

Implementation of Telehealth Program in Mato Grosso State, Brazil



<p>Maria Conceição da Encarnação Villa</p>	<p>Vice Coordinator of Telehealth Center, Mato Grosso, Brazil. University Hospital Júlio Müller/UFMT – Cuiabá, Brazil</p>
<p>Oberdan Ferreira Coutinho Lira</p>	<p>e-learning coordinator of Telehealth Center, Mato Grosso, Brazil. State Health Department – Mato Grosso – Brazil</p>
<p>Valdelírio Venites</p>	<p>Field coordinator of Telehealth Center – Mato Grosso, Brazil. State Health Department – Mato Grosso – Brazil</p>
<p>Cor Jesus Fernandes Fontes</p>	<p>Coordinator of Telehealth Center- Mato Grosso, Brazil. University Hospital Júlio Müller/UFMT – Cuiabá, Brasil.</p>

Abstract

This article aims to report the telehealth's implementation process in the state of Mato Grosso (Brazil) and how the initial difficulties have been overcome, through the articulation and integration between local educational and health institutions. The text describes how the program is structured and provides details on the activities of the Telehealth-Mato Grosso Center (Telehealth-MT), its staff and services, with emphasis on teleconsulting, remote diagnostics and tele-education. The positive results are evidenced by evaluation of the satisfaction of Primary Health Care (PHC) professionals of the included municipalities, and the membership and participation of the staff in the Center's activities. The conclusion is that in fact, Telehealth-MT was established in the year of 2015, meeting the needs of the continuing education of Mato Grosso's PHC professionals. It stands out, to this rapid success, the importance of harmonious partnership between public institutions responsible for the health service and the vocational education in the health area of Mato Grosso.

Keywords: *Telemedicine; Remote Diagnostics; Distance Learning.*

Resumen

Implantación del Programa de Telesalud en el estado de Mato Grosso, Brasil

Este artículo tiene como objetivo informar sobre el proceso de implementación de telesalud en el estado de Mato Grosso (Brasil) y la forma en que las dificultades iniciales se han superado, a través de la articulación e integración entre las instituciones educativas y el servicio de salud. El texto describe cómo el programa está estructurado y proporciona detalles sobre las actividades del Centro de Telesalud de Mato Grosso (Telesalud-MT), su personal y los servicios, con énfasis en la teleconsulta, diagnóstico remoto y tele-educación. Los resultados positivos se evidencian por la evaluación de la satisfacción de los profesionales sanitarios de Atención Primaria de Salud (APS) de los municipios incluidos y el número de miembros y la participación de los mismos en las actividades del Centro. Llegamos a la conclusión de que la Telesalud-MT efectúa, de hecho, su aplicación en el año 2015, la satisfacción de las necesidades permanentes de educación de los profesionales de Mato Grosso APS. Refleja a este rápido éxito, la importancia de la colaboración armónica entre las instituciones públicas responsables de los servicios de salud y la formación profesional en el área de salud de Mato Grosso.

Palabras-clave: *Telemedicina; Diagnóstico Remoto; Educación a distancia.*

Implantação do Programa de Telessaúde no estado do Mato Grosso, Brasil

Este artigo tem como objetivo relatar o processo de implantação do Telessaúde no estado Mato Grosso (Brasil) e a maneira como foram superadas as dificuldades iniciais, por meio da articulação e integração entre instituições de ensino e serviço de saúde. O texto descreve como o programa está estruturado e apresenta detalhes sobre as atividades do Núcleo Telessaúde de Mato Grosso (Núcleo Telessaúde-MT), sua equipe e serviços oferecidos, com ênfase para a teleconsultoria, telediagnóstico e tele-educação. Os resultados positivos são evidenciados pela avaliação de satisfação dos profissionais de saúde da Atenção Primária à Saúde (APS) dos municípios contemplados e pela adesão e participação dos mesmos nas atividades do Núcleo. Conclui-se que o Núcleo Telessaúde-MT efetivou, a sua implantação no ano de 2015, indo de encontro às necessidades de educação permanente dos profissionais de Atenção Primária à Saúde do Mato Grosso. Destaca-se, para esse rápido sucesso, a importância da parceria harmônica entre instituições públicas responsáveis pelo serviço de atenção à saúde e pelo ensino profissional na área de saúde de Mato Grosso.

Palavras-chave: Telemedicina; Telediagnóstico; Educação a distância.

INTRODUCTION

The large territory extension and the diversity of regional contexts in the state of Mato Grosso are characteristics that negatively impact on its health sector. Located in the Central West region of Brazil, the state has a land area of 903,378.292 square kilometers, an estimated population in 2015 of 3,265,486 inhabitants and low population density, with 3.61 hab / km. It consists of 141 municipalities, 47.5% of those with less than 10,000 inhabitants¹, with a clear heterogeneity among its various regions. In terms of health services, the state stands out for its South and Central North Regions, where the capital and cities with vast expansion of agribusiness are situated. In others, there are great care and educational gaps, thus enhancing the importance of telehealth.

The Brazil Telehealth Networks Program is a national action that seeks to improve the quality of care and primary health care (PHC) in the Unified Health System (UHS), integrating teaching and service through information technology tools, which offer conditions to promote tele-assistance and tele-education. It was established in 2007 by the Ministry of Health in nine Brazilian states.²

The first project for the implementation of Telehealth in Mato Grosso (Telehealth-MT) was prepared in 2009, and in December 2011, it was signed agreement between the Ministry of Health / Secretary of Labor Management and Health Education (SGTES / MS) and the State Secretariat of Health of Mato Grosso (SES-MT), for program funding. However, several operational difficulties faced by the SES-MT delayed the start of the project implementation and, therefore, the transfer of financial resources, already guaranteed by SGTES / MS, to the telehealth-MT, was also postponed.

In April 2013, a new team took over the coordination of Telehealth-MT and organized, with support from the Fed-

eral University of Mato Grosso (UFMT), the consolidation of Telehealth-MT Center. In this same year, with the support of the Ministry of Health, it was signed a term of adoption with the Telehealth Center of the Federal University of Rio Grande do Sul (UFRGS), so that it passed to offer teleconsultations to the professionals of APS from Mato Grosso State. In this way and with the coordination of the team ahead of Telehealth-MT Center, the program started its actual activities and acted, from June 2013 to January 2015, making disclosure of the activities with the managers and APS professionals from all the municipalities of the state and registered numerous primary care professionals in the Teleconsulting Platform of the Ministry of Health.

In January 2015, after joining the Júlio Müller University Hospital (HUJM) to the Brazilian Company of Hospital Services (EBSERH), a new movement is recorded in the history of Telehealth-MT. Due to the existence of a Telehealth Unit in the organizational structure of the university hospitals of EBSERH, the HUJM has incorporated the Telehealth-MT Center along with UFMT and SES-MT, and a new Technical Cooperation Agreement was signed between these three institutions. In order the Telehealth-MT could have autonomy and initiated to implement all its activities, the Telehealth-MT Center was installed on HUJM, which started offering the teleconsulting services, second formative opinion, remote diagnostics and tele-education to all state municipalities.

Once organized and running, the next step was the mobilization by the SES-MT for the transfer of financial resources approved by SGTES. The negotiated solution was the conclusion of an Agreement between SES-MT and Uniserva Foundation to support UFMT. In 2015, SES-MT only transferred the first installment of the resource, corresponding to 20% of the total amount approved, which ensured the funding of the activities developed by the pro-

gram that year. For the continuity of the works in the year 2016, it is expected that there is no delay or interruption in the process of transfer of the remaining installments of the financial resource.

METHOD

This is a descriptive study on the implementation of Telehealth-MT Center, which has taken the following steps. Initially, it rescued the structuring process of Telehealth-MT Center, through interviews with coordinating team, covering the aspects: physical structure, functioning and activities performed. The data from the teleconsultations, cover the period from January to November 2015 and were collected through the National Platform of teleconsulting that is used by Telehealth MT. The data analyzed were: number of teleconsultations made, solution of doubts, most requested themes (classified according to the International Classification of Primary Care) and satisfaction of the system users.

Next, the data relating to tele-education activities were described. The tele-education activities were analyzed in the period from March to November 2015, covering the number of professional participants and the municipalities of Mato Grosso and countries, using the Mconf software and YouTube channel, called Tele-Educa Mato Grosso. For monitoring and analyzing the video lessons views housed on YouTube channel, it was used integrated Google Analytics tracking. The data tabulation of the participants of web-conferencing and web-classes transmitted by Mconf was performed through a custom spreadsheet in MS -Office 2007, using Tableau 9.1, a tabulation software, and TabWin software for the construction of thematic maps.

RESULTS

Structuring of Telehealth – MT Center

For overcoming the difficulties of physical structure, the activities of the Telehealth-MT Center integrated to the activities of Telemedicine University Network (RUTE) in HUJM, optimizing the use of its space and existing equipments. The Telehealth Unit of HUJM, today e-Health Unit, is connected to the Teaching and Research Management of the hospital and now has, among its duties, the responsibility for integration and management of Telehealth-MT services.

A specific team of Unit, consisting of two HUJM and two SES-MT professionals, is incumbent upon the agenda and coordination of all program activities, including teleconsultations, remote diagnostics and tele-education. There is still a field coordinator connected to Telehealth-MT Center and, SES-MT server, which performs his function in the municipality of Sorriso, north of Mato Grosso state, in a physical space provided by the Municipal Secretariat of Health, which facilitates professional shifts to the state interior. With the help of two interns and employees of the Sector of Information Technology (IT) of HUJM, the e-Health Unit also assumes the coordination and organization of activities related to RUTE in the institution.

Only tele-education activities are carried out in external physical space, at SES-MT, using equipments lent by the National Program of Telehealth and the previously existing structure on-site.

The Center coordination team consists of a general coordinator doctor who is also the Teaching and Research Manager of HUJM, an assistant coordinator nurse who is also the Head of e-Health Unit, a coordinator biologist of tele-education and a field coordinator nurse. The technical team consists of a nurse, a biologist, an IT analyst and four interns, besides counting on the IT sector support of the hospital.

As there is no specific budget to keep contracted teleconsultants, the Telehealth-MT Center chose to compose the teleconsultants team with professionals belonging to HUJM and SES-MT team, whose participation was negotiated and agreed with the governance of HUJM and the administration of SES-MT, which allowed the dedication of a part of the schedule of the selected servants to respond to teleconsulting requests and also participate in tele-education activities.

Current range of Telehealth-MT

The state is divided into 16 health regions and in each region there is a regional representation of SES/MT in its reference municipality, formed by the Regional Health Offices, whose team has technicians who work as tele supporters of Telehealth-MT, mainly in the disclosure of the program and guidance on their use for health professionals from Basic Health Units (UBS) of the municipalities.

Thus, the Telehealth-MT reaches all municipalities in the state and it is allied to a growing process of computerization and internet provision in the UBS.

Services implemented by Telehealth-MT

TELECONSULTING

It was chosen to use the National Platform of Telehealth for the requests and responses to the teleconsultations in a continuous process of registration of professionals from UBS, monitoring of requests and the most requested topics, audit of responses, satisfaction assessment of applicants and with the resolution of response, assessed by the decision of not having necessity to refer the patient.

FIELD ACTIVITIES

The field activities have been the means by which the health professionals from UBS are qualified to know the Teleconsulting Platform and its functionalities and learn to use in their daily routine as a support of their professional practice. It is also made contacts with the municipal managers and coordinating team training of APS of the municipalities, with the objective that the teleconsulting request is part of the routine of the UBS, as well as the participation of tele-education activities.

TELE-EDUCATION

The continuing education³ offered by Telehealth-MT requires from professionals a critical and reflective thinking that allows the construction of collective projects and the change of practice always focused on solving problems in health services. It can collaborate in the construction of the health professional knowledge to be able to change the reality of the health system, turning it into a democratic, participatory system and promoting social equality and completeness of health care with quality, efficiency and resolution.

The Telehealth comes to attend the need to improve the service provided to the public by health professionals, based on the qualification, training and improvement of its performance. The tele-education activities offered by Telehealth-MT are composed of web-classes, web conferencing and distance learning (EaD), meeting the training needs of APS professionals, prioritizing the themes demanded by teleconsultation requests. In February 2015 the first transmission tests with *Mconf* system were carried out, starting the tele education activities with the transmission of the first APS web conferencing.

The choice of the covered themes follows the criteria: most requested themes in teleconsulting, constant priorities in the State Plan of Continuing Education and the epidemiological profile of the state. For the dissemination of video lessons, it was created a Google account and the

construction of a channel on YouTube, called Tele-Educa Mato Grosso.

For the live broadcast of web conferencing and web-classes, it is used the *Mconf* system, a web conferencing platform based on free software, with the capacity to inter-operate transparently between computers and mobile devices connected to the web. This platform is made available by the National Network of Education and Research, which provides support to the tool and the storage of recorded productions.

The web-classes are held preferably on Wednesdays and Thursdays in the period from 2 to 4pm to facilitate the participation of the UBS health teams and also to allow the dedication habit of a schedule for team qualification. The UBS professionals of the municipalities access the web-classes and conferences after the form filling available at housed link in the available agenda in the Telehealth-MT website (www.telessaude.mt.gov.br).

TELEDIAGNOSTICS

The telediagnosics has been used in different areas of medicine when the interpretation of an image, graphic or dynamic method represents a key step for the treatment definition, like in the radiology, dermatology, cardiology, ophthalmology and pulmonology. Its organization depends on the creation of a network linking the health professional of APS, a remote diagnostics center and a teleconsultant, using technological infrastructure and established protocols.⁴

The structuring of telediagnosics potentiates the Telehealth activities in that extends the support offering to the diagnostic and clinical practice at UBS. Most of the small-sized municipalities do not have services that provide the basic means of cardiologic evaluation. In many situations the patient is referred to the municipality of reference in the health area and in more complex cases, the only alternative is the referral to the capital, Cuiabá.

According to the National Registration System of Health Establishments (SCNES), from 67 (sixty seven) municipalities with less than 10,000 inhabitants, only 32 (thirty-two) municipalities have the EKG service (EKG) and of these, 15 (fifteen) are located in hospitals and emergency units and 17 (seventeen) in UBS.⁵

The EKG is a research method of the cardiovascular system established, easy to perform, low cost and great clinical utility in the detection and management of cardiovascular diseases and can be transmitted remotely via Internet.⁶

In the municipalities where there is no EKG supply, the patients are referred to another municipality, with delay of

several days for the test, costs and risks with locomotion and transport, besides the possibility of health situation worsening for the delay in appropriate care. In many situations, the patient is forced to bear the costs performing the test in private service for obtaining greater agility in his treatment.

The telediagnostic electrocardiographic service is structured in the Telehealth-MT Center with report offer of EKG via internet. It has the initial installation in 5 (five) small-sized municipalities, with expansion prediction over 20 (twenty) municipalities and uses a report management system available in technical cooperation for the Telehealth Center of the Clinics Hospital of Federal University of Minas Gerais (UFMG). It is expected that in a short time, all municipalities with less than 10,000 inhabitants, primarily, have access to the service.

The Telehealth-MT also offer the remote diagnostics in dermatology, which shows effective as dermatologic screening, resulting in less need for referral to face to face consultation, shortening the waiting time for specific treatments and reducing the social costs of patients' displacements.⁷

The remote diagnostics requests in dermatology are made by teleconsulting request, by sending pictures of dermatological lesions and a form with the patient's clinical data, and are answered by teleconsultants in dermatology. The applicants are advised to inform the patients with the Free Informed Consent Form, which is signed by him and attached in his medical record.

Products

The products shown are for the period from January to November 2015, marking the beginning of the activities of the Telehealth-MT Center and its consolidation. It is a reflection of the intense effort to overcome the difficulties and accomplish the Telehealth as a support tool to the continuing education of professionals from APS of Mato Grosso state.

According to the assessment of applicants to the teleconsultation responses, the Figure 1 shows that a rate around 79% of solving their questions, 20% of partial resolution and 1% of non-resolution of the doubt maintains. This result shows that the answers prepared by teleconsultants are meeting the information needs expressed by the professional applicants.

In assessing the applicants' satisfaction after receiving the response to the request of teleconsulting, from February to November 2015, the Figure 2 shows an increase in the percentage of very satisfied applicants.

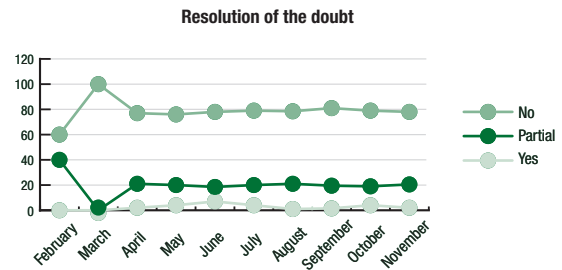


Figure 1 - Degree of resolution of the doubt – February to November, 2015.

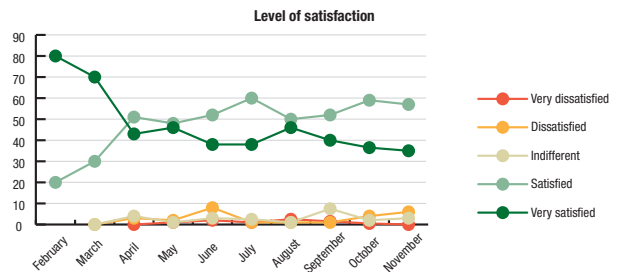


Figure 2 - Level of satisfaction with the response – February to November, 2015.

The Figure 3 shows the evolution of the number of teleconsultation requests, comparing the years 2013, 2014 and 2015 with evidence for the increase in the period from February to September 2015, in which the field activities that qualify and motivate professionals to request teleconsulting were intensified. In the months of October and November 2015, the number of requests had a significant drop, coinciding with the period in which it was not possible the continuation of the field activities, due to financial difficulties of the program.

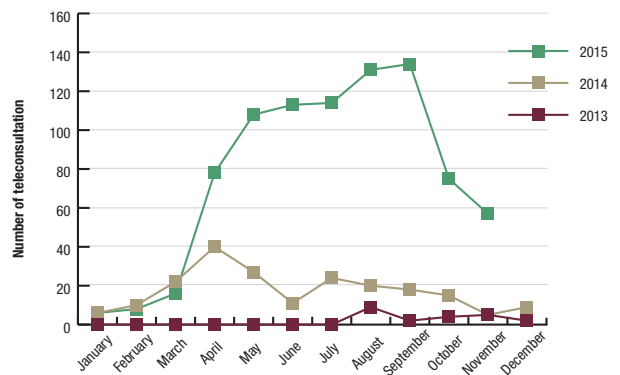


Figure 3 - Evolution of the number of teleconsultation. July, 2013 to November, 2015.

The themes most requested in the teleconsultations, classified according to the International Classification of Primary Care and shown in Table 1, were from the General

and unspecified group. In this group stand out work processes in APS, leprosy and other infectious diseases, vaccination and preventive medicine, health education, counseling and diet, and *dengue* and other viral diseases. The second group with the highest number of requests was the skin diseases, followed by digestive, pregnancy, childbirth and family planning and gynecology.

Table 1 - Percentage of request, by theme, according to the international classification of Primary Health Care. January to September, 2015

Requests of teleconsultations according to the international classification of Primary Health Care	Percentage of request
General	46%
Skin	16%
Digestive system	8%
Pregnancy, childbirth, familiar planning	8%
Gynecology	6%
Endocrinology, metabology, nutrition	5%
Psychology	4%
Orthopedics	2%
Respiratory, circulatory and neurological	5%

The questions submitted through teleconsultation requests reflect the continuing education needs of APS professionals who are in the Telehealth-MT, a channel for training and support to clinical practice.

In tele-education activities in the period from March to November 2015 were trained 4,200 (four thousand two hundred) professionals in 124 (one hundred and twenty four) municipalities which corresponded to 87.9% of 141 (one hundred and forty one) municipalities in the state of Mato Grosso.

The average number of participants in the measured months was 463 (four hundred and sixty-three) students, with a standard deviation of 184.4. The Figure 4 shows the high oscillation of the participants in May (854) and September (237), which influenced the standard deviation value, being not possible to show the trend of average participants throughout the nine months analyzed. It is likely that an analysis on a larger time scale will provide a more representative data.

Despite the large variation in the number of professional participants, the average of contemplated municipalities stood at 48 (forty-eight) with a standard deviation of 9.5 municipalities.

The Figure 5 shows the map of participants' coverage per municipality of Mato Grosso state in web-classes transmissions and web conferencing in the nine-month period, especially municipalities of the South and North Central Region.

Participants in distance learning activities March - November, 2015

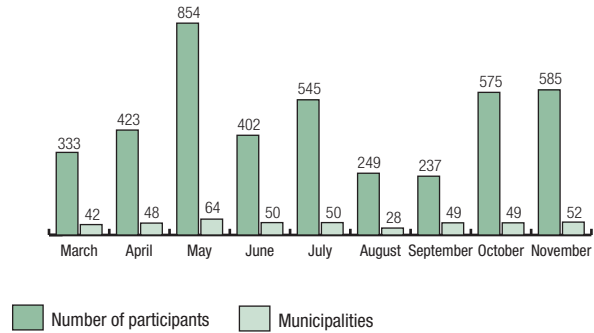


Figure 4 - Participants in distance learning activities. March – November, 2015.

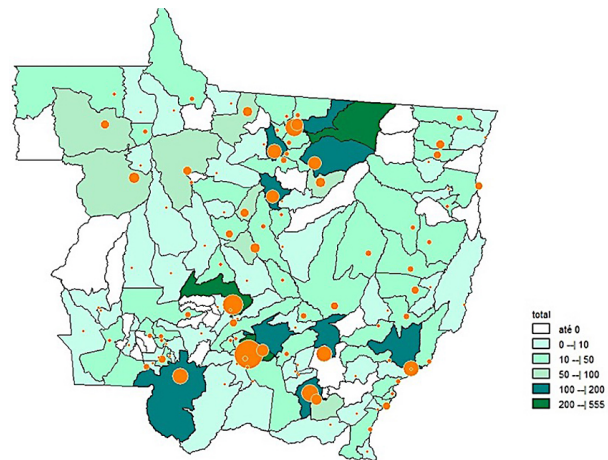


Figure 5 - Geographical distribution of the participants of the distance learning activities- March – November, 2015.

The Figure 6 shows the total number of participants per professional category in the period from June to November 2015, especially for nurses, followed by other higher education professionals, community health agents, nursing technicians, endemics agents, other mid-level professionals, administrator and doctors.

The profile views of video lessons produced by Tele-Educa Mato Grosso and housed on streaming YouTube channel, accounts for the period from 2 October 2014 to 31 November 2015, the number of 47,479 gross views. The average length of views was 9 hours and 57 minutes and the total playing time was 446 minutes, pointing to the need to reduce the video lessons time to ensure a greater adherence of the professionals.

The access to the video lessons is worldwide in scope by Tele-Educa Mato Grosso channel, which was seen in 92 countries, with an emphasis on Brazil, Bolivia, Portugal, the United States, Mexico, Angola and Colombia, responsible for the bulk of views.

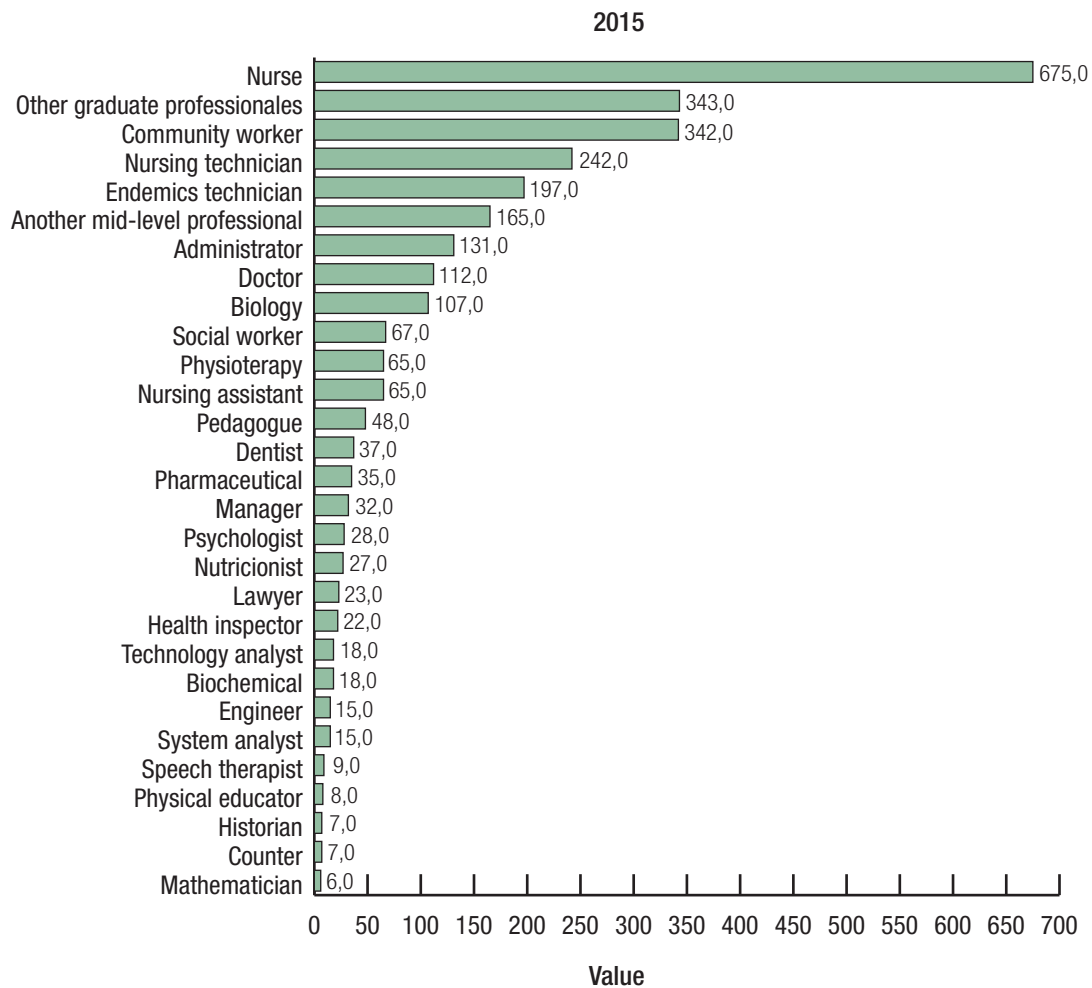


Figure 6 - Professional category of the participants of the distance learning activities. June to November, 2015.

The themes of the web conferencing web-classes in which there was greater participation of professionals with over 100 participants were: Control diagram for *dengue* control, followed by responsible parenthood, fall in elderly people, smoking prevention in the APS, maternal breast-feeding, human health in the APS, health policies and viral isolation for *dengue*.

CONCLUSION

The results already achieved in a short time show that the initial objectives of Telehealth-MT were fully met and with satisfactory level of quality. However, much more that can be done to consolidate the program, for example, expand the team and structure of the Center, ensure its financial sustainability, increase the membership of APS professionals in the use of services provided, combining the request

for teleconsultations to the regulatory processes and expand the supply of remote diagnostics and tele-education.

It stands out in this way already taken, the importance of integration among SES-MT, the HUJM and UFMT, without which would not have been possible to overcome the existing conjunctural obstacles since the preparation of the initial project until the effective functioning of Telehealth in Mato Grosso state.

ACKNOWLEDGEMENTS

We thank the institutions that make up the Telehealth-MT: Federal University of Mato Grosso, State Secretariat of Health of Mato Grosso, Júlio Müller University Hospital and Brazilian Company of Hospital Services. We also thank the institutions that have been very important in this trajectory: the Ministry of Health, the Telehealth Center of UFRGS, the Telehealth Center of UFMG and the National Network of Teaching and Research.

REFERENCES

1. Instituto Brasileiro de Geografia e Estatística – IBGE. Estimativas de população para 1º de julho de 2015. [Citado 2015 dez. 05]. Disponível em: http://www.ibge.gov.br/home/estatistica/populacao/estimativa2015/estimativa_tcu.shtm.
2. Medeiros A, Gomes B, Valentim R, Guedes T, organizadores. A telessaúde no Brasil e a inovação tecnológica na atenção primária. Natal: EDUFRN; 2015.
3. Olivi M. Tecnologias da informação e comunicação na saúde – Telessaúde: um estudo de caso [tese]. Cuiabá: Universidade Federal de Mato Grosso. Instituto de Educação. Programa de Pós-Graduação em Educação; 2014.
4. Brasil. Ministério da Saúde. Manual de Telessaúde para Atenção Básica - Atenção Primária à Saúde. Porto Alegre: Universidade Federal do Rio Grande do Sul; 2012.
5. Brasil. Ministério da Saúde. Datasus. Cadastro Nacional de Estabelecimentos de Saúde. [Citado 2015 dez. 06]. Disponível em: <http://cnes.datasus.gov.br/>.
6. Andrade MV, Maia AC, Cardoso CS, Alkmim MB, Ribeiro ALP. Custo-benefício do serviço de telecardiologia no Estado de Minas Gerais: Projeto Minas Telecardio. *Arq Bras Cardiol.* 2011; 97(4): 307-16.
7. Miot HA, Paixão MP, Wen CL. Teledermatologia: passado, presente e futuro. *An Bras Dermatol.* 2005; 80(5): 523-32.