Effectiveness of traditional chinese medicine nursing intervention on constipation and anxiety in chemotherapy

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Author contributions
Fan MS and Bian HL collected the data; Ni L and Fan MS wrote the draft of the paper; Ni L analyzed the data and revised the paper; Ni L was the guarantor of this work and had full access to all the data in the study and take responsibility for its integrity and the accuracy of the data analysis. All authors read and approved the final manuscript.

Competing interests
The authors declare no conflicts of interest.

Acknowledgments
This study is supported by the Special Fund for Construction Projects of Major Weak Disciplines of Shanghai Pudong New District Health System (No. PW2br/2022-04).

Peer review information
Nursing Communications thanks all anonymous reviewers for their contribution to the peer review of this paper.

Abbreviations
TCM, traditional chinese medicine; CIC, chronic idiopathic constipation; HAMA, Hamilton Anxiety Scale.

Citation
Fan MS, Bian HL, Ni L. Effectiveness of traditional chinese medicine nursing intervention on constipation and anxiety in chemotherapy. Nurs Commun. 2024;8:e2024010. doi: 10.53388/IN2024010.

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Executive editor: Xiu-Jin Wei.
Received: 01 March 2024; Accepted: 23 May 2024; Available online: 26 May 2024.
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Abstract
Background: In a study conducted from March to September 2021, 124 cancer patients undergoing chemotherapy at our hospital were divided into two groups. The control group received routine inpatient nursing care, while the observation group received Traditional Chinese Medicine (TCM) nursing interventions in addition to routine care. Data analysis was conducted to compare the incidence of clinical adverse reactions, constipation scores, and changes in anxiety levels between the two groups. The results showed that the observation group, receiving TCM nursing interventions, had lower incidence of clinical adverse reactions and lower constipation scores compared to the control group. Additionally, anxiety levels were found to decrease significantly in the observation group post-intervention. These findings suggest that incorporating TCM nursing interventions in the care of cancer patients undergoing chemotherapy may help in reducing the occurrence of adverse reactions, alleviating constipation, and managing anxiety levels. Further research is needed to explore the full potential of integrating TCM into conventional nursing care for cancer patients.

Methods: Following interventions, both groups experienced varying degrees of clinical adverse reactions, with the observation group demonstrating a significantly lower total incidence (29.03%) compared to the control group. This disparity was statistically significant ($P < 0.05$). Furthermore, improvements were observed in defecation time (0.53 ± 0.18) points and defecation frequency (1.17 ± 0.25) points post-intervention. These findings suggest that the intervention had a positive impact on reducing adverse reactions and improving defecation patterns.

Results: In a recent study, researchers found that individuals in the observation group experienced lower levels of difficulty with defecation and had a more regular defecation form compared to those in the control group. The results showed a significant difference in defecation difficulty and form, with the observation group scoring lower in both aspects. Interestingly, there was no significant difference in anxiety levels between the two groups prior to the intervention. However, after the intervention, both groups experienced a decrease in anxiety levels, with the observation group showing a greater reduction compared to the control group. This suggests that the intervention had a positive impact on reducing anxiety levels, particularly in the observation group, where anxiety scores were significantly lower. These findings highlight the possible benefits of certain interventions in improving both physical and psychological well-being.

Conclusion: TCM nursing interventions have shown to be beneficial in reducing anxiety and improving constipation symptoms in cancer patients. These methods not only enhance the quality of life for patients but also offer a promising approach in clinical cancer treatment. The efficacy of TCM nursing highlights its value and encourages further promotion and application in future cancer care strategies. TCM nursing helps cancer patients undergoing chemotherapy with constipation and anxiety.

Keywords: chemotherapy, cancer, TCM syndrome, constipation, anxiety
Background

The number of cancer patients experiencing constipation has been on the rise in recent years. Chemotherapy is a crucial component of cancer treatment, but it often leads to constipation as a common complication. Studies show that approximately 15% of patients undergoing chemotherapy will experience constipation [1, 2]. Chemotherapy-induced constipation (CIC) is a prevalent and distressing side effect, affecting between 40–90% of patients [3–5]. This condition occurs when the intestines absorb too much water from stool, leading to the formation of dry, hard stools and a decrease in bowel movements [6]. CIC not only causes physical discomfort but also has serious implications for patients’ health. It has been linked to an increased risk of coronary heart disease, ischaemic stroke, and other complications [7]. Furthermore, CIC can result in abdominal distension, rectal tears, haemorrhoids, and rectal fissures due to the passage of hard stools. It can also contribute to psychological issues such as depression, anxiety, nausea, vomiting, and urinary retention [8, 9]. In severe cases, CIC can even be life-threatening, leading to symptoms like loss of appetite, fatigue, pain, and dizziness, significantly impacting the patient’s quality of life [10]. Cancer patients may experience psychiatric crises at different stages of their illness, along with emotional disorders such as anxiety due to drug toxicity [11]. These psychological issues can exacerbate physical symptoms, creating a complex interplay between mind and body that medical professionals are increasingly recognizing [12]. Therefore, it is imperative to address patients’ anxiety and reduce the incidence of constipation during chemotherapy to improve their overall well-being.

To effectively manage CIC, healthcare providers should prioritize addressing patients’ mental health needs and implementing strategies to prevent and alleviate constipation. By providing comprehensive support throughout the treatment process, healthcare professionals can enhance cancer patients’ quality of life and improve their overall outcomes.

Currently, there are various methods used both domestically and internationally for treating constipation, including the use of antidiarrheal medications, biofeedback therapy, psychotherapy, health education, and surgical interventions. Antidiarrheal drugs can have differing effects from person to person and often require long-term use, which can lead to side effects like diarrhea. Biofeedback and psychotherapy have limited scopes, while surgical treatments can be traumatic and carry a high risk of complications [13]. Traditional Chinese Medicine (TCM) takes a holistic approach to analyzing a patient’s condition, addressing not only the symptoms of constipation but also any accompanying issues such as fever, dry mouth, anxiety, and depression [14]. TCM nursing embraces holistic and evidence-based care, incorporating lifestyle management, disease monitoring, emotional support, and traditional Chinese medical techniques like moxibustion and cupping. These methods are gaining recognition in clinical settings for their simplicity, convenience, effectiveness, and cost-efficiency [15]. While research has demonstrated the benefits of TCM nursing in managing symptoms like nausea, vomiting, sleep disorders, and anxiety in chemotherapy patients, there is a lack of studies focusing on its effectiveness in alleviating constipation and associated anxiety levels [16]. To address this gap, a study was conducted on 124 oncology patients undergoing chemotherapy. They were treated with a Chinese medicine nursing program targeting constipation and related symptoms, with notable success. The outcomes of this study highlight the significant impact of TCM nursing in improving constipation symptoms and reducing anxiety levels in patients undergoing chemotherapy. By integrating traditional Chinese medical practices into nursing care, healthcare providers can offer comprehensive and effective treatment options for individuals facing constipation and related issues.

Methods

Patient population

The research conducted at Shanghai Class IIIA Hospital received approval from the Ethics Review Committee (Shanghai East Hospital; [2021] Preliminary Examination No. 221), and all patients admitted to Dongfang Hospital affiliated with Tongji University signed informed consent forms. A total of 124 patients undergoing chemotherapy from March to September 2021 were chosen as participants for the study. These patients were randomly split into two groups for further examination and analysis. The study utilized random number tables to select 62 cases each for the control and observation groups. The control group consisted of 34 males and 28 females, with ages ranging from 35 to 78 years and an average age of 55.3 years. This method ensures diversity and impartiality in the selection process, providing a solid foundation for the research findings.

The observation group comprised 33 males and 29 females, aged between 36 and 79 years, with an average age of 56.1 years. There was no notable variance in general demographics between the male and female participants, enabling a comprehensive comparison and analysis. Refer to Table 1 for a visual representation of the data depicting the uniformity in age and gender distribution within the group.

Inclusion criteria [17, 18]

All patients included in the study were diagnosed with tumors in accordance with national diagnostic criteria. None of the patients had pre-existing constipation conditions before treatment. All participants were over 18 years old and had undergone chemotherapy. Additionally, they had given informed consent and willingly took part in the study, showcasing their commitment to advancing medical research.

Table 1 Summary of general information of patients in both groups

<table>
<thead>
<tr>
<th></th>
<th>Control subjects</th>
<th>Observation group</th>
<th>T/X²</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Number of examples</strong></td>
<td>62</td>
<td>62</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td><strong>Gender (cases)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>34</td>
<td>33</td>
<td>1.428</td>
<td>0.487</td>
</tr>
<tr>
<td>Women</td>
<td>28</td>
<td>29</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Average age (years)</strong></td>
<td>55.3 ± 13.9</td>
<td>56.1 ± 13.8</td>
<td>0.369</td>
<td>0.871</td>
</tr>
<tr>
<td><strong>Type of cancer (cases)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gastric cancer</td>
<td>28</td>
<td>24</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lung cancer</td>
<td>16</td>
<td>15</td>
<td>2.033</td>
<td>0.124</td>
</tr>
<tr>
<td>Liver cancer</td>
<td>8</td>
<td>11</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(sthi. or sb) else</td>
<td>10</td>
<td>12</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Average duration of illness (years)</strong></td>
<td>4.32 ± 2.68</td>
<td>5.17 ± 3.24</td>
<td>0.487</td>
<td>0.763</td>
</tr>
<tr>
<td><strong>Educational level (example)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary and below</td>
<td>31</td>
<td>28</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Junior and senior high school</td>
<td>25</td>
<td>30</td>
<td>3.104</td>
<td>0.067</td>
</tr>
<tr>
<td>University and above</td>
<td>6</td>
<td>4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Exclusion criteria [19, 20] Excluding patients with severe mental illness or additional organ damage, along with those lacking complete data, ensures the accuracy of our study findings and the reliability of our results.

Traditional nursing versus TCM practices. In the study, the control group received standard care with morning intake of saline, light and digestible diet, increased water consumption, and medication for constipation. The observation group, however, received an additional intervention of TCM nursing. This approach was implemented alongside the conventional care from the control group. Through this combined approach, the effectiveness of TCM nursing in improving patient outcomes was assessed. The results of the study will provide valuable insights into the potential benefits of integrating TCM into conventional healthcare practices.

Abdominal massage is a beneficial technique that can help promote bowel movements and stimulate peristalsis in the intestines. By massaging the abdomen in a clockwise direction with increasing pressure, a warm sensation can be created which encourages the body to defecate. It is important to pay attention to the friction and temperature of the hands during the massage to avoid discomfort for the patient. Before starting the massage, it is recommended to have the patient empty their bladder and assume a supine position. Ideally, this massage should be done in the evening before bedtime or in the morning after waking up. For optimal results, it is suggested to perform this massage twice a day for two weeks. This simple yet effective technique can help alleviate constipation and improve overall digestive health.

Acupuncture point massage targets specific points such as Hegu, Tianshu, Shuidao, Guigui, and Changqiang to provide relief and promote healing. By applying pressure with the thumb until a warm sensation is felt, the therapist stimulates these points effectively. Patients are advised to empty their bladder before each session and receive a 3 min massage with fingertips twice daily. This technique aims to improve overall well-being and address various health concerns through the manipulation of key acupoints.

Focused dietary attention is crucial for optimal health. In conjunction with acupuncture massage, including Hegu, Tianshu, Shuidao, Guigui, and Changqiang, patients can experience targeted relief. A specific technique involves applying pressure to the patient’s right hand with the thumb until a warm sensation is felt. Prior to the massage, it is recommended to empty the bladder. This method typically involves a 3 min session, twice daily, utilizing fingertip pressure. These practices aim to promote overall well-being and balance within the body.

In the nursing process, we prioritize emotional care through enhanced ward rounds and attentive patient support. By fostering positive nurse-patient relationships and providing tailored psychological counseling, we address patients’ mental states to enhance their coping skills. This approach effectively alleviates anxiety, fear, and other negative emotions, promoting emotional healing and maintaining a positive mindset. Our commitment to emotional well-being ensures patients feel supported and comforted during their recovery journey.

Observational indicators The clinical data from both patient groups was analyzed, comparing clinical symptoms of adverse reactions, constipation scores, and anxiety scores before and after the intervention. This comprehensive analysis revealed insights into the impact of the intervention on patient well-being and symptom management.

A self-developed constipation score was created, consisting of four key factors: defecation time, frequency, difficulty, and stool shape. Each aspect was rated on a five-point scale, totaling 16 points. A higher score indicating more severe constipation. This personalized scale aimed to evaluate the level of constipation in individuals effectively.

The Hamilton Anxiety Scale (HAMA) is a tool used to evaluate anxiety levels, with 14 dimensions ranging from “asymptomatic” to “extremely severe” [21]. Each dimension is scored from 0 to 4, with a total score above 29 indicating severe anxiety, indicating marked anxiety, indicating anxiety, indicating possible anxiety, and below 7 indicating the absence of anxiety symptoms. Developed by Hamilton, this scale provides a comprehensive assessment of anxiety severity. By analyzing these dimensions, healthcare professionals can better understand the level of anxiety a person is experiencing and tailor treatment accordingly. This valuable tool aids in accurately identifying and addressing anxiety disorders.

Statistical analysis
The SPSS23.0 software system is utilized to analyze valid statistical data in this study. All measurements are distributed following normal statistics and presented as average ± standard deviation. The comparison between patients’ constipation and anxiety scores is conducted using a t-test, while the occurrence of adverse reactions is evaluated using the x² test for counting data percentages. A significance level of P < 0.05 indicates a difference in the test results. The study emphasizes the importance of accurate data analysis and statistical methods in medical research to draw meaningful conclusions.

Results

Comparison of the frequency of adverse reactions
After receiving the intervention, both groups of patients experienced varying levels of clinical adverse reactions. The observation group had a significantly lower total incidence of clinical symptoms (29.03%) compared to the control group. This difference was statistically significant (P < 0.05), as evidenced in Table 2. The findings highlight the potential benefits of the intervention in reducing adverse reactions in patients.

Comparison of constipation scores
Following the intervention, patients in the observation group demonstrated significantly improved defecation time (0.53 ± 0.18), frequency (1.17 ± 0.25), difficulty (0.81 ± 0.23), and stool shape (1.43 ± 0.24) scores compared to those in the control group. These differences were found to be statistically significant (P < 0.05), as indicated in Table 3.

Comparison of anxiety levels
Before the intervention, the anxiety scores of both groups were similar, indicating no significant difference (P > 0.05). However, following the intervention, the anxiety scores of patients in both groups decreased significantly. Notably, the anxiety scores of patients in the observation group (10.37 ± 4.53) were significantly lower than those in the control group. This difference was statistically significant (P < 0.05). These findings are detailed in Table 4, illustrating the positive impact of the intervention on reducing anxiety levels in patients.

Discussion
In recent years, the prevalence of malignant tumors has been on the rise, significantly impacting the physical and mental well-being of individuals, along with the overall quality of life [22]. Chemotherapy remains a primary treatment option for cancer patients, though it comes with its own set of challenges. More than 80% of patients undergoing chemotherapy experience various physical and psychological side effects, with feelings of anxiety, irritability, and pessimism being particularly prevalent among cancer patients [23, 24]. Constipation is a common issue faced by those undergoing cancer treatment, with research suggesting that psychological distress, toxicity from chemotherapy drugs, and dietary choices can all contribute to this uncomfortable symptom. Studies, such as the work of Lulu Fang, have highlighted the emotional toll that chemotherapy takes on cancer patients, often leading to increased

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stress, anxiety, and other negative emotions [25–27]. These emotional responses can trigger an overstimulation of the sympathetic nervous system, which in turn inhibits the parasympathetic nervous system, disrupting normal gastrointestinal functions and exacerbating issues like constipation. Therefore, implementing proactive and effective nursing interventions to address the root causes of constipation and reduce patient anxiety is crucial. In TCM, various methods such as abdominal massage, acupressure, and dietary adjustments are believed to help alleviate constipation symptoms. For example, Tianshu is thought to aid in clearing the large intestine and promoting proper bowel movements. Acupoint massage is said to balance the body’s yin and yang energies, as well as improve blood circulation. The Gaolai acupoint is believed to regulate digestive functions, facilitating smoother bowel movements. Additionally TCM posits that emotions play a significant role in overall health, with emotions such as anger, joy, thoughts, sadness, and fear directly impacting specific organs [28, 29]. By providing effective emotional support and care, healthcare providers can help alleviate vegetative nerve dysfunction caused by stress, fear, and other negative emotions, ultimately aiding in the resolution of constipation and promoting overall well-being. In conclusion, addressing the emotional and physical challenges faced by cancer patients undergoing chemotherapy is essential in improving their quality of life and overall treatment outcomes. By incorporating both traditional and modern nursing interventions, healthcare providers can help alleviate symptoms such as constipation and reduce patient anxiety, ultimately supporting their journey towards recovery [30].

Adverse reactions are a common occurrence in patients undergoing chemotherapy. Constipation refers to the symptoms of prolonged defecation time, increased difficulty in defecation, etc., and the number of defecation is less than 3 times in a week, and the commonly used clinical treatments are the promotion of defecation medication or enema, but it can’t cure the constipation completely, and it is easy to lead to drug dependence [31]. A recent study revealed that the use of TCM nursing in oncology chemotherapy patients significantly reduced the incidence of adverse symptoms compared to standard care. This suggests that integrating TCM into the care of chemotherapy patients can help alleviate side effects. One of the most common side effects experienced by chemotherapy patients is constipation. Traditional treatments often involve the use of medication or enemas, which may not provide long-term relief and can lead to drug dependence. However, a study focusing on nursing interventions based on TCM dialectic theory showed promising results in improving constipation in cancer patients undergoing chemotherapy. Patients in the observational group reported significantly better constipation scores compared to those in the control group, indicating a positive impact of TCM nursing interventions. Anxiety is another important aspect to consider when caring for chemotherapy patients. HAMA is a widely used tool to assess anxiety levels in clinical settings [32]. By utilizing the HAMA scale, researchers evaluated the anxiety levels of patients before and after receiving the TCM nursing interventions. The results indicated a significant improvement in anxiety levels for both groups post-intervention, with patients in the observation group showing lower anxiety scores compared to the control group. This underscores the beneficial effects of TCM nursing programs in alleviating anxiety among chemotherapy patients, aligning with previous findings by Wang et al. [33]. While the results of the study are promising, it is important to note that the sample size was relatively small, which may introduce some errors in the findings. Therefore, further validation through larger-scale experiments is necessary to confirm the efficacy of TCM nursing interventions in improving the well-being of chemotherapy patients. By incorporating TCM practices into traditional care protocols, healthcare providers can offer a more holistic approach to managing side effects and psychological distress in cancer patients undergoing chemotherapy.

In conclusion, implementing nursing interventions rooted in TCM theory can significantly reduce anxiety in patients with tumors. Furthermore, this approach has been shown to effectively address constipation issues and ultimately enhance the overall quality of life for these patients. Therefore, it is recommended that this holistic approach be further integrated into the clinical treatment protocols for cancer patients in order to provide more comprehensive care and support.

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**Table 2 Comparison of the occurrence of clinical adverse reactions between the two groups (Cases)**

<table>
<thead>
<tr>
<th>Groups</th>
<th>Number of examples</th>
<th>Insomnia</th>
<th>Bloating</th>
<th>Loss of appetite</th>
<th>Fussiness (sth. or sb) else</th>
<th>Total incidence (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control subjects</td>
<td>62</td>
<td>10</td>
<td>7</td>
<td>9</td>
<td>11</td>
<td>64.52</td>
</tr>
<tr>
<td>Observation group</td>
<td>62</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>4</td>
<td>29.03</td>
</tr>
<tr>
<td>( \chi^2 )</td>
<td></td>
<td></td>
<td></td>
<td>–</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td>( P )</td>
<td></td>
<td></td>
<td></td>
<td>–</td>
<td>–</td>
<td>&lt; 0.001</td>
</tr>
</tbody>
</table>

**Table 3 Comparison of constipation scores between the two groups (Points)**

<table>
<thead>
<tr>
<th>Groups</th>
<th>Defecation time</th>
<th>Number of times a person has a bowel movement</th>
<th>Difficulty in defecating</th>
<th>Stool shape</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control subjects</td>
<td>1.58 ± 0.35</td>
<td>1.68 ± 0.39</td>
<td>2.03 ± 0.48</td>
<td>2.88 ± 0.63</td>
</tr>
<tr>
<td>Observation group</td>
<td>0.53 ± 0.18</td>
<td>1.17 ± 0.25</td>
<td>0.81 ± 0.23</td>
<td>1.43 ± 0.24</td>
</tr>
<tr>
<td>( T )</td>
<td>6.132</td>
<td>4.267</td>
<td>6.225</td>
<td>6.467</td>
</tr>
<tr>
<td>( P )</td>
<td>0.037</td>
<td>0.042</td>
<td>0.028</td>
<td>0.019</td>
</tr>
</tbody>
</table>

**Table 4 Comparison of anxiety scores before and after treatment between the two groups of patients (Points)**

<table>
<thead>
<tr>
<th>Groups</th>
<th>Anxiety scores</th>
<th>Pre-treatment</th>
<th>Post-treatment</th>
<th>( T )</th>
<th>( P )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control subjects</td>
<td></td>
<td>23.63 ± 3.89</td>
<td>15.28 ± 3.66</td>
<td>8.625</td>
<td>0.018</td>
</tr>
<tr>
<td>Observation group</td>
<td></td>
<td>24.13 ± 4.07</td>
<td>10.37 ± 4.53</td>
<td>11.367</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>( T )</td>
<td>2.154</td>
<td>7.928</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>( P )</td>
<td>0.063</td>
<td>0.027</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
</tbody>
</table>
References


28. Huang Y, Pan CY, Tian YZ, et al. Progress in treatment of functional constipation with traditional Chinese medicine accompanied by anxiety and depression. *Chin Med Sci*. 2021;11(24):5. (Chinese) Available at: https://kns.cnki.net/kcms/article/abstract?v=axrnJTP8fwNmgDrDgP5Wu8a1e10UPZz6pYxdqC06qMFRHkGxjkrLPUt8NksX1nVGd42w87v-mTR5dSrI4-j3rJzg4vrt0OkSYw6W7YsWmtkT_rEqMkYjKTBx0r9w5qI0h0lEWhkwvKmVgyg&=uniplant.form=NZKPTLanguage=CHS

29. Yang L, Yi X, Wang XN, et al. Effect of constipation massage combined with acupressure in treating constipation in elderly

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32. Wu GH, Ma LY, He HJ, et al. Investigation of sleep disorders in the patients with depression and analysis on the influencing factors. *Chin Mod Physician.* 2021;59(4):5. (Chinese) Available at: https://kns.cnki.net/kcms2/article/abstract?v=anrJTP8flzB1b_wf3pku8OnJy9X-ENj-gtxv4wemUCSJphmb0q4PthvXJZRTHHVh5x-G6WUHlykiruooz50VzFE06FgyVH8X6I4y4EHGd2md0r7UDlRgaNIXYRykn6L4x2WqC1xxCzm6xpxqMg==&uniplatfrom=NZKPT&language=CHS