

## Balance scorecard (BSC): Incorporating "Key performance indicators" (KPI) in the Evaluation of the Healthcare System

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### ABSTRACT

Using the balanced scorecard approach, Strategic Management Initiative (SMI) driven Key Performance Indicators (KPIs) have allowed measurable data regarding various clinical, medical, patient and logistic outputs for healthcare leadership to manage an ongoing improvement system in real-time. We underwent a comprehensive search to have 168 articles with the keywords "Balanced Scorecard in healthcare". We applied filters for the last ten years only. We shortlisted 14 studies. The study highlighted various KPIs utilised in different healthcare settings, with most authors favouring BSC methodology as a comprehensive strategy to deal with multi-dimensional hospital processes. The most utilised KPIs included service quality, patient safety, increased healthcare literacy, empowering patients, developing the empathic attitude and social skills in medical staff, professional human resource management and financial management and interests of stakeholders. In short, the BSC strategy is suggested for implementation to improve healthcare-related processes.

**Keywords:** Balance Scorecard (BSC), Strategic Management Initiatives (SMI), Key Performance Indicators (KPIs), Healthcare, clinical leadership

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### Balance Score Card System (BSC)

BSC is an organisation-defined strategic management initiative (SMI) where internal functions are strategised into order with doable step-wise quantifiable initiatives to reach the desirable outcomes.<sup>1</sup> The approach David Norton and Robert Kaplan first advocated for measuring and improving business performance over time sprawled across other industries.<sup>2</sup> The theory advocated in the BSC approach provides a comprehensive and wholesome blueprint for a target and method to approach desirable outcomes in a sequential-time bound flexible manner by combining the management of "strategy" and "operations".<sup>3</sup> While the passionate proponents with questioning opponents have led to a plethora of pathways, differential approaches and crossing lines on developed consensual themes. Though not common in our setups, we have witnessed the implementation of BSC protocols and methods with slight modifications in various healthcare setups. Zaidi *et al.* developed and implemented the BSC system for the vaccination process (EPI) in rural areas of Pakistan with much improvement.<sup>4</sup> Similarly, such a comprehensive system has been in Afghanistan from 2004 to 2013 to evaluate the gaps in Healthcare and take focused steps

to address the provision of medical facilities in targeted areas.<sup>5</sup>

With ever-expanding facilities, the healthcare industry needs to focus on providing quality services to its ailing clientele along with a dedicated focus on technology improvement and service provision criteria. A strategic management system driven under an umbrella can allow for targeting core areas for improvements with a generalised perspective and monitoring in the continuum. We have suggested an SMI system using the BSC approach for hospital deployment, including "Key Performance Indicators" (KPIs) with targetable time frames and quantitative measures for regular third-party evaluation for our hospital setup.

### Review of Literature

A non-systematic data search was done on PubMed with the keywords "Balanced Scorecard in healthcare" (n=168) and further shortlisted to include clinical trials, meta-analysis, randomised controlled trials, and systematic reviews and reviews only to include 24 articles. Search was shortlisted to last ten years to have 14 articles.<sup>6-19</sup> Few studies were excluded from the review due to a very specific focus (n=2), not directly dealing with KPIs (n=1) and not incorporating BSC or equivalent strategy (n=1)

### Strategic Management Initiatives (SMI) Implementation In Healthcare Set UPS

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## "Key Performance Indicators"

Notwithstanding the sole objective of the hospital, any private or public sector managerial efforts rely knowingly or unknowingly to endeavour to improve the performance. Healthcare, unlike corporate and related organisations, deals with ailing patients as their clientele along with their relatives, are inclusive of the management of core multi-dimensional healthcare processes, related logistics, finances, information transfer, procurement processes, continuous training, non-conformances, stakeholder's interests and staff satisfaction.<sup>20, 21</sup> Defining the complexity of operations involved within a healthcare setup the clinical leadership is posed at any given time with multiple

concerns including respect of core values like empathy, technically specific evidence-based medical practices and systems in place for skilled human resource utilisation for best productivity.<sup>22,20</sup> Therefore, hospital leadership, unlike a routine business process in an organisation, must address all the aforementioned multi-dimensional managerial domains at once. Therefore, the "clinical leadership" challenge needs realistic and manageable care pathways and a structured format with assigned departmental leader's tasks to execute the core vision defined by clinical leaders. While organisations like ISO and other accrediting authorities define details of standard operative

**Table-I: Key Outcomes and Conclusions drawn by Authors about BSC based KPIs in Healthcare Set-ups**

Key Performance Indicators (KPIs) / Key outcomes	Research Category	Healthcare Domain	Conclusion	Ref
9 KPIs included as: 1-Systematization, 2-Authority, 3-Rationalization, 4-Jurisdiction, 5-Knowledge base, 6-Professional qualification, 7-Discipline, 8-Transparency, 9-Accountability	Cross-sectional study	Administration (Complete hospital)	Balance Scorecard (BSC) is a useful management tool which for improving hospital function	Oliveira <i>et al.</i> <sup>6</sup>
KPIs for clinical laboratory strategic plan included:1-Customer's satisfaction, 2-Financial KPIs, 3-Internal processes related KPIs, 4-Learning & knowledge	Review	Laboratory	BSC can improve lab management by KPI's development from professionalism to outcome	Alvarez <i>et al.</i> <sup>7</sup>
BSC transformation from corporate use to clinics can be made useful by:1- Design of scorecard, 2-Involvement of stakeholder i.e., patient, 3-Clinical setting feasibility	Review	Administration (Complete hospital)	BSC frameworks needs improvement to address clinical context and should also take into account a patient-centered approach in healthcare settings	Bohm <i>et al.</i> <sup>8</sup>
Healthcare KPIs incorporated in reviewed data included:1-Process-related indicators, 2-Patient care, 3-Hospital infections, 4-Staffing, 5-Morbidity/mortality indicators, 6-Staff burnout rates, 7-Patient satisfaction indices, 8-Training and learning	Review	Administration (Complete hospital)	BSC implementation in context of Greater Maghreb should be included as preliminary requirement to measure and improve hospital performance	Rouis <i>et al.</i> <sup>9</sup>
Shortlisted KPIs for radiology services included: 1-Customer focused, 2-Financial dimensions, 3-Process improvement, 4-Knowledge and training	Cross-sectional study	Radiology department	Incorporation of BSC model helped improve overall management of radiological services	Maurer <i>et al.</i> <sup>10</sup>
KPIs included to address: 1-Healthcare worker (HCW) satisfaction, 2-Patient satisfaction, 3-Financial performance	Review	Administration (Complete hospital)	Implementing BSC showed positive outcomes for all targeted KPIs except patient HCW satisfaction	Amer <i>et al.</i> <sup>11</sup>
Specific step-wise critical care pathways by defining concept, design, implementation and sustaining a critical care telemedicine program required KPIs targeting: 1-Administration, 2-IT services, 3-Steps involved in critical care pathways	Review	Critical care telemedicine program	A successful business model was developed for critical care telemedicine program	Farmer <i>et al.</i> <sup>12</sup>
Usual KPIs psychiatric disorders included:1-Patient safety, 2-Mechanical restraint,3-Exacerbation, 4-Suicidal behavior,5-Psycho-education,6-Adherence to medication, 7-Physical health.	Review	Psychiatry and mental healthcare	These KPIs allowed better quality management of patients with psychiatric disorders by using BSC	Bernardo <i>et al.</i> <sup>13</sup>
KPIs were tailor-made for application at level of healthcare application with control and intervention groups for assessing:1-Training domain, 2-Adult clinical observation domain, 3-Health information domains	Randomized clinical trial	Community level healthcare	BHOMA study incorporates BSC driven KPIs implementation at district, health facility and community with net improvement in outcomes	Mutale <i>et al.</i> <sup>14</sup>

## "Key Performance Indicators"

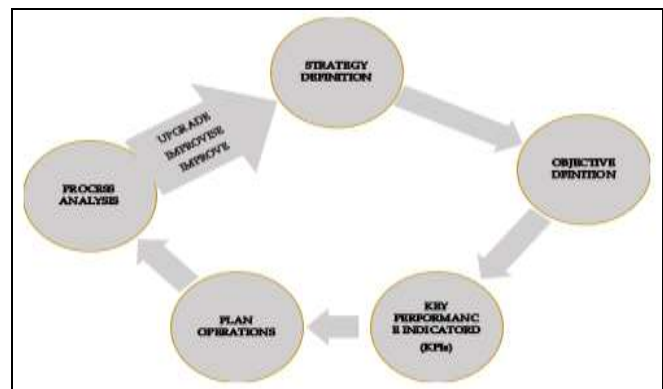
Comparison of developing healthcare management strategies from objective, measuring model, output and analysis for:1-Data envelopment analysis model (n=9), 2-Pabon Lasso model (n=6), 3-Balanced scorecard (n=3), 4-Organizational excellence model (n=3), 5-Hospital self-defined KPIs (n=21)	Review	Hospital set ups (Administration)	From the 42 selected studies with only 3 utilizing BSC strategy, authors suggested indigenously defined healthcare models with focused attention to well-defined inputs, processes to outputs through KPIs	Rasi <i>et al.</i> <sup>15</sup>
Systematic evaluation of selected nursing staff performance indicators were reviewed to shortlist 12 KPIs by developing a balanced score card	Review	Performance of nursing care	Authors concluded that these selected initiatives can bridge current gaps in operationalization of nursing care and performance measurement	Dubois <i>et al.</i> <sup>16</sup>
Strategic corporate objective of GGZ included:1-Increase health literacy residents and care providers, 2-Patient empowerment, 3-Induction of qualified staff, 4-Developing empathic attitude in staff, 5-Improving good social skills, 6-Ensuring professional human resource management	Review	Geriatric care set ups	Geriatric Health Care Centres of Graz opined that incorporating routine workplace health management into corporate strategy by strategic management instruments (BSC) is supported	Löffler <i>et al.</i> <sup>17</sup>
Primary healthcare services suggested 5 major KPI domains:1-Quality of Service, 2-Finance, 3-Stakeholders i.e.,customers and clients, 4-People and culture, 5-Governance and business Management	Review	Hospital set ups (Administration)	Purposeful, strategic KPIs in primary care set ups with defined mission and implementation can allow improved outcomes	Colbran <i>et al.</i> <sup>18</sup>
Comparison between six performance measurement strategies was done:1-Dashboard, 2-Balanced scorecard, 3-Open system model, 4-PCATool, 5-Analyze dimension and performance indicators, 6-Standardized checklist and interview	Review	Hospital set ups (Administration)	BSC approach was less encouraged to develop KPI than other contemporary KPI based strategies in a healthcare setting	Carnut <i>et al.</i> <sup>19</sup>

procedures with third-party external checks for compliance, the hospitals vary in capacity and purpose with differences in objectives between hospitals as delineated by different stakeholders. Furthermore, the third-party evaluation can be better served by internal processes and developing KPIs based upon some strategic management system.<sup>19,11,13-15</sup> We have suggested a pathway for implementing SMI-defined KPIs per the BSC approach [Figure].

The Balance scorecard (BSC) approach follows a step-wise management approach to tackle any healthcare business process. The standardised Strategic Management Initiative (SMI), as per the schema of the BSC system, needs to be routed through general process guidelines as below.

### Strategy Definition

Central to BSC BSC-directed Strategic Management Initiative's (SMI) success is identifying institutional stakes, envisioning the mission, and utilising allocated material and human resources. The Balancescore card approach remains fundamentally successful in strategising management initiatives and further developing tangible objectives and measurable KPIs for monitoring progress within hospitals.<sup>23</sup>



**Figure: Step wise implementation of Strategic Implementation Initiatives (SMI) as per Balance Score Card (BSC) Method**

### B. Objectives

The organisation's objectives, i.e., the hospital, spring from a leadership-provided strategy which leads to multiple defined strategic objectives per requirements with consensus towards an economised, measurable, evidence-based practice. These strategic objectives are defined as per BSC-defined SMI and are usually further translated to sub-objectives depending upon the need and comprehensive coverage. In this regard, Verzola *et al.*, in Ferrara University Hospital

## "Key Performance Indicators"

Table-II: General example of Balance Scorecard as recommended for use in Pakistani Healthcare System

Vision of Hospital <i>"To be an organization with a reputation for excellence, staffed by well trained and highly motivated people, delivering quality health services at per best possible evidence based practices and serving Pakistan Armed Forces with honor"</i>		STRATEGIC MANAGEMENT INITIATIVES (SMI) & KEY PERFORMANCE INDICATORS (KPI)			
		5.9% Green = 100% or greater achievement Yellow = 90% or greater achievement Red = 80% or greater achievement			
HOSPITAL NAME		SCORECARD			
Strategic Objectives		Score	Target	Actual	Baseline
<b>Strategic Objective- 1 (S1)</b> <b>Improve professional knowledge, technical and soft skills of medical/paramedical staff</b>					
S1-1	Frequency of Critical-pathological conferences (CPC) per month	30	Weekly		Bi-weekly
S1-2	% attendance of CPC by the doctors	70	80%		70%
S1-3	Frequency of professional workshop / seminars / short courses attended by various categories of staff				
	A-Professional workshop (No/Annnum)		3		1
	B-Seminars (No/Annnum)		2		0
	C-Short courses for staff (%)		5%		3%
S1-4	Participation of medical, nursing and paramedical staff in various training activities				
	A-Courses for doctors (No)		2		0
	B-Courses for nurses (No)		2		0
	C-Courses for nursing assistants (No)		20		10
	D-Courses for medical transcriptionist (No)		2		2
<b>Strategic Objective- 2 (S2)</b> <b>Capacity enhancement to handle emergencies, starting from pre-hospital emergency service to the critical care in the hospital</b>					
S2-1	% qualification of pre (primary trauma course) and PALS (Basic Life Support) by ambulance crew	0	15%		4%
S2-2	Frequency of casualty evacuation drills /month	0	4		1
S2-3	% qualification of ATLS (Advance Trauma Life Support) and ACLS (Advance Cardiac Life Support) by the doctors & nursing staff	0	10%		3%
S2-4	% reduction in cases ending up with avoidable complications	0	Not known		Not known
S2-5	Frequency of mass casualty evacuation exercises per year	0	12		4
S2-6	Frequency of hospital crisis expansion exercises per year	0	4		2
<b>Strategic Objective- 3 (S3)</b> <b>Rational up-gradation &amp; optimal utilization of hospital equipment/medical stores</b>					
S3-1	No of new technologies incorporated/annnum	0	1		1
S3-2	Optimal equipment utilization index (%)	0	Not known		Not known
S3-3	Medical store optimal utilization index (%)	0	Not known		Not known
S3-4	% of non-functional electro-medical equipment	0	0.40%		0.33%
S3-5	% of non-functional electrical equipment	0	2%		3%
S3-6	Mean repair time (days) for various equipment	0	Not known		Not known
S3-7	Surplus of medical stores in PRR excluding 30% disaster reserve	0	Not known		Not known
<b>Strategic Objective- 4 (S4)</b> <b>Improve patient satisfaction level of patients/attendants in hospitals</b>					
S4-1	Patient satisfaction index (%) thru a questionnaire	0	Not known		Not known
S4-2	Waiting time (minutes) in outpatients departments	0	Not known		Not known
S4-3	Waiting time (minutes) in radiology	0	Not known		Not known
S4-4	Waiting time (minutes) in pathology	0	Not known		Not known
S4-5	Waiting/appointment time (days) for common elective surgeries:				
	a-Hernia	0	Not known		Not known
	b-Circumcision	0	Not known		Not known
	c-DNA	0	Not known		Not known
	d-Caesarean surgery	0	Not known		Not known
<b>Strategic Objective- 5 (S5)</b> <b>Improve healthcare and treatment outcomes through medical audit</b>					
S5-1	Length of hospital stay (days) in prototype cases				
	A-Viral hepatitis (Mean ± SD )	0	Not known		Not known
	B-Malaria (Mean ± SD )	0	Not known		Not known
	C-Caesarian section (Mean ± SD )	0	Not known		Not known
	D-Appendicitis (Mean ± SD )	0	Not known		Not known
S5-2	Range of post-treatment complications in prototype cases (Morbidity audit)				
	A-SURGICAL: Post operative UTI after using catheter (No)	0	Not known		Not known
	B-SURGICAL: Post surgical wound infection (No)	0	Not known		Not known
	C-CYNAE: Post caesarian section wound infection (No)	0	Not known		Not known
	D-ENT: Nasal septal perforation in IRR cases	0	Not known		Not known
S5-3	Range of hospital infections in post-operative cases				
	A-MRSA in surgical patients	0	Not known		Not known
	B-VRE in surgical patients	0	Not known		Not known
	C-MRSA in gynae/obs patients	0	Not known		Not known
	D-VRE in gynae/obs patients	0	Not known		Not known
	E-MRSA in ENT patients	0	Not known		Not known
	F-VRE in ENT patients	0	Not known		Not known
<b>Strategic Objective- 6 (S6)</b> <b>Expedient finalization/disposal of medical boards</b>					
S6-1	Average time taken (days) in finalization of prototype medical boards				
	A-Board out/investment doc completion time in days	0	90		75
	B-Categorization document completion time in days	0	70-8		55
	C-Sick leave document completion time in day	0	65		50
S6-2	Range of medical boards proceedings returned by competent authority with				
S6-3	Average time taken in (days) completion of fatal case documents (ICDs)	0	100		< 70
<b>Strategic Objective- 7 (S7)</b> <b>Hospital QA practices</b>					
S7-1	ISO ACCREDITATION	0	Not known		Not known
S7-2	Annual medical inspection (% marks)	0	Not known		Not known
S7-3	LAD NQCAP	0	Not known		Not known
S7-4	Department specific QA practices	0	Not known		Not known

utilising the BSC approach, have developed macro and micro objectives for comprehensive coverage of the management process.<sup>24</sup>

### Developing KPIS-The

Strategic objectives need to be measurable, and key performance indicators (KPIs) are needed to define baseline, achievement targets, and scores achieved, thus allowing managers to assess progress on any

objective periodically. An attempt must be made to develop KPIs which are understood by staff, easily assessable and can, in real-time, act as a "progress indicator". Table-I has shown multiple areas where KPIs have been developed, and a hospital can tailor-make its KPIs to assess different areas of progress monitoring.<sup>6,7,10-13,16</sup>

### Operational Plan

After defining the mission, strategy, objectives and KPIs, an operation plan must be developed. This plan must address the mission of the hospital through targeting objectives and allow a realistic evaluation through KPIs for the manager to measure optimal progress towards targets, define newer interventions or reconsider any changes in the operational plan or any aspect of the BSC.

### Process Analysis

This stage allows healthcare organisers to assess the complete process regarding patient-related complaints, staff non-conformances, lagging target KPI scores, and finally, to refine and innovate new changes into the process. Here, the healthcare managers can discuss improvements in various care pathways, ask for inputs from different experts in clinical specialties, identify gaps in clinical care/processes and financial issues resulting from operational plans, and finally, allow a blueprint for successfully implementing a redefined strategy. The analysis should allow newer interventions in BSC approaches and changes in operational plans.

### Strategic Management Initiative (SMI) Recommendation for Armed Forces Hospitals

An exemplified generalisation of a balanced scorecard with vision, strategic objectives and KPIs with baseline, targets and achieved scores are depicted in Table-II.

### CONCLUSION

A balanced Scorecard-based management system has been recommended for use by many healthcare organisations with few exceptions. In brief, KPIs provide a systematically measurable mathematical evaluation system defined by the healthcare leadership to organise various ongoing hospital-based processes to improve the net output for patients and stakeholders.

**Conflict of Interest:** None.

### Authors Contribution

Following authors have made substantial contributions to the manuscript as under:

SHK & NK: Conception, study design, drafting the manuscript, approval of the final version to be published.

MSA & SR: Data acquisition, data analysis, drafting the manuscript, critical review, approval of the final version to be published.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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## "Key Performance Indicators"

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