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## ВИДЕО КОНТРОЛИРУЕМОЕ ЛЕЧЕНИЕ БОЛЬНЫХ РЕЗИСТЕНТНЫМ ТУБЕРКУЛЁЗОМ

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### АННОТАЦИЯ

Оценка значимости видео контролируемой терапии, для оптимизации подходов лечения больных с множественно и широкой лекарственной устойчивости туберкулёза, путём создания благоприятных условий для улучшения качества жизни и повышения лояльности к химиотерапии. В категорию входили пациенты, лечащиеся противотуберкулёзными препаратами, независимо от вида толерантности и стадии лечения. Выполнены все требования для организации видео контролируемое лечение в амбулаторных условиях согласно инструкции. Мониторинг, проводилось дистанционно онлайн, ежедневно со стороны специалиста учреждения и ежемесячно со стороны областного координатора, с использованием особых форм отчёта и специализированного приложения. Результатами исследования нашего случая видео контролируемое лечение и психосоциальная поддержка пациента дал излечение на 85%, против 72% у пациентов традиционным методом лечения. Данная система позволяет психосоциальную поддержку пациента с уменьшением тревоги по поводу конфиденциальности, что повышает приверженности к лечению. Появляется возможность: дробного приёма большого количества антибактериальных препаратов в течении дня (2-3 раза), своевременным устранением нежелательных реакции лекарств у пациента, одновременная выдача лекарств на 15 дней, что экономит время и появляется возможности для самореализации пациента. Решаются проблемы с расходами на организацию лечения и нерациональному распределению ресурсов в здравоохранении.

**Ключевые слова.** Видео контролируемое лечение (ВКЛ), психологическая поддержка и социальная помощь (ППСП), противотуберкулёзные препараты (ПТП), нежелательные реакции (НР), множественно и широкой лекарственной устойчивости туберкулёза (МЛУ/ШЛУТБ).

### АННОТАЦИЯ

Сил касаллигининг кўп ва кенг дориларга чидамлилиги бўлган беморларни даволаш ёндашувларини такомиллаштириш учун видеоназоратли терапиянинг аҳамиятини баҳолаш, бу орқали беморларнинг ҳаёт сифатини яхшилаш ва кимётерапияга содиқлигини ошириш учун қулай шароитлар яратиш. Беморлар тоифаси - толерантлик тури ва даволаниш босқичидан қатъи назар, силга қарши дорилар қабул қилаётган шахслар. Йўриқномага мувофиқ амбулатория шароитида видеоназоратли даволашни ташкил этиш учун барча талаблар бажарилди. Назорат махсус ҳисобот шакллари ва махсус дастурий илова ёрдамида масофадан туриб онлайн тарзда амалга оширилди. Тадқиқотимиз натижаларига кўра, видео назоратли даволаш ва беморни рухий-ижтимоий қўллаб-қувватлаш анъанавий даволаш усули билан беморларнинг 72% ўрнига 85% даволанишни таъминлади. Ушбу система беморларни рухий-ижтимоий қўллаб-қувватлашга имкон беради, бу эса даволанишга содиқликни оширади. Кўп миқдордаги дориларни кун давомида бўлиб-бўлиб (2-3 марта) қабул қилиш

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имконияти пайдо бўлади ва дориларнинг ножўя реакцияларини бартараф этиш мумкин. Даволашни ташкил этиш харажатлари ва соғлиқни сақлашда ресурсларнинг нооқилона тақсимланиши билан боғлиқ муаммолар ҳал этилмоқда.

**Калит сўзлар:** Видеоназорат остида даволаш (ВНД), психологик қўллаб-қувватлаш ва ижтимоий ёрдам (ПҚИЙ), сил касаллигига қарши дори воситалари (СКДВ), ножўя реаксиялар (НР), силнинг кўп ва кенг дориларга чидамлилиги (КДЧ/ККДЧС).

### ABSTRACT

To evaluate the significance of video controlled therapy (VCT) for optimization of treatment approaches for patients with multidrug-resistant and extensively drug-resistant tuberculosis (MDR/XDR-TB) by creating favorable conditions for improving quality of life and increasing loyalty to chemotherapy. . The category of patients is persons treated with anti-TB drugs, regardless of the type of tolerance and stage of treatment. All requirements for the organization of video-controlled treatment in outpatient conditions according to the instructions were fulfilled. Monitoring was conducted remotely online, daily by a specialist of the institution and monthly by the regional coordinator, using special report forms and a specialized application. The results of our case study showed that VKL and psycho-social support of the patient (PPSP) resulted in 85% cure rate, compared to 72% in patients with traditional treatment method. VCL allows PPSP and reduction of patient's anxiety about confidentiality, which increases adherence to treatment. Patients were recruited into the program based on their consent. There is an opportunity to administer a large number of antimicrobial drugs (AMBs) in a day (2-3 times), with timely response and elimination of adverse drug reactions (ADRs) in the patient by the coordinating physician. Simultaneous dispensing of medicines for 15 days saves time and opportunities for self-realization of the patient. Problems with costs of treatment organization and irrational distribution of resources in health care are solved.

**Keywords.** Video-assisted treatment (VAT), information and communication technology (ICT), psychological support and social support (PSS), antituberculosis drugs (ATD), adverse reactions (AR).

**Relevance.** In the context of globalization as a requirement of the modern world, the Republic of Uzbekistan is carrying out large-scale reforms to introduce information and digital technologies into various spheres of our society. The priority tasks in the social sphere are: the multi-purpose use and introduction of information and electronic technologies by the population, improving the computer skills of citizens, and the gradual transition of public services to electronic form.

Traditional tuberculosis therapy with long periods of in-person treatment affects the mental state of patients, reducing their motivation to undergo treatment. Daily visits to tuberculosis medical facilities and internal discrimination against tuberculosis patients are compounded by the risk of external stigmatization. In-person monitoring also increases the work-

load for healthcare workers. This requires additional time and transportation costs for both healthcare workers and patients, when the patient could be working and improving their financial situation depending on their professional qualifications and health status.

Large and powerful programs for tuberculosis care and the fight against various infectious diseases, according to projects proposed by the WHO, are provided for in rational and diverse types of proposals and projects, where there is an opportunity to implement programs with the mandatory use of medical solutions with the widespread use of information and electronic technologies [1]. The use of tableted forms of new complex antibacterial drugs as a priority in the treatment of MDR/XDR tuberculosis, regardless of the duration of treatment, must be combined with information and electronic technologies.

On February 13, 2019, the government of our republic issued a decree stating: PP4191 “On measures to improve the system of providing specialized phthisiatric and pulmonological care” (Appendix No. 1, paragraph 19) provides for “the creation of a unified electronic multi-module healthcare system for tuberculosis and non-specific lung diseases, as well as the expansion of the experience of the Republican Specialized Scientific and Practical Medical Center for Phthisiology and Pulmonology in the implementation of telemedicine at the regional level”[2]. In 2020, the President of the Republic of Uzbekistan issued a decree “On the approval of the strategy ”Digital Uzbekistan – 2030“ and measures for its effective implementation” (No. UP-6079, 05.10.2020) to ensure the accelerated digital development of the Republic of Uzbekistan, the formation of a data-driven digital economy by creating the neces-

**Materials and methods.** The study was conducted at the regional center for phthisiology and pulmonology in the Samarkand region from 2021 to 2024. The process category included patients treated with anti-tuberculosis drugs (ATDs), regardless of the type of tolerance and stage of treatment. By decision of the medical council of the central medical control commission for the implementation of VCL, patients were selected to participate in this program, where the criteria for including patients for this treatment were strictly adhered to. Specialists directly involved in the program were appointed – coordinators, psychologists, social workers, and a trained medical worker skilled in conducting VCT, with the approval of program documents in accordance with the National Clinical Protocol for the Organization of Video-Controlled Treatment of Tuberculosis Patients.

All participants in our study gave their voluntary written consent for the further processing of their personal data.

All requirements for the organization of VCT in outpatient settings have been met, in accordance with the instructions in the internal or-

sary environment for the production of innovative products, improving the efficiency of public administration, and providing the population and business entities with relevant public services [5]. Also, as part of the digital transformation in 2020-2022, with the possibility of covering all regions and industries, the Republic of Uzbekistan plans to develop and implement at least 400 information systems, electronic digital services, and modern software developments at all levels of economic and social areas.

**Research objective.** To assess the significance of video-controlled therapy (VCT) for optimizing treatment approaches for patients with multidrug-resistant tuberculosis (MDR-TB) and extensively drug-resistant tuberculosis (XDR-TB) by creating favorable conditions for improving quality of life and increasing adherence to chemotherapy.

der of the head of the facility. Responsible medical workers who carry out VCT (coordinators, nurses) have been appointed.

The VCL infrastructure includes: a laptop with a webcam, speakers, and microphone or a tablet for coordinating doctors. A specialized mobile application, I like vest.uz, was used for participants—district coordinators (responsible doctors, nurses) and patients who directly participated in VCL. Given the characteristics and diversity of mobile providers, both synchronous and asynchronous VCL methods were used. Due to unstable internet connections, preference was given to the asynchronous method, where the responsible coordinator has the opportunity to view the video recording immediately or at the earliest opportunity. Special systems were used to ensure the secure storage and transmission of video images in accordance with applicable international and national laws, guaranteeing confidentiality and data protection. The telemedicine process itself was carried out with the support and direct assistance of the non-governmental and non-profit organization Intilish. This organization provided patients with mobile devices with internet access and a specialized application connected to

them, with the ability to monitor treatment and consult with the patient.

The decision to include a patient in telemedicine was made by a medical council on the implementation of telemedicine. Patients signed an informed consent form for a specially developed application, received detailed instructions on how to conduct telemedicine, and had a mandatory consultation with a psychiatrist.

During the telemedicine process, all instructions and requirements were followed according to the manual.

Doctors at city and district TB facilities were provided with one type of electronic media: netbooks, desktop computers, or tablets containing patient numbers and their account details. Lists of outpatients were entered into the computer, along with their personal accounts and the phone numbers of the SIM cards issued to them. Trained nurses analyzed the daily reports. Doctors at city and district TB institutions monitored monthly, quarterly, and annual reports on the implementation of VCL. The mandatory conditions for the implementation of VCL were observed, with the application of basic standard regulations for patients over 18 years of age;

Patients undergoing outpatient treatment from day one or discharged from hospital demonstrate 100% adherence to VCT in outpatient settings for at least 14 days;

Patients sign an informed consent form for EMR;

Patients have the skills to independently (or with the help of a family member) use electronic equipment (computer with webcam/laptop/tablet/smartphone), the Internet, and the web application for EMR after training by staff; The patient is able to take anti-tuberculosis drugs independently (in accordance with the prescribed regimen and schedule), in strict accordance with the instructions of the web application, after training by staff involved in VCL [7-8].

The VCL function of the nurse included:

- Preparing weekly doses for DMT participants;
- Receiving daily video messages from patients participating in DMT;

according to the manual. The following components of the process were organized: providers – the VCL service, beneficiaries – patients participating in VCL, and infrastructure for VCL.

Process coordinators were provided with the necessary equipment and accessories for conducting VCL (configured smartphones with SIM cards). Training was conducted for VCL participants on the criteria for using smartphones and sending video messages.

and VCL providers. With the help of VCL, the organization of work with control over the daily intake of drugs, registration of side effects of ABP, as well as their correction, was ensured, mainly with asynchronous communication. All standard reporting forms were filled out with data on the implementation of drugs, including monitoring of the entire VCL process.

According to the national clinical protocol for organizing video-controlled treatment of tuberculosis patients, the criteria for including patients in VCT were:

- Conducting additional explanatory work with patients on the criteria for the quality of video messages;
- Providing patients with a questionnaire on side effects and explaining how to fill it out;
- Recording medication intake in medical records;
- Preparing a daily report on the conduct of the VCL among patients and submitting it to the coordinator [5-8].

According to the instructions, a video message was sent daily to the nurse with a completed questionnaire on side effects, as per the appendix.

Monitoring of the conduct of VCL was carried out by the appointed regional coordinator, as well as by the district specialist of the institution conducting the VCL. Monitoring was carried out remotely online using administrative rights, daily by the institution's specialist and monthly by the regional coordinator using specialized reporting forms [6-7].

**Results.** Remote communication is very convenient and gives patients more freedom for self-realization and active participation in the treatment process. Under the VCL standards, patients have a real opportunity to request and receive information about medical care for their primary disease, as well as the elimination and as by the appointed specialist of the institution conducting the VCL. Percentage and number of patients receiving traditional face-to-face treatment and patients eligible for inclusion in the

correction of chemotherapy-related side effects, while surrounded by and supported by their family and friends. Monitoring of the work carried out by the VCL was carried out strictly in accordance with the national clinical protocol by the appointed regional coordinator, as well

VCL among all patients receiving outpatient treatment.

| № | year | Total Number | Patients with traditional treatment |                    |                      | Patients included in the VSL |                    |                    |
|---|------|--------------|-------------------------------------|--------------------|----------------------|------------------------------|--------------------|--------------------|
|   |      |              | number                              | Successful outcome | Unsuccessful outcome | number                       | Successful outcome | Lost to follow-up* |
| 1 | 2021 | 150          | 112                                 | 62.5 (70)          | 37.5 (42)            | 38                           | 6.                 | 5.3 (2)            |
| 2 | 2022 | 129          | 87                                  | 62.1 (54)          | 39.3 (33)            | 42                           | 90.5 (38)          | 9.5 (4)            |
| 3 | 2023 | 135          | 92                                  | **                 | **                   | 43                           | **                 | **                 |
| 4 | 2024 | 142          | 88                                  | **                 | **                   | 54                           | **                 | **                 |

\* Patients who moved to other regions

\*\*Results after 2 years

The results of our study showed that VCL and PPSP cured 85% of patients, compared to 72% of patients treated with traditional methods.

**Conclusions.** At the present stage, drug-resistant tuberculosis remains a serious problem worldwide. Healthcare reforms involving digitalization are becoming increasingly relevant. Traditional therapy under direct supervision in a hospital setting exhausts and strains the patient's regulatory processes due to prolonged stress on their adaptive mechanisms. Given the characteristics of the social contingent of tuberculosis patients (patients with alcohol or drug addiction, those living with HIV, prisoners or convicted persons who have served their sentences, migrants, refugees, patients from low-income groups), the introduction of the VCT system offers great opportunities both for increasing adherence to treatment and for active participation in treatment.

Video-controlled treatment (VCT) is the provision of individualized medical care focused on human needs and support services, based on information and communication technologies and digital health tools [8]. The new approach to treating resistant tuberculosis in our country (since 2021) has increased patient confidence in recovery from the disease and has yielded good results in curing the disease. Patients do not need to visit their doctor every day to take their medication in their presence. They need to record a video of themselves taking the medication, report any side effects or health problems that may arise, and send it via a special app. The treatment of MDR/XDR TB patients has entered a new era with the use of ICT, in which patients need to move with the times. With the skills to use advanced technologies,

patients do not waste time visiting medical facilities, save money on travel, and are less prone to stigmatization by relatives and those around them.

Given the unusual situations in medicine with reduced resources, the spread of contagious infections, and the financial situation of

**Conclusion.** VCL allows for psychological support of the patient, reducing anxiety about confidentiality, which increases adherence to treatment. Patients were enrolled in the program based on their written consent in accordance with the protocol. Patients are able to take large amounts of ABPs in small doses throughout the day (2-3 times), with timely response and elimination of drug interactions by

patients, the use of traditional face-to-face contact between patients, doctors, and nurses creates problems and difficulties. Healthcare reform with the transition to programs using digital technology is radically changing traditional treatment methods, where patient health priorities and needs are correlated with resource savings.

the coordinating physician. Patients are given a 15-day supply of medication at one time against receipt, which saves time and money and provides opportunities for self-realization. Problems with the costs of organizing treatment and the irrational distribution of resources in healthcare are solved.

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