Supplemental material

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Supplementary 1S. Semi-structured interview questions for qualitative data

1. Have you realized any changes in patient safety culture in your department? Why?

2. What are your suggestions to improve patient safety in your department? Why?

3. In your opinion what are the factors that influence the patient safety culture in healthcare?

   Probing question:

      a) How do you think these factors influence the patient safety culture?

      b) Who do you think are responsible for these factors?

      c) Do you receive feedback and action taken?

      d) Do you feel empowered?

4. Based on the current level of patient safety culture in your hospital what do you think is an important factor to improve patient safety culture?

   Followed by:

      a. Do you think these can be achieved at all hospital`s levels?

      b. How do you think these factors could be incorporated with the hospital`s activities

5. What are the barriers and how to overcome them?

6. Do you have any other comments?

For managerial:

7. Which managerial decisions were taken to help improving patient safety culture?

8. What are the additional areas leadership should support to enhance patient safety?

Supplementary table 1S. Interview schedule.

Position	Date and time	Location (Site A, Site B, or Both)
Chief Executive Officer	Aug-2-2019	Corporate Level
Chief Medical Officer	July-30-2019	Corporate Level
Hospital Medical Director	July-30-2019	Site C
Deputy Medical Director	July-30-2019	Site A, Site B
Nursing Corporate Director	July-25-2019	Corporate Level
Nursing Hospital Director	July-25-2019	Site A, Site B, Site C
Nursing Corporate Deputy Director	July-26-2019	Corporate Level
Chief Operation Officer	Aug-6-2019	Corporate Level
Chief Administrative and Financial Officer	Aug-13-2019	Corporate Level
Chief Academic Officer	Aug-4-2019	Corporate Level
Safety and Security Supervisor	July-21-2019	Site A, Site B
Pharmacy Services Corporate Supervisor	July-14-2019	Corporate Level
Pharmacy Services Hospital Director	July-14-2019	Site A, Site B
Human Resources, Executive director	July-2-2019	Corporate Level
Human Resources, Hospital Director	July-6-2019	Site B
Patient Affairs, Hospital Director	July-10-2019	Site A
Medical Laboratory and Pathology Director	Aug-5-2019	Corporate Level
Radiology and Medical Imaging Department Director	July-23-2019	Site A
Operating Room Department Chairman	Jun-28-2019	Site B
Emergency Medicine Department Chairman	Jun-25-2019	Site A,Site B
Medicine Department Chairman	Jun-29-2019	Site A
Surgery Department Chairman	Jun-20-2019	Site A
Nursing Service Manager	July-19-2019	Site B (2)
Health Education Center	July-19-2019	Site A
Front-liner staff – Two Focus group (15 members per group) multidisciplinary composition.	July-15-2019 July-16-2019	2 focus groups in Sites A and C and 2 in Site B

Supplementary table 2S. Summary of the main themes and subthemes identified during the interviews.

Theme	Subthemes
Changes in PSC in the facility	- Change in overall culture. - More awareness among staff regrading patient safety. - Improved communication - Increased error reporting - Improved understanding and following hospital policies and procedures. - Improved care processes within the hospital - Provision of guides and manuals - More awareness of risks and how to avert them. - Addressing staff fears about the punitive culture. - Clearer job descriptions, roles, and responsibilities - Making staff less resistant to change - Improved teamwork across the hospital
Factors influencing the PSC in healthcare	- Communication between staff and patients and within and across departments - Staff continued education and training. - Teamwork within and across units, particularly when it came to handoffs and transitions. - Leadership and administrative support - Monitoring and evaluation including feedback on patient safety indicators - Number of staff available - Robust incident reporting system and receiving feedback on reported events. - Clarity and correct implementation of policies and procedures - Implementing a system for monitoring patient safety goals - Improving workflow within specific departments
Barriers to establishing PSC and how to overcome them	- Poor communication within and across departments - Punitive culture - Limited staff awareness - Staff resistance to change. - Staff shortage - Language barrier - Limited cooperation from physicians - Poor training of staff - Budget and space constraints
Organizational changes since 2012	- Changes in the human resources regulations and workflows (from the traditional civil service to a self-operation system) - Preparation for dual accreditation (i.e., national and international) - Separation of the hospitals' healthcare quality from the academic medical education quality - Infrastructure expansions throughout the organization - Launching of new healthcare services - Conducting regular "Quality Days" - Strategic initiatives to enhance communication between top management and frontline staff (e.g., "Patient Safety Leadership Walk-Rounds," "Open Day," and "Breakfast with the Chief Executive Officer") - Digitalizing the incident reporting system

Suggestions to improve patient safety	• Increasing staffing • Offering continuous training and education • Improving communications and teamwork within and across departments • Implementing a horizontal chain of command • More support from management and leadership • Offering feedback on events reported • Supporting a non-punitive culture • Using an open-door leadership approach • Rewarding and empowering staff • Using walk-rounds • Regular meetings to discuss quality and patient safety. • Increasing the space and number of machines available • Better management of patient flow • Better triage and patient assessment • Better implementation of policies and procedures and improved infrastructure • Supporting departmental patient safety initiatives • Staff empowerment to obtain their commitment. • Conducting brainstorming sessions for staff and projects spearheaded by departments to improve patient safety and hosting a "Quality Day." • Empowering the quality committee and creating ambassadors in the hospital supported by hospital leadership