Hindawi
Journal of Nanomaterials
Volume 2022, Article ID 1887533, 9 pages
https://doi.org/10.1155/2022/1887533

Research Article

Development and Research of Health Examination and Nursing Technology Based on Nanotechnology

Shuai Li

College of Physical Education, Anyang Normal University, Anyang, 455000 Henan, China

Correspondence should be addressed to Shuai Li; lishuai@aynu.edu.cn

Received 14 March 2022; Revised 27 April 2022; Accepted 16 May 2022; Published 27 May 2022

Academic Editor: Awais Ahmed

With the improvement of the socio-economic level and the continuous popularization of health concepts, more and more people have increased their attention to physical health and often go to physical examinations to protect their health. Nanotechnology, also known as nanotechnology, is a technology for studying the properties and applications of materials with structural dimensions in the range of 1 nm to 100 nm. The rapid development of nanotechnology has provided an important guarantee for healthy physical examination and nursing methods. Therefore, it is necessary to conduct research on the development of health examination and nursing technology based on nanotechnology. Nursing safety means that nursing staff should strictly follow the nursing system and operation procedures in carrying out nursing work, execute medical orders accurately, and implement nursing plans to ensure that patients are physically and mentally safe during treatment and rehabilitation. Based on the development and research of health examination nursing technology under nanotechnology, 220 physical examinees in our hospital were selected and divided into experimental group and control group according to whether nanotechnology-based physical examination nursing method was applied, and then, the physical examination time, physical examination efficiency, and the coincidence degree of physical examination results were compared. The results showed that the physical examination time of the experimental group was 58.94 ± 31.40 min, while that of the control group was 73.74 ± 38.95 min; the difference between the two groups was 14.8 ± 7.55 min, with statistical significance ($P < 0.05$). Therefore, it can be seen that the development and research of health examination nursing technology based on nanotechnology can effectively improve the level of medical care service and the satisfaction of physical examinees.

1. Introduction

With the development and progress of human society, people pay more and more attention to health. People no longer feel satisfied with pure material life but pay more attention to how to improve their quality of life. Early treatment of disease and disease-free prevention has become the life philosophy that people pursue. Regular health checkups can help detect early signs of disease and prevent or delay the onset of disease. Therefore, annual inspections have become a health choice for more and more people.

Physical examination refers to the process of examining subjects through medical means and methods to understand the health status of subjects, early detection of diseases or health damage, and a comprehensive assessment of the health status [1]. The physical examination includes clinical items such as internal medicine, surgery, ophthalmology, otorhinolaryngology, anorectology, and gynecology routine. The purpose of the health check is to assess the health of people, screen for diseases and risk factors, and provide one-way preventive consultation and intervention measures to prevent the onset of diseases or aggravate existing diseases to achieve the purpose of prevention [2]. In other words, medical examinations are aimed at most subjects in society who have no subjective symptoms [3]. Compared with others, this emphasizes the initiative of the subjects and replaces mandatory physical examination with active physical examination. Health is one's own, health is dynamic, health is social, and health is proactive. Regular comprehensive health checkups are required to understand one's health

status, to adopt the best approach and intensity, to improve immunity and resistance to disease, and to detect health risk factors early.

Wider uses the cations released by the cation exchange reaction of nanocrystals to induce fluorescent dyes and detect trace amounts of biomolecules, with good results. This shows the great potential of using portable point-of-care testing equipment to detect biomarkers [4]. Harrison uses polyethylene glycol glucose gold nanoparticles (PEG-Glu-GNP) as the imaging probe for CT and PET scans. Mice injected with gold nanoparticles can be examined by high-resolution micro-CT, and the gray density and CT can be determined [5]. PET-CT is a perfect integration of the functions of the highest-grade PET scanner and advanced spiral CT equipment, which is mainly used clinically for the early detection and diagnosis of major diseases in the fields of tumor, brain, and heart. Farrar used reverse microemulsion technology to further prepare core-shell quantum dot fluorescent nanoparticles with amino and phosphate groups, thereby successfully identifying liver parenchymal cells [6]. van Houwelingen et al. pointed out that the specific distribution of superparamagnetic iron oxide magnetic nanoparticles in biological tissues can help improve the MRI contrast between tumors and normal tissues at that site. MRI, also known as magnetic resonance imaging, uses the magnetic resonance phenomenon to obtain electromagnetic signals from the human body and reconstruct information about the body. It can be applied to MRI to diagnose tumors and other diseases [7]. Murphy uses magnetic iron oxide particles as a carrier to immobilize protease A and uses its ability to specifically bind hepatitis B virus surface antigen antibodies to achieve the purpose of measuring hepatitis B virus [8]. The microfluidic biochip based on nickel oxide nanorods prepared by Ridley et al. can determine the total cholesterol concentration in human blood through electrochemical detection method [9]. Cholesterol is actually an important substance indispensable to human tissue cells. High-density cholesterol has a protective effect on blood vessels; if low-density cholesterol is high, the risk factor for coronary heart disease will increase.

Compared with the previous research on health examination and nursing technology literature, the innovative content of this article is roughly divided into the following points: The first point is the application of nanotechnology as the main aspect. The previous literature mostly introduces human factors such as physical examination and nursing. The second point is to clarify the huge effect of nanotechnology on health examination and nursing technology, because the literature has paid less attention to this in the past.

2. Theory of Health Checkup

Health checkups include medical examinations using medical methods and methods to understand people's health status and find clues to diseases and health risks early. Health checkup is a health-centered physical examination, which refers to the medical examination of the subject through medical means and methods to understand the health status of the subject and to detect disease clues and hidden health problems at an early stage. This includes special medical examinations required by the state, such as occupational medical examinations, medical examinations for practitioners, enrollment, enlistment, marriage registration, medical examinations provided by basic public health services, and new types of local cooperation examinations [10]. But it does not include people who use union medical funds or participate in new rural joint medical care.

Health check is a diagnosis and treatment measure [11]. Secondly, the quality of diagnosis and treatment is the core element of quality control in health examinations. Therefore, the core of medical examination quality control is the quality of supervision and treatment. The central determinant of the quality of diagnosis and treatment is the skill level of medical staff and the composition of related medical devices [12]. In general, the survival and development of a hospital depends on quality, which in turn depends on talents and management. Therefore, there is no doubt that the quality of diagnosis and treatment is an eternal topic in the quality control of health examinations.

There are still some misunderstandings about the health check in some areas, such as Japan, so the local people take the health check late [13]. In pursuit of economic benefits, they sacrificed the quality of diagnosis and treatment and ignored the quality of management. Health checks are becoming more and more important, but they have not attracted enough attention from managers. For example, some excellent managers do not want to go to the health check center for management work, and some do not want to go to the health check center of the health check center [14]. All these hinder the transition from medical experience management to scientific management. Health checks require internal, external, female, eyes, ears, nose, throat, oral cavity, ultrasound, radiology, and laboratory department checks. It can be said that the physical examination center is the epitome of outpatient clinics [15]. Its quality is closely related to people's health and life. Without a sound management system as a guarantee, the quality of the test is also questionable. Health management is a process of holistic management of health risk factors of an individual or a population. Its purpose is to mobilize individual and collective initiatives to effectively use limited resources to achieve maximum health outcomes. Good management quality can not only mobilize the enthusiasm, initiative, and creativity of medical staff but also promote healthy external competition among medical laboratories. At the same time, by continuously attracting outstanding medical staff to engage in health examination work, the professional development of health examination can be promoted.

Physical examination and medical services have some things in common and have their own characteristics. Health check is an action to pursue health and a process of obtaining comprehensive health information [16]. Candidates are usually healthy or unhealthy people who have higher requirements for service quality. Therefore, the quality control of a health examination organization is not only the professional level of medical personnel inspection and the performance of the equipment used in the diagnosis and treatment process but also the evaluation of the health

examination management system of the organization and the implementation of the processing technology platform. The level of service is reflected in the workflow. Due to the lack of advanced science and technology and effective management methods in the past, medical staff had to spend a lot of manpower and material resources to process various inspections and inspection reports, and their work efficiency was very low. Today, the rapid development of science and technology provides technical support for the computerization of medical examinations. The health check has realized the computerization of the health check by establishing the foundation of network technology and introducing information management software [17]. Many application results show that the introduction of information management software for physical examination work can not only improve work efficiency, reduce errors and accidents, and reduce the waiting time of subjects but also make the stored information an ideal for scientific research and optimization of decision-making management select. As shown in Figure 1, to do a good job of health examination and nursing should start from the following points.

Make good training and work arrangements for nursing staff. Reasonably arrange the working hours of nursing staff, conduct batch retraining, improve the quality and ability of nursing staff, and continuously improve their work ability. They are trained on emergency handling capabilities every month, and emergency plan training is conducted on emergency situations to improve the actual combat capabilities of nursing staff [9]. The head nurse organizes the work reasonably according to the nurse's skills and position and improves the reward system according to the level of completion of the nurses to encourage work. The chief nurse will arrange the positions of the nurses reasonably and ensure that there is a staff member for each position, depending on the number of daily inspections. In daily work, in order to ensure the smooth progress of the physical examination, two nurses are required at the front desk, and the nurses will carefully answer the questions of each enquirer with the patient to improve their satisfaction.

Make preparations for each link of the physical examination. Nursing staff should strengthen contact with the health department to avoid having multiple auditors in the long-term testing department, thereby extending the testing time. In one link, the nursing staff brings the medical examiner to the place and procedure of the examination to avoid delays caused by unfamiliar situations [18]. When telling the doctor to complete each examination, the corresponding doctor must sign on it to prevent leakage. In order to improve the efficiency of nursing work, improve compliance, and shorten the inspection time, the examination room of the medical center needs clear signs to guide the examinee to conduct various examinations. Not only that, but various physical examination procedures need to be improved to avoid emergencies such as blood fainting, needle fainting, and low blood sugar.

Improve service methods to ensure a quiet and comfortable environment in the examination room, and separate the examiners from patients with other diseases. Establish a reasonable and convenient path for medical examiners, install

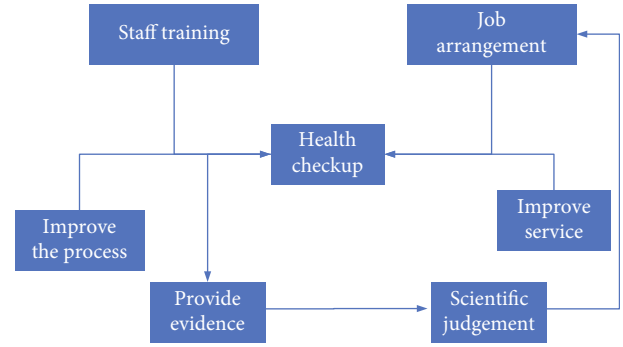

Figure 1: Important criteria for health checkup.

all medical examination items on the same floor, and provide one-stop service for the entire medical examination to shorten the time for medical examiners to go up and down the stairs [19]. Paste the relevant knowledge flow chart of the interview on the stairs and walls to ensure that the inspected personnel complete all the exams in the shortest time. After the physical examination, assess the health of the examiner. If there is any problem, we will promptly notify the medical examiner and make appropriate arrangements for the medical examiner's follow-up visit or entry.

3. Application of Nanotechnology in Medicine

Nanotechnology is a high technology with a wide range of disciplines and interdisciplinary development developed in 1980 [20]. When the material reaches the nanometer size, its characteristics will change, thus showing special characteristics, such as small size effect, surface effect, quantum size effect, and macroscopic quantum tunneling. In recent years, bio-related nanobiotechnology has developed rapidly and has become a frontier and hot spot in the international biotechnology field. When nanobiology develops to a certain technology, nanobiological cells with recognition ability can be made from nanomaterials, and biomedicine that can absorb cancer cells can be injected into human body and can be used for targeted killing of cancer cells. It has broad application prospects and clear industrialization prospects in the field of medicine and health. Technologies such as nanomedical carriers, nanomedical materials, nanobiosensors and imaging technologies, and microsmart medical devices will lead to new developments in diagnosis and treatment methods.

Nanodiagnostic technology is the application of nanobiotechnology in molecular diagnosis, which is very important for the development of personalized therapy. At present, research on nanobiotechnology in clinical diagnosis mainly focuses on nanobiosensors and imaging technologies, manufacturing nanorobots at the cellular level for repair, biomarker extraction and measurement, and applications in other fields [21]. Nanodiagnostic technology aims at early diagnosis of diseases and improvement of treatment effects. The application of nanotechnology in health examinations is shown in Figure 2.

Nanotechnology is used in in vitro molecular detection projects. Nanobiomolecule detection methods can be used

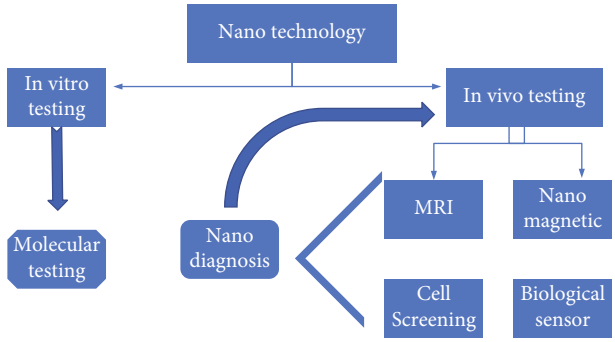

Figure 2: Application of nanotechnology in physical examination.

for clinical diagnosis. Due to the very low content of the detected molecules, the detection sensitivity of this method is very high [22]. The unique properties of nanomaterials greatly improve the sensitivity and convenience of molecular detection. Various signal amplification methods for detecting ultrasmall biomolecules have been studied. A change in the properties of a particle caused by a sharp increase in the ratio of the number of surface atoms to the total number of atoms as the particle diameter becomes smaller. For example, at a particle diameter of 10 nm, the particle contains 4000 atoms and 40% of the surface atoms; at a particle diameter of 1 nm, the particle contains 30 atoms and 99% of the surface atoms. For example, the detection performance of cation exchange amplifiers based on ZnS nanoclusters is better than enzyme-linked immunosorbent assay (ELISA), with a detection limit of 1/1000.

Nanotechnology is also used in in vivo molecular detection projects. Gold nanoparticles are nontoxic and biocompatible nanomaterials. The synthesis method is simple, the particle size is controllable, the surface is chemically active, it is easy to modify or adsorb other substances, and it has unique photoelectric properties [23]. There are many researches on the application of gold nanoparticles in the field of biology. After the injection of gold nanoparticles, the mice were examined by high-resolution micro-CT to determine the gray density, and the attenuation value of particle excretion over time was determined by CT [24]. After injection of PEG-Glu-GNP, the outline of the tumor is easily distinguished from the surrounding tissues. This complex probe can diagnose diseases in the body early and help detect cancer or cancer metastasis early. In addition, the development of neurotransmitters in the body and participation in brain chemistry monitoring help us better understand the pathological and physiological effects of biomolecules. In this study, a new type of glass capillary encapsulated in gold nanoparticles is reported, which can sense dopamine in the brain. The results showed that Au/GCNE modified by perfluorosulfonic acid can be successfully used to monitor striatal dopamine in anesthetized rats. The high quantum dot is a core-shell nanobody with Cd Se as the core and Cd S or Zn S as the shell and has excellent spectral characteristics. Water-soluble quantum dots provide a very broad application prospect in research fields such as biochemistry. It has low cytotoxicity and can be used for ultrasensitive detection of living cells and nonisotopically labeled biomolecules in vivo. The unique labeling characteristics of quantum dot technology will undoubtedly make it a leading technology for DNA detection (DNA chip), protein detection (protein chip), and the detection of biomolecules in protein-protein interactions. This provides a new method for the preparation of antigen and antibody and the principle of body-receptor (enzyme-substrate) reaction. At the same time, it will greatly promote the rapid development of bioimaging and biopharmaceutical technology, which will bring huge progress in the diagnosis and treatment of diseases.

The emergence of nanomaterials has completely changed the medical detection technology, making it one of the frontier areas of public concern. Nanodiagnosis is the use of the extremely high sensitivity of nanotechnology for early diagnosis of diseases [25]. The tools needed for nanodiagnostics include quantum dots, gold nanoparticles, and cantilevers, where quantum dots have high photostability. This requires the molecules being detected to interact with the nanoparticles to generate a strong signal to detect the sample. (1) Nanomaterials exhibit many excellent physical properties in biomedical imaging applications. In the field of nanoimaging, small superparamagnetic iron oxide nanoparticles coated with biomolecules provide anatomical details and help achieve real-time monitoring of treatment. Magnetic resonance imaging (MRI) to detect cancer is widely used as a contrast agent. Compared with traditional diagnostic methods, certain cancer cells can be detected earlier (months or years). Nanoimaging technology can also be used to detect residual or metastatic cancer cells after chemotherapy. (2) Since magnetic nanoparticles have the advantages of easy handling and large specific surface area, the application of functionalized magnetic nanoparticles is very attractive. Current magnetic separation research involves many aspects of the biological field, such as the removal of metal ions from the blood, the concentration of proteins and nucleic acids, and the recovery and repetition of immobilized enzymes. (3) When there is a small amount of cancer cells in the tissue or blood, they can be accurately detected by specific techniques, which can provide early diagnosis and treatment of patients and indeed provide patients with valuable treatment time and improve the cure rate [26]. Therefore, cell screening is very important. The immunomagnetic bead cell screening method can separate high-purity cells from complex cell mixtures within minutes. Nanotechnology can improve accuracy by enhancing or even completely transforming the screening of biomarkers in tissues and body fluids. (4) Nanobiosensors in the field of cancer research and sensors based on nanotechnology are expected to achieve early diagnosis of various cancers. The sensitivity of the nanosensor is very high. During blood testing, when a specific cancer cell antibody preset in the sensor encounters the corresponding antigen, the sensor current will change, and the change in the current can identify cancer cells in the blood, type, and concentration. At present, more and more venture capital invested in this field, but this technology still has technical problems that need to be solved in practical applications. In the future, various nanosensors will be integrated and placed in the human body to allow early detection of various diseases.

4. Experiments on Health Examination and Nursing

4.1. Experiment Preparation

4.1.1. Subject. There was a selection of 220 medical examiners in our hospital from March 2018 to March 2019, of which 116 were males and 104 were females. The age ranged from 18 to 65 years old, with an average of 33.67 ± 5.73 years old. A total of 60 medical staff, 18 doctors, 4 chief nurses (senior nurses), 11 intermediate, 10 junior, and 17 nurses participated in the medical examination center. For inclusion criteria, all subjects underwent physical examinations and signed all informed consent forms. For exclusion criteria, there are serious communication problems. The conditions of the experimental subjects are shown in Table 1.

4.1.2. Experimental Group. Magnetic nanoparticles with a particle size of less than 20 nm usually exhibit superparamagnetic and can be widely used in clinical diagnosis. At present, the more mature and rapidly developing application in clinical diagnosis is mainly magnetic resonance imaging. Therefore, magnetic resonance imaging of nanomaterials was used as the standard to distinguish the experimental group from the control group. The experimental group will use MRI technology applied with magnetic nanoparticles, and the control group will use traditional imaging technology for physical examination. 110 people per group, the ratio of male to female in each group is 58 : 52.

The porous $Fe_3O_4@SiO_2$ nanoparticles have uniform morphology, ordered pore size distribution, and good acid response. At the same time, the nanocarrier has excellent biocompatibility, strong antipain drug loading capacity, and excellent nutrition-guided fan orientation. In addition, the relaxation rate of $Fe_3O_4@SiO_2$ nanoparticles in an acidic environment is significantly improved, which provides a more direct method for detecting cancer tissues by magnetic resonance imaging. Therefore, $Fe_3O_4@SiO_2$ nanoparticles can target and deliver therapeutic agents loaded into tissues in the body and monitor the therapeutic changes in the tissues in real time through magnetic resonance imaging.

4.1.3. Preparation of $Fe_3O_4@SiO_2$ Core-Shell Nanoparticles. According to the classic hydrolysis method, the core-shell structured silica-coated Fe_3O_4 nanospheres were synthesized. A specific method is to uniformly disperse 0.1 g of synthetic Fe3O4 nanospheres in a mixed solution of 140 ml of ethanol and 20 ml of distilled water to form a colloidal solution and then add 2 ml of concentrated ammonia to the solution. Stir mechanically for 10 minutes. Then, a mixed solution of 1.5 ml TEOS and 10 ml ethanol was gradually added to the colloidal solution, stirred at room temperature for 30 hours, collected with a magnet, washed several times with ethanol and distilled water, and dried in vacuum.

Disperse 0.1 g of the synthesized core-shell $Fe_3O_4@SiO_2$ nanoparticles uniformly in distilled water, add 10 g 8 g/L NaBH4 ice water solution, and pour the mixed solution into the PTFE hydrothermal reaction solution and heat it at 80°C. The reaction was kept at °C for 12 hours. Finally, the product was collected on a magnet; washed 3 times with propanol, ethanol, and water; and dried in a vacuum drying oven at 30°C overnight. Add $Fe_3O_4@SiO_2$ as a contrast agent to the magnetic resonance device.

Table 1: Basic situation of experimental subjects.

Number	Age	Sex ratio	Number of medical staff
220	33.67 ± 5.73	116 : 104	60

4.1.4. Experimental Instruments and Reagents. The experimental instruments and reagents are as follows: automatic blood analyzer, EDTA-K2 vacuum anticoagulation tube, automatic urine analyzer, magnetic resonance meter, electrocardiograph, and CT detector.

4.2. Experiment Content. Before the experiment, fully understand the needs of examinees, solicit opinions from relevant experts, and strive to meet the needs of medical examiners at all levels, and refer to literature. It is necessary to combine the characteristics of the physical examination center and the characteristics of the examinee to establish a physical examination path diagram to learn and understand the meaning and standards of the clinical nursing path.

Use the nursing service satisfaction questionnaire and various nursing quality work questionnaires compiled by our hospital to collect statistics on the health examination and nursing work quality scores. Develop complete rules and regulations based on different scores. Health check contents are as follows: internal medicine, surgery, otolaryngology, oral cavity, 5 items of hepatitis B, blood test, urine test, electrocardiogram, chest X-ray, thyroid B ultrasound, prostate B ultrasound (male), uterus, and appendix B if necessary. Endoscopy will be performed, such as ultrasound (for women), B-ultrasound of the liver and pancreas, and CT. Coordinate the reasonable examination sequence and scientific physical examination process of each group of medical examiners, and ensure that every link in the physical examination path can operate normally. Each physical checkpoint has one or two full-time staff to provide nursing services.

4.2.1. Routine Blood Test. Both groups of patients were collected at 9 o'clock in the morning. The experiment used venous blood collection. The patient's cubital vein was selected as the venous blood collection site. After cleaning and disinfecting the skin, the disposable blood collection needle was connected to a vacuum anticoagulant. Collect the blood in a test tube with a blood volume of 5-8 ml. After the blood is collected, add a diluent to the anticoagulation tube to dilute the sample, and shake it gently to mix well. The control group adopted the peripheral blood sampling method. The left hand of the patient was selected, the skin of the index finger was cleaned and disinfected, and then, the blood was collected with a disposable lancet and placed in an anticoagulation tube. After the blood samples of the two groups were shaken well, the blood analyzer was used for routine blood tests. All samples are tested within 2 hours after blood collection. Strictly follow the operating

Table 2: Health physical examination and nursing service level.

Group	Knowledge propaganda	Care etiquette	Communication skills
Control group	8.46 ± 0.87	9.56 ± 0.69	8.02 ± 0.35
Trial group	8.51 ± 0.76	9.64 ± 0.74	7.97 ± 0.28

procedures of the automatic blood analyzer, and perform regular maintenance and quality control on the instrument before use. Strictly follow the instructions of the kit to keep the equipment stable and check and maintain blood cells to ensure stable operation of the equipment. Under the condition of continuous operation for 24 hours, the instrument is automatically cleaned and calibrated according to the program, and the values of various parameters are controlled within the normal measurement range.

4.2.2. Urine Routine. All women need to clean their vulva and collect specimens. After the specimens are sent to the laboratory, they are inoculated with fully mixed urine in a 35°C incubator using a 1 μL loop and cultured for 18-24 days to colonize colonies. Liquid forming element analysis can quantitatively calculate white blood cells and bacteria. After mixing the urine sample, use an automatic urine forming element analyzer to detect the number of bacteria and white blood cells in the urine, and report it in "units/μL."

4.2.3. Evaluation Criteria. After the physical examination is completed, a statistical score will be made on the length of the physical examination, the efficiency of the physical examination, the reliability of the physical examination, the satisfaction of the medical examiner, and the degree of interest in statistical treatment. Use t-test and $\chi 2$ test, and use the SPSS 10.0 software package to process and analyze all data. The inspection level is$\alpha = 0.05$.

5. Results of Health Checkup Care

5.1. The Development and Research Effect Comparison of Health Examination and Nursing Technology Based on Nanotechnology. The core of high-quality services is to provide customers with safe, high-quality, efficient, and satisfactory nursing services and to integrate the "patient-centered" nursing service concept into physical examination. High-quality service is an inevitable product of the development of the times and social progress. Innovating the physical examination path model and creating a standardized physical examination path are specific signs of improving quality services. With the implementation of the physical examination certificate, the nursing staff of the physical examination center must be enthusiastic about their work, have a good service attitude to the candidates, and have good nursing skills. "From passive service to active service, from active service" service concept "to touching service" provides all nursing staff with beautiful, more common problems, more information, and more detailed services. As shown in Table 2, there is basically no difference in the level of health examination and nursing service of different groups.

As shown in Table 2, the health knowledge preaching score of the nursing staff in the control group was 8.46 ± 0.87 points, and the nursing etiquette and communication skills were 9.56 ± 0.69 and 8.02 ± 0.35 points, respectively. The scores of health knowledge presentation, nursing etiquette, and communication ability of the experimental group were 8.51 ± 0.76, 9.64 ± 0.74, and 7.97 ± 0.28 points, respectively. In general, the two sets of data are not statistically significant.

Nanobiotechnology has great development potential. It can be used as a more sensitive and rapid response clinical diagnostic reagent, providing a valuable basis for the advancement of disease prevention and treatment. Taking into account the heterogeneity between patients, personalized medicine combining nanoclinical medicine and molecular biomarkers can ensure excellent efficacy and safety. Therefore, health checkup and nursing technology based on nanotechnology can effectively reduce checkup time and improve checkup efficiency.

As shown in Figure 3, after applying the health checkup and nursing technology under nanotechnology, the time of the physical examination of the experimental group was significantly reduced. The time of the physical examination of the experimental group was 58.94 ± 31.40 min, and that of the control group was 73.74 ± 38.95 min; the difference between the two is 14.8 ± 7.55 min, and the two groups of data are statistically significant ($P < 0.05$). The physical examination efficiency score of the experimental group physical examination subjects was 8.72 ± 0.68 points, and the physical examination time of the control group physical examination subjects was 7.29 ± 1.23 points. It is obvious that the health examination and nursing technology based on nanotechnology are more mature, saving a lot of time in the physical examination.

The detection accuracy of physical examination items is also an important criterion for measuring health examination and nursing technology. Therefore, the credibility scores on the physical examination items are compared to determine which group has the higher accuracy of the physical examination. Comparing the experimental group using nanotechnology health examination and nursing technology with the control group, the data is statistically significant, $P < 0.05$.

As shown in Figure 4, the reliability scores on the physical examination items of the experimental group using nanotechnology health examination and nursing technology are distributed in the range of 6.57-8.69. In contrast to the control group, the reliability scores on the physical examination items are distributed at 5.28—within the 6.85 interval. This also shows that due to the application of nanotechnology, the experimental group has significantly improved the health examination and nursing technology and can have a very clear judgment on the health of the examinee. At this point, the health examination and nursing technology of nanotechnology have been applied. The experimental group has a very big advantage.

5.2. Analysis on the Satisfaction of Medical Examiners Based on the Health Examination and Nursing Technology Based on Nanotechnology. During the physical examination, the

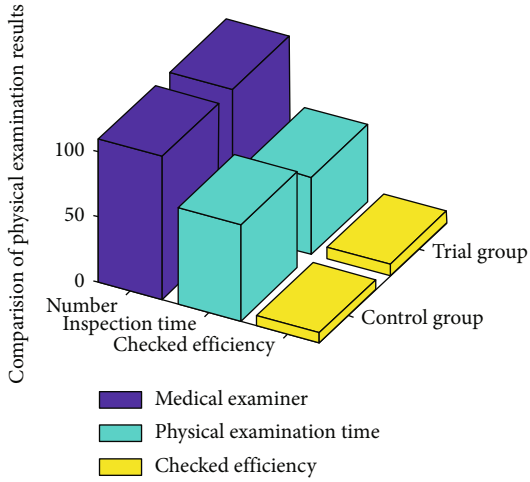

Figure 3: Comparison of physical examination results between the two groups.

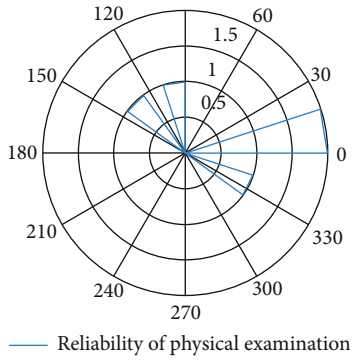

Figure 4: Comparison of physical examination reliability scores.

nursing staff will actively communicate with the patient and their family members according to the patient's psychological endurance and understanding ability and explain the current medical technology used to treat and treat the disease. Nursing staff should conduct some tests on patients who may have depression and then provide counseling and psychological counseling to them to reduce the psychological pressure of patients and seek to win their trust in order to establish a good nurse-patient relationship. While carrying out necessary communication, compare the medical examination satisfaction of the two groups of examinees to observe whether the application of nanotechnology can be favored by the examinees.

As shown in Figure 5, the satisfaction value of the experimental group continues to rise with the increase in the number of people undergoing physical examinations, from the initial 87.67% to the final 88.97%. In the control group, the satisfaction value fluctuates greatly. This shows that the experimental group based on nanotechnology-based health examination and nursing technology has achieved more satisfaction with the examinees by virtue of less examination time and accurate examination results. In contrast, the control group experienced fluctuations in satisfaction, and the high probability was related to its poor physical examination experience.

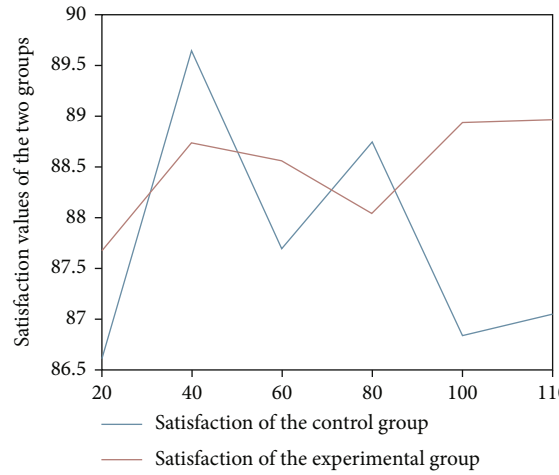

Figure 5: Comparison of satisfaction values between the two groups.

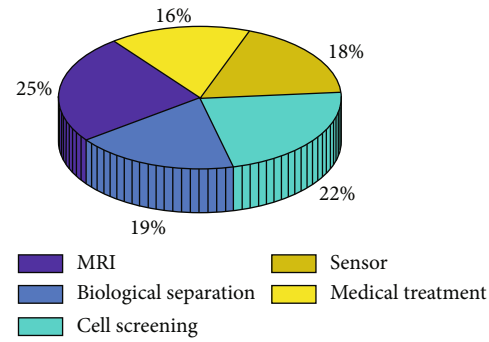

Figure 6: Classification of nanotechnology in health checkup.

Nanotechnology-based physical examination and nursing technology not only provide advanced clinical diagnostic methods, such as magnetic resonance imaging during physical examination, bioisolation, and cell screening, but also provide the convenience provided by nanorelease drugs and nanobiosensors. Therefore, the position of nanotechnology in health examination and nursing is very important. In order to see the specific application of nanotechnology in health examination and nursing more intuitively, it is expressed as a percentage.

As shown in Figure 6, the main application of nanotechnology in health checkup care is magnetic resonance imaging (MRI), which accounts for 22%. The special properties of nanoparticles make them an excellent contrast agent, which can make the imaging clearer and more intuitive, so as to understand the internal structure of the examinee more clearly, and achieve the purpose of protecting health.

6. Conclusions

(1) The research background of this article is that with the improvement of socio-economic level and the continuous popularization of health concepts, more and more people have increased their attention to physical health and often participate in physical

examinations to protect their health. The rapid development of nanotechnology has provided an important guarantee for healthy physical examination and nursing. Nanotechnology plays an important role in health examination and nursing. Therefore, it is necessary to conduct research on the development of health examination and nursing technology based on nanotechnology

(2) The purpose of this article is to start with the development and research of health examination and nursing technology under nanotechnology. 220 physical examination patients in our hospital are selected and divided into experimental group and control group according to whether the physical examination and nursing method under nanotechnology is applied. The experimental group prepares Fe3O4@SiO2 core-shell nanoparticles as the MRI contrast agent for detection. The control group does not use it by default. Data statistics are made on the physical examination time, physical examination efficiency, and physical examination results, and then, the physical examination time, physical examination efficiency, and physical examination results coincide with each other

(3) The experimental data shows that after applying the health checkup nursing technology under nanotechnology, the checkup time of the experimental group's checkups is significantly reduced, the checkup time of the checkups in the experimental group is 58.94 ± 31.40 min, and the checkup time of the checkups in the control group is 73.74 ± 38.95 min; the difference between the two is 14.8 ± 7.55 min, and the two groups of data are statistically significant ($P < 0.05$). The physical examination efficiency score of the experimental group was 8.72 ± 0.68 points, and the physical examination time of the control group was 7.29 ± 1.23 points. This clearly shows that the health examination and nursing technology based on nanotechnology are more mature, saving a lot of time in the physical examination

Data Availability

No data were used to support this study.

Conflicts of Interest

The author declares that there are no conflicts of interest regarding the publication of this article.

Acknowledgments

This study was funded by the Humanities and Social Science Research Projects in Colleges and Universities of Henan Province (Project Approval Number: 2021-ZZJH-008).

References

[1] T. Okura, T. Tsuji, K. Tsunoda et al., "Study protocol and overview of the Kasama Study: creating a comprehensive, community-based system for preventive nursing care and supporting successful aging," *Journal of Physical Fitness & Sports Medicine*, vol. 6, no. 1, pp. 49–57, 2017.

[2] S. F. Paparella, "What's in your kit? A safety checkup may be in order," *Journal of Emergency Nursing Jen Official Publication of the Emergency Department Nurses Association*, vol. 41, no. 6, pp. 513–515, 2015.

[3] K. Szczerbińska, E. Topinková, P. Brzyski et al., "Delivery of care to nursing home residents with diabetes: results from the SHELTER study," *Journal of the American Medical Directors Association*, vol. 17, no. 9, pp. 807–813, 2016.

[4] J. Wider, "Tips for giving your organization a telehealth checkup," *Health Management Technology*, vol. 38, no. 4, pp. 6–9, 2017.

[5] P. Harrison, "A birthday checkup for the NHS at 70," *Gastrointestinal Nursing*, vol. 16, no. 7, pp. 51–51, 2018.

[6] C. F. Farrar, "Transforming home health nursing with telehealth technology," *Nursing Clinics of North America*, vol. 50, no. 2, pp. 269–281, 2015.

[7] C. T. M. Van Houwelingen, R. G. A. Ettema, H. S. M. Kort, and O. Ten Cate, "Internet-generation nursing students\view of technology-based health care," *Journal of Nursing Education*, vol. 56, no. 12, pp. 717–724, 2017.

[8] K. Murphy, "Is technology affecting our health?," *Nursing Made Incredibly Easy*, vol. 14, no. 4, pp. 44–52, 2016.

[9] J. Ridley, A. Ischayek, V. Dubey, and K. Iglar, "Adult health checkup: update on the Preventive Care Checklist Form©," *Canadian Family Physician Médecin De Famille Canadien*, vol. 62, no. 4, pp. 307–313, 2016.

[10] N. R. Yancey and N. R. Yancey, "Ubiquitous technology in healthcare and teaching-learning: scourge or blessing?," *Nursing Science Quarterly*, vol. 30, no. 3, pp. 207-208, 2017.

[11] R. M. Brown, "Thinking of serving nursing abroad: how technology assists nurses on mission trips," *Nursing Clinics of North America*, vol. 50, no. 2, pp. 399–410, 2015.

[12] H. G. Buck, "Does health care technology work for or against older adults?," *Journal of Gerontological Nursing*, vol. 43, no. 8, pp. 3-4, 2017.

[13] P. V. E. Mcclintock, "Size really does matter: the nanotechnology revolution," *Contemporary Physics*, vol. 60, no. 2, pp. 204-205, 2019.

[14] V. Subramanian, E. Semenzin, D. Hristozov et al., "Sustainable nanotechnology decision support system: bridging risk management, sustainable innovation and risk governance," *Journal of Nanoparticle Research*, vol. 18, no. 4, pp. 1–13, 2016.

[15] C. M. Castro, H. Im, C. Le, H. Lee, R. Weissleder, and M. J. Birrer, "Exploring alternative ovarian cancer biomarkers using innovative nanotechnology strategies," *Cancer and Metastasis Reviews*, vol. 34, no. 1, pp. 75–82, 2015.

[16] J. L. Rivera and J. W. Sutherland, "A design of experiments (DOE) approach to data uncertainty in LCA: application to nanotechnology evaluation," *Clean Technologies and Environmental Policy*, vol. 17, no. 6, pp. 1585–1595, 2015.

[17] T. Mori, "Utilizing nanotechnology and novel materials and concepts for advanced thermoelectric and thermal management technology development," *Semiconductors*, vol. 51, no. 7, pp. 965–967, 2017.

[18] A. D. Maynard and D. Y. H. Pui, "Nanotechnology and occupational health: new technologies - new challenges," *Journal of Nanoparticle Research*, vol. 9, no. 1, pp. 1–3, 2016.

[19] A. D. Maynard, "Nanotechnology: assessing the risks," *Nano Today*, vol. 1, no. 2, pp. 22–33, 2006.

[20] A. Csáki, G. Maubach, D. Born, J. Reichert, and W. Fritzsche, "DNA-based molecular nanotechnology," *Single Molecules*, vol. 3, no. 5-6, pp. 275–280, 2002.

[21] M. C. Hersam, N. P. Guisinger, and J. W. Lyding, "Silicon-based molecular nanotechnology," *Nanotechnology*, vol. 11, no. 2, pp. 70–76, 2000.

[22] P. B. da Silva, E. S. de Freitas, J. Bernegossi et al., "Nanotechnology-based drug delivery systems for treatment of tuberculosis—a review," *Journal of Biomedical Nanotechnology*, vol. 12, no. 2, pp. 241–260, 2016.

[23] B. Fonseca-Santos, M. P. D. Gremião, and M. Chorilli, "Nanotechnology-based drug delivery systems for the treatment of Alzheimer's disease," *International Journal of Nanomedicine*, vol. 10, no. 10, pp. 4981–5003, 2015.

[24] L. Gao and X. Yan, "Nanozymes: an emerging field bridging nanotechnology and biology," *Science China Life Sciences*, vol. 59, no. 4, pp. 400–402, 2016.

[25] W. Tingting, "Study on the effect of applying health examination route nursing method in physical examination nursing work," *Contemporary Medical Essays*, vol. 15, no. 18, pp. 219-220, 2017.

[26] A. Abudujilili, "An Observation of acute myocardial infarction complicated with syndrome of elderly patients with emergency resuscitation effect[j]," *Smart Health*, vol. 3, no. 5, pp. 101-102, 2017.