By the end of 2014, mainland China had carried out 20,000 quality control circle (QCC) activities in the medical industry. However, while the number of QCC activities has soared, their quality is uneven, which, to some extent, restricts QCC's effect. To push forward QCC activities, it needs to be promoted to people who never use QCC, and also to conduct research to find the current problems of using it, analyze problems and come up with countermeasures. This is the developing process of practice-theory-practice.

QCC's connotation

QCC is a team, which is composed of a few people (usually 7 to 13 people) from workplaces with the same, similar or complementary natures. Following certain sequences, QCC adopts scientific statistical tools and quality control techniques to solve problems and challenges of the job site and management activities, thereby improving work efficiency and quality of products and services.

The theoretical basis of QCC is the Deming cycle (PDCA cycle) which was a theory proposed by Dr. Deming from the United States to clarify scientific management. On the basis of PDCA and with the use of seven quality control techniques, QCC generally can be divided into plan, do, check and action (PDCA); four phases and ten steps, integrating ideas, actions and management methods successfully. The relationship between the four phases and ten steps is closely linked and indivisible, as shown in Figure 1. In the process of practice, the old and new seven quality control techniques were formed, highlighting QCC's advance with time. It is worth mentioning that, although there are differences between the old and new techniques, it does not mean that the new techniques will replace the old ones, because the former focus on the planning and conception before problems occur and the latter focus on improvement after problems occur. In fact, it is a collaborative relationship between the two, shown in Table 1.

Compared with the traditional administrative activities in a way of top-down orders, QCC is undoubtedly a more active form of management activities. It fully embodies efforts of the grassroots front-line staff, reflects the wisdom of employees and highlights the status and value of the front-line staff in the process of finding problems, analyzing causes and formulating solutions as well as standardization and continuous quality improvement.

From minority to mainstream

Taiwan of China is a pioneer in the introduction of quality control circles. In 1999, Taiwan's “Hospital Evaluation Cum Medical Quality Promotion Committee of Consortium Corporation” prepared for the first “Medical circles publication cum competition” and this competition was held in 2000. After that, medical QCC has become a common practice in Taiwan (1).
### Table 1 The contrast between the old and new seven quality control techniques

<table>
<thead>
<tr>
<th>Variable</th>
<th>Name</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Old seven quality control techniques</td>
<td>Tally sheet</td>
<td>Collect and collate information</td>
</tr>
<tr>
<td></td>
<td>Pareto diagram</td>
<td>Determine the dominant factors</td>
</tr>
<tr>
<td></td>
<td>Scatter diagram</td>
<td>Show a linear relationship between variables</td>
</tr>
<tr>
<td></td>
<td>Characteristic diagram</td>
<td>Find causes of results</td>
</tr>
<tr>
<td></td>
<td>Data stratification</td>
<td>Find problems from different angles and levels</td>
</tr>
<tr>
<td></td>
<td>Histogram</td>
<td>Display distribution of process</td>
</tr>
<tr>
<td></td>
<td>Control chart</td>
<td>Identify the source of volatility</td>
</tr>
<tr>
<td>New seven quality control techniques</td>
<td>Relationship diagram</td>
<td>Clarify the relationship between complex factors</td>
</tr>
<tr>
<td></td>
<td>System diagram</td>
<td>Seek means to achieve goals systematically</td>
</tr>
<tr>
<td></td>
<td>Affinity diagram</td>
<td>Draw information from the clutter of language data</td>
</tr>
<tr>
<td></td>
<td>Matrix diagram</td>
<td>Clarify problems and relationship between variables from a multi-perspective</td>
</tr>
<tr>
<td></td>
<td>PDPC</td>
<td>Predict obstacles that may arise in the design and results</td>
</tr>
<tr>
<td></td>
<td>Arrow diagram</td>
<td>Develop a reasonable schedule</td>
</tr>
<tr>
<td></td>
<td>Matrix data analysis chart</td>
<td>Convert more variables into less variables data for easier analysis</td>
</tr>
</tbody>
</table>
In 1993, a few hospitals of mainland China tried to use QCC in nursing departments once in a while. In 2004, Hainan province was the first province to carry out QCC in secondary medical institutions and above across the province and achieved remarkable results. By 2009, the number of QCC in Hainan outnumbered 1,000, doubling the total number of hospital QCC in other provinces nationwide. After that, the province’s former health department brought QCC into the Provincial Hospital Accreditation Standards and promoted QCC in all secondary and third level general, specialist and private medical institutions. Inspired by this, then national health administration also put the use of modern management tools and tracking methodology into Hospital Accreditation and Evaluation Criteria and entrusted Tsinghua University to carry out research and training (2).

The past ten years has witnessed a huge development of promotion of QCC, from ignorance of QCC to today’s joint promotion of QCC in 29 provinces, cities and districts and further to forming the atmosphere of thousands of people participating in competitions and training actively.

In 2013, “The First National Quality Control Circle Competition of Chinese Hospitals” was held in Beijing by the Institute for Hospital Management of Tsinghua University and hosted by Tsinghua University. Participating teams from medical institutions of 21 provinces and the PLA displayed the process and effectiveness of QCC in a comprehensive and three-dimensional way through various forms. After the competition, the author, together with several units and individuals, jointly sponsored the China Federation for Hospital Quality Control Circles to study and promote QCC. By holding competitions, training, building network platforms and in-depth study of the crux and difficulties in the process of carrying out QCC, the federation aims at further expanding the quantity and quality of QCC.

In 2014, “The Second National Quality Control Circle Competition of Chinese Hospitals” was held in Shanghai. There were more than 300 QCC teams participating the competition, and 157 QCC teams in the final round. The number of participants outnumbered 1,000. QCC teams were not only from large tertiary hospitals but also secondary hospitals, specialist hospitals and private hospitals. The competition was also subdivided further into nursing section, secondary hospitals section and general hospitals section in order to give participating hospitals more performance opportunities (3).

So far, QCC is advancing in depth in the field of health care. Although nursing departments are still the main force in the use of QCC, health care, medical technology, administration, logistics and other departments have also formally joined the QCC.

**Four problems in QCC’s operation practice**

Due to lack of understanding of QCC’s operation practice, currently problems mainly exist in four steps of QCC practice: theme selection, real cause verification, solution formulation and standardization.

Aiming at those four problems, the Institute for Hospital Management of Tsinghua University conducted the research, which adopts case analyses and questionnaire surveys to investigate and analyze the current situation of theme selection in China’s hospitals. Cases come from China Federation for Hospital Quality Control Circles. There are altogether 396 QCC cases in the case library, of which there are 354 tertiary hospitals and 42 second-class hospitals. And then, Tongji Hospital of Tongji Medical College of HUST, People’s Hospital of Jilin Province, and Shanghai Pudong Hospital were selected to conduct questionnaire surveys. They conducted stratified sampling of nurses, doctors, technicians, logistical personnel, and administration staff. The questionnaire contained seven parts, including basic information, theme selection, real cause verification, solution formulation, standardization, outside participation and glossary. They issued 100 copies to each hospital, altogether 300, and finally recovered 280 valid copies, so the effective rate was 93.3%.

As for theme selection, statistical analysis indicates that the majority of China’s hospitals use evaluation methods to choose the theme of QCC. And there are four underlying problems: lack of accurate evaluation dimensions, lack of key evaluation dimensions and lack of weight among different evaluation dimensions.

Aiming at the above problems, after analyzing its underlying problems, the research group puts forward the suggestion that the basic evaluation system consists of four dimensions: leadership’s attention, circle’s capacity, significance, and attainability in this period. Besides, to ensure selecting a scientific and reasonable theme, it also needs to complete the weight of evaluation dimensions and establish the mechanism of outside participation if necessary.

In the cause analysis step, there are three main problems: (I) the use of characteristic diagrams is non-standard; (II) lack of real cause verification or de-normalization of real cause verification; (III) the design of the tally sheet is non-standard.
The reason why the problems occur is that members of QCC lack rational knowledge of cohesion between the ten steps of QCC and are less adept at the use of some quality control tools, such as scoring and tally sheets.

Aiming at these problems, the research group recommends that on one hand we should strengthen standardized training of QCC to promote the understanding of the principles of QCC and the use of quality control tools and on the other hand we need to update the concept and establish an open model of QCC.

There are also many problems in the implementation of solution formulation. (I) The four steps procedure of the solution formulation which includes drafting and analyzing, appraising and selecting, integrating and ranking and implementation planning wasn’t be employed completely; (II) in drafting and analyzing, some QCCs didn’t develop solutions aiming at real causes, or the solutions lacked adequacy or maneuverability; (III) in appraising and selecting, the indicator system was irrational or it lacked criteria and weight distribution among the indicators; (IV) more than half the circles left out integration and ranking, which wasted the time and energy and also affected the effect of the countermeasures; (V) responsible persons, time, place and other information in implementation plan tables were not clear and many circles confused the plan table with the 5W1H method.

Through in-depth analysis of the problems, the research group put forwards targeted recommendations which include improving the process of solution formulation, establishing a standardized appraisal system, improving integration and ranking of solutions, and so on.

On the standardization, the research group summed up nine problems which include the lack of standardization, weak operability of the description of the standard operation, irregular flowcharts and so on. Focusing on these defects, the research group formulated the flowchart of the standardization of Hospital QCC which consists of drawing up, checking, approving, numbering, publishing, popularizing, implementing, continuously revising and repealing the standard operating guidelines.

**Conclusions**

Since the author made preparations for the setting up of the Hainan Hospital Accreditation and Evaluation Center, the author had been sparing no effort to promote the application of QCC in Hainan’s hospitals. After that the author was transferred to Tsinghua University and continued to use this platform to conduct the research, training and promotion about QCC. And then the author constituted the China Federation for Hospital Quality Control Circles and made preparations for two National Quality Control Cycle Competitions of Chinese Hospitals. There have been 10 years along the way. The author has accumulated a great deal of personal insights about QCC in the 10 years, hoping to share with peers as an encouragement.

**Although the QCC focuses on the improvement of the field work, it is inseparable from the recognition and support of the administration and the leaders in the hospital**

When he introduced QCC initially, the author had got around quite a lot, hoping to obtain support from health administrative departments, relevant associations and hospital managers. But the author was always refused for the excuse that the QCC was not very fit for the national situation and the promotion is rather difficult. In fact, the so-called Nation Situation Theory and National System Theory put the blame squarely on the national situation and the national system, and then found an adequate excuse for their inaction. However, the institutional barriers are by no means without foundation and they are ultimately created by each individual. Furthermore, the system is not impregnable and individuals can rely on their own efforts to find flexible space in the system. As a quality management tool, QCC does not advocate transforming the system, and the pursuit of it is to improve the micro-environment in the system through the power of the individual bit by bit.

As a matter of fact, since the popularization of the QCC, it has to some extent changed the opinions of the administration and the leaders, who firstly boycotted or observed QCC and at last actively joined the promotion of the QCC. Quality management systems and operation mechanisms of the entire medical profession have also been greatly improved. The small QCC plays a huge role in the subtle process, and it gets rid of the imprisonment of the Nation Situation Theory and National System Theory.

**To the health care industry, QCC is far from a tool or a method, it is also a cultural icon**

Apparently, QCC is a tool to improve medical care quality, but through the frequent use by the first-line health care workers, the scientific spirit and the lean spirit will be recognized by the health care workers and a subtle culture will be fostered. Once all the hospital staff and the entire
medical industry are deeply influenced by this culture, then the overall quality of the medical profession is bound to jump to a new level.

**QCC is not only an important means to meet the staff’s self-realization, but also a significant method to advance the democratic management in hospitals**

In the QCC, the front-line employees no longer position themselves simply as faithful executors of executive orders from top to bottom, but also the discoverers of the problems in the field work and the manager who can analyze and solve these problems. They make a transition from “somebody wants me to do” to “I want to do”. In the process of solving the problems, the members of the circles often get together to brainstorm and give full play to their talents, and they enjoy the irreplaceable satisfaction that their creative ideas can develop into rules and norms of the department or the entire hospital. For the hospital, the wisdom of the front-line staff can be changed into the rules and norms of the hospital and the democracy is truly in action.

**The appearance of the QCC greatly covers the shortages of traditional management methods and achieves a closed-loop management**

Currently, the traditional management methods in Chinese hospitals principally follow the top-to-down management style which is based on the executive orders. However, QCC is based on the improvements made by the front-line staff. The combination of administration and QCCs can transform the one-way and abstract management to a two-way and concrete management and as a result, the efficient implementation of the management intents will be ensured.

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**Footnote**

*Conflicts of Interest:* The author has no conflicts of interest to declare.

**References**


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