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Identification of Indicators Used to Assess Needs for Telemedicine Consultations in Various Profiles of Medical Care

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ABSTRACT

BACKGROUND: A unified system for assessing the results and real contributions of telemedicine consultations to improving medical care quality in the healthcare system of the Russian Federation has not yet been developed.

AIM: To develop a system of indicators for differentiated assessment of the needs for telemedicine consultations in the provision of medical care.

MATERIALS AND METHODS: In the first stage, reports on the results of on-site activities of national medical research centers in regions of the Russian Federation and their annual public reports (2020–2022) were analyzed to identify indicators that determine the need for telemedicine consultations. The identified indicators were clarified and validated in an open interview with the representatives of the national medical research centers. In the second stage, the value of each indicator was determined based on the expert survey: 18 experts assessed each indicator on a scale of 1–5. Then, the weight coefficient of each indicator was calculated for their subsequent use in planning the coverage of telemedicine consultations.

RESULTS: Three groups of indicators that determined the need for telemedicine consultations for different medical care profiles were as follows: (1) indicators that affect the planned volumes of telemedicine consultations, (2) indicators that characterize the efficiency and effectiveness of telemedicine consultations, and (3) indicators that characterize the validity of requests for telemedicine consultations. Group 1 included indicators of lethality, disability, hospital mortality, frequency of emergency/urgent consultations, and frequency of consultations of patients requiring intensive care. Group 2 included indicators for assessing the effectiveness and efficiency of telemedicine consultations, both subjective (result satisfaction) and objective (number of positive and negative treatment and hospitalization outcomes for cases that received where telemedicine consultations). Group 3 included indicators that characterize the validity of requests for telemedicine consultations: thoroughness of a patient's examination before a telemedicine consultation and accuracy of the diagnosis. The weight coefficients of group 1 indicators ranged from 0.05 to 1.61 and varied for different profiles.

CONCLUSION: A system of indicators was proposed for the differentiated assessment of the needs for telemedicine consultations when providing medical care.

Keywords: need for telemedicine consultations; effectiveness; national medical research centers; profile of medical care; indicator; weight coefficient.

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Разработка системы показателей, определяющих потребность в проведении телемедицинских консультаций при оказании медицинской помощи различных профилей

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АННОТАЦИЯ

Обоснование. На данный момент не существует разработанной единой системы оценки результатов и реального вклада телемедицинских консультаций в повышение качества оказания медицинской помощи в системе здравоохранения Российской Федерации.

Цель — разработка системы показателей для дифференцированной оценки потребности в проведении телемедицинских консультаций при оказании медицинской помощи различных профилей.

Материалы и методы. Исследование проходило в два этапа. На первом этапе были проанализированы отчёты по результатам выездных мероприятий национальных медицинских исследовательских центров в субъекты Российской Федерации и годовые публичные отчёты об их деятельности за 2020–2022 гг. на предмет выявления показателей, определяющих потребность в телемедицинских консультациях. Выявленные показатели уточняли и валидировали в открытом интервью с представителями национальных медицинских исследовательских центров. По результатам первого этапа был сформирован перечень показателей для определения потребности в телемедицинских консультациях по различным профилям медицинской помощи. На втором этапе 18 экспертов проходили опрос, в котором оценивалась значимость каждого показателя в баллах от 1 до 5 и рассчитывались весовые коэффициенты каждого показателя для их последующего использования при планировании объёмов телемедицинских консультаций.

Результаты. Выделено три группы показателей, определяющих потребность в телемедицинских консультациях для различных профилей медицинской помощи: 1) показатели, влияющие на плановые объёмы телемедицинских консультаций; 2) показатели, характеризующие результативность и эффективность проведения телемедицинских консультаций; 3) показатели, характеризующие обоснованность запросов на телемедицинские консультации. К первой группе относятся показатели, отражающие состояние здоровья пациентов и некоторые особенности оказания медицинской помощи этого профиля (смертность, инвалидность, больничная летальность, частота экстренных/неотложных консультаций и консультаций реанимационных пациентов). Вторая группа включает показатели субъективной и объективной оценки результативности и эффективности проведения телемедицинских консультаций, где субъективная оценка включает удовлетворённость результатами ТМК, а объективная — число положительных и отрицательных исходов заболевания и исходов госпитализаций, по которым были проведены телемедицинские консультации. К третьей группе отнесены показатели, характеризующие обоснованность запросов на телемедицинские консультации: полнота обследования пациента перед консультацией, корректность установленного диагноза, экспертная оценка возможности принятия самостоятельного решения на уровне региона или медицинской организации. Весовые коэффициенты значимости показателей первой группы варьировали от 0,05 до 1,61 и отличались для разных профилей.

Заключение. Предложена система показателей для дифференцированной оценки потребности в проведении телемедицинских консультаций при оказании медицинской помощи различных профилей.

Ключевые слова: потребность в телемедицинских консультациях; эффективность; национальные медицинские исследовательские центры; профиль медицинской помощи; показатель; весовой коэффициент значимости.

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制定一套指标体系，确定在提供各种医疗服务时对远程医疗会诊的需求

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摘要

论证。目前，还没有一个完善的统一体系来评估远程医疗会诊在提高俄罗斯联邦医疗系统医疗质量方面的成果和实际贡献。

目的是制定一套指标体系，用于区别评估在提供各种医疗服务时对远程医疗会诊的需求。

材料和方法。研究分两个阶段进行。在第一阶段，分析了俄罗斯联邦各主体国家医学研究中心的实地活动成果报告。此外，还分析了关于其 2020–2022 年活动的年度公开报告，以发现确定远程医疗会诊需求的指标。在与国家医学研究中心代表的公开访谈中，对确定的指标进行了澄清和验证。根据第一阶段的结果，形成了一份指标清单，以确定在各种医疗保健情况下对远程医疗会诊的需求。在第二阶段，对 18 名专家进行了访谈，以 1 至 5 分评估每项指标的重要性。在同一阶段，还计算了每项指标的加权系数，以便随后在规划远程医疗会诊量时使用。

结果。确定了三组指标，这些指标决定不同医疗保健情况下的远程医疗会诊需求：1）影响远程医疗会诊计划量的指标；2）表明远程医疗会诊效率和效果的指标；3）表明远程医疗会诊申请有效性的指标。第一组包括反映病人健康状况的指标和医疗护理的一些特征（死亡率、残疾、住院致死率、急诊/非急诊会诊频率和重症监护病人的会诊）。第二组包括对远程医疗会诊效果和效率的主观和客观评估指标。主观评估包括对远程医疗会诊结果的满意度，客观评估包括进行远程医疗会诊的疾病正负结果和住院结果的数量。第三组包括描述远程医疗会诊申请有效性的指标。这些指标包括会诊前病人检查的完整性、确定诊断的正确性、专家对在地区或医疗组织层面做出独立决定的可能性的评估。第一组指标的显著性加权系数从 0.05 到 1.61 不等，不同情况下的加权系数也不同。

结论。提出了一套指标体系，用于区别评估在提供各种医疗服务时对远程医疗会诊的需求。

关键词：远程医疗会诊需求；效率；国家医学研究中心；医疗护理概况；指标；显著性加权系数。

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BACKGROUND

Telemedicine is a highly effective and innovative healthcare service in different treatment areas [1]. Its widespread use reduces the time patients spend in healthcare organizations, increases the availability of healthcare—especially in underpopulated countries—by increasing the coverage of diagnostic tests and outpatient follow-up, and increases patient satisfaction with the overall quality of healthcare [2].

Telemedicine has been shown to increase the accessibility and clinical effectiveness of care and improve patient satisfaction across treatment areas [3, 4]. Additionally, evidence suggests that it helped contain the spread of COVID-19 during the pandemic [5]. Telemedicine has also proven effective in remotely monitoring the health status of patients with various diseases [6–9].

In the Russian Federation, a significant proportion of telemedicine consultations (TMCs) are performed by National Medical Research Centers (NMRCs). One of the primary objectives of the Federal Project "Development of the NMRC Network and Implementation of Innovative Medical Technologies" is the implementation of TMCs for regional, republican, territorial, and district healthcare organizations across the constituent entities of the Russian Federation. Positive experiences with TMCs have been described in some treatment areas:

- General Practice [10],
- Psychiatry and Psychiatry/Narcology [11–13],
- Ophthalmology [14],
- Oncology [15],
- Surgery (Transplantology) [16],
- Anesthesiology and Intensive Care in Pregnancy [17],
- Obstetrics/Gynecology and Neonatology [18].

Positive experiences of using TMCs are confirmed by "anchor" healthcare organizations of the constituent entities of the Russian Federation [19]. However, there is still no unified system for assessing the results and real contribution of TMCs toward improving the quality of care in the Russian healthcare system. Additionally, no factors have been identified to enhance the efficient use of financial resources allocated to the implementation of TMCs.

STUDY AIM

The aim of this study was to develop a system of parameters to differentiate the need for TMC in different treatment areas.

MATERIALS AND METHODS

The study included two phases:

1. Creating a list of parameters that determine the need for TMC in the delivery of healthcare services in various treatment areas,

2. Conducting a quantitative assessment of the significance of each parameter using a weighting coefficient.

The list of parameters was based on studying the established practice of TMC and its evaluation, including the following:

- Analysis of analytical reports on NMRC field events in the constituent entities of the Russian Federation and annual public reports on the activities of NMRCs for 2020–2022 in order to identify parameters influencing the need for TMC,
- Open interviews with representatives of the NMRCs to clarify and validate the identified parameters.

The expert survey was used to assess the quantitative significance of each parameter. Based on the results of the expert survey, weighting coefficients were calculated to assess the significance of parameters that determine the need for TMC in different treatment areas.

A structured form was developed to analyze the NMRC reports, including the following:

- Parameters used by the NMRC to determine the need for TMC,
- Specific and general suggestions for improving the effectiveness and efficiency of TMC,
- Parameters that determine the technical feasibility of TMC implementation in the constituent entities of the Russian Federation,
- Results of the assessment of the implementation of the recommendations made by the NMRC professionals during the TMC (if any).

Similar parameters determining the need for TMC were grouped for subsequent validation through open interviews with NMRC experts.

To clarify and validate the key parameters determining the need for TMC, face-to-face open interviews were conducted with 14 experts from five NMRCs. The experts were asked to determine the relevance of the parameters selected in the field report analysis phase, determine the scope of TMC for each treatment area, and formulate additional conditions that should be considered in determining the need for TMC for different treatment areas.

Based on the results of the first phase, a list of potential parameters was created to determine the need for TMC in different treatment areas.

In the second phase, experts assessed the significance of the listed parameters using a standardized form. To participate in the interview, experts had to meet the following criteria:

- At least 1 year of experience participating in the Federal Project "Development of the NMRC Network and Implementation of Innovative Medical Technologies,"
- At least 5 years of experience in management and methodology development at the level of constituent entities of the Russian Federation,
- Experience in planning and implementing TMC, calculating the cost of implementing TMC, and/or

analyzing the effectiveness of implementing TMC at various levels,

- A self-assessed expertise level of ⩾0.5 points[1] [20].

In total, 18 experts participated in the survey: heads of structural departments responsible either for management and methodology development in the constituent entities of the Russian Federation or for TMCs, as well as specialists of NMRCs and the Federal State Budgetary Institution "The Center of Expertise and Quality Control of Medical Care" of the Ministry of Health of the Russian Federation. The mean coefficient of expertise was 0.58.

Each expert was asked to rate the significance of considering each parameter on a scale of 1 to 5, with 1 being the least significant and 5 being the most significant. It was suggested that the significance of the parameters influencing the planned scope of TMC be evaluated separately for each treatment area. To assess the significance of parameters of effectiveness and efficacy of the TMC implementation and the validity of corresponding requests, it was decided not to use reference to specific treatment areas since, in an open interview, the majority of experts agreed that the significance of these parameters does not vary depending on the treatment area.

For each parameter, an average score (based on all expert responses) was calculated in points. Subsequently, the concordance of expert opinions was assessed using Kendall's W [21], which is a statistic ranging from 0 to 1 that characterizes the concordance of expert opinions (ranks) for a set of criteria. The degree of expert opinion concordance was considered unsatisfactory at $W < 0.3$, intermediate at $0.3 < W < 0.7$, and high at $W > 0.7$. To ensure the significance of the differences in the identified parameter correlation, the coefficient of concordance was evaluated using the Friedman test. Statistical analysis was conducted using Statistica 10 (StatSoft, Tulsa, OK, USA).

The final weighting coefficients for all parameter profiles were calculated by multiplying the mean assessment value by Kendall's coefficient of concordance. Weighting coefficients for parameters influencing the planned scope of TMC were calculated for each profile separately. This was done for parameters of TMC effectiveness and efficacy and the validity of corresponding requests without reference to specific treatment areas.

RESULTS

A review of the NMRC reports and open interviews with NMRC experts identified three groups of parameters that determine the necessity of TMC for a range of treatment areas:

1. Parameters influencing the planned scope of TMC,
2. Parameters characterizing the effectiveness and efficacy of TMC implementation,
3. Parameters characterizing the validity of requests for TMC.

Parameters Influencing the Planned Scope of Telemedicine Consultations

The planned scope of TMC is defined by specific parameters that reflect the health status of patients who are receiving healthcare services in the specific treatment area, as well as certain characteristics of such services. The parameters are divided into five subgroups:

1. Mortality rates from diseases covered by the treatment area,
2. Disability rates,
3. In-hospital mortality rates,
4. Rates of emergency/urgent consultations (among all TMCs),
5. Rates of intensive care consultations (among all TMCs).

Table 1 shows the most used parameters in the various subgroups.

Parameters Characterizing the Effectiveness and Efficacy of Telemedicine Consultations

The effectiveness and efficacy of the TMC are evaluated using subjective and objective parameters.

Subjective parameters include the satisfaction level of healthcare professionals in the constituent entities of the Russian Federation with the TMC outcomes, which can be assessed through surveys using a structured feedback form. At some NMRCs, experts are already using forms that ask questions, such as:

- Are you satisfied with the outcomes of the consultation?
- Does the outcome of the consultation meet the goals?
- Are you satisfied with the conclusion based on TMC results?
- Were the recommendations made during the consultation followed?
- Was the diagnosis clarified/changed as a result of the consultation?
- Was the treatment plan changed as a result of the consultation?
- Did you have any difficulties creating a TMC request?
- Please rate whether the expectation of the request matches the priority of the consultation (scheduled, urgent, emergency).
- Please rate your level of satisfaction with the work of the TMC NMRC Group.
- Based on the TMC results, the patient was referred to a federal healthcare organization for treatment/further examination ("yes" or "no").

[1] Each expert was asked to evaluate their level of expertise in three domains: k1 for the level of theoretical knowledge of a subject matter, k2 for the level of practical knowledge (experience) of a subject matter, and k3 for the level of ability to predict future development of a subject matter. Each of the three domains was rated by an expert using the following scale: 1 point for the high level, 0.5 points for the intermediate level, 0 points for the low level. The coefficient of expertise (k) was calculated by averaging k1, k2, and k3.

Table 1. Parameters influencing the planned scope of telemedicine consultations (most frequently used by National Medical Research Centers)

Subgroup	Parameters
Mortality rates from diseases covered by the treatment area	Mortality rates per 100,000 for individual diseases or groups of diseases by treatment area Overall mortality rate 100,000 for all diseases by treatment area
Disability rates	Disability rates per 10,000 for individual diseases or groups of diseases by treatment area Overall mortality rate 10,000 for all diseases by treatment area
In-hospital mortality rates	In-hospital mortality in different surgeries by treatment area
Rates of emergency/urgent consultations (among all TMCs)	Percentage of patients with various acute disease complications by treatment area
Rates of intensive care consultations (among all TMCs)	Rates of major emergency and urgent conditions (ICD-10) Prescription rate for a range of healthcare services (dialysis, ECMO, etc.)

Note. ECMO, extracorporeal membrane oxygenation; ICD-10, International Classification of Diseases, 10th revision; TMC, telemedicine consultations

Each question is suggested to be answered in points, usually ranging from 1 to 5, with the overall score being the final result.

To objectively assess the effectiveness and efficacy of TMCs conducted by a constituent entity of the Russian Federation, experts most often consider it necessary to evaluate outcomes of diseases and hospitalizations for which the TMC was performed. Based on open interviews with TMC department heads, two parameters were recommended for an objective assessment:

1. The percentage (or absolute number) of positive TMC outcomes: recovery/improvement/remission + discharged/referred to another healthcare organization, federal healthcare organization, or NMRC,

2. The percentage (or absolute number) of negative TMC outcomes: deterioration/progression/complications/death + discharged/referred to another healthcare facility, federal healthcare facility, or NMRC.

Parameters Characterizing the Validity of Requests for Telemedicine Consultations

According to NMRC field reports and interviews with NMRC specialists, the validity of TMC referral by healthcare organizations of constituent entities of the Russian Federation is influenced by the following:

- Scope of examination prior to the consultation,
- The accuracy of the diagnosis,
- Expert assessment of the possibility for independent decision-making at the level of region or healthcare organization.

A complete examination of the patient before the consultation indicates that all necessary tests, including laboratory tests and imaging modalities, are conducted in accordance with clinical guidelines.

Accuracy of the established diagnosis means that the patient's diagnosis is fully consistent with the clinical picture of the disease and that the wording and coding of the diagnosis are consistent with the current International Classification of Diseases and other generally accepted classifications.

Experts evaluate the possibility of making independent decisions at the regional or healthcare organization level, considering the availability of human and material resources for accurate diagnosis, the ability to perform appropriate examinations and tests, prescribe the necessary treatment, and the need for timely referral of a patient to another healthcare organization, without conducting TMC with the NMRC.

To determine the need for TMC, most experts have suggested evaluating the share of justified TMC requests from the total number of requests from a constituent entity of the Russian Federation.

Assessment of Parameter Significance and Calculation of the Weighting Coefficients

Table 2 shows the weighting coefficients based on expert assessment for Group 1 (separately for different treatment areas).

In Group 1, the significance of each parameter varied by treatment area. For example, in Obstetrics/Gynecology, the percentage of intensive care patients was the most significant (coefficient of 0.92), and the disability rate was the least significant (0.66). In Cardiology, the in-hospital mortality rate was the most significant parameter (0.66), with the disability rate being the least significant parameter (0.49). In Oncology, the mortality rate was the most significant parameter (0.57), whereas the disability rates and the percentage of emergency/urgent TMCs were the least significant parameters (0.45). In Medical Rehabilitation, the percentage of intensive care patients and the disability rates were the most significant parameters (0.14 and 0.13, respectively), and the mortality rate was the least significant parameter (0.10). However, all parameters had lower coefficients compared to other treatment areas (except for Coloproctology and Geriatrics).

Table 2. Weighting coefficients for the significance of parameters influencing the planned scope of telemedicine consultations

Treatment area	Coefficient of concordance	*P*-value	Weighting coefficient of parameter significance				
			Mortality rate	Disability rate	In-hospital mortality rate	Percentage of emergency TMCs	Percentage of intensive care patients
Obstetrics/Gynecology	0.2171	0.0036	0.74	0.66	0.87	0.77	0.92
Anesthesiology and Intensive Care (Pregnancy)	0.3188	0.0001	1.28	0.81	1.36	1.20	1.36
Anesthesiology and Intensive Care (Adults)	0.3723	0.0000	1.45	0.95	1.61	1.41	1.59
Anesthesiology and Intensive Care (Children)	0.3486	0.0001	1.39	0.91	1.53	1.32	1.49
Hematology	0.1151	0.0817	0.43	0.32	0.44	0.36	0.43
Geriatrics	0.0240	0.7863	0.06	0.05	0.06	0.05	0.06
Oncology and Hematology (Children)	0.1761	0.0130	0.76	0.58	0.69	0.63	0.67
Traumatology and Orthopedics (Children)	0.1734	0.0141	0.54	0.60	0.67	0.61	0.69
Infectious Diseases	0.3406	0.0001	1.02	0.78	1.31	1.06	1.23
Cardiology	0.1541	0.0255	0.59	0.49	0.66	0.52	0.62
Coloproctology	0.0201	0.8355	0.06	0.05	0.06	0.06	0.07
Medical Rehabilitation	0.0547	0.4146	0.10	0.13	0.11	0.11	0.14
Neurology	0.0425	0.5477	0.15	0.13	0.16	0.14	0.16
Neurosurgery	0.2201	0.0032	0.93	0.71	0.97	0.89	0.95
Neonatology	0.1307	0.0516	0.52	0.45	0.57	0.51	0.56
Oncology	0.1342	0.0466	0.57	0.45	0.49	0.45	0.48
Otorhinolaryngology	0.0973	0.1355	0.22	0.22	0.28	0.27	0.30
Ophthalmology	0.0859	0.1859	0.20	0.24	0.24	0.20	0.26
Pediatrics	0.1611	0.0206	0.59	0.47	0.66	0.55	0.64
Psychiatry and Psychiatry/Narcology	0.0760	0.2424	0.18	0.19	0.19	0.21	0.22
Pulmonology	0.0509	0.4536	0.16	0.37	0.47	0.40	0.47
Health Resort Treatment	0.0316	0.6852	0.05	0.05	0.06	0.05	0.05
Cardiovascular Surgery	0.2363	0.0019	0.95	0.75	1.05	0.93	1.02
Dentistry	0.0973	0.1811	0.22	0.22	0.28	0.27	0.30
General Practice	0.0582	0.3806	0.16	0.15	0.19	0.15	0.19
Traumatology and Orthopedics	0.1118	0.0898	0.35	0.37	0.44	0.37	0.42
Urology	0.0928	0.1539	0.26	0.23	0.29	0.27	0.31
Phthisiology	0.1376	0.0421	0.47	0.36	0.45	0.34	0.44
Surgery	0.1844	0.0100	0.64	0.53	0.72	0.63	0.73
Surgery (Organ and/or Tissue Transplantation)	0.0836	0.1979	0.32	0.26	0.33	0.29	0.33
Maxillofacial Surgery	0.0578	0.3850	0.15	0.15	0.18	0.16	0.19
Endocrinology	0.0458	0.5099	0.15	0.13	0.17	0.14	0.17

Note. TMC, telemedicine consultations

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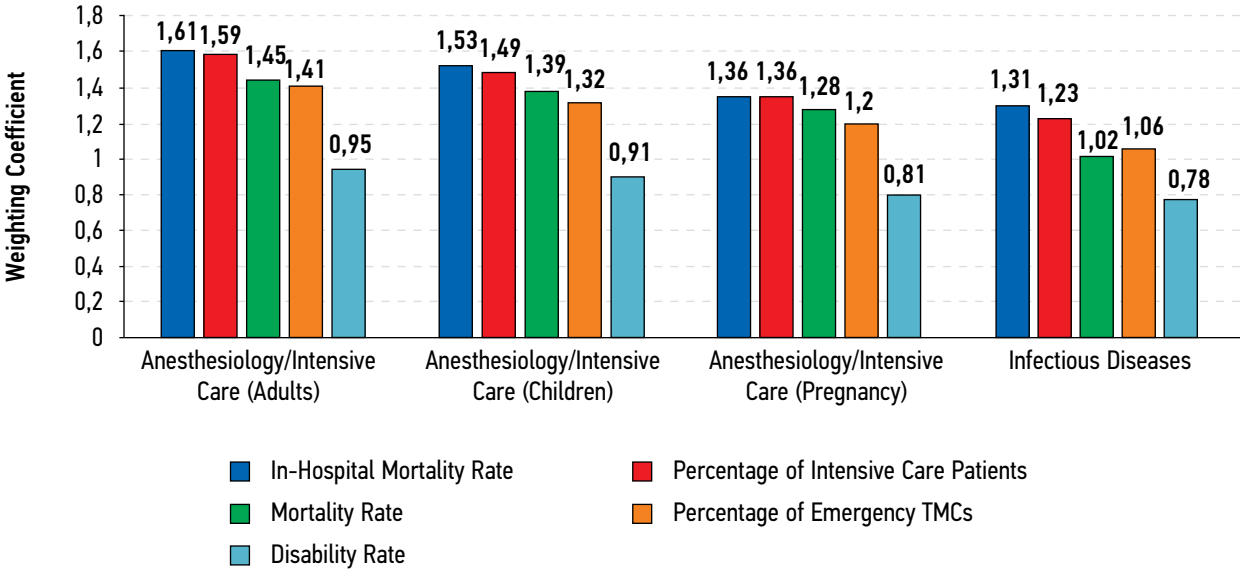

Fig. 1. Four treatment areas with the highest weighting coefficients of the parameters influencing the planned scope of telemedicine consultations. TMC, telemedicine consultations.

The highest weighting coefficients for all five subgroups were found in four treatment areas such as Anesthesiology/Intensive Care (Adults), Anesthesiology/Intensive Care (Children), Anesthesiology/Intensive Care (Pregnancy), and Infectious Diseases (Fig. 1). In these treatment areas, the in-hospital mortality rate and the percentage of intensive care consultations were the most significant parameters. Less significant parameters for Intensive Care included the mortality rate and the percentage of emergency TMCs, and vice versa for Infectious Diseases. The disability parameters were the least significant.

Table 3 shows the weighting coefficients of the parameter significance for Groups 2 and 3 (not related to the treatment areas). The percentage of justified TMC requests from the total number of requests from a constituent entity of the Russian Federation was the most significant parameter (0.0743). Subjective quality of TMC (0.0679), the number of positive TMC outcomes (0.0658), and the absolute number of negative TMC outcomes (0.0638) followed.

DISCUSSION

Based on the analysis of established expert TMC practices, our study generated a list of parameters to assess the need for TMC in different treatment areas. The significance of each parameter was evaluated using a weighting coefficient.

Most of Russian studies included a qualitative assessment of the effectiveness of TMC. For example, in several treatment areas, the active use of TMC in constituent entities of the Russian Federation has the following:

- Reduced length of hospital stays by optimizing drug therapy (Psychiatry and Psychiatry/Narcology [11–13]),
- Improved the effectiveness of minimally invasive surgery through adaptation of surgical techniques (Ophthalmology [14]),
- Supported criteria for initiation of anticancer drug therapy (Oncology [15]),
- Reduced postoperative morbidity and in-hospital mortality rates in some healthcare organizations (Anesthesiology/Intensive Care (Pregnancy) [17], Obstetrics/Gynecology and Neonatology [18]).

Table 3. Weighting coefficients of parameters characterizing the effectiveness and efficacy of telemedicine consultations

Parameter	Coefficient of concordance	*P*-value	Weighting coefficient
Significance of the subjective quality of telemedicine consultations based on a feedback form obtained from a constituent entity of the Russian Federation	0.01852	0.71653	0.0679
Significance of percentage (or absolute number) of positive TMC outcomes			0.0658
Significance of percentage (or absolute number) of negative TMC outcomes			0.0638
Significance of percentage of justified TMC requests from the total number of requests from a constituent entity of the Russian Federation			0.0743

Note. TMC, telemedicine consultations

Our parameters for determining the need for TMC are partially consistent with those from other studies. For example, a systematic review by Khanal S et al. [22] evaluated 46 papers on 36 TMC programs in different countries and identified some predictors for the most appropriate and effective telemedicine use. For example, such criteria included treatment of urgent conditions (if real-time TMC is possible); this parameter was also highlighted in our study. However, Khanal S et al. did not quantify the significance of the identified factors.

In an open interview, we clarified the parameters that influence the need for TMC. A similar approach was used in a Norwegian study, which also conducted open interviews with key stakeholders at the national, regional, and local levels to identify the main factors determining the use of telemedicine by health authorities and healthcare organizations [23]. However, according to the study, organizational factors were critical, including the integration of telemedicine into daily healthcare services, a single body for telemedicine management, and training of healthcare professionals in the proper use of telemedicine.

Both studies emphasized the need for a quantitative assessment of the parameters and factors that determine the use of telemedicine and its necessity. The aim of our study was not only to identify the most significant parameters and factors that determine the need for TMC in different treatment areas but also to develop a methodology for quantitative assessment of parameter significance using weighting coefficients.

A quantitative assessment of the parameter significance and differentiated approach to treatment areas are the main differences between our study and other similar studies, which, in most cases, only conducted a qualitative assessment of the factors influencing the use of TMC. Similar studies that quantitatively assessed the significance of parameters and factors were not found.

However, our study had some limitations. It may be difficult or inaccurate to obtain primary data to calculate some parameters. The weighting coefficients reflecting the significance of the factors were determined by a small panel of experts, and a larger study may be needed to refine them in the future.

CONCLUSION

A system of parameters (with their significance considered) has been developed that can be used for a differentiated assessment of the need for TMC in different treatment areas.

ADDITIONAL INFORMATION

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