Audit of emergency electrocardiograms from a Brazilian large scale telecardiology service

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Minas Gerais state, Brazil
Minas Gerais state, Brazil
Human development index
Introduction

- Public healthcare has hierarchical attention levels: from primary care to tertiary care
Telehealth Network of Minas Gerais (TNMG)

A partnership of six public universities established in 2005 to provide telehealth service, coordinated by University Hospital of Federal University of Minas Gerais

Provides support to primary care of 730 of the 853 municipalities of the state in:

- Teleconsultations (+65,000)
- Telediagnosis (+2.1 million ECGs)
Telehealth Network of Minas Gerais (TNMG)

• The ECG is classified by the healthcare practitioner who records it as emergency, priority or routine

• The emergency ones are assessed immediately, and the cardiologist provides the report in just a few minutes. For the routine ones, the healthcare practitioner gets the report back in average in 4 hours
Emergency electrocardiograms

- On average, 2,200 ECGs per day
- An assessment of the system from 01/10/2013 to 31/12/2013 showed that 27.6% of all ECG exams performed by the primary care telehealth sites were sent as “emergency”
- It is not expected that these units attend such a large number of emergencies
- Hypothesis: a great number of ECGs were incorrectly classified
Objectives

• To investigate the reasons for the primary care telehealth sites to send a higher number of emergency ECGs than expected

• To implement corrective actions in order to reduce the proportion of ECGs incorrectly classified
Methods

• This is a quasi-experimental study

PHASE 1: BASELINE

• Primary Care Units (PCU) that sent > 70% of ECGs as emergency were selected from February to March 2014

• Emergency Care Units and telehealth sites that performed < 15 exams during that time period were excluded
Methods

PHASE 2: INTERVENTION

• Telephone calls to investigate the main causes for sending the ECGs as emergency

• Hypothesis: primary care professionals were not aware of the correct criteria to classify the exams

• Information about the use of the system and the definition of emergency according to the Brazil’s Board of Physicians (Conselho Federal de Medicina)
Methods

PHASE 3: FOLLOW-UP

• New assessment of the proportion of ECGs sent as emergency by each telehealth site was performed, 1 and 2 months after the first contact.
Results

• In the 1st phase, 63 telehealth sites were selected

Table 1 - Primary care practitioners responsible for the ECG recording

<table>
<thead>
<tr>
<th>Primary care practitioners</th>
<th>N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nurses</td>
<td>41 (65.1)</td>
</tr>
<tr>
<td>Nursing technicians</td>
<td>17 (27.0)</td>
</tr>
<tr>
<td>Primary care Manager</td>
<td>1 (1.6)</td>
</tr>
<tr>
<td>Municipality secretary of health</td>
<td>1 (1.6)</td>
</tr>
<tr>
<td>Not declared</td>
<td>3 (4.8)</td>
</tr>
</tbody>
</table>
Results

Most frequent reasons to classify an ECG as emergency

<table>
<thead>
<tr>
<th>Reasons</th>
<th>N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medical request</td>
<td>33 (52.4)</td>
</tr>
<tr>
<td>Chest pain</td>
<td>28 (44.4)</td>
</tr>
<tr>
<td>Abnormal blood pressure</td>
<td>14 (22.2)</td>
</tr>
<tr>
<td>Preoperative assessment of elective surgery</td>
<td>6 (9.5)</td>
</tr>
<tr>
<td>Patient that needs to leave</td>
<td>4 (6.3)</td>
</tr>
<tr>
<td>Medical consultation scheduled</td>
<td>3 (4.8)</td>
</tr>
<tr>
<td>Investigation of myocardial infarction</td>
<td>2 (3.2)</td>
</tr>
<tr>
<td>Dyspnea</td>
<td>2 (3.2)</td>
</tr>
<tr>
<td>Others</td>
<td>8 (12.7)</td>
</tr>
</tbody>
</table>
Results

Proportion of electrocardiograms classified as emergency on baseline and 1-2 months after the intervention
# Results

<table>
<thead>
<tr>
<th></th>
<th>1st month after intervention</th>
<th>2nd month after intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N (%)</td>
<td>N (%)</td>
</tr>
<tr>
<td>Significant reduction</td>
<td>42 (66.7)</td>
<td>11 (17.4)</td>
</tr>
<tr>
<td>Trend of reduction</td>
<td>6 (9.5)</td>
<td>15 (23.8)</td>
</tr>
<tr>
<td>Significant increase</td>
<td>4 (6.3)</td>
<td>3 (4.7)</td>
</tr>
<tr>
<td>Trend of increase</td>
<td>4 (6.3)</td>
<td>25 (39.6)</td>
</tr>
<tr>
<td>No reduction</td>
<td>2 (3.2)</td>
<td>-</td>
</tr>
<tr>
<td>Did not send ECGs</td>
<td>5 (7.9)</td>
<td>5 (7.9)</td>
</tr>
</tbody>
</table>

- 3 telehealth sites remained with the same percentage when compared to the 1st and 2nd months.
- 1 PCU did not send any ECGs in the 1st month.
Discussion

• The majority of the primary care practitioners who are responsible for the ECG recording in the PCU were not aware of the criteria to classify the ECG as an emergency

• A simple intervention had a significant impact reducing the misclassification

• It is important to promote an intervention which impacts the physicians: training, emails, letters

• Regular activity
Conclusion

• Many primary care practitioners are not aware of the definition of emergency

• A simple intervention may be effective in reducing the proportion of ECGs incorrectly classified

• This may be a topic for future training and tele-education activities performed by TNMG

• Next step: investigation of the real emergencies – impact of performing the tele-ECG
Thank you!

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