Itinerant electrocardiogram tests done in Primary Health Care by telemedicine

Kleber Teixeira de Souza — Professor at Faculty Unidas do Norte de Minas Gerais. Montes Claros, MG – Brazil

Nayra de Oliveira Duarte — Health State Departament at Minas Gerais. Montes Claros, MG – Brazil

Tatiane Marques Dantas Silva — Academic at Faculty Unidas do Norte de Minas Gerais. Montes Claros, MG – Brazil

Abstract

This work evaluated the itinerant actions of digital electrocardiogram tests by telemedicine in primary care in the municipality of northern Minas Gerais, between the years 2013 to 2015. The methodology used was the experience report. Supported by the Municipal Secretariat of Health, the professionals of the Family Health Strategy (ESF) and academics of the courses of Nursing and biomedical engineering made available digital electrocardiogram tests for the population in its units, in partnership with the Network of Telecare of Minas Gerais (NTMG). The examinations were evaluated and performed in rural and urban communities, whose population was composed of patients who were awaiting the completion of electrocardiogram test (EKG) with report. The instruments were analyzed from the database of the Telehealth Network of Minas Gerais. We identified, with this study, the impacts and results of the availability of electrocardiogram test with report by telemedicine to patients of primary care and, furthermore, allowed the dissemination of the strategies of the use and management of a new diagnostic technology made available to users of the Unified Health System – telemedicine.

Keywords: *Telemedicine; Electrocardiography; Primary Health Care.*

Resumen

Itinerantes exámenes electrocardiográficos realizados en la Atención Primaria de Salud por telemedicina

Este trabajo evaluó las acciones itinerantes de exámenes de electrocardiograma digital por la telemedicina en la atención primaria en el condado del norte de Minas Gerais, entre los años 2013 a 2015. La metodología utilizada fue el relato de experiencia. Con el apoyo de la Secretaría Municipal de Salud, los profesionales de la Estrategia Salud de la Familia (ESF) y académicos de la enfermería y la ingeniería biomédica realizado pruebas de electrocardiografía digital de la población en sus unidades, en colaboración con la Red de Teleasistencia de Minas Gerais (RTMG) . Los exámenes fueron evaluados y se realizan en comunidades rurales y urbanas, cuya población aguardaba la realización del examen de electrocardiograma (ECG) juntamente con el informe. Los instrumentos fueron analizados a partir de la base de datos de Red de Teleasistencia de Minas Gerais. Hemos identificado con este estudio, los impactos y los resultados de la disponibilidad de electrocardiograma con informe por la telemedicina a pacientes de atención primaria y, además, permitió la difusión de las estrategias de uso y manejo de una nueva tecnología de diagnóstico disponibles para los usuarios del Sistema Único de Salud – telemedicina.

Palabras-clave: *Telemedicina; Electrocardiografía; Atención Primaria en Salud.*

Resumo

Exames eletrocardiográficos itinerantes realizados na Atenção Primária à Saúde por telemedicina

Este trabalho avaliou as ações itinerantes de exames de eletrocardiograma digital por telemedicina na atenção primária em município do norte de Minas Gerais, entre os anos de 2013 a 2015. A metodologia utilizada foi o relato de experiência. Apoiados pela Secretaria Municipal de Saúde, os profissionais da Estratégia Saúde da Família (ESF) com a participação de acadêmicos de enfermagem e engenharia biomédica disponibilizaram em suas unidades, exames de eletrocardiograma digital para a população. Os exames foram avaliados e realizados em comunidades urbanas e rurais cuja população foi composta por pacientes que aguardavam a realização do exame de eletrocardiograma (ECG) com laudo. Os instrumentos analisados foram provenientes do banco de dados da Rede de Teleassistência de Minas Gerais (RTMG). Identificaram-se, com este estudo, os impactos e resultados da disponibilização dos exames com laudo por telemedicina aos pacientes da atenção primária e, além disso, o estudo possibilitou a divulgação das estratégias do uso e gestão de uma nova tecnologia de diagnóstico disponibilizada aos usuários do Sistema Único de Saúde – a telemedicina.

Palavras-chave: *Telemedicina; Eletrocardiografia; Atenção Primária à Saúde.*

INTRODUCTION

The Telecardiology, especially the holding of electrocardiograms, allows a greater attention to cardiovascular diseases, the leading cause of death in Brazil. The EKG becomes an important method for investigation, finding and conduction of cardiovascular diseases. [1]

The Minas Telecardio project, started in 2006 in the state of Minas Gerais, available to 82 small municipalities, equipment for holding of digital electrocardiogram tests, being the tests rendered by cardiologists at the telecardiology poles in the participant universities of the project. This project provided the holding of electrocardiogram test rendered by a cardiologist at a lower cost in relation to the tradicional methods. [1]

In a study on the prevalence of normal electrocardiogram tests in primary care can be seen that most of the reports showed no abnormalities, but this percentage decreased with the increasing of age and association with comorbidities. [2,3] It was found that the EKG tests requested in primary care for investigation of chest pain did not show changes. Thus, the use of integrated telecardiology to the public health services would allow to define strategies for detection and recognition of abnormalities in EKG[2]. In addition to observing that the holding of tests in primary care identified the restrained demand and reduced the overload on secondary and tertiry health care.[3]

The integration between the family doctor and the cardiologist in the monitoring of cardiovascular diseases, have shown in studies a higher quality attendance by family doctors and criteria for referral to specialized consultation, according to therapeutic guidelines. The clinical consultancy allowed greater narrowing among professionals, identification of severe cases, case discussion, reducing of referrals and request for complementary tests, besides being a teaching tool in service.[4]

OBJECTIVES

Considering the impact of cardiovascular diseases, the difficulties in access to EKG test and the underutilization of Telemedicine resource in primary care, this study aimed to provide the population, in accessible local to their homes, EKG tests, and from that end the restrained demand and enable the diagnosis and early treatment of cardiac diseases.

METHODOLOGY

This is the experience of reporting on the use of telecardiology to perform electrocardiogram tests with report on a mobile basis in health primary care units closer to the population attended. The study population was composed of primary care patients who had medical request of electrocardiogram tests with report and had not yet performed it. For inclusion in this test, the family health professionals of the units identified all patients who were awaiting the test conduction and scheduled it on Saturday mornings at the nearest unit closer to their home, according to the scale of the performer team. The conduction of the tests in each unit was repeated until complete all the tests that were in restrained demand, to subsequently guide to another location.

The actions of itinerant tests of Electrocardiogram (EKG) by telemedicine in urban and rural areas emerged from academy partnership, the health municipal service and Nursing students and Biomedical Engineering of private colleges located in the study municipality.

The Telehealth Center of Clemente de Faria Hospital University – Unimontes, made available a software – (Version 6.2) – Review 1, with operation through the web.[4] The performer team provided volunteer labor, notebook (4GB RAM memory and 320GB hard drive), Windows 7 professional and a modem for 3G internet connection.

The use of Telecardiology for quick obtaining of EKG reports began in December 2012. The service was made possible through an agreement between the State Secretariat of Health of Minas Gerais, Telecare Network of Minas Gerais, Telehealth Center of Clemente Faria University Hospital – Unimontes and Municipal Secretariat of Health. [5]

During a visit of biomedical engineering academics at the Municipal Emergency Care Unit, they verified the nonexistence of EKG tests scheduling with report on Saturday mornings and a large number of patients waiting for the test, as well as the low turnout in the days that it was scheduled in the mentioned unit.

In view of this reality, the idea of creating a group of students for test performances in the health primary care units who possessed tests in restrained demand emerged. The team would perform the tests on Saturday mornings as a volunteer labor.

The Municipal Secretariat of Health identified the health units with restrained demand, authorized their operation on Saturday mornings and made available transport to the team that conducted the tests. The group of academics

under the supervision and in partnership with the health services installed the EKG equipment in the health primary care units. At the end of the tests the equipment was returned to the source unit.

The first action of the Nursing Group and Applied Biomedical Engineering (GEEBA) took place in November 2013. In this action, all the necessary tests were carried out to obtain evidence that the equipment would work in their typical configurations (Figure 1), even being out of the physical structure built for it in the Municipal Emergency Care Unit, and that it would work normally when delivered back to its place of origin.

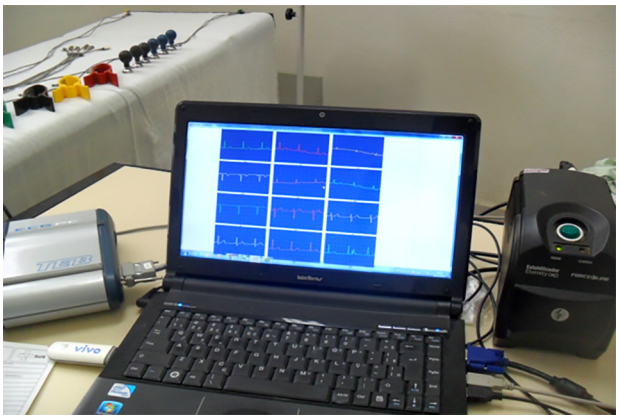

Figure 1 - Equipments used for electrocardiogram tests with report.

The date and time of the tests were informed to the patients by the community health workers (CHW). The action was held in the Health Care Unit closer to the homes of the users. On the day of the action, the vehicle of the Municipal Secretariat of Health took volunteers in their homes, carrying them to the Municipal Emergency Care Unit where its Telemedicine system was dismantled and taken to the site of action.

The telemedicine system was maintained by the biomedical engineering academics, while the nursing students performed the anamnesis that preceded the exam. As the interview and the anamnesis were performed on distinct sites, it was possible to carry out from 10 to 12 tests per hour (Figure 2 and 3).

The tests were transmitted via web for the Telehealth Network of Minas Gerais (RTMG) that issued the reports, making them available on web platform on the first business day subsequent to the completion of the action. At the end of the action, the equipments were returned to the Municipal Emergency Care Unit for their ordinary use.

Figure 2 - Mounted equipments for the conduction of EKG tests in a health unit.

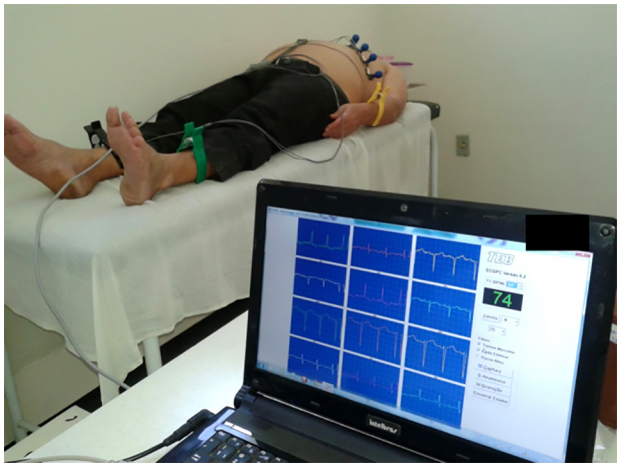

Figure 3 - Electrocardiogram test being performed on a patient.

RESULTS AND DISCUSSIONS

From November 2013 to November 2015 were held, 58 tests only on Saturdays, accounting for a total of 2,376 tests with report run (Table 1), whereas the restrained demand in the period before the start of this study was about 2,613 tests, because many patients failed to present themselves for the scheduling, even possessing a request for the test. The actions took place in health care units in urban and rural areas, and being necessary adaptations in space and structure for carrying out the tests.

The members of the Nursing and Applied Biomedical Engineering Group (GEEBA) imprinted the reports in a maximum of 48 hours and forward them to the health teams, where they were delivered to patients by community health workes.

It was found that, with this study, the equipment made available by Telecare Network of Minas Gerais can be used on a mobile basis without loss of its usual operation. None of the actions taken was delayed or canceled due to technical problems.

The integration between Primary Care and Hospitals has limitations in its communication that end up favoring the delay in diagnosis and appropriate treatment in cases of patients with cardiovascular diseases. Developments have been made in diagnosis and treatment, but the organization of the system still has substantials flaws. [6]

In the rural area there was difficulty in concentrating patients in a health care unit due to the distances to the patients' homes. The membership of the population was high, as they were attended close to their homes, on Saturdays, avoiding absenteeism at work. It was noted with relevance the reduced participation of the adult male population, requiring more researches on the accession of this population to health actions.

The data made available in this work are part of an ongoing research.

Table 1 - Number of actions and patients attended in the Family Health Strategy units for performing electrocardiogram tests in the municipality of northern Minas Gerais in the period of November 2013 to November 2015

Health Unit	Tests (N)	Tests (%)	Attendances (N)	Attendances (%)
VILAGE DO LAGO	3	5.17	76	3.20
NOVO DELFINO	1	1.72	24	1.01
VILA SÃO FRANCISCO DE ASSIS	3	5.17	67	2.82
SANTOS REIS	3	5.17	110	4.63
VILA SION	4	6.90	158	6.65
MARACANÃ	1	1.72	36	1.52
SÃO GERALDO II RURAL	2	3.45	86	3.62
VILA TELMA	6	10.34	245	10.31
MAJOR PRATES	4	6.90	215	9.05
VARGEM GRANDE	2	3.45	64	2.69
CHIQUINHO GUIMARÃES	3	5.17	138	5.81
INDEPENDÊNCIA	2	3.45	101	4.25
CANTO DO ENGENHO RURAL	1	1.72	31	1.30
JARDIM SÃO GERALDO	1	1.72	35	1.47
MORRINHOS	2	3.45	84	3.54
PLANALTO RURAL	1	1.72	35	1.47
VERA CRUZ	3	5.17	134	5.64
VILA ATLANTIDA	2	3.45	88	3.70
NOVA ESPERANÇA RURAL	3	5.17	145	6.10
PAM ALPHEU DE QUADROS	2	3.45	56	2.36
MANDAQUARIL RURAL	2	3.45	83	3.49
JARDIM PAMEIRAS	2	3.45	125	5.26
PLANALTO	1	1.72	14	0.59
ELDORADO	1	1.72	94	3.96
LOURDES	1	1.72	57	2.40
BELA PAISAGEM	1	1.72	32	1.35
CIDADE INDUSTRIAL	1	1.72	43	1.81
TOTAL	58	100.00	2376	100.00

Source: Research data.

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