
THE THEORY AND PRACTICE OF THE HEALTHCARE 'GOLDEN TRIANGLE'

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Abstract

The ultimate goal of the healthcare system is patient recovery and the improvement of quality of life. However, this goal cannot be achieved without guaranteed safety of medical personnel. The health, working capacity, and psychological resilience of staff constitute the foundation upon which patient safety and health rest. Sustainable infrastructure, physical, biological, and chemical factors, construction standards, and procedural order create a supportive environment for risk reduction. The present research focuses on reducing risks directed at medical personnel, but inevitably addresses the so-called 'Golden Triangle,' within which patient recovery, staff safety, and infrastructure sustainability form an integrated system. Each component is essential for the effective realization of healthcare objectives. International practice demonstrates that the implementation of the 'Golden Triangle' principles varies according to local specificities: in economically advanced countries, priority is given to infrastructure sustainability (Japan), biological risk control (USA), psychosocial risk management (Germany, Sweden), and reduction of chemical and physical risks (Germany).

Keywords: Golden Triangle, staff and patient safety, psychological resilience, physical facilities and environment, biological and chemical factors.

1. Introduction

The ultimate goal of the healthcare system is patient recovery and the improvement of quality of life. However, in practice this goal cannot be achieved by focusing solely on the treatment process. Ensuring staff safety and infrastructure sustainability is essential, as they form the foundation upon which patient safety rests [1, 2].

The example of Japan demonstrates how local conditions determine priorities. Frequent earthquakes and natural disasters compel both the state and healthcare institutions to prioritize seismic resilience and safe construction standards. This is not merely an infrastructural issue – it directly affects risks to staff health and safety, and ultimately patient recovery [3].

In the United States, during the COVID-19 pandemic, the main emphasis was placed on controlling biological risks. Strict protocols, personal protective equipment (PPE), and infection prevention systems aimed not only to protect patients but also to safeguard staff, since unprotected personnel cannot deliver quality treatment [4].

Germany and Sweden highlight the importance of psychosocial risk management. Regulation of working hours, stress reduction programs, and prevention of psychological strain demonstrate that the psychological well-being of staff directly influences patient outcomes [5, 6].

2. Methodology

Comparative analysis of international practice - Based on the research, four main categories of risks were identified:

- Biological risks (infections, viruses, epidemics).
- Psychosocial risks (stress, burnout, maintaining psychological resilience).
- Infrastructural risks (building resilience, fire and seismic safety) [7-10].
- Prevention of chemical and physical risks (toxic substances, radiation, compliance with ergonomic requirements).

Ranking model - Each risk was assessed according to the *Influence Index (II)*, which reflects its impact on staff and patient safety. Analysis of scientific literature [3-6, 11-15] revealed the following ranking:

- Level I - Biological risks (highest impact).
- Level II - Psychosocial risks.
- Level III - Infrastructural risks.
- Level IV - Chemical and physical risks.

Integration of indices - Three main indices were applied:

- Patient Outcome Index (POI) - indicator of patient recovery.
- Safety Integrated Index (SII) - indicator of staff safety.
- Influence Index (II) - degree of risk impact.

It should be noted that a low SII automatically reduces POI, which demonstrates the critical importance of staff safety.

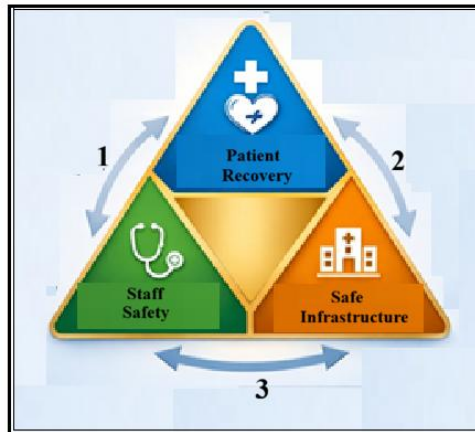


Fig. 1. 'Golden Triangle' in healthcare: patient recovery, staff safety, and infrastructure sustainability - interdependent objectives forming a unified system:
1 - Safe Staff; 2 - Stable Environment; 3 - Optimal Care.

'Golden Triangle' in methodology - Applied as a visual model, where:

- The top vertex of the triangle represents patient recovery.
- The lower left vertex represents staff safety.
- The lower right vertex represents infrastructure sustainability.

All three vertices are interdependent and form a unified system.

Thus, according to the **'Golden Triangle'**:

- Staff safety ensures quality service.
- A stable environment creates a sense of security.
- The best care for patients is the ultimate outcome.

3. Results

The **'Golden Triangle'** in healthcare - patient recovery, staff safety, and infrastructure sustainability - represents interdependent objectives that form a unified system. According to international experience, this model directly improves desired indicators.

Biological risk control (USA) - During the COVID-19 pandemic, the introduction of strict protocols, use of PPE, and diligent implementation of infection prevention systems resulted in the best outcome: improved staff safety directly reflected in patient recovery indicators [4].

Psychosocial risk management (Germany, Sweden) - Regulation of working hours, introduction of stress reduction programs, and measures aimed at maintaining psychological resilience produced positive results: the number of medical errors decreased and the quality of service increased [5, 6].

Infrastructure sustainability (Japan) - The adoption of seismic standards and safe construction norms led to the following outcome: during natural disasters, healthcare institutions continued functioning without interruption, ensuring the safety of both staff and patients [3].

Reduction of chemical and physical risks (Germany) - Safe chemical management, control of toxic substances, and improvement of ergonomics produced the following result: preservation of staff health and increase of work capacity [6, 15].

Table 1.

Risk ranking based on international examples

Risk type	Impact on staff	II indicator (Influence Index)	International example
Biological	Spread of infections	High (101-200)	USA - COVID-19 protocols [4]
Psychosocial	Stress, burnout	Medium (51-100)	Sweden - regulation of working hours [5]
Infrastructural	Injuries, accidents	Medium	Japan - seismic standards [3]
Chemical/Physical	Toxic exposure	Low (0-50)	Germany - safe chemical management [6]

Determinant circumstances of the obtained results:

- **Staff safety - initial and ultimate objective:** Staff health and psychological resilience are the foundation of patient safety. Unprotected staff cannot provide quality treatment, which directly harms patient recovery. Therefore, staff safety must be considered not as a supporting factor, but as the central axis of the system.
- **Infrastructure sustainability - a critical supporting factor:** Infrastructure creates a safe environment that ensures stability of staff performance. The Japanese example shows that local conditions (earthquakes, natural disasters) define priorities. Infrastructure sustainability should be assessed through the Influence Index (II).
- **International experience - a guide for local systems:** USA - strict control of biological risks. Germany and Sweden - management of psychosocial risks. Japan – infrastructure sustainability. Germany - reduction of chemical and physical risks. These examples demonstrate that strengthening local systems is possible by considering local specificities and integrating international practice.
- **Integration of indices - an objective evaluation tool:** Patient Outcome Index (POI) -patient recovery indicator. Safety Integrated Index (SII) - staff safety indicator. Influence Index

(II) - degree of risk impact. A low SII automatically reduces POI, which once again confirms the critical importance of staff safety.

- **The 'Golden Triangle' – an integrated vision:** Patient recovery, staff safety, and infrastructure sustainability are inseparable components necessary for achieving positive outcomes. The 'Golden Triangle' can be applied as a strategic framework in healthcare policy planning.

Table 2.

Determinant circumstances of the obtained results

Circumstance	Implemented measure	Immediate result	Impact on patient
Biological risk control (USA)	Strict protocols, PPE, infection prevention	Improved staff safety	Increased patient recovery rate
Psychosocial risk management (Germany, Sweden)	Regulation of working hours, stress reduction programs	Reduced medical errors, improved service quality	Better patient outcomes
Infrastructure sustainability (Japan)	Seismic standards, safe construction norms	Continuous functioning during disasters	Protection of staff and patients
Reduction of chemical/physical risks (Germany)	Control of toxic substances, improved ergonomics	Preservation of staff health	Enhanced quality of treatment

Additional argument on psychosocial risk management - based on Natalia Bulia's research [14]: 'Psychosocial risk management in clinical settings represents a continuous and systematic process that includes identification, assessment, control, and monitoring of risks. According to international approaches, this process should be integrated into the organizational management system and not implemented merely as a reaction to individual problems.'

4. Recommendations

Based on international practice, the following recommendations have been developed.

For systematic strengthening of staff safety:

- Develop national standards for minimum requirements of staff safety.
- Establish regular training and psychological support programs.
- Monitor the Staff Safety Index (SII) annually.

For ensuring infrastructure sustainability:

- Review construction standards with consideration of seismic resilience.
- Update fire prevention and emergency systems.
- Integrate the Infrastructure Influence Index (II) into healthcare policy.

For management of biological risks:

- Introduce strict infection prevention protocols.
- Ensure permanent availability of personal protective equipment (PPE).
- Strengthen epidemiological monitoring systems.

For reduction of psychosocial risks:

- Regulate working hours and prevent burnout.
- Implement stress management programs and psychological support.
- Introduce strategies for maintaining psychological resilience.

For control of chemical and physical risks:

- Ensure safe management of toxic substances.
- Comply with radiation safety standards.
- Improve ergonomics in the working environment.

For integration of international experience:

- Apply the example of the USA in biological risk control.
- Implement German and Swedish practices in psychosocial risk management.
- Consider the Japanese model in infrastructure sustainability.
- Use German experience in reducing chemical and physical risks.

The 'Golden Triangle' should be applied as a strategic framework, meaning that every healthcare policy decision must be evaluated according to the following three components:

- Patient recovery,
- Staff safety,
- Infrastructure sustainability.

In addition, integration of indices (POI, SII, II) should become a strategic monitoring tool.

5. Conclusion

The declared goal of the healthcare system is patient recovery. However, achieving this fundamental objective is impossible without ensuring staff safety and infrastructure sustainability, as confirmed by the presented research and obtained results.

Staff safety must be considered the central axis of the system – staff health, working capacity, and psychological resilience directly determine the quality of treatment and patient outcomes. Unprotected staff cannot provide effective care, which negatively affects recovery indicators.

Infrastructure sustainability serves as a critical supporting factor – safe construction standards, seismic resilience, and reliable emergency systems create a stable environment for both staff and patients.

International experience demonstrates that strengthening local systems is possible by integrating global practices while considering local specificities. The examples of the USA (biological risk control), Germany and Sweden (psychosocial risk management), Japan

(infrastructure sustainability), and Germany (chemical and physical risk reduction) confirm the effectiveness of the 'Golden Triangle' approach.

Integration of indices – Patient Outcome Index (POI), Safety Integrated Index (SII), and Influence Index (II) – provides an objective monitoring tool. A low SII automatically reduces POI, once again highlighting the critical importance of staff safety.

Thus, the 'Golden Triangle' – patient recovery, staff safety, and infrastructure sustainability – should be applied as a strategic framework in healthcare policy planning, ensuring comprehensive and sustainable improvement of healthcare systems.

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ჯანდაცვის 'ოქროს სამკუთხედის' თეორია და პრაქტიკა

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აბსტრაქტი

ჯანდაცვის სისტემის საბოლოო მიზანი არის პაციენტის გამოჯანმრთელება და ცხოვრების ხარისხის გაუმჯობესება. თუმცა, ამ მიზნის მიღწევა შეუძლებელია პერსონალის გარანტირებული უსაფრთხოების გარეშე. პერსონალის ჯანმრთელობა, მუშაობის უნარის შენარჩუნება და ფსიქოლოგიური მდგრადობა წარმოადგენს იმ საყრდენს, რომელზეც დგას პაციენტის უსაფრთხოება და ჯანმრთელობა. მდგრადი ინფრასტრუქტურა, ფიზიკური, ბიოლოგიური და ქიმიური ფაქტორები, სამშენებლო სტანდარტები და პროცედურული წესრიგი ქმნიან რისკების შემცირების მხარდამჭერ გარემოს. წინამდებარე კვლევები შესრულებულია სამედიცინო პერსონალზე მიმართული რისკების შემცირების კუთხით, თუმცა გვერდს ვერ ავუვლით ე.წ. 'ოქროს სამკუთხედს', რომლის ფარგლებში პაციენტის გამოჯანმრთელება, პერსონალის უსაფრთხოება და ინფრასტრუქტურის მდგრადობა წარმოადგენს ერთიან ინტეგრირებულ სისტემას, სადაც თითოეული კომპონენტი აუცილებელია დასახული მიზნების ეფექტურად განხორციელებისათვის. საერთაშორისო პრაქტიკა გვიჩვენებს, რომ ხშირ შემთხვევაში მითითებული 'ოქროს სამკუთხედის' პრინციპების გასატარებლად ქვეყნების მიხედვით ადგილობრივი თავისებურებების მხედველობაში მიღებას აქვს ადგილი. კერძოდ, ეკონომიკურად დაწინაურებულ ქვეყნებში პრიორიტეტი ენიჭება: ინფრასტრუქტურის მდგრადობას (იაპონია), ბიოლოგიური რისკების კონტროლს (აშშ), ფსიქოსოციალური რისკების მართვას (გერმანია, შვედეთი), ქიმიური და ფიზიკური რისკების შემცირებას (გერმანია).

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