

INSERTION OF NURSING IN DIAGNOSTIC TECHNOLOGIES: INNOVATIONS IN SECONDARY HEALTH CARE

Inserção da enfermagem nas tecnologias diagnósticas: inovações em atenção secundária de saúde

Inserción de la enfermería en las tecnologías diagnósticas: innovaciones en atención secundaria de salud

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How to cite this article:

Reis NSP, Dias CS, Monteiro VO, Barreto CTG, Santos RS, Nunes AS. Insertion of nursing in diagnostic technologies: innovations in secondary health care. Rev Fun Care Online. 2020 jan/dez; 12:29-36. DOI: <http://dx.doi.org/10.9789/2175-5361.rpcf.v12.6903>.

ABSTRACT

Objective: develop Standard Operating Procedures (POPs) for nursing care in performing diagnostic exams in secondary health care. **Method:** a Systematization Committee for Nursing Assistance (SAE) was developed, which evaluated the sectors in which new diagnostic technologies were being implemented and raised the need for training of the technical team that performed these tests to standardize procedures, reducing errors and failures in its realization. The SOPs were described through tables composed of: definition of the diagnostic procedure, necessary material, nursing interventions and special care. **Results:** four POPs were elaborated, related to the exams of spirometry, polysomnography, retinography and test of expired hydrogen. **Conclusion:** through the study it was possible not only to know the execution of the exams, but also to understand the applicability of SAE with a focus on diagnostic technologies, besides providing subsidies for future implementation of SAE in the study institution. **Descriptors:** Secondary care; Chronic disease; Nursing; Diagnostic services.

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RESUMO

Objetivo: desenvolver Procedimentos Operacionais Padrão (POP) para a assistência de enfermagem na realização de exames diagnósticos na atenção secundária à saúde. **Método:** elaborou-se uma comissão de Sistematização da Assistência de Enfermagem (SAE), que avaliou os setores em que estavam sendo implantadas novas tecnologias diagnósticas e levantou a necessidade de treinamento da equipe técnica que realizava estes exames para padronizar os procedimentos, diminuindo os erros e falhas em sua realização. Os POPs foram descritos através de quadros compostos por: definição do procedimento diagnóstico, material necessário, intervenções de enfermagem e cuidados especiais. **Resultados:** foram elaborados quatro POPs, relacionados aos exames de: espirometria, polissonografia, retinografia e teste do hidrogênio expirado. **Conclusão:** através do estudo foi possível não somente conhecer a execução dos exames, mas também entender a aplicabilidade da SAE com foco nas tecnologias diagnósticas, além de fornecer subsídios para futura implementação da SAE na instituição de estudo.

Descritores: Atenção secundária à saúde; Doença crônica; Enfermagem; Serviços de diagnóstico.

RESUMÉN

Objetivo: desarrollar procedimientos operativos estándar (POP) para la asistencia de enfermería en la realización de exámenes diagnósticos en la atención secundaria a la salud. **Métodos:** elaboró una comisión de Sistematización de la Asistencia de Enfermería (SAE), que evaluó los sectores en que se estaban implantando nuevas tecnologías diagnósticas y planteó la necesidad de entrenamiento del equipo técnico que realizaba estos exámenes para estandarizar los procedimientos, disminuyendo los errores y fallas en su realización. Los COPs se describieron a través de cuadros compuestos por: definición del procedimiento diagnóstico, material necesario, intervenciones de enfermería y cuidados especiales. **Resultados:** se elaboraron cuatro COPs, relacionados con los exámenes de: espirometría, polisomnografía, retinografía y prueba del hidrógeno expirado. **Conclusiones:** A través del estudio fue posible no sólo conocer la ejecución de los exámenes, sino también entender la aplicabilidad de la SAE con foco en las tecnologías diagnósticas, además de proporcionar subsidios para la futura implementación de la SAE en la institución de estudio.

Descriptorios: Atención secundaria de salud; Enfermedad crónica; Enfermería; Servicios de diagnóstico.

INTRODUCTION

Urbanization, falling birth, and death rates, accompanied by increased life expectancy, are characteristic of the process of demographic and epidemiological transition, consequences of economic development and the process of modernizing societies in the mid-twentieth century. Factors related to unhealthy living habits, caloric intake, and obesity increased the incidence and prevalence of Noncommunicable Chronic Diseases (NCCDs) and were responsible for several changes that had an impact on the current epidemiological profile.^{1,2}

NCCDs are considered a serious public health problem, responsible for the highest mortality and morbidity rates in the world, in Brazil 72% of deaths are related to NCCDs. National surveys show that the increase in NCCDs is higher among individuals belonging to lower socioeconomic classes who are more vulnerable to risk factors such as smoking, alcohol consumption and obesity.^{3,4,2}

The increase in NCCDs has negative consequences for the quality of life of the adult population of the country but also accounts for the higher expenses with hospital care in the *Sistema Único de Saúde (SUS)* [Unified Health System]. Considering this reason, Brazil has been developing public health promotion and disease prevention policies and in 2011 structured the Action Plan and Strategies for Coping with NCCDs, considering as a priority diseases of the circulatory system, cancer, diabetes and chronic respiratory diseases.³

Bearing in mind the aforesaid, the training of health professionals focused on prevention and early detection for the diagnosis of NCCDs and their possible complications is essential in order to minimize the magnitude of chronic complications and promote health care based on the quality of life of patients with a NCCD.

It is understood that health care for patients bearing a NCCD should be based on an Attention Network; in other words, it is necessary to articulate the different levels of health care, thus allowing the provision of comprehensive care.⁵

Therefore, we will highlight the role of Secondary Care, which is formed by a specialized diagnostic and therapeutic support service, whose function is not only to complement the health care offered by Primary Care, but also to offer services and actions directed at the chronic disease that is already at high or very high risk. In other words, they need a differentiated and specialized assistance focused on early diagnosis and minimization of possible complications.^{5,6}

It should be noted that in this scenario nursing is responsible for conducting diagnostic tests, such as: polysomnography, spirometry, retinography, and hydrogen testing. This context is an innovation for the care practice based on ethical and legal principles, but that needs to be based on technical-scientific knowledge and training.

In order to do so, it is important to deepen the scientific knowledge about specialized nursing care in Secondary Care, in order to establish the Standard Operating Procedure (SOP), whose purpose is not only educational, but also to enable innovations for nursing care that is constantly learning to adapt to the new contexts and health scenarios.⁷

It is worth mentioning that the elaboration of the SOP will allow us to introduce the Nursing Care Systematization (NCS) in the study institution, which, besides being a private activity of the nurse and which should occur in every public and private healthcare institution, uses method and scientific work strategy for the identification of health/illness situations and organizes the professional work on the method, personnel and instruments favoring safer assistance.⁸

The performance of nursing in the area of diagnostic exams requires the professional to perform the standardization and improvement of their actions, in order to enable an excellent assistance. Consequently, the elaboration of the SOP is an important tool for the organization of the nursing service, since the SOP allows all professionals of the nursing team to provide a standardized care for all patients, respecting the technical and scientific principles of each examination in the diagnostic therapies, avoiding systematic errors.⁹

Considering the aforementioned context, the research aimed to develop a SOP for nursing care in the performance of diagnostic tests in secondary health care.

METHOD

It is a descriptive research with a qualitative approach, which was performed from January to June of 2017 in a Secondary Health Care Unit from the *Rio de Janeiro* city.

The research scenario offers outpatient care, in addition to having an Ambulatory Surgical Center for small and medium-sized surgeries, academic laboratories, diagnostic and therapeutic care, programs and projects focused on preventive medicine.

The nursing team is comprised of 16 outpatient care sectors; the pulmonology, diabetes, and gastroenterology sectors were selected because they are the target of an extension project directed to Technological Innovations in Secondary Care and to perform diagnostic tests by the nursing team.

For the development of the research, a committee for NCS was created, consisting of nurses from specialized outpatient units. This commission evaluated the sectors in which the new diagnostic technologies were being implemented, raising the need for training of the technical team that performed these tests to standardize procedures, reducing errors and failures in their performance. After the diagnosis of the scenarios, in order to identify the problem situations, it was sought to standardize the nursing actions, promoting patient safety and quality of care, assuring the user a service free of undesirable variations in their final quality.

The study was developed in six stages, as follows: initial elaboration of SOPs by nurses working in the diagnostic exams of these clinics; Review by the quality control nucleus of the nursing department; approval by the nursing board; validation by the nursing team that performs the diagnostic exams (technicians and nurses), with calculation of the time spent to perform the procedure; updating of the SOP (preparation of the final version) and the training of all nursing staff able to perform each diagnostic examination, carried out through the unit's permanent education center.

The SOPs were described through tables comprised by the following: definition of the diagnostic procedure, necessary material, nursing interventions, and special care. It is worth mentioning that in all the sectors in which the study was carried out, the selected diagnostic procedures are the responsibility of the nursing team.

RESULTS AND DISCUSSION

The study allowed the elaboration of four (04) SOPs that were distributed among the following sectors, study scenarios: two (02) for pneumology, one (01) for diabetes and one (01) for gastroenterology.

Following, it can be found the four (04) SOPs, considering that the SOP systematizes, directs and organizes nursing care.

Standard Operating Procedures (Pneumology)

The Pneumology sector is responsible for diagnosing and treating Chronic Respiratory Diseases (CRDs) that are chronic diseases of both the upper and lower airways. Asthma, allergic rhinitis and Chronic Obstructive Pulmonary Disease (COPD) are the most common CRDs.¹⁰

It is estimated that hundreds of millions of people of all ages suffer from these diseases and respiratory allergies in all countries of the world and more than 500 million of them live in developing countries, such as Brazil.¹⁰

Spirometry, also known as Respiratory Function Test, has an important role in pulmonology because it is considered the main tool to evaluate the respiratory function and despite its limitations in the extreme age groups (children and elderly), it is an examination of easy applicability and high reproducibility. Possessing a unique role in the diagnosis of respiratory diseases. **Table 1** presents the SOPs for this exam.¹¹

The training time of technicians in the area of spirometry should be at least 80 hours, with up to 200 examinations. The certificate must be given by the attending physician at the end of the training. It is worth emphasizing the importance of a continuous evaluation, performed periodically by observing the performance during the examinations and analyzing the results of the tests performed.¹¹

Table 1 - Standard Operating Procedure representing to the inclusion of nursing in the Spirometry Test.

SPIROMETRY		
Definition/ Material	Nursing Interventions	Especial Care
<p>It is an examination performed to measure the volume and velocity of air entering and exiting the lungs. It can be performed during slow breathing or during forced expiratory maneuvers.</p> <p>Material: Spirometer; Trachea; Nozzles; Nasal clips; Bronchodilator.</p>	<ul style="list-style-type: none"> - Hands hygiene; - Gauge the anthropometric measurements; - Position the patient comfortably; - Orient resting over 5 to 10 minutes before the exam. - Explain the procedure to the patient and his/her companion (if any). - Install the spirometer through a nozzle; - Place the nasal clip on the patient's nose; - Ask the patient to inhale to fill the chest of air, after holding the breath for a few seconds and perform the forced, slow blow through the mouthpiece; - Administer the bronchodilator (salbutamol) with three jets with the interval of 1 minute between one and another one, then, waiting for an interval of 15 to 20 minutes until its complete absorption; <p>The second phase of the procedure begins.</p>	<ul style="list-style-type: none"> - Respiratory infections in the last three weeks may alter lung function or lead to bronchial - Patients who routinely do these exams may give an impression of accelerated functional loss; - Short-acting bronchodilators should be suspended for 4 hours and prolonged action for 12 hours before the test if the objective is to verify the presence of reversible obstruction; - Do not perform the fasting test; - Smoking - increases resistance to airflow and should be prohibited for at least 2 hours before the examination; - Alcohol should not be ingested in the last 4 hours; hyperresponsiveness. - In case of use of dental prosthesis, do not remove it for the examination.

Polysomnography is considered a gold standard for the diagnosis of sleep disorders, and should be done by a qualified professional, who will stay awake following all the patient's reactions and ensuring the good quality of the registry. Then the data are analyzed by a medical specialist, who will issue a decision. The SOPs prepared for this examination are described in **Table 2**.¹²

It is emphasized that the absence or disturbance of sleep can cause physiological disorders to people such as: immune system imbalance, changes in metabolism, disorders in thermoregulation, psychological disorders and reduction in the quality of life of the individual, which demonstrates the importance of the correct diagnosis.¹³

Patients who are not in their normal state, such as: experiencing influenza, febrile or after international travel with a change of time zone; they should not take the exam.¹⁴

Table 2 - Standard Operating Procedure representing to the inclusion of nursing in the Polysomnography Test.

POLYSOMNOGRAPHY		
Definition/ Material	Nursing Interventions	Especial Care
<p>It is the record of a night of sleep, where the individual sleeps connected to sensors that will record several parameters of sleep, making a complete record of brain electrical activity, breathing and signs indicative of muscle relaxation, ocular movements, blood oxygenation and beat according to the objective of the sleep study.</p> <p>-Material: Electrode; Sphygmomanometer; Stethoscope; Conductive paste; Nasal cannula Bell; Hospital bed; Computer.</p>	<p>- Guidance on the procedure;</p> <p>- Note the medications the patient used or will use on the day of the exam;</p> <p><u>At the beginning of the exam</u></p> <p>- Turn the camera on and turn on the bell;</p> <p>- Mount the equipment after turning off the lights and turning off the TV;</p> <p>- Register in the book of orders and occurrences the time of the beginning of the examination, name of the patient, equipment, responsible team, and any intercurrent;</p> <p>- Follow the exam, recording the data every 1 hour.</p> <p><u>At the end of the exam</u></p> <p>- Remove the electrodes from the patient;</p> <p>- Clarify possible doubts of the patient;</p> <p>- Verify that the data has been saved to the computer in the appropriate folders;</p> <p>- Leave the medical records in the specific folder of polysomnography for later referral to the billing.</p>	<p>- Provide guidelines for the day of the examination: do not use any type of cream, oil or lotion on the face, do not use enamel, maintain normal food, but avoid foods containing caffeine (coffee, mate, chocolate, cola drinks, energy drinks), do not nap during the day and keep your usual medication.</p> <p>- For the day of the examination: If after 1 hour of the examination the patient has not started to sleep, administer the medicine, Zolpidem 10 mg, according to medical prescription.</p>

Standard Operating Procedures (Diabetes)

The diabetes ambulatory is composed of a multidisciplinary team, being the nursing responsible for developing activities such as: nursing consultation, educational actions (waiting room and groups), supervision of interns and interns of nursing courses, nursing research based on indicators and retinography for screening for Diabetic Retinopathy (DR).¹⁵

It is currently estimated that approximately two million Brazilians with DR and 50% of patients with diabetes *mellitus* are affected by DR, being responsible for 7.5% of the causes of adults' incapacity to work and 4.58% of visual disabilities. Having this in mind, DR can be considered the main cause of blindness among diabetics.¹⁶

DR can be diagnosed through Retinography, an imaging exam that photographs areas of the fundus of the eye, such as the retina, choroid, optic nerve, and blood vessels, and aims to detect changes in the regular pattern of pigmentation and of the retinal vessels. It is an examination that can be performed by technicians, properly trained by an ophthalmologist, and then analyzed by a specialist doctor, as is done in the scenario in question.¹⁷

Table 3 shows the SOP directed to the Retinography examination.

Table 3 - Standard Operating Procedure representing to the inclusion of nursing in the Retinography Test.

RETINOGRAPHY		
Definition/ Material	Nursing Interventions	Especial Care
<p>It is an imaging exam that photographs the areas of the back of the eye, such as the retina, choroid, optic nerve, and blood vessels. It is performed to detect changes in the regular pattern of pigmentation and the regular path of retinal vessels.</p> <p>Material: Retinal apparatus; Computer for image processing and storage; Table adapted for handling the appliance; Tropicamide 1% eye drops.</p>	<ul style="list-style-type: none"> - Guide the patient on the exam; - Check the vital signs and capillary glycemia; - Administer a drop of tropicamide 1% about 30 to 45 minutes before the test, but this dilation (mydriasis) may take up to an hour in some cases; - Register the patient in the computer software of the exam, only when in mydriasis; - Position the patient with the chin supported on the bottom of the retinograph apparatus and the front of the head slightly tilted against the top of the retina. The height of the camera should be adjusted for each patient according to their height; - Perform the first image in the right eye, then the patient is instructed to close the eyes so that a natural mydriasis of the eyes is performed, after opening the eyes again the second image is photographed from the left eye; - Store the images in the software along with the personal information of the patients and will be available for the ophthalmologist to issue the reports. 	<ul style="list-style-type: none"> - For the administration of tropicamide 1% must have a medical prescription; - The nursing techniques responsible for the Retinography photos were previously trained by the ophthalmologist of the sector. - Every patient before taking the exam receives clarification about the accomplishment of the examination, because the nursing team is responsible for the technical procedure and the ophthalmologist physician for the issuance of the decision.

Standard Operating Procedures (Gastroenterology)

The nursing professional working in the field of gastroenterology needs to have in mind the role of food in the life of the individual, because in many situations nutrition goes beyond its role of generating health and well-being and becomes an obstacle because it is associated with signs and symptoms that make it difficult to establish a life routine.¹⁸

Accordingly, it is extremely important to perform the Hydrogen Breath Test (HBT) that the professional could distinguish the difference between food intolerance and food allergy in order to properly perform the diagnostic test. It should be understood that only food allergy is mediated by an immune response to dietary antigens, while food intolerance may be a consequence of a variety of non-immune mechanisms. Nevertheless, overlap can be observed in the presented symptoms, so obtaining an accurate history (anamnesis) is a vital component of the evaluation when adverse reactions to food are suspected.¹⁹

Food intolerances are the adverse reactions to food that are affecting millions of people of all age groups and can be diagnosed through HBT. **Table 4** shows the SOP meant to perform this diagnostic examination.¹⁸

Table 4 - Standard Operating Procedure representing to the inclusion of nursing in the Hydrogen Breath Test.

Hydrogen Breath Test (HBT)		
Definition/ Material	Nursing Interventions	Especial Care
<p>It is an examination for the diagnosis of food intolerances based on the measurement of hydrogen produced by intestinal bacteria and, after diffusion through the bloodstream, is expelled during forced expiration of the user.</p> <p>Material: Plastic cup; Filtered water; The specific substrate of the examination to be performed; Gaseous chromatograph apparatus with specificity for hydrogen detection; Mouth device; Disposable filter; Electronic apparatus for access to the HBT data recording and analysis system; Toothbrush, toothpaste, and mouthwash.</p>	<ul style="list-style-type: none"> - Check vital signs; - Measure the anthropometric data. - Check diet adherence and preparation guidelines for the HBT; - Refer the patient for supervised dental brushing and use of oral antiseptic; - Explain the whole test procedure: to introduce the patient to the test apparatus, to explain and present the filter and the way of use of the disposable mouthpiece, correct expiration at the time of the examination, duration, substrates and adverse reactions; - Present to the patient the self-registration form of signs and symptoms. It is important at this stage to ensure the assistance to patients with reading, writing and comprehension difficulties; - To heal the doubts, to calm the patient, to emphasize the necessity of the value of the first expiration measured (basal) to be inferior 20 ppm to give continuity to the test. This value reflects the fulfillment of the preparation guidelines; - Start the HBT with the first forced expiration after deep inspiration and air retention for 10-15 seconds. - Prepare the substrate to be administered (dilute in 300 mL of water) and administer it orally; - Request the forced expiration in the device, every 15 minutes, being necessary attention the client's adherence to the guidelines previously provided in the baseline measurement; - Check the vital signs again; - Provide a snack to the patient, with restriction of lactose, fiber, and fructose, for their reestablishment and minimization of discomfort. 	<ul style="list-style-type: none"> - Use of laxatives and antibiotics in the last month; if positive, to reschedule HBT, after 30 days of termination of treatment; - Telephone contact should be made between 24 and 48 hours before the scheduled date, for reinforcement of the guidelines, clarification of doubts and confirmation of the scheduling. - Suspend from the eve of the exam, the use of chewing gum, physical activity, denture fixative, smoke, alcoholic beverages, and vitamins; - The HBT preparation diet should be started 24 hours before the test, with restriction of the intake of fibers, milk and its derivatives and flatulent foods; - To perform the HBT, the patient should be fasting 8 to 12 hours before the procedure, with only water ingestion released; In diabetic patients, capillary glycemia should be checked before and after the test; - During the examination, signs, and symptoms such as: abdominal pains, sprains, borborygm, diarrhea, headache, nausea, vomiting, flatulence, and belching should be observed and appropriate action is taken when necessary; - The data obtained by performing the exam are evaluated through graphs and generate a result, which will be recorded in the field of the single print; - Have access to a unit for urgent/emergency care, due to eventualities; - Make available the contact of the unit for cases of doubts or interurrences.

CONCLUSIONS

Secondary Health Care is fundamental for the treatment of patients bearing a NCCD, but a knowledge gap was found regarding not only the nursing performance in this scenario, but also the importance of this level of care for diagnosis and follow-up of NCCDs.

Hence, this study through the elaboration and subsequent validation of the SOPs allowed not only to know the execution of the exams as well as the necessary routines and materials, but also to explore a portion of the assistance provided by nursing in this scenario.

Aiming to the effectiveness this instrument, it must be emphasized that it needs to be accompanied by the training of the team performing the diagnostic procedure, as well as its availability to the related sectors so that it is always accessible for consultation by the professionals of the unit. Nurses also have the responsibility to either update the SOP whenever there are modifications in the technique used to perform the diagnostic procedures or after 2 years of its implementation at maximum.

The study's results helped to better understand the applicability of NCS with a focus on diagnostic technologies, as well as to provide subsidies for the future implementation of NCS in the study institution.

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Received in: 09/10/2017

Required revisions: Did not have

Approved in: 17/01/2018

Published in: 10/01/2020

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Disclosure: The authors claim to have no conflict of interest.