HYGIENIC ASPECTS OF GENERAL MEDICINE WARD OPERATION: PROBLEMS AND SOLUTIONS

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The existing problems in the field of healthcare and prevention create new challenges and difficulties in various parts of the national public health system. Today, there is an effective set of new sanitary rules and regulations important for competent organization and stable functioning of general medicine wards. In 2023, this set is SanPiN 2.1.3678-20, developed to ensure safe and effective work in medical facilities. There are special bodies tasked with controlling compliance with the standards, including Rospotrebnadzor. The COVID-19 pandemic revealed a number of problems in the organization of work of inpatient departments, which required revision of the ways of rendering medical assistance. This article considers current sanitary and hygienic aspects of organization of operations at a general medicine ward, as well as the approaches to infection prevention in the context of medical care.

Keywords: organization of work, general medicine ward, COVID-19 pandemic, SanPiN, medical care

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ГИГИЕНИЧЕСКИЕ АСПЕКТЫ ОРГАНИЗАЦИИ РАБОТЫ ТЕРАПЕВТИЧЕСКИХ ОТДЕЛЕНИЙ: ПРОБЛЕМЫ И ПУТИ ИХ РЕШЕНИЯ

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Существующие проблемы в сфере здравоохранения и профилактики заболеваний создают новые вызовы и сложности в различных звеньях отечественной системы здравоохранения. На сегодняшний день действует перечень новых санитарных правил и нормативов, важных для грамотной организации и стабильного функционирования отделений терапевтического профиля. Гигиенические аспекты организации работы отделений медицинских учреждений в 2023 г. регламентированы санитарными правилами и нормами СанПиН 2.1.3678-20, созданными для обеспечения безопасной и эффективной работы. Соблюдение норм проверяют специальные органы — в частности, сотрудники Роспотребнадзора. Наряду с этим пандемия COVID-19 продемонстрировала ряд проблем в организации функционирования отделений стационаров, что, в свою очередь, потребовало трансформации организации оказания медицинской помощи. В статье рассмотрены современные санитарно-гигиенические аспекты организации работы терапевтического отделения и подходы к профилактике инфекций, связанные с организацией оказания медицинской помощи.

Ключевые слова: организация работы, терапевтическое отделение, пандемия COVID-19, СанПиН, оказание медицинской помощи

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Health of the citizens is one of the crucial components of ensuring operation and security of a state. Therefore, introduction and improvement of measures designed the keep the population healthy is one of the priorities for a country's healthcare system. High efficiency of this system hinges on a combination of competent organization of work of the departments providing medical care to the population, adequate financing, measures designed to ensure good sanitary and epidemiological conditions, and state control over production and turnover of pharmaceutical drugs [1–10].

Currently, general medicine wards can be considered within a holistic view of the current problems in the public health system, since most patients are initially received by primary care physicians. In healthcare, they man the "first line" and have to work with a wide range of different disease entities on a regular basis, as well as plan diagnostics, prescribe treatment, and, if necessary, refer patients to doctors specializing in respective fields [1–10].

The system of primary care was significantly influenced by the COVID-19 pandemic: consistent conversion of hospital departments into COVID-19 wards left to room for planned medical procedures [5, 7]. Lack of reliable information about specifics of the disease posed considerable difficulties at the beginning of the pandemic, translated into numerous diagnostic and treatment errors, and complicated development of new treatment methods and conversion of the departments [5–13].

Systematization and review of patterns of application of the current sanitary and hygienic aspects and standards in general medicine wards, with the situation and specifics of the national public health system accounted for, are the tasks of both fundamental and applied importance set before the hygienic science today.

Organization of operations in a general medicine ward under current legislation

Russian Federation Ministry of Health Order 923n of 15.11.2012 "On approval of the Procedure of provision of primary/general medical care to adult population" regulates specifics and key

aspects of the respective activity [14]. Medical care is subdivided into primary care; emergency care, including its purpose-specific varieties; specialized care, including high-tech medical assistance; palliative care. Sanitary rules and regulations (SanPiN) include by-laws that provide basic requirements for a safe environment ensuring healthy and full-fledged living for people. In particular, there are SanPiN governing organization of operations in general medicine wards [15]. The main purpose of SanPiN provisions is to maximize health preservation and reinforcement capacities and, consequently, improve quality of life. The by-laws stem from scientific studies; they are mandatory for individuals and legal entities providing services to the population on the territory of the Russian Federation (RF). According to sanitary code SP 2.1.3678-202, a medical organization must control adherence to sanitary rules and hygienic standards, implementation of sanitary and anti-epidemic (preventive) measures, by inviting duly accredited laboratories to perform tests and measurements. Such organization must create conditions ensuring conformity to the hygienic regulations in all the buildings, structures, and rooms it operates. Microclimate and air exchange rate in the rooms should meet the requirements set in the hygienic standards, same as levels of natural and artificial lighting, insolation, noise, vibration, and electromagnetic fields [15]. For the territory of a medical organization, hygienic standards also prescribe limit values of sanitary-chemical, microbiological, parasitological indicators, radiation factor, as well as thresholds for priority pollutants in the atmospheric air, electromagnetic radiation, noise, vibration, and infrasound. It is forbidden to set up microbiological laboratories (departments) in apartment buildings and structures built in or attached thereto. Magnetic resonance imaging (MRI) rooms cannot be located near apartments. In permanently occupied rooms, including rooms with permanently manned workstations, the levels of physical factors (noise, vibration, permanent magnetic field) should not exceed limits stipulated in the hygienic standards [16]. Making a general medicine ward walk-through is not allowed, same as other rooms and units not designed such [16–18]. Inpatient hospitals should have furnished admission and examination boxes or wards for admission, treatment and temporary isolation of patients with suspected infectious diseases [15]. According to Appendix № 3 to SP 2.1.3678-20, determination of the contamination class (total content of microorganisms in 1 cubic m) of indoor air in the general medicine wards of a multidisciplinary inpatient hospital shall factor in temperature and air exchange rate [15]. Patients with infectious (parasitic) diseases that can cause an emergency of sanitary and epidemiological nature, and, as prescribed by the applicable regulations of the Russian Federation, shall be sanitarily controlled, are isolated in boxes with a mechanical ventilation system [15, 19]. The respective equipment and structures shall only be used for the intended purpose.

The main structural and functional unit of a general medicine ward in a multidisciplinary hospital is a section of patient rooms, therapeutic and auxiliary facilities designed for treatment of patients with similar diseases [16–18, 20]. The capacity of one section depends on the specialization of the department and patients' age (children, adults), and usually comprises 20–30 beds. A room for adults has four beds at most, a room for children less than one year old – no more than two beds. Sixty percent of all patient rooms in a ward have 4 beds, 20% are single-bed, and the remaining 20% are 2-bed rooms [16–20]. A modern general medicine ward has 14 m^2 of area per patient (earlier, this figure was 7 m^2 per person). In addition, at least two single-bed rooms for serious patients should be located adjacent to the nurse's station. Treatment rooms are designed to simultaneously accommodate a maximum of 10 patients. The minimum required width of a hallway is 2.5 m, which allows free movement and maneuvering of stretchers and gurneys. It should be noted that the ratio of the patient rooms' area and that of auxiliary/treatment rooms is 1:1, and the standards for the former are as follows: 7 m^2 per bed in 2-bed rooms, 9 m^2 in single-bed rooms, and 12 m^2 in patients rooms with an airlock. According to the regulations, the minimum headroom of a patient room is 3 m, and cubic capacity per bed — 20 m^3.

A general medicine ward includes a warden's office, a staffroom, a head nurse's room, a floor nurse's station (6 m^2), a doctor's office (10 m^2), a treatment room (12 m^2), a washroom, a bathroom, a toilet, utility rooms, a pantry, and rooms for outpatients (0.8 m^2 per bed) [14, 15, 19]. Patient rooms must be fitted with necessary equipment, as well as medical beds, bedside tables, regular tables, and chairs. Individual lamps and nurse call buttons should be in the bedside space. Current codes, despite the expediency thereof, do not require setting up dressing and manipulation rooms in a general medicine ward [16–24], since application of dressings is not a usual activity for a general practitioner, and patients admitted with conditions requiring this type of treatment are examined together with surgeons. After examination, if necessary, they are treated respectively in surgical dressing rooms. In addition, contemporary general medicine wards include no canteens, which saves significant space. The codes allow diagnostic rooms to share floors with the wards proper, thus facilitating the range of respective activities. The design of the ward isolates handled epidemiologically hazardous materials, with an alternative option being the use of special equipment (closed trolleys, sealed waste containers, through-pass sterilizers and washing machines, barrier washing machines, etc.).

Design recommendations suggest arranging sources of natural lighting for the rooms, such as courtyards, and atriums for sky light. The windows may be facing any cardinal direction, but insolation rate should meet the regulated requirements in at least 60% of indoor premises of the medical facility [14–24]. The recommendations for allocation of patient rooms on the floors are as follows:

– sections of children's inpatient departments — not higher than on the fifth floor;

– sections for unaccompanied children of 7 and younger, hospice and nursing sections, geriatric sections and residential sections for elderly with disabilities — not higher than on the second floor.

General medicine wards cannot be located next to rooms and other wards posing a high risk of infection, such as contagious disease wards and purulent surgery departments. The windows in the rooms must face south and south east, since it is necessary to maintain a certain intensity, uniformity and biological usefulness of the lighting spectrum. Placing beds parallel to the wall with windows allows the most efficient use of daylight, but arrangements should be made to prevent excessive insolation (blinds, curtains, or similar elements).

The surfaces in patient and other rooms of the ward should be made of hypoallergenic materials. Surface finishes should be smooth and capable of withstanding wet cleaning and disinfection, selected accounting for the specifics of medical and technological processes. Walls and ceilings of rooms designed to be dry (treatment and diagnostic rooms, patient rooms, doctors' offices, physiotherapy rooms, etc.) are coated with acrylic or silicate water-soluble paints, or other materials that allow wet cleaning and disinfection. The walls of high humidity rooms should be covered with matte ceramic tiles or other moisture-resistant materials floor-to-ceiling [14–24].

The space around workplaces should be designed with the aim at ensuring optimal microclimate and properties of the air (temperature, humidity, velocity, chemical and bacterial composition), as well as the necessary exchange rate thereof. The equipment should be placed, installed and operated as prescribed by the current safety and health regulations, avoiding situations that can be dangerous to health of staff and patients [14–24]. The nurse's station should have a table with separate drawers for medical documentation, as well as a medicines locker with separate lockable compartments for poisonous (group A) and potent (group B) drugs. A treatment room is also set up here, manned by a certified treatment nurse. There are stricter sanitary requirements for treatment rooms; in particular, air there should be disinfected with bactericidal lamps. Effective national legislation stipulates periodical preventive examinations (checkups) for every healthcare professional [14–24].

Currently, national public health system undergoes transition to the new organizational patterns, which significantly altered the approaches to primary and general medicine, above all, by reorganization and dissolution of an array of subdivisions thereof. This modernization resulted in a significant reduction of financial costs and allowed removing duplicate processes in healthcare. Ultimately, responsibility of the physician attending a case and his role in treatment of the respective patient have grown more significant. However, some territorial outpatient clinics were not ready for these transformations; inter alia, they could not routinely assess of the impact of adverse factors on the health of the population. In addition, shortage of medical personnel in the regions has grown into a major problem. As a result, there formed the need to retrain doctors and to develop and deploy a system of high-quality and effective medical assistance and prevention system. Review of the requirements given in the respective codes (SP), as they pertain to organization of work of general medicine wards, allows discerning the following key trends and features: reinforcement of the primary care component (polyclinics), development and extension of the chain of day hospitals, and the resulting changes in types and numbers of beds (fewer beds in overnight and inpatient facilities) [14–24]. Despite the profound economic effect of the decisions taken, this transition has provoked a number of problems. The insufficiency of bed capacity became a serious problem during the COVID-19 pandemic, which brought the urgent need for additional beds, and numerous hospitals and clinics could not respond thereto. Another problem cultivated by reorganization at the level of national healthcare system (not only its general medicine component) is the increasing workload of medical professionals, a factor that is supposed to trigger growth of the respective financial incentives, in the absence of which a number of healthcare facilities sees spiking outflow of professional personnel [17–26].

Thus, today, there is an extensive list of sanitary and hygienic requirements that govern operation of general medicine wards, and current sanitary rules and regulations are routinely refined and supplemented to improve quality, efficiency, and safety of medical assistance rendered to the population. Unfortunately, despite the ongoing work on legislation that conditions functioning of such wards, there are staff-related aspects that negatively affect health and recovery of patients (noise early in the morning, irregular wet cleaning, formal attitude to bed linen changes), as well as occasional disruptions associated with utilities and technical infrastructure (temporary lack of hot water and heating, telephone communication breakdowns). Elimination or minimization of the effect of various negative factors, including those that emerged after reorganization of the national public health system, will help preserve health of the general medicine wards' patients and personnel.

In addition, healthcare legislation has an array of problems with conflicting by-laws, which complicates implementation of sanitary codes [25]. In the context of organization of work of a general medicine ward, these codes need to be regularly updated with the changes in healthcare factored in.

COVID-19-related sanitary and hygienic aspects of operation of general medicine wards, and suggested solutions to current problems

The COVID-19 pandemic caused by SARS-CoV-2 was a serious challenge not only for infectious disease departments but also for wards not working with such pathologies [5, 7, 26–30]. In different countries of the world, including Russia, a stably functioning public health system did not guarantee lack of problems, which, ultimately, affected virtually every process therein. For example, in the context of conversion of a ward, the said problems pertained to sufficiency/adequacy of staffing, equipment, number of beds (which has been decreasing through the last few years as part of optimization of inpatient hospitals and transition to a contemporary model of work of medical organizations), availability of supplies/tools etc. (an especially serious problem for facilities in the regions), personal protective equipment, and disrupted logistics [5, 7, 26]. The challenges brought by the pandemic triggered an urgent rearrangement of the medical care system and revealed the weakest components in all models of provision of medical assistance to the population. Sanitary and hygienic aspects of operation of general medicine wards in multidisciplinary hospitals were quickly adjusted to the pandemic, driven by the rapid conversion of medical facilities and the registered flaws in their adaptation and functioning in the new conditions [26].

A number of large multidisciplinary medical institutions have had anti-pandemic organizational measures implemented, which, in particular, entail increase of the number of beds in pulmonary departments and extended headcount. Reorganization of logistics boosted efficiency of patient and interdepartmental transfers; there have been set up isolation wards, and some hospitals began to routinely screen individuals with a suspected infectious pathology. Currently, an extremely important matter is training the personnel of general medicine wards to prevent, diagnose, and treat infectious diseases, including those caused by SARS-CoV-2. It is necessary to introduce, implement, and further improve mandatory anti-epidemic and disinfection programs in medical facilities [26, 31–36]. In the current conditions, there is a need for dynamic organization of examination and treatment of patients with suspected COVID-19, as well as timely improvement of the relevant guidance documentation [29, 34–38]. Underpinned by data, the requirements of today necessitate provision of the full range of medicines, disinfectants, personal protective equipment to all services and bodies providing medical care, including general medicine wards, with the list of mandatory equipment also including tools and devices needed to collect, transport, store and analyze biological materials of patients with suspected COVID-19 [26, 31–38]. Current codes prescribe implementing sanitary and epidemiological measures designed to prevent the spread of infection caused by SARS-CoV-2 among patients and staff of medical organizations.

One of the key problems in the context of the pandemic was the lack of reliable information on the principles of diagnosing, treatment and prevention of COVID-19, which forced a quick

alteration of the previously existing paradigm that allowed prompt processing of the emerging new research and empirical data [38]. Nevertheless, after the main wave of the pandemic, the functioning of general medicine wards in multidisciplinary hospitals should be re-engineered accounting for the current epidemiological situation.

The conversion of a number of medical facilities into hospitals admitting only COVID-19 patients (confirmed or suspected) decreased the number of addressed cases of severe non-communicable diseases, which, in turn, translated into more fatalities therefrom and general deterioration of state of those suffering chronic noncommunicable diseases (CNCDs). Today, medical organizations need to balance care for COVID-19 patients, should their number spike, and assistance provided to patients with noncommunicable pathologies [38]. The primary documents that discuss organizational and methodological aspects of infection control (including the novel coronavirus infection) are guidelines and regulations issued by the Ministry of Health of the Russian Federation and the Department of Health of the City of Moscow, as well as local acts of medical institutions [39, 40]. The facilities specializing in infection prevention and mitigation also have lists of respective countermeasures. In addition, medical constituents of the Ministry of Defense of the Russian Federation have procedures regulating deployment of mobile infectious disease hospitals [41]. To date, there has been developed a whole set of instructions, orders and methodological recommendations aimed at arresting the spread of the novel coronavirus infection, primarily through prevention, diagnosis and treatment of the diseases caused thereby [39]. However, there are still no uniform standards regulating operations in general medicine wards in the context of the still high threat of COVID-19, persisting despite the end of the pandemic. One of the reasons behind this shortcoming is the ever-changing nature of the situation, which necessitates adjustment of the existing recommendations. Currently, the incidence of COVID-19 goes down, operation of the public health system gradually normalizes, and patients with respective diseases are admitted to the general medicine wards as usual. Most healthcare institutions work in the normal mode. However, it is necessary to remain highly alert, observing all precautions against the spread of infection. For general medicine wards in multidisciplinary hospitals, it is essential to strictly adhere to the current legislation and codes. In addition, taking into account the experience of conversion of several large multidisciplinary hospitals, it is possible to list the most important recommendations aiding compliance with the rules that factor in the current situation. Any medical institution should have a clear plan of implementation of measures to counter the spread of infection and provide medical assistance to the population in an emergency situation [5, 7, 26–31, 38–43]. For this purpose, there should be formed a task force responsible for preparation and practical execution of such a plan, enlisting medical professionals, utility and maintenance engineers, and managers of the organization. The task force should be capable of preventive mitigation of infection, and adequate implementation of the developed action program [38–49]. In order to avoid shutdown of a general medicine ward and deterioration of the quality of assistance rendered there, in case of a high risk of infection spread through the department/institution, it is feasible to implement the most stringent sanitary and epidemic safety measures in the said ward [38–51]. Medical personnel should be trained the main diagnostic and therapeutic approaches COVID-19 cases, confirmed or suspected. In addition, it is necessary to organize continuous education of the staff for them to learn the current principles of diagnosing of infectious pathologies and operation of high-tech equipment [38, 49–53]. Regular timely monitoring of the epidemiological situation inside and outside the institution, and sharing the respective information with the medical personnel, as well as direct participation of the management in search for solutions to problems arising in the ward and the facility on the whole, can significantly reduce tensions in the team and prepare it for operation in the emergency mode [38–54]. In the current situation, one of the most significant sanitary and epidemiological aspects of the work of a general medicine ward is regular dynamic monitoring and strictest control over compliance with the introduced safety regulations and codes by all parties involved, with identification and further development of the most effective practices and measures [38–54]. This approach allows developing and coordinating the most effective preventive routines for emergency-like situations that significantly reduce the risk of spread of the infection.

Today, it is advisable to restructure and modernize operations of a general medicine ward. The available beds should be used rationally, which requires constant control over their turnover. Among the patients, it is advisable to differentiate senior citizens (and set up a separate gerontological section for them, if possible), and patients with special social circumstances (alcoholics, homeless individuals). To ensure proper functioning of a general medicine ward in view of the increased workload and difficult working conditions, it is necessary to reallocate resources and extend the staff schedule with additional positions (for junior and mid-level personnel, in the first place). This approach significantly lightens the burden on medical professionals manning departments. In addition, with regard to the current codes, general medicine wards may be extended with specialized sections for serious patients, including incurable ones. Despite the fact that the said codes contain a set of visiting rules, the attitude to their enforcement among the staff is often formal, which makes it advisable for the management of hospitals and departments to focus on strict compliance with these rules. This suggestion is especially relevant in the current epidemiological situation, when the high risk of spread of the new coronavirus infection persists. It is also necessary to carefully analyze and optimize the working hours of mid-level medical staff and general practitioners, since the applicable instructions do not clearly outline proper distribution of time between specific tasks (primarily for nursing staff). In this connection, it is also feasible to optimize the medical records keeping processes.

Given the extremely dynamic development of medicine today, continuous training of general practitioners in modern diagnostic and therapeutic techniques is an important aspect. It is recommended to fully fit the ward with materials and equipment, including medications and consumables, and to ensure doctors and nurses work on modern computers, since in many cases these components of operations of the wards are problematic from the financial perspective. Development of an effective information support system for the ward is a work in progress; the system is supposed to significantly boost execution of a number of diagnostic and therapeutic procedures.

Increasing financial incentives for medical staff is likely to alleviate the existing shortage of personnel, especially in regional healthcare institutions. In some cases, a promising option is to raise funds from private sector and investors in the context of a mutually beneficial cooperation.

In addition to all of the above, it is advisable to allocate restricted zones in general medicine wards, and introduce sanitary measures aimed at prevention of spread of an

infectious pathology, including that caused by SARS-CoV-2. A design deserving consideration is that of semi-detached isolation sections with independent air exchange systems. It is also recommended to impose stricter visiting requirements, up to a fully restrictive regime.

CONCLUSION

The new codes governing operations of general medicine wards are of particular importance. They are designed to improve the quality and safety of medical care provided to patients with diseases addressed in such wards, and to counter development of a range of infectious diseases, including the novel coronavirus infection. Breaches provisions of the codes can lead to the occurrence of nosocomial infections and a number of other dangerous consequences, which can be extremely severe. Today, the national public health system has transitioned to a more economically feasible model, but this process triggered development of a number of new problems. In addition, the COVID-19 pandemic brought forth completely new challenges and many problems related to both organizational matters and the lack of necessary knowledge and training on the part of medical personnel manning the general medicine wards of multidisciplinary hospitals. Finding solutions to the organizational issues hindering operations of such wards will significantly improve health of the general population, and strict observance of sanitary and epidemiological rules and regulations, as well as recommendations on countering the spread of infectious diseases, will allow providing medical assistance more effectively and with better quality.

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