АНАЛИЗ ФАКТОРОВ, ПРЕПЯТСТВУЮЩИХ ФОРМИРОВАНИЮ ПРИВЕРЖЕННОСТИ ЛЕЧЕНИЮ СРЕДИ БОЛЬНЫХ САХАРНЫМ ДИАБЕТОМ, И СТРАТЕГИЙ, СПОСОБСТВУЮЩИХ ЕЕ ПОВЫШЕНИЮ

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В обзоре рассмотрен современный взгляд на проблему низкой приверженности лечению среди пациентов, страдающих хроническими заболеваниями, в частности сахарным диабетом 2 типа (СД2). Согласно определению Всемирной организации здравоохранения, «приверженность лечению» – это степень соответствия поведения пациента назначениям врача в отношении приема лекарственных препаратов, выполнения рекомендаций по питанию и/или изменения образа жизни. Современная медицинская литература насчитывает большое число научных публикаций, посвященных изучению различных факторов, обуславливающих низкую приверженность лечению. Для их обозначения наиболее часто используется термин «барьеры». В первой части работы проведен анализ основных факторов, препятствующих соблюдению рекомендаций врача, включающих социально-экономические, психологические (личностные), барьеры, связанные с самим заболеванием, особенностями его лечения, с организацией медицинской помощи (системой здравоохранения).

Во второй части обзора рассматриваются различные теоретические модели поведения пациентов и стратегии, способствующие улучшению приверженности лечению. По мнению большинства исследователей, при СД2 наблюдается неудовлетворительная (низкая) приверженность лечению, и ни одна из существующих интервенционных стратегий не может улучшить приверженность лечению среди всех пациентов. Краеугольным камнем всей системы управления СД является обучение больных в рамках разработанных структурированных программ. С другой стороны, успех зависит от индивидуального подхода, течения болезни и обязательного учета индивидуальных психологических особенностей каждого человека. Установление партнерских доверительных взаимоотношений между врачом и пациентом способствует формированию большей удовлетворенности пациентов лечением, улучшению приверженности и, в конечном счете, оказывает влияние на эффективность лечения и клинические исходы.

КЛЮЧЕВЫЕ СЛОВА: сахарный диабет 2 типа; барьеры; приверженность лечению; теоретические модели поведения

ANALYSIS OF THE FACTORS THAT PREVENT ADHERENCE TO TREATMENT IN PATIENTS WITH DIABETES MELLITUS AND THE STRATEGIES THAT CONTRIBUTE TO THE IMPROVEMENT IN ADHERENCE

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This review examined the current problem of low adherence to treatment in patients with chronic diseases, particularly type 2 diabetes mellitus. According to the definition of the World Health Organization, 'adherence to treatment' is the degree to which a patient's behaviour corresponds to the doctor's recommendations with respect to medications and implementation of dietary advice and/or lifestyle changes. The current medical literature includes a large number of scientific publications devoted to the study of various factors that lead to low adherence to treatment. The term 'barriers' is most often used to designate these factors. The first part of this work contains an analysis of the main factors that impede compliance to the doctor's recommendations, such as socio-economic and psychological (personal) barriers related to the disease itself, the peculiarities of its treatment and the organisation of medical care (the health care system).

The second part of this review examines the different theoretical models of patient behaviour and strategies that improve adherence to treatment. Most researchers believe that there is an unsatisfactory (low) adherence to treatment and that none of the existing intervention strategies can improve adherence to treatment among all patients. The cornerstone of the entire diabetes management system is the training of patients within the framework of developed structured programmes. Conversely,, success depends on the individual approach, the course of the disease and the mandatory consideration of the individual psychological characteristics of each person. Establishment of a partnership built on trust between a doctor and a patient contributes to greater patient satisfaction with treatment and improved adherence, and this relationship ultimately affects the treatment efficacy and clinical outcomes.

KEYWORDS: type 2 diabetes mellitus; barriers; patient compliance; theoretical models

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Type 2 diabetes mellitus (T2DM) is a common chronic disease that leads to macrovascular and microvascular complications and significantly affects quality of life. T2DM management is multifactorial, including patient education on the elements of a healthy lifestyle, self-control of glycaemia, lifelong treatment with glucose-lowering agents (GLAs), prevention of T2DM-related complications and treatment of concomitant diseases. Advances in management of T2DM include the development and implementation of new algorithms of specialised medical care, development of novel classes of GLAs and establishment of targeted levels of glycaemia. The long-term inability of patients to adhere to treatment and lifestyle recommendations is a significant public health challenge. Multiple publications have developed a holistic concept and established a specific terminology to describe the multiple influences that impact T2DM management. In the mid-twentieth century, Haynes and Sackett introduced the term 'compliance' to describe individual behaviour toward following medication regimens [1]. The term first appeared in the Russian literature in 1995 and was defined as the patient's attitude to treatment and the behaviour conditioned by it [2]. In 2001, an Expert Committee of the World Health Organization (WHO) proposed the term 'adherence to treatment' to describe the extent to which a patient correctly follows medical instructions [3]. That definition has been criticised because 'medical' does not apply to all aspects of the treatment of chronic diseases and 'instructions' is associated with passive fulfilment of medical prescriptions and not behaviour that includes active doctor-patient interaction. In 2003, the WHO expanded the definition of adherence to include management of chronic diseases and a consideration of the extent to which a person's behaviour, including taking medication, following a diet, and/or adopting lifestyle changes, reflects the recommendations of health care providers. The WHO position emphasises that high adherence to treatment can be achieved only through close cooperation of the patient and health care providers, including doctors, nurses, other professionals [4]. An atmosphere of trust is necessary for discussion of alternative approaches to treatment, potential problems and ongoing follow-up. We have previously reviewed the currently accepted terminology, methods for measuring adherence to treatment and general and specialised diagnostic scales (questionnaires) used to assess adherence to treatment in patients with T2DM [5]. This review analyses existing barriers that prevent patients from adhering to the recommendations of health care providers and discusses psychometric models that have been developed to overcome poor adherence to treatment.

ANALYSIS OF BARRIERS TO ADHERENCE TO MEDICAL RECOMMENDATIONS

Nonadherence to T2DM medications is believed result from ineffective patient education, ineffective patient-physician communication and low patient motivation to adopt lifestyle changes and lifelong treatment with multiple drugs. Other reasons for poor adherence include personal and psychological characteristics, clinical manifestations, the type of treatment, social and economic factors and country-specific characteristics of medical care [5, 6]. Many studies of treatment nonadherence refer to 'barriers' that influence a patient's ability to follow the instructions of a healthcare provider. The term was introduced in the Health Belief Model (HBM), which was developed in the 1950s by the social psychologists Hochbaum, Rosenstock and Kegels [7]. Continuing research into the causes of nonadherence have led to an understanding of a diversity of existing barriers, but no uniform classification is available. Table 1 summarises the reasons for poor treatment adherence in patients with chronic diseases that were reported in five recent studies. Gellad et al. classified barriers as main, additional and medical, and emphasised the importance of patient satisfaction with treatment [8]. Taha et al. described the financial, physical and psychological barriers that prevent patients from adhering to diet and exercise recommendations, medications and self monitoring [9]. White et al. investigated the psychological and social causes of nonadherence [10]. Jin et al. [11] and Delamater et al. [12] reported the effects of diverse demographic. social, psychological, disease- and treatment-related, economic and healthcare system factors on adherence.

Some barriers, such as demographic and social characteristics (age, sex, nationality, ethnic group, low socioeconomic status and low education level) and factors related to the disease and its treatment (the nature of the disease, severity, presence of symptoms) are not modifiable [13]. Many barriers can be modified to increase treatment adherence. Recent medical advances may improve compliance by offering a more convenient treatment regimen or changing its duration, by offering more effective treatment, or by minimising medication side effects [12]. Physical disabilities and cognitive disorders, especially in elderly or senile patients significantly affect treatment adherence [11]. Such patients require personal medical care and environmental and social support.

Healthcare system barriers primarily derive from the medical care organisation and delivery in various countries and they merit attention. The most significant healthcare barriers are financial (the need to share treatment costs or to cover all the costs), lack of accessibility to medicines and medical care; difficulty in access to prescribed medications; long waiting times for consultations or diagnostic procedures and lack of patient satisfaction with a consultation.

Depression has a strong effect on treatment adherence that can carry over to treatment efficacy. Timely diagnosis and treatment of depression can improve the prognosis of the primary disease [14]. Close attention to patient psychological characteristics can help in overcoming any associated barriers. The barriers described by Delamater et al., include psychosocial behaviours influenced by

Table 1. Barriers to patient adherence

Authors	Barriers to adherence
Gellad et al. (2009) [8]	1. Main factors: financial barriers such as high treatment costs, cost-sharing and out-of-pocket expenses; regimen complexity; low belief in treatment effectiveness and depression. 2. Additional factors: lack of disease knowledge and understanding of the treatment and possible medication side effects. 3. Medical factors: patient-provider trust and patient satisfaction.
Taha et al. (2011) [9]	Financial, physical and psychological factors preventing patients from adhering to diet and exercise recommendations, medication and diagnostic examination as well as lack of disease knowledge.
White. (2010) [10]	Psychological problems (depression); cognitive impairment; treatment of asymptomatic disease; poor planning of therapy; medication side effects; lack of belief in treatment benefit; lack of disease knowledge; poor patient-provider relationship; barriers to patient care; missing appointments; complex treatment regimen and high medication costs and/or co-payments.
Jin et al. (2008) [11]	1. Patient-centred factors (personal barriers): demographic factors (age, ethnicity, gender, education, marital status); psychosocial factors (beliefs, motivation, attitude); patient-prescriber relationships; health literacy; physical difficulties; harmful habits (smoking, alcohol abuse); memory disorders (forgetfulness) and history of good compliance. 2. Therapy-related factors: route of administration; treatment complexity; duration of the treatment period; medication side effects; degree of behavioural change required; taste of the medication and requirements for drug storage. 3. Social and economic factors: inability to take time off from work; treatment cost and income and social support 4. Healthcare system factors: lack of access to medicines and medical care; long waiting times for consultations or diagnostic procedures; difficulty in filling prescriptions and unpleasant clinic visits. 5. Disease factors: disease symptoms and severity of the disease.
Delamater (2006) [12]	1. Demographic factors: ethnic minority, low socioeconomic status and low levels of education. 2. Psychological factors: understanding the purposes of treatment; perceived efficacy of recommendations; belief that the treatment risks exceed the benefits; feeling unable to succeed at the regimen; psychological support and help from the social environment; awareness of health condition; perceived seriousness of the disease; vulnerability to complications; stress; irritability; depression and eating disorders. 3. Social factors: family relationships directly affect adherence. 4. Medical factors: relationships with medical professionals; support from the health care team; frequency of contacts and attention to the patient. 5. Disease- and treatment-related factors: the nature of the disease (chronic or non-chronic); presence of symptoms; complexity of the treatment regimen and need for lifestyle changes.

understanding the purposes of therapy, perceived efficacy of recommendations, belief that the treatment benefits exceed the risks and confidence in the ability to successfully adhere to the regimen [12]. Health awareness and understanding the seriousness of the disease are essential for treatment adherence. Identifying and addressing modifiable barriers can significantly improve treatment adherence.

THEORETICAL MODELS OF HEALTH BEHAVIOUR AND STRATEGIES INTENDED TO ENHANCE TREATMENT ADHERENCE

Several models of health behaviour that were developed at the end of the twentieth century are useful in describing patient behaviour and developed strategies to overcome poor adherence to treatment. In 1980, Ajzen and Fishbein published the Theory of Planned Behaviour, which suggests that patient behaviour is determined by his or her attitude to the treatment itself, the expected value of therapy, the subjective understanding of existing norms and the ability to adhere to proper behaviour [14]. In 1980, evaluation of the then current approaches to change in health-related behaviour taken in medical and prevention programmes in the United States, led Rosenstock et al. to propose the HBM, in which patient behaviour is affected by four concepts.

1. perceived benefits from adhering to treatment (for example, improvement of disease symptoms)
2. perceived barriers that prevent adhering to treatment (for example, side effects)
3. perceived susceptibility to subjective assessments of the risk of developing health problems
4. perceived severity of anticipated health problems

In the HBM, treatment adherence results from addressing the patient concepts or perceptions to increase their acceptance of the changes in behaviour and lifestyle necessary to fulfil the recommendations of the health care provider.

The Transtheoretical Model of behaviour change developed by Prochaska et al. includes five consecutive stages [16].

1. precontemplation–patients do not intend to take action in the next 6 months
2. contemplation–patients intend to change their behaviour within the next 6 months
3. preparation–patients are ready to take action in the next 30 days
4 action–patients change their behaviour
5. maintenance–patients successfully changed their behaviour more than 6 months earlier

Identification of the current patient stage allows choice of an intervention (e.g. informing, counselling, reminding, self-monitoring, family therapy or support) most likely to effect a change in behaviour resulting in improved adherence. Simultaneous use of interventions is thus avoided. The Transtheoretical Model describes various empirical and behavioural strategies to promote successful progression through the five stages of change to attain the desired change in behaviour. The empirical strategies are cognitive, affective and evaluative. The behavioural strategies include reminders or rewards of positive behaviour. Prochaska et al. also discuss the primary psychological attributes that contribute to readiness, or a decisional balance consisting of the pros and the cons for behaviour change. Decisional balance is the model's ideal indicator of the readiness to progress through the five stages.

The Self-Regulation Model considers that a patient's reaction to disease depends on his or her judgements and beliefs about illness [17] and the understanding that an illness, experiencing poor health, differs from a disease, which is a diagnosed pathological condition. In the model, illness is a subjective experience of not being well, and it need not be associated with a physical pathology, or disease. Patients faced with a health threat form a personal perception of the illness that generates accompanying emotional reactions [18].

Other behavioural models are built around strategies and methods of overcoming barriers to treatment adherence rather than patient characteristics. The SIMPLE behavioural strategy includes detailed healthcare provider interventions intended to improve adherence to treatment and to overcome the barriers faced by patients during treatment [19]. The recommendations made in the model are described below.

S–Simplifying the drug regimen

1. Adjust the drug administration timing, frequency, amount and dosage. Drugs with once-daily dosing are preferred. If the cost of treatment is the main barrier to adherence, then this approach will not address the problem.
2. Match the regimen to the activities of daily life.
3. Recommend that all medications be taken at same time of day.
4. Avoid prescribing medications with special needs.
5. Divide the regimen into a sequence of easy steps and ensure the patient understands each step.
6. Use adherence aids and reminders or alarms of dose times.
7. Change the setting not the patient and promote adherence by clarifications and instructions that simplify the regimen. The physician should tailor the medication to the patient, not the reverse.

I–Imparting knowledge

A clear understanding of their condition and the advantages of treatment significantly improves adherence. Increased patient education should be combined with a simplified regimen.

1. Strive for joint treatment decisions.
2. Encourage discussion of all concerns with doctors, nurses and pharmacists.
3. Provide clear written and verbal instructions with all prescriptions. Limit instructions to no more than three or four key points. Use simple, everyday language. Supplement oral instruction with written documentation.
4. Include family members and friends in the discussion

when appropriate.
5. Patients with chronic diseases should be shown how to access high-quality Internet resources, educational and disease-specific information.
6. Provide advice on how to cover medical costs.
7. Encourage discussion, especially with patients who are poorly informed about their disease.

M–Modifying patient beliefs

1. Empower patients to perform self-monitoring. Ask questions about their health. Promote an open dialogue and ask about their expectations, needs and treatment experiences. Ask them to explain what would help them to become and remain adherent.
2. Make sure that they understand that avoiding their medication places them at risk.
3. Ask them to describe the consequences of not taking their medication.
4. Ask them to describe the benefits of taking their medication.
5. Listen carefully to their explanations of the fears, concerns and perceived barriers associated with medication.
6. Consider the use of contingency contracts, physician-patient agreements that define and establish behavioural goals.
7. Reward patients for improved adherence. Praise the patient for following recommendations and achieving high treatment efficacy. Encourage patient's adherence with gifts of small souvenirs and reduced frequency of visits.

P–Patient communication

1. Improve your own interviewing skills.
2. Practice active listening, an interactive process that requires close attention to what patients say. Be sure to confirm that you understand patient messages with nonverbal feedback, by asking questions and with other signs. Interpret patient messages correctly. Use verbal and nonverbal feedback to show understanding, compassion, emotional support and to continue the discussion to get more information. When answering questions, pay attention to patient reactions indicating agreement, uncertain or reluctant acceptance.
4. Provide clear and accurate information and ask patients repeat it.
5. Involve patients in the decision making process and note the extent of their contribution.
6. Give patients adequate time to ask questions.
7. Establish confidential relationships with patients. Physicians can use a short test to see whether the relationship needs improvement.

L–Leaving the bias

The ethnic, social and economic background affects treatment outcome if it results in decreased physician attention, communication and contact. To overcome ethnic and social barriers, physicians should

1. Assess the health literacy of their patients and the effort that they make to improve the treatment results.
2. Apply new skills in practice.
3. Evaluate patient beliefs in the positive effects of the suggested treatment.
4. Revise their communication style to be sure that it is truly patient-centred.
5. Acknowledge intentional or unintentional bias in making treatment decisions.
6. Pay attention to possible effects of ethnic, racial and language differences on physician-patient relationships. Learn the demographic characteristics of their patents and consciously attempt to overcome cultural barriers. Ask patients about attitudes, beliefs and cultural norms that may affect compliance. Use a culturally and linguistically appropriate patient-oriented approach to increase patient involvement. Tailor patient disease and health education to match their level of understanding, and use visual aids.

E–Evaluating adherence

1. Self-reports are the most common tool to measure adherence. Ask patients simply and directly whether they adhere to their treatment regimens.
2. Ask patients about their behaviour and adherence at every appointment.
3. Try to identify barriers to adherence and the reasons underlying poor treatment compliance.
4. If self-reports do not clearly assess adherence, then use pill counting or measuring serum or urine drug levels.
5. Periodically monitor patient medication containers and note the changes.

Implementation of this model in routine clinical practice requires specialised physician training on how to conduct a motivational interview. The interview is designed to increase patient awareness of adherence problems, to promote their activity in addressing the problems. Involving a professional psychologist can also be considered. Adopting this model in routine practice requires additional time and material costs.

The **Information-Motivation-Behavioural Skills Model** [20] evaluates cognitive, psychological and social factors that potentially affect the provider-patient interaction and offers approaches to achieve mutual understanding. In the model, Information refers to the transfer of knowledge about the disease and the available treatments, treatment regimens and treatment strategies. Physicians inform patients on all aspects of their disease, build trust in their relationship, encourage active patient participation in treatment decisions, engage patients as partners, practice active listening and pay attention to patient problems and concerns. Motivation refers to patient attitudes on adherence, their subjective norms and their perceptions of proper behaviour. Physicians encourage patients to believe in the effectiveness of treatment, and listen to and discuss negative attitudes toward treatment. It is important to promote patient responsibility for their care and to instil confidence in their ability to succeed in adhering to the treatment regimen. **Behavioural Skills** include patient confidence in their disease-specific knowledge and ability to follow the treatment recommendations

and enlist social support when needed. Physicians help patients to overcome the identified barriers to adherence. They may consider involve people who can provide practical assistance, help in finding financial resources to address treatment costs, give clear written instructions related to treatment regimen, use contingency contracts, contact patient support groups and provide reminders by email or telephone.

The available behavioural models all depend on strategies that include psychological-pedagogical, behavioural and cognitive-behavioural elements. The common elements in the models discussed above can be included in a comprehensive strategy to enhance patient compliance. The first step involves accurate assessing whether patients follow treatment recommendations. Estimating patient adherence is challenging, and a full accounting of patient decisions is usually impossible. Consequently, physicians tend to be poorly informed on actual adherence and rely on their own best judgement or attempt to detect instances of patient nonadherence, which is often problematic. Patients generally describe their adherence truthfully when they are not embarrassed to admit their difficulties. That is possible only if there is no risk of criticism from a physician, with whom they have a good relationship [21, 22]. Obtaining accurate estimates of treatment adherence depends on the level of trust between the patient and the physician. The simplest system of assessing compliance probably gives the most reliable results [21, 42].

Realistic evaluation of patient knowledge, understanding of the therapy regimen and acceptance of treatment benefits would help to identify adherence-related problems. Accurate estimation of treatment adherence requires the establishment of close physician-patient. Patients should have an ability to tell their story [23-27] and to share their opinion. If that is the case, the healthcare professional receives a lot of information on patient beliefs, attitudes, subjective norms, cultural background, social support and health-related emotional problems such as depression. These elements are required for achieving and maintaining adherence and should be always discussed during healthcare visits. An ideal mutual understanding is not always achievable and may not always be desirable. Disagreements can promote useful discussions of treatment options and ways to follow them [28, 29]. The recognition of differences is an important step toward building a respectful and trusting relationship between physicians and patients.

TREATMENT ADHERENCE IN PATIENTS WITH T2DM

As T2DM is a chronic progressive disease, the achievement of therapeutic goals requires lifelong adherence to many medical recommendations. Successful disease management requires adopting 'diabetes-related behaviour' [30] that requires not only routine intake of GLAs, but also adherence to programmes of balanced nutrition, physical activity, regular self-monitoring of blood glucose, regular foot care and scheduled follow-up with healthcare professionals. Poor long-term glycaemic control leads to the development and progression of late complications of DM that complicate treatment and decreasing health-related quality of life. Patients with T2DM are often on lifelong therapy with hypolipidemic and antihypertensive agents because of the high prevalence of cardiovascular diseases. Only conscientious and highly motivated behaviour and a high level of awareness of the importance of treatment adherence allow achieving the desired results [25]. Much of the available evidence confirms poor treatment adherence by patients with T2DM associated with development of complications including cardiovascular diseases, retinopathy, neuropathy and nephropathy, associated with increased frequency of hospitalisation, and high mortality [28]. Low adherence or nonadherence to treatment may be intentional of unintentional [20, 31-34].

Unintentional nonadherence includes

1. inability to take medications as prescribed, i.e. primary nonadherence
2. periodic discontinuation of medication
3. incorrect drug intake
4. ignoring diet recommendations and laboratory and instrumental follow-up
5. incomplete adoption lifestyle recommendations (e.g. performing recommended physical exercises without loading target muscle groups, partially avoidance of certain foods or incorrect use of medical devices)

Intentional nonadherence involves a conscious decision not to take prescribed medications after considering possible risks and side effects compared with potential benefits. A Cochrane systematic review of 21 randomised clinical trials that investigated treatment adherence programmes in patients with T2DM [35] reported that patient education had the strongest. The publications described the effects of various structured educational programmes, but the aspect of education or the combination of educational components that had the strongest association with improved adherence was not clear. It was not clear whether patient education had a long-term effect, or whether programmes needed to be periodically repeated, and none of the reviewed studies included an economic analysis. The review concluded that current models that guide efforts to improve T2DM treatment adherence have not demonstrated significant effects or harms. The question of whether any existing strategy enhances adherence is still unanswered.

A review by Haynes et al. of 182 RCTs that evaluated interventions intended to enhance treatment adherence in patients with T2DM with T2DM [36] found that the results were inconsistent, and that only a minority of interventions improved both adherence and clinical outcomes. Methods designed to improve adherence to the treatment of chronic health problems are often too complex to be implemented in clinical practice, and are not very effective. The development and implementation of long-term interventions that improve adherence are

needed to obtain statistically significant evidence of the positive impact of adherence on treatment.

Physicians have limited time for each consultation, thus shifting some tasks to nurses and pharmacists would be helpful and potentially cost-effective. In addition, the patient environment must be considered because the social atmosphere is extremely important in optimising treatment adherence. Expert recommendations include consideration of three primary factors when developing measures intended to enhance adherence [36].

1. Measures aimed at improving adherence are often as complex as the treatment regimen, but it is not clear they are more effective than simple interventions.
2. If an intervention appears to be effective, all the measurements should be implementable without excessive additional personnel and cost.
3. If the measure lacks implementation flexibility and external validity, then the effects of individual components should be excluded. In case of a factorial design, the most prognostically significant components should be retained.

The final recommendation was to stop re-inventing poorly performing intervention 'wheels' intended to enhance adherence [36].

The leading expert in the biomedical and psychosocial aspects of DM in Russia, Professor EG Starostina, has described the traditional model of DM care as an attempt by physicians to convince patients to accept treatment goals that are important from a medical point of view, modify their lifestyle in accordance with those goals and take numerous medications [1]. In their daily lives, most patients do not consider the goals as important as physicians do. Many diabetes patients do not attach sufficient importance to their disease because of the subjective absence of symptoms and complications. Consequently, they experience significant difficulties in accepting the diagnosis and the recommendations associated with lifelong treatment and lifestyle changes. Many patients are not able to cope with anxiety, which was in fact created by a doctor. After a short period of strict compliance, inconvenient information is excluded from their consciousness, and they resume poor compliance.

Novel models of patient-provider interactions that include the active participation of patient together with a physician who is an expert, and provides access to the knowledge needed to make informed therapeutic decisions. In the model, medical professionals would also teach self-care skills, provide social and emotional support and offer options for changing behaviour and developing coping strategies [37]. Unfortunately, an in-depth analysis of individual barriers to treatment adherence and adopting and lifestyle change recommendations may be restricted by the short outpatient consultation times established in most countries, including Russia. The Ministry of Health of the Russian Federation restricts patient visits to a cardiologist, endocrinologist or dentist to 19 min [38]. During the visit, healthcare professionals must find enough time to ask about complaints, perform physical examinations, screen the patient for DM-associated complications, evaluate patient self-reported information, discuss diet therapy and lifestyle modification, choose appropriate therapeutic regimens, explain the rules for taking GLAs, antihypertensive, and hypolipidemic agents, write prescriptions and enter patient data into the state registry of patients with DM.

Physician have more opportunities to evaluate clinical and psychological characteristics of inpatients, which undoubtedly increases patient compliance after discharge. However, inpatient care is expensive and cannot be provided to all patients with DM. Moreover, many regions have shortages of qualified diabetologists, and diabetic patients are treated by general practitioners. The healthcare environment cannot address the high prevalence of late complications of DM in our country, with non-compensated DM in 30%–40% of patients and treatment adherence is poor [39].

CONCLUSION

A majority expert investigators are convinced that none of the existing behaviour models and intervention strategies can improve adherence to DM treatment to the same extent in all patients [40-42]. Success depends on an individual approach, the disease course and the treatment regimen [43]. Physicians should pay attention to the psychological profile specific to each patient. A flexible and creative approach to the design of treatment plans is an advantage in the hands of a healthcare professional. Nevertheless, a doctor-patient partnership is a key contributor high treatment adherence. Active participation of the patient in decision making, the involvement of relatives, negotiation with caregivers and the ability to compromise all significantly increase the chances of choosing an optimal treatment plan. They also lead the patient to assume the responsibility to adhere to treatment recommendations. Such relationships increase patient satisfaction with treatment, enhance adherence and ultimately affect treatment efficacy and clinical outcomes [44]. The burden of this noncommunicable disease continues to increase, and there is room for improvement of the organisation of specialised medical care for patients with T2DM.

ADDITIONAL INFORMATION

Conflict of interest. The authors declare no conflicts of interest related to the current manuscript.

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