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Optimization of Testing Process at HIV Rapid Testing Sites and Strategies to Improve Subject Compliance

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Abstract: *Objective:* To explore the actual effects of optimization measures for the HIV rapid testing process and the role of these measures in improving the compliance of subjects. *Methods:* 100 subjects who underwent HIV rapid testing in our hospital from January 2023 to December 2023 were selected as the non-optimized group, and 100 subjects who underwent HIV rapid testing after the process was optimized from January 2024 to December 2024 were selected as the optimized group. The two groups were compared in terms of the time-consuming testing process, test report acquisition time, and subject compliance rate. *Results:* The time-consuming testing process and test report acquisition time of the optimized group were shorter than those of the non-optimized group, and the compliance rate of subjects was higher than that of the non-optimized group ($P < 0.05$). *Conclusion:* Optimizing the HIV rapid testing process can effectively shorten the time associated with testing and improve the compliance of subjects, which has practical application value.

Keywords: HIV rapid testing; Process optimization; Subjects; Compliance

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1. Introduction

HIV rapid testing is a key link in curbing the spread of HIV. Whether the process is reasonable directly affects the testing efficiency and the cooperation of the subjects [1]. In actual testing practice, the traditional testing process has shortcomings such as disconnected links and complicated information entry procedures. Such problems can easily cause subjects to spend too long waiting for testing, thereby weakening their cooperation in testing. As HIV prevention and control work continues to advance, improving testing coverage and subject compliance has become an important direction for current prevention and control work, and optimizing the testing process is a feasible way to achieve this direction [2]. Based on the above reality, this study analyzed the actual effect of process optimization measures on improving testing efficiency and subject compliance by comparing the specific development status before and after optimization of the testing process, thereby providing a relevant reference for the improvement of HIV rapid testing work.

2. Materials and methods

2.1. General information

100 subjects who underwent rapid HIV testing in our hospital from January 2023 to December 2023 were selected as the non-optimized group, and 100 subjects who underwent rapid HIV testing after process optimization from January 2024 to December 2024 were selected as the optimized group. The non-optimized group included 100 subjects, 56 men and 44 men respectively. The age range was between 18 and 65 years old, with an average age of (38.45 ± 6.23) years old. The optimization group included 100 subjects, 53 men and 47 women, respectively. The age range was between 19 and 64 years old, and the average age was (38.72 ± 6.18) years old. The basic information of the two groups of subjects was comparable, $P > 0.05$.

Inclusion criteria: (1) voluntarily participate in HIV rapid testing; (2) have clear consciousness and can cooperate with testing; (3) have no contraindications related to testing.

Exclusion criteria: (1) Combined with severe mental illness; (2) Unable to complete the entire testing process; (3) Refusal to participate in follow-up.

2.2. Method

The non-optimized group adopted the original HIV rapid testing process, which included subjects queuing up to register on site, medical staff explaining testing precautions one-on-one, collecting blood samples, processing sample numbers, conducting rapid testing, waiting for test results, issuing test reports, and interpreting results.

The optimization team relied on the original testing process to implement process improvement measures:

(1) Streamline the information entry steps, organize medical staff to sort out the content of the original registration form, eliminate redundant information irrelevant to the test, and retain core required items such as name, gender, age, ID number, contact route, and presence of high-risk behaviors. It developed a standardized information registration form and adopted a clear entry style design to facilitate the subjects in quickly completing the form. At the same time, two special guides are arranged in the registration area to guide the subjects to queue up and enter information in an orderly manner. For the elderly and those with low educational levels who have difficulty filling in the form, the guides will actively provide assistance to help them fill in the form accurately and avoid repeated entry due to filling errors or irregularities. In addition, an online appointment entry channel has been opened. Subjects can make an appointment in advance through the receiving doctor's WeChat group, fill in personal basic information, and select a testing period. After arriving at the site, they can directly check the entry with the appointment information, further reducing the time required for information entry.

(2) Improve the pre-test explanation link, combine the cognitive characteristics of grass-roots subjects, and produce a handbook of testing precautions that combines pictures and texts with concise descriptions. The manual contains core information such as testing process diagrams, sampling locations and precautions, result waiting time, key results interpretation, follow-up consultation methods, etc., and will be distributed uniformly by the guide when the subject's information is entered. At the same time, a fixed centralized explanation period is set, and centralized explanations are held every 30 minutes. Medical staff with clinical experience will uniformly explain the test-related content to the subjects through PPT demonstrations, physical display, etc., with emphasis on post-sampling precautions and the result collection process. The centralized explanation time is controlled to about 10 minutes. For subjects who still have questions after the centralized explanation, a dedicated person will be arranged to provide one-on-one supplementary Q&A, reducing the overall time-consuming nature of one-on-one explanations.

(3) Scientifically deploy sampling and testing personnel, establish a prediction model for testing peak hours, and analyze the testing data of the past year to determine that 9:00–11:00 and 13:00–16:00 are the peak testing hours every day. Two sampling windows will be added during the peak hours, and the number of sampling medical staff will be increased from the original 1 to 3, and the number of medical staff in the testing area will be adjusted from

1–2 to 3 to ensure a smooth connection between sampling and testing. Initiated and organized by the Centers for Disease Control and Prevention, special training on rapid testing quality was carried out for testing site staff, clarification of the job responsibilities and operating guidelines of each position, and implementation of the sampling-numbering-testing assembly line operation method to avoid idle personnel or busy-leisure imbalances and improve overall work efficiency.

(4) Standardize the sample handling and testing process, formulate operating guidelines for HIV rapid testing sample handling, clarify the time requirements for sample numbering, delivery, testing, result verification, and other aspects after sample collection. It is stipulated that sample numbering should be completed within 5 minutes after sampling is completed, samples should be transferred to the testing area within 10 minutes, and testing personnel should complete the testing operation within 30 minutes after receiving the sample. A unified sample numbering rule is adopted. The number includes the subject's registration serial number, sampling date, and other information to prevent sample confusion. At the same time, a dedicated quality control personnel will be arranged to be responsible for checking the testing process and results. After the testing is completed, the quality control personnel will check the consistency of the sample number and the testing results again. The reagent plates during the testing will be photographed and saved. Registration information is electronic, and information and results are traceable.

(5) After the test is completed, a notification will be sent via SMS (sent to the reserved mobile phone number), prompting "the test report is available for collection. Please go to the self-service report printer at the test point to obtain it as soon as possible." Please note: No specific test results will be provided in the text message. All results must be collected on-site and professionally interpreted by you. With valid vouchers, you can go to the testing point within the specified time period and use the self-service report printer to obtain a paper report. There are full-time "result consultants" in the report collection area to provide one-on-one interpretation services. The consultants will use easy-to-understand language to explain the report content. If the test result is negative, the consultant will inform you of the result and provide daily protection guidance and regular testing recommendations. If the screening result is reactive, the consultant will first explain that this result is only a screening result and cannot be used as a basis for diagnosis. Confirmatory testing needs to be initiated in accordance with national standard procedures. Immediately arrange re-sampling and send the samples to the Municipal Center for Disease Control and Prevention for authoritative confirmatory testing. The counselor will patiently soothe your emotions, clearly explain the steps and timetable for subsequent confirmation testing, and inform you of official information such as treatment policies, psychological support, and social assistance resources that can be provided by the disease control department after confirmation, and provide clear action guidelines.

A consultation hotline is set up, with dedicated personnel responsible for answering follow-up questions about testing procedures, prevention knowledge, etc., and can provide guidance information from relevant official service agencies.

2.3. Observation indicators

Compare the time spent on the testing process between the two groups (the total time from the arrival of the subject to the completion of the test), the time to obtain the test report (the time from the completion of sampling to the receipt of the report) and the compliance rate of the subjects (statistics of the proportion of subjects who are fully compliant and partially compliant. Full compliance means cooperating with the test throughout the process, partial compliance means cooperating with the test after being reminded, and non-compliance means giving up the test midway.

2.4. Statistical methods

SPSS 24.0 was used to analyze the data, and the t-test was used for measurement data; the χ^2 test was used for count data. $P < 0.05$ represents a significant difference.

3. Results

3.1. Comparison of the time spent on the testing process and the time it takes to obtain the testing report between the two groups

The detection process time and detection report acquisition time of the optimized group were shorter than those of the non-optimized group ($P < 0.05$). See **Table 1** for details.

Table 1. Comparison of test process time consumption and test report acquisition time between two groups (mean ± SD, min)

Group	The detection process is time consuming	Time to obtain test report
Unoptimized group ($n = 100$)	42.36 ± 8.52	18.45 ± 4.23
Optimization group ($n = 100$)	25.68 ± 6.34	8.72 ± 2.15
t	15.706	20.506
P	0.000	0.000

3.2. Comparison of compliance rates between the two groups of subjects

The compliance rate of subjects in the optimized group was higher than that in the non-optimized group ($P < 0.05$). See **Table 2** for details.

Table 2. Comparison of compliance rates between the two groups of subjects [n (%)]

Group	Complete compliance	Partial compliance	Noncompliance	Overall compliance rate
Unoptimized group ($n = 100$)	45 (45.00)	33 (33.00)	22 (22.00)	78 (78.00)
Optimization group ($n = 100$)	68 (68.00)	25 (25.00)	7 (7.00)	93 (93.00)
χ^2				9.074
P				0.003

4. Discussions

The smooth advancement of rapid HIV testing plays a key role in HIV prevention and control, and the scientific level of the testing process is directly related to the enthusiasm and cooperation of the subjects. Grassroots testing is a front-line link in HIV prevention and control [3]. The composition of service targets is complex, and there are considerable differences in education levels and health awareness levels. This puts forward stricter standards for the simplicity, efficiency, and humanization of the testing process. The traditional testing process has shortcomings such as cumbersome information entry, a single explanation form, and unreasonable personnel arrangements. It not only causes the testing to take a long time and increases the time investment of the subjects, but also easily breeds resistance and even gives up the testing halfway, which directly hinders the expansion of testing coverage. At the same time, the traditional process lacks unified operating principles and time control standards, and the connection between various links is not tight enough. It is prone to sample numbering errors, delayed test results, etc., and also increases the workload of medical staff, making it difficult to meet the actual needs of grassroots HIV prevention and control work [4].

From the psychological perspective of the subjects [5], HIV testing involves personal privacy. Some subjects themselves have emotions such as anxiety and fear, and are particularly concerned about the convenience and confidentiality of the testing process. In the traditional testing process, subjects need to wait in line for a long time, and the information registration items are complicated, which can easily make them resist and worry that their personal

privacy will be leaked, thus reducing their cooperation with the testing. After the process was optimized, measures such as streamlined information registration, WeChat group appointments with doctors, and standardized privacy protection methods effectively alleviated the anxiety of the subjects and enhanced their trust in the testing work. This is also a key factor in the significant increase in the compliance rate of the optimization group [6].

The data of this study show that the time spent on the testing process and the time taken to receive the test report in the optimized group are shorter than those in the non-optimized group, which fully proves that process optimization measures can significantly improve testing efficiency [7]. Specifically, the information registration process is streamlined and redundant content is deleted, and the time consumed by registration is greatly reduced by using dedicated personnel to assist in filling in and online appointment registration; centralized explanations are used to replace one-on-one interpretations, and graphic manuals are combined to improve the efficiency of information transmission and reduce the time occupied by a single individual; flexible adjustments are made to staffing during peak hours, and sampling windows are added to promote The line sampling-numbering-testing assembly line operation method can effectively alleviate the queuing pressure and improve the connection efficiency of each link; formulate sample processing operation guidelines, clarify the time requirements of each link, and coordinate with full-time quality control personnel for verification, which not only avoids reporting delays caused by sample accumulation, but also reduces repeated testing caused by result errors, and ultimately forms an efficient closed-loop process [8].

5. Conclusion

In general, the optimization of the HIV rapid testing process can effectively shorten the testing time and improve the compliance rate of test subjects. It not only improves the experience of test subjects but also improves the quality and efficiency of grassroots testing services, and plays a positive role in expanding HIV testing coverage and strengthening prevention and control efforts. This optimization method is in line with the actual situation at the grassroots level, is feasible and can be widely promoted, and deserves to be widely used in rapid HIV testing at the grassroots level to provide assistance in promoting the high-quality development of HIV prevention and control work.

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Disclosure statement

The author declares no conflict of interest.

References

[1] Peng J, Yuan J, Ye ZH, et al., 2025, Prediction Analysis of Factors Affecting HIV Testing Willingness of Middle-Aged and Elderly Men in Rural Areas of Sichuan Province: Based on XGBoost and SHAP Models. Chinese Public Health, 41(12): 1473–1480.

[2] Jin C, Jia XF, Wang Y, et al., 2025, The Development and Current Situation of HIV Testing Technology and Testing Products in My Country. China AIDS and Sexually Transmitted Diseases, 31(11): 1173–1178.

[3] Zhou QB, Tang RH, Yang YC, et al., 2025, Application of Accurate Detection Technology Platform in HIV Detection of

the General Population in Dehong Prefecture, Yunnan Province. China AIDS and Sexually Transmitted Diseases, 31(11): 1271–1273.

[4] Zhang JZ, Luo Y, Yang LY, et al., 2025, Meta Integration of Qualitative Research on Factors Affecting MSM HIV Self-Testing Based on COM-B Model. China AIDS and Sexually Transmitted Diseases, 31(11): 1287–1293.

[5] Zhang XH, Liu X, Wang YY, 2025, Research on Alternative Strategies for Routine HIV Testing. Guizhou Medicine, 49(11): 1743–1746.

[6] Zhu D, Zhang YL, Li SS, et al., 2025, Analysis of 68 Samples Showing HIV-2 Specific Bands in Western Blotting Test. Public Health and Preventive Medicine, 36(06): 152–156.

[7] Wang T, Han MJ, Yao J, et al., 2025, Expert Guidance on HIV-1 DNA Testing and Its Application. China AIDS and Sexually Transmitted Diseases, 31(10): 1149–1157.

[8] Chen WH, Chen WY, Ding Y, et al., 2025, Analysis of HIV/Syphilis Regular Testing Behavior and Influencing Factors Among Men Who Have Sex with Men in Shenzhen Based on WeChat Mini Program. Journal of Tropical Medicine, 25(09): 1276–1281.