Fully agree

3. I apply information retrieved from the platform in clinical practice
   1. Fully disagree
   2. Disagree
   3. Neutral
   4. Agree
   5. Fully agree

4. Information retrieved from the platform enables me to provide better COVID-19 care
   1. Fully disagree
   2. Disagree
   3. Neutral
   4. Agree
   5. Fully agree

5. This platform helps me reduce referrals due to COVID-19 to secondary healthcare
   1. Fully disagree
   2. Disagree
   3. Neutral
   4. Agree
   5. Fully agree
6. This platform facilitates direct consultation and information exchange between primary and secondary healthcare
   1. Fully disagree
   2. Disagree
   3. Neutral
   4. Agree
   5. Fully agree

7. Use of this platform contributes to better healthcare
   1. Fully disagree
   2. Disagree
   3. Neutral
   4. Agree
   5. Fully agree

8. How do you benefit from this platform?
   a. Specific knowledge
   b. Better patient care
   c. Time saving
   d. Other, specify: ...

9. Would you like to use this platform for medical conditions other than COVID-19?
   a. Yes
   b. No