Quality Mindset: The Missing Ingredient in Tuberculosis Care and Control in Togo

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Abstract:
Quality has been mentioned as the missing ingredient in TB care and control. In Togo, TB is a priority public health problem. We hypothesize that “quality mindset” is the missing ingredient for excellence in TB care and control in Togo. We used statistical process control (SPC) tools to analyze cohort data from the National Tuberculosis Control Program. There was an unstable quarterly variation in smear-positive pulmonary TB (TBP+) treatment success rate from 2017 to 2022. The general trend since the first instability was a quarterly variation around a success rate of 86%. Results showed stability in the quarterly variation of TBP+ case fatality rate at 7% since 2017. The root cause analysis of the low performance of the program revealed that TB management and DOTS strategy standards were not well adhered to. Based on the Pareto chart prioritizing the most affected health systems building blocks, health services delivery and health workforce building blocks accounted for 70% of all the dysfunctions. This study revealed that quality mindset is the missing ingredient for TB control program to be a center of excellence in Togo. It is therefore timely for a national project to verify the real contribution of total quality care to TB program performance in Togo.

Keywords: Tuberculosis (TB), Statistical process control (SPC), Quality management, Excellence in care, Togo.

Introduction
Tuberculosis (TB) is the second leading cause of death among communicable diseases worldwide, killing nearly two million people each year, mostly in least developed countries (Frieden et al., 2003). Although TB control has improved over the past two decades, TB incidence has increased in Africa (Atun et al., 2010; WHO, 2010; WHO, 2015).
Quality has been mentioned as the missing ingredient in TB care and control (Pai & Temesgen, 2019). In Togo, TB is a priority public health problem. In Lacs health district, poor quality was the root cause of the high TB case fatality rate (Afanvi, 2015). We hypothesize that "quality mindset" is the missing ingredient for excellence in TB care and control in Togo.

Materials and Methods

We used statistical process control (SPC) tools (Diaz & Neuhauser, 2005) to analyze cohort data from the National Tuberculosis Control Program (PNLT, for “programme national de lutte contre la tuberculose”) from 2017 to 2022. Created in 1992, the PNLT is one of the flagship programs of the Ministry of Health (PNLT, 2022). Tuberculosis control is integrated into the primary health care implemented by health districts. District health facilities are set up as screening and treatment centers (CDT, for centre de diagnostic et de traitement) (PNLT, 2008) in which TB focal points are appointed to ensure the application of national guidelines (PNLT, 2008). In 2022, there were ninety (90) CDTs and a network of one hundred and one (101) sputum-smear microscopy laboratories with twenty-five (25) GeneXpert sites throughout the country (PNLT, 2022).

SPC includes a set of tools for managing processes and determining and monitoring the quality of the output of an organization (Oakland, 2008). As SPC tools, we used process flowcharting to visualize the process of TBP+ patients’ care; run and control charts to understand variation; cause and effect analysis with five whys to analyze the root cause of the actual performance of selected indicators; and Pareto analysis to prioritize the sub-systems (Oakland, 2008).

Variables studied among others were (i) cumulative incidence, (ii) case fatality rate of bacteriologically confirmed pulmonary TB (TBP+), expressed as a percentage, and defined as the proportion of cases of TBP+ which have a fatal outcome during their care (Bonita et al., 2010), and (iii) treatment success rate of TBP+ which corresponds to the proportion of TPB+ having successfully completed their treatment. To estimate the cumulative incidence, we used official population data as denominator (INSEED & UNFPA/Togo, 2015; INSEED, 2023).

Data were attribute data grouped by quarter and obtained from reports provided by PNLT. To meet the minimum requirements for good “P” Shewhart control charts with boundaries, at least 12 data points were needed (Provost & Murray, 2011). To understand variations, we used the four rules of probability to interpret run charts and the five rules recommended for general use of Shewhart's charts to determine special cause (Provost & Murray, 2011).

The study was based on secondary data and received administrative approval from PNLT.

Results

The cumulative incidence went from 30 TBP+ per 100000 persons, 95% CI [29; 31] in 2019 to 33 [32; 35] in 2022 (Table 1).

Table 1. TB cumulative incidence from 2017 to 2022

<table>
<thead>
<tr>
<th>Year</th>
<th>Population at risk</th>
<th>Suspected TB cases</th>
<th>TBP+ cases</th>
<th>Cumulative incidence (per 100000) [95% CI]</th>
</tr>
</thead>
<tbody>
<tr>
<td>2017</td>
<td>7167000</td>
<td>24874</td>
<td>2231</td>
<td>31 [30; 32]</td>
</tr>
<tr>
<td>2018</td>
<td>7336000</td>
<td>34321</td>
<td>2107</td>
<td>29 [27; 30]</td>
</tr>
<tr>
<td>2019</td>
<td>7505000</td>
<td>37267</td>
<td>2236</td>
<td>30 [29; 31]</td>
</tr>
<tr>
<td>2020</td>
<td>7674000</td>
<td>17988</td>
<td>1985</td>
<td>26 [25; 27]</td>
</tr>
<tr>
<td>2021</td>
<td>7843000</td>
<td>17203</td>
<td>2127</td>
<td>27 [26; 28]</td>
</tr>
<tr>
<td>2022</td>
<td>8095498</td>
<td>13031</td>
<td>2694</td>
<td>33 [32; 35]</td>
</tr>
</tbody>
</table>

Source: From this study.

The Shewhart “P” control chart in Figure 1 showed an unstable quarterly variation in TBP+ treatment success rate (new cases and relapses) from 2017 to 2022.
The instability was marked by two series of two out of three consecutive points (Year 2018 and Q2 2019; Q2 2021 and Q3 2021) within and beyond the lower control limit. The first instability was a decline in the success rate. This was corrected by an increase in the second instability. The general trend since the first instability was a quarterly variation around a success rate of 86%. Figure 2 showed stability in the quarterly variation of TBP+ case fatality rate at 7% since 2017.

Notification of multidrug-resistant tuberculosis (MDR-TB) is progressing in the country at a three-year rate (Figure 3).

Between 2010 and 2012, on average 3 cases of MDR-TB were notified each year. This trend increased to an average of 11 cases between 2013 and 2016, 25 cases between 2017 and 2019, and 18 cases in 2020 and 2021.

The root cause analysis of the low performance of the program revealed that the standards (TB management standard and DOTS strategy standard) were not well adhered to. Figure 4 is
the Pareto chart prioritizing the most affected health systems building blocks.

We noticed that 40% the dysfunctions belonged to health services delivery building block. Health services delivery and health workforce building blocks accounted for 70% of all the dysfunctions.

![Figure 3. Run chart of the number of TB MDR case. Source: From this study](image)

![Figure 4. Pareto chart prioritizing the most affected health systems building blocks. Source: From this study](image)

**Discussion**

We hypothesized that "quality mindset" is the missing ingredient for excellence in TB care and control in Togo. This seems true based on findings from this study.

Indeed, the downward trend in the suspected cases reflects a drop in the suspicion of TB on the part of clinicians. In a national survey in 2012, the proportion of the population who was asked a sputum test after suffering from a cough for more than two weeks and having visited a health center in the last 12 months was 45% (PNLT, 2012). To this low suspicion of TB was added a therapeutic success rate below the target of 90% set by the 2021-2023 national strategic...
The plan for the control of TB (PNLT, 2022). The downward trend from 2019 could also be due to COVID-19 pandemic. The COVID-19 pandemic had a damaging impact on access to TB diagnosis and treatment and the burden of TB disease. Progress made in the years up to 2019 slowed, stalled, or reversed, and global TB targets were off track (World Health Organization, 2022). These factors constitute the nest for high case fatality and the emergence of drug-resistant cases. Drug resistance is one of the major threats to the treatment of TB and an escalating global health crisis tuberculosis (Jang & Chung, 2020; Dookie et al., 2018; Kadia, et al., 2020). The root cause analysis of the low performance of the program revealed that TB management and DOTS strategy standards were not well adhered to. Non-compliance with standards is also the cause of the low quality identified in the Lacs Health District (Afanvi, 2015).

Using a quality management toolkit, we identified the root cause of TB control program in Togo. A quality mindset gives you the skills to problem solve at a deeper level mindset (Urban, 2023). SPC methods provide objective means of controlling quality in any transformation process. SPC is not only a tool kit. It is a strategy for reducing variability, the cause of most quality problems (Oakland, 2008).

Now that the root cause is identified, quality of care can be improved. TB control can use the approach experimented in Lacs Health District to increase by 15 points (from 80% to 95%) the treatment success rate and decrease by 10 points (from 13% to 3%) the case fatality rate (Afanvi, 2015).

To develop quality mindset, TB care and control actors at all levels must be trained. If Togo wants to achieve excellence in TB care and control, managers and leaders must act because achieving quality in project implementation is not a matter of luck or coincidence; it is a matter of management (Rose, 2014).

A call had been made for more use of SPC in health care studies because studies based on SPC have greater statistical power to exclude chance as an explanation. SPC avoids ethical issues, saves lives, relies on experience to control confounding factors, responds more quickly, and has much greater statistical power (Diaz & Neuhauser, 2005). This study is an example of his interest.

Conclusion

Despite being one of the flagship programs of the Ministry of Health, TB control program struggles to be a center of excellence. This study revealed that quality mindset is the missing ingredient for this achievement. It is therefore timely for a national project to verify the real contribution of total quality care to TB program performance in Togo.

The approach of total quality care is particularly important because it will help our health system to reduce major diseases case fatality rate and improve their treatment success rate.

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Conflict of interests

No conflict of interest.

References

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