Wanna Chat? A quick study using an AI chatbot for COVID-19 Screening

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PROJECT BACKGROUND

The Mayo Clinic brand is synonymous with world-class healthcare guided by its unwavering commitment to patient care, education, and groundbreaking research. The foundation of this commitment is cemented in the culture of patient-centric clinical care and innovation. At the onset of the COVID-19 pandemic in 2020, the Centers for Disease Control and Prevention issued guidelines for safety measures with respect to screening high-risk patient populations for exposure. Additionally, healthcare organizations were urged to limit in-person contact when possible, to reduce transmission rates.

OBJECTIVE

To determine the feasibility of an AI enabled text-based chatbot for COVID-19 screening for patients prior to radiology appointments.

METHODS

Multiple stakeholders were consulted including Radiology Physicians, Radiology Administrative Leadership, Center for Digital Health Administrative Leadership, Allied Health Staff, and Nursing. A multidisciplinary project team was assembled with champions from Radiology to pilot a HIPAA-approved, IRB waived study implementing an AI chatbot into the clinical practice for four months in 2020. The team partnered with an external vendor to customize a secure AI chatbot to screen patients for COVID-19 symptoms prior to a scheduled radiology exam. The initial pilot group consisted of patients scheduled for ultrasound exams, and then, subsequently, MRI exams in outpatient settings across all regional campuses. The SMS-based AI chatbot routed patients into several pathways depending on response to COVID screening survey.

RESULTS

The chatbot COVID-19 screening test was sent to 4,687 patients. Of these patients, 2,722 (58.1%) responded. Of the respondents, 46 (1.7%) reported COVID-19 symptoms, 34 (1.2%) had COVID-19 tests scheduled or pending. Of the 1,965 nonresponders, authentication failed for 174 (8.8%), 1,496 (76.1%) did not engage with the test, and 251 (12.8%) timed out of the survey. The mean rating for the chatbot experience was 4.6. In a multinomial logistic regression model predicting response rate, English written language preference independently predicted response (odds ratio: 2.77 [95% CI, 1.77-2.77].

TABLE 1

<table>
<thead>
<tr>
<th>Variable</th>
<th>Responders N=1,362</th>
<th>Nonresponders N=1,321</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, median (IQR)</td>
<td>50 (42-68)</td>
<td>55 (46-78)</td>
<td>.57</td>
</tr>
<tr>
<td>Male sex</td>
<td>1,257 (46.2)</td>
<td>1,258 (47.0)</td>
<td>.66</td>
</tr>
<tr>
<td>Age, n=2,722</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0-14</td>
<td>153 (5.7)</td>
<td>157 (5.1)</td>
<td>.83</td>
</tr>
<tr>
<td>15-24</td>
<td>102 (3.7)</td>
<td>104 (3.3)</td>
<td>.90</td>
</tr>
<tr>
<td>25-34</td>
<td>745 (27.0)</td>
<td>780 (27.7)</td>
<td>.69</td>
</tr>
<tr>
<td>35-44</td>
<td>1,058 (36.2)</td>
<td>1,133 (36.5)</td>
<td>.50</td>
</tr>
<tr>
<td>45-54</td>
<td>790 (28.3)</td>
<td>865 (27.0)</td>
<td>.68</td>
</tr>
<tr>
<td>55-64</td>
<td>497 (18.1)</td>
<td>564 (17.2)</td>
<td>.50</td>
</tr>
<tr>
<td>65+</td>
<td>135 (4.9)</td>
<td>137 (4.1)</td>
<td>.70</td>
</tr>
<tr>
<td>Written language preference</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>English (n=4,600)</td>
<td>1,362 (51.0)</td>
<td>1,321 (50.1)</td>
<td>.84</td>
</tr>
<tr>
<td>Non English (n=2,302)</td>
<td>1,362 (51.0)</td>
<td>1,321 (50.1)</td>
<td></td>
</tr>
</tbody>
</table>

Abbreviation: CI, confidence interval. *Data presented as n (%), unless indicated otherwise.

IMPLEMENTATION

• Patients were first identified from the EMR of scheduled appointments meeting the criteria.
• Patients were notified about COVID-19 screening via a text message containing a link to access a secure website where they would answer screening questions.
• Upon activation, patients were verified, and the AI chatbot used a decision-tree algorithm capable of routing patients into several pathways depending on their responses to the COVID-19 screening questions.
• Patients who reported symptoms were then directed to a COVID-19 testing site before their appointment.
• Asymptomatic patients were routed to confirm appointments, and patients with questions were identified so that an outbound call to the patient could be made.
• User experience and overall satisfaction was assessed via a questionnaire based on a 5-point Likert scale (1 = poor and 5 = outstanding).

FIGURE 1

Outreach by text message

Authentication in web chat

COVID-19 Screening

FIGURE 2

NEXT STEPS

• Identify other use cases for AI enabled chatbot technology within the clinical practice.
• Pursue integration with the electronic medical record for further expansion of AI enabled chatbot technology.
• Create a digitally enabled practice mechanism to leverage AI technology for an end-to-end comprehensive digital experience.
• Share successes and best practices with other specialties to benefit from a similar innovative approach to patient care delivery.

NOTE: Responders: n=1,321

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