Analysis of the disease management program in the post-covid period: improvement and its further development

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Abstract.
The article discusses the importance of improving and developing the Disease Management Program in the post-Covid period. The emphasis is on the need to adapt existing strategies to new challenges arising from the COVID-19 pandemic. The purpose of this study is to evaluate the effectiveness of the post-Covid Disease Management Program, with a view to identifying successful practices and possible improvements to ensure more effective disease control in the wake of the COVID-19 pandemic.

Keywords:
Disease Management Program
post-Covid period
pandemic
healthcare
strategies
**Introduction.** In the post-Covid period, disease management becomes even more important as many people suffer from the long-term effects of COVID-19, known as «long COVID». Disease management programs must be improved and evolved to meet this new challenge. The COVID-19 pandemic has presented significant challenges to healthcare systems around the world. The Disease Management Program has become a key tool in combating the spread of infection. However, as the world moves into the post-Covid period, there is a need to review and improve this program to effectively cope with new challenges [1].

**Materials and methods:**
The study used data from a variety of sources, including scientific publications, statistical reports and official health documents. An analysis of the current state of the Disease Management Program was carried out and the main shortcomings requiring correction were identified.

**Main provisions**
The main provisions for improving the Disease Management Program in the post-Covid period are:
1. Emphasis on preventive measures and early diagnosis.
2. Using technology to improve disease monitoring and control.

**Literature review**
There is a wealth of research demonstrating the effectiveness of Disease Management Programs in controlling infectious diseases. However, in the post-Covid period, it is necessary to take into account the specific features of the new virus and its consequences for health.

The scientific name Coronavirus was adopted as the genus name by the International Committee on Nomenclature of Viruses (later renamed the International Committee on Taxonomy of Viruses) in 1971 [2]. As the number of new species increased, the genus was divided into four genera: Alphacoronavirus, Betacoronavirus, Deltacoronavirus, and Gammacoronavirus in 2009. The common name «coronavirus» is used to refer to any member of the subfamily Orthocoronavirinae. As of 2020, 45 species are officially recognized [3].
The viremia stage is characterized by severe fever, dry cough, and respiratory discomfort. In the future, two scenarios are possible: a “window” may arise at which the process ends, or the process will develop into subsequent complications that will affect such important functions as gas exchange of the lung tissue, as a result of which respiratory distress syndrome will develop, etc.

Coronavirus infection leads to a sharp disruption of mucosal immunity (immunity of mucous membranes, skin, barrier tissues), including both innate (nonspecific) immunity and acquired (specific or adaptive) immunity [5]. Rapid replication of SARS-CoV-2 occurs in conditions of suppressed mucosal immunity. It is known that the immunity of the mucous membranes is realized through a single structured and highly specialized system – mucosa-associated lymphoid tissue.
(mucosa-associated lymphoid tissue). Lymphoid tissue – MALT, consisting of specialized epithelial cells, lymphoid structures and immune molecules located in the submucosa [6]. MALT is a multi-level system that secretes lymphoid tissue associated with the nasopharynx, trachea, gastrointestinal system, urogenital tract, etc.

The main protective factor at the level of mucous membranes is secretory IgA, which is synthesized in the subepithelial part of the mucous membranes of the respiratory tract and gastrointestinal tract (Fig. 5) [7]. Secretory IgA antibodies are effective against various types of pathogens, including the SARS-CoV virus. Existing vaccines mainly have an immunostimulating effect on acquired immunity. Currently, scientific development of vaccines is underway to regulate innate and mucosal immunity.

### Figure 2
Results of analysis of global data on the prevalence of post-Covid syndrome in 2019 [7]
However, we are still not strong in defining post-Covid syndrome. The ambiguity of data on the epidemiology of post-Covid syndrome is due to many reasons, including the lack of clear diagnostic criteria, different approaches to assessing symptoms, serological studies, and assessing the severity of the consequences of this syndrome. In Fig. Figure 6 shows data published by C. Chen in 2022, showing significant variation in the prevalence of post-Covid syndrome among different researchers in different countries, indicating a lack of common understanding.

Thus, in order to form joint responsibility for health with the involvement of the person himself and the management of chronic non-communicable diseases aimed at reducing morbidity, complications and mortality of the population within the framework of the State Health Development Program «Densaulyk» for 2016-2019. The Ministry of Health of the Republic of Kazakhstan is working to strengthen primary health care with the introduction of disease management programs (DMP) based on evidence-based medicine [9].

The introduction of PHC is dictated by the need for serious changes in the prevention and control of chronic non-communicable diseases, increasing the shared responsibility of patients for their health, improving the interaction of medical personnel and using all available resources aimed at preventing possible complications or aggravation of conditions.

HHS is a program aimed at reducing health care costs and improving the quality of life of people with chronic diseases by preventing or minimizing the consequences of the disease through integrated care.

However, HSS is a system of coordinated medical interventions and communications for certain groups of patients with conditions where self-care/ self-management efforts can be made. This program empowers individuals to work with other health care providers to manage their disease and prevent complications.

International experience and various approaches to the implementation of HSS were discussed at the level of the Ministry of Health of the Republic of Kazakhstan with international consultants. It was decided to develop and
implement a disease management program based on evidence-based medicine, increase public awareness on health issues and shared responsibility for the health of citizens between the state, workers and citizens themselves to address social modernization approaches and further strengthen health care reforms.

**Results and discussion**

As a result of the study, we identified the main shortcomings that may require adjustments in the Disease Management Program in the post-Covid period:

1) Lack of universal approaches to treatment: Since more than 200 different symptoms were recorded in patients with post-Covid syndrome, universal approaches to its treatment simply do not exist. This creates challenges in determining the most effective ways to care for patients with long-term COVID-19.

2) High risk of developing post-Covid syndrome: Even now, when the worst stage of the pandemic has probably passed, the risk of developing post-Covid syndrome after infection with COVID-19 remains just as high (approximately 10–20% of the total number of infected people).

3) Requires effort from the entire health care system: Implementation of disease management programs leads to better outcomes, but requires effort not only from the patient, but also from the entire health care system.

4) Concerns with the long-term effects of COVID-19: Most people who become ill with COVID-19 recover fully, however, approximately 10% to 20% of people who recover from the initial illness are reported to experience varying mid- to long-term effects.

There are currently no approaches to consistent monitoring of the functional state of patients after novel coronavirus disease [10]. Of course, the lack of reliable information on the management of patients in the recovery period, specifically in the first three months of the disease, creates certain challenges in assessing dynamic changes in the clinical picture and in the development of therapeutic and preventive measures for physicians who work in outpatient health care.

The workload on the primary care unit requires rational approaches to the management of patients in the post-COVID-19 period.
period, given that, according to the World Health Organization, as of December 27, 2020, more than 79.2 million cases of the diseases had been registered in the world, and over 1.7 million were fatal.

Klok F. et al. (2020) proposed a scale for assessing the functional state of patients after COVID-19 [11] (Fig. 3). This scale can be used to assess the effect of symptoms on the functional state of a person and allows assessing the changes in the post-COVID-19 recovery period. This scale is intended for use at various stages of the post-COVID period, which allows assessing the functional status and changes in the patient’s recovery [12].

![The Post-COVID-19 Functional Status (PCFS) Scale](image-url)
The main objective in the early days of the pandemic was the treatment and follow-up of patients in the acute period of the disease. Given that most patients are followed up on an outpatient basis, there is currently a need for management algorithms since many patients have residual symptoms after infection. Clear algorithms for the management of patients during the post-COVID period will surely not only reduce the burden on the outpatient unit but will also help reduce the number of re-hospitalizations, avoiding the complications associated with COVID-19 and improving the quality of life.

From our point of view, planning rehabilitation programs (rehabilitation treatment plan) should start during hospitalization (or in the acute period in the case of outpatient treatment) in order to further monitor the clinical condition of recovering patients and optimize their functional recovery. The continuity of hospital and outpatient stages plays a critical role in this process. Post-COVID-19 rehabilitation at the outpatient stage should start as early as possible and should include the following aspects:

- restoration/maintenance of functional status (aimed at regression of clinical symptoms and their consequences),
- monitoring the course of chronic non-communicable diseases (if any),
- maintaining mobility and mental health (especially in elderly people),
- vaccine prophylaxis of acute infectious respiratory diseases.

When examining a patient at the outpatient stage after coronavirus disease, the general condition, respiratory symptoms and their severity, anthropometric and hemodynamic parameters, exercise tolerance (possibly using a six-minute walk test), bad habits, risk factors, and the level of adherence to a healthy lifestyle should be assessed.

Depending on the severity of the condition, it is necessary to resolve the issue of dispensary follow-up of the patient on an individual basis. One should take into consideration the reluctance to follow the physician’s recommendations and poor adherence to a healthy lifestyle (non-compliance with the principles of healthy nutrition, active lifestyle, and behavioral risk factors) of outpatients.
of working age due to their formal attitude to preventive examinations and delayed response to examination results due to the lack of time because of work.

In the recovery period, it is important to recommend physical activity of any type depending on the individual characteristics of the person — breathing exercises, walking, exercise therapy. Aerobic exercises for 20-30 minutes are indicated at least three times a week for 8-12 weeks, taking into consideration weather conditions, the patient’s condition and physical capabilities. Patients should be trained to monitor the effectiveness and safety of physical exertion, to know the «red flags». It is recommended to provide the patient with a leaflet/booklet containing recommendations on a healthy lifestyle, dietary habits, aerobic exercises, breathing exercises, etc. The set of measures should include a fixed date for the next follow-up visit to the physician or health center. Because the long-term consequences of new infections are still being studied, the determination of the frequency and indications for consultations with specialists (physiotherapy physician, rehabilitation physician, dietitian, physiotherapist, etc.) seems promising at the outpatient stage.

In this regard, improving the Disease Management Program in the post-Covid period will increase the effectiveness of measures to prevent the spread of infection and improve the quality of medical care provided. Discussing the results and taking appropriate measures will allow us to achieve better results in the fight against the pandemic.

### Table 1

<table>
<thead>
<tr>
<th>Stages</th>
<th>Goals</th>
<th>Actions</th>
<th>Expected results</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Assessment of the current situation</strong></td>
<td>Understanding patients' current health status and needs</td>
<td>Analysis of medical records, patient surveys, discussions with medical specialists</td>
<td>Obtaining information about patient problems and needs</td>
</tr>
<tr>
<td><strong>Planning</strong></td>
<td>Developing a strategy and action plan to improve the program</td>
<td>Setting goals, developing strategy, planning actions</td>
<td>A clear action plan to achieve your goals</td>
</tr>
</tbody>
</table>
Table continuation 1

<table>
<thead>
<tr>
<th>Implementation</th>
<th>Personnel training, implementation of new techniques, process monitoring</th>
<th>Improving the quality of patient care and improving their health status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade</td>
<td>Evaluating the effectiveness of implemented changes</td>
<td>Collection and analysis of data, comparison of results before and after implementation of changes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Understanding the effectiveness of the implemented changes, identifying further steps to improve the program</td>
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</tbody>
</table>

Improving disease management programs may include the following:

Expanding coverage: Disease management programs must be expanded to reach more people suffering from the long-term effects of COVID-19.

Individualize the approach: Each patient is unique, and their disease management plan must be individualized to accommodate their unique needs and circumstances.

Integration with other health services: Disease management programs should be integrated with other health services, such as primary health care, psychological support and rehabilitation.

Further development of disease management programs could include the following:

Use of technology: Technologies such as telemedicine and digital health platforms can be used to improve access to and ease of use of disease management programs.

Improving quality of care: Disease management programs should continually strive to improve quality of care, for example, through staff training, research, and patient feedback.

Community Collaboration: Disease management programs must work closely with the community to improve their effectiveness and ensure that they respond to community needs.

Conclusion
It should be concluded that improvement and further
development of the Disease Management Program in the post-Covid period is a necessity for effective control of infectious diseases. Adapting strategies to new challenges will help society successfully cope with the consequences of the pandemic and ensure the safety of the population.

The study analyzed measures taken within the framework of the Disease Management Program in the post-Covid period. Some of these measures have been found to be effective in controlling disease following the COVID-19 pandemic. Particular attention should be paid to the following successful practices: actively informing the population about precautionary measures, conducting mass vaccination, organizing a morbidity monitoring system. However, areas for improvement have also been identified, including the need to strengthen early case detection and improve coordination between different levels of health care. Further study of successful practices and implementation of adjustments are recommended to improve disease control in the future.

References:


