



ORIGINAL ARTICLE

Assessment of Human Resources in Medical Laboratory Sciences In Timor-Leste

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Abstract

The shortage of qualified human resources at the medical laboratory level remains a major challenge in Timor-Leste. High maternal and child mortality rates are related to the lack of highly qualified human resources. This study aims to identify some structural problems of medical laboratory human resources in health facilities in Timor-Leste. This study was conducted in Covalima, Ermera, and Viqueque municipalities in Timor-Leste. Three municipal health authorities were selected for interviews. The 35 respondents are directors, heads of community health centers, medical laboratory technicians, and patients who visited the health centers. It was found that there is a lack of human resources in health facilities to serve the community throughout the country. Each health facility (Community Health Centers with and without beds) has one medical laboratory technician with a grade of diploma one and some laboratory analysts with a grade of diploma three in medical laboratory. However, these medical laboratory technicians have been working for more than 10 years without any possibility to progress in their studies, acquire new knowledge and skills, and apply for other positions.

Keywords:

- Health Human Resources in Timor-Leste
- Medical Laboratory Technician
- Health Facilities in Timor-Leste
- Community Health Centers

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Introduction

Timor-Leste is a Southeast Asian nation occupying the eastern half of the island of Timor with a population of 1,341,926 in 2022 (Timor-Leste Population [TLP], 2022). The country is comprised of 13 municipalities, 65 administrative posts, 442 villages, and 2,225 hamlets. About 70 per cent of the population are rural residents with most people living in small and scattered villages that are isolated by mountainous terrain and poor roads. There are several distinct language groups and dialects in Timor-Leste, with the local languages Tetum and Bahasa Indonesia accounting for around 80 per cent of the population (World Bank [WB], 2022).

Timor-Leste has one of the youngest populations in the Asia and Pacific regions, with a median age of 20 years. The majority of people are below the age of 35 years, which accounts for 74 per cent of the total population; and nearly 40 per cent are children under the age of 15 (Asia Development Bank [ADB], 2021). According to the latest data, 41.8 per cent of the population lived below the national poverty line in 2014, and 63.4 per cent of the population had access to electricity in 2016.

The municipality of Covalima is located in southern Timor-Leste with a width of 1.203 km² and 65.301 inhabitants. This municipality has oil and other natural resources. Meanwhile, it has an international airport and a road connection from the southern part, which is connected to the municipality of Viqueque. The municipality of Viqueque is located east of Dili and hosts the second-largest area with 1,877 km² and 76,033 inhabitants in Timor-Leste. This municipality has several known natural resources, such as gas, oil, and minerals such as gold, silver, coal and copper. Ermera municipality is located west of Dili, with 768 km² and 125,702 inhabitants. This municipality is known for the quality of the local coffee product and other natural resources of Timor-Leste (Population of Timor-Leste [TLP], 2021, Monteiro da C, F and Pinto da C, V, 2003, p.6)



Figure 1: Map of Timor-Leste (Source Wikipedia)

The people of Timor-Leste have a constitutional right to health, medical care, and a healthy environment according to article 57 of the Constitution (RDTL Constitution [C-RDTL], 2022). The health system of Timor-Leste has a network of 71 Community Health Centers (CHC), around 440 village health posts, 5 referral hospitals, and one (1) national hospital. Most health facilities are in collaborate with various health workers such as doctors, nurses, midwives, and

health professionals, including medical laboratory technicians (National Health Strategic Plan II [NHSP II], 2011, p.135-136).

In 2017, number of health workers in Timor-Leste was about 4. 898 people, working for the Ministry of Health of Timor-Leste (Bertone MP et al, 2018, p. 9). The number of health workers may have increased due to the existence of the 2019 Coronavirus disease (COVID-19); due to the epidemiological outbreak, more health workers were needed and hired to ensure the quality of the health service.

Health facilities in Timor-Leste are equipped with basic laboratory diagnostics, especially in Community Health Centers (CHCs) without beds. However, in the CHCs with beds, the national and referral hospitals, the government placed several pieces of equipment to perform urgent laboratory services, such as cell-dyne and vitros machines to detect complete blood count and blood chemistry analysis. These machines are operated by overseas medical laboratory science graduates from Thailand, Cuba, and Indonesia, among others. Some medical laboratory graduates from the Timor-Leste government since the independence era are also able to operate the said machines.

The National Health Laboratory plays an important role in supervising all the laboratories in the country, including the laboratory at the National Hospital, the laboratories at referral hospitals, the laboratory at bedded CHCs, and the laboratory at non-bedded CHCs (National Health Laboratory Decree of Law [NHL-DL], article 3 No.2). On the other hand, senior medical laboratory technicians are also doing supervision and monitoring to all health facilities in administrative posts, including private clinics which have basic laboratory examinations (Aghaji, A, et al, 2021, p.5). Therefore, the basic quality service of the laboratory at the municipality level is more reliable to do the treatment.

Human resources in the medical laboratory are an important aspect of the healthcare sector worldwide, and also remain a major problem affecting the quality of care in the healthcare sector worldwide. In more advanced countries, the medical laboratory professional plays an important role in both medical diagnosis and treatment; medical laboratories are available with well-trained graduates from accredited universities (Okech, M, et al., 2021, p.42). However, in poorer countries, there is a shortage of human resource graduates from accredited universities, that is, well-trained human resources with undisputed quality. Therefore, good quality in a medical laboratory is extremely necessary not only in the capitals of developing countries but especially in remote and rural areas of these countries (Dal poz, R, M, 2015, p.8).

The human resources working in the medical laboratory have different functions such as medical laboratory technician, medical laboratory technologist, and medical laboratory scientist (Laboratory Scientist Position [PLS], 2021, p.76). However, Timor-Leste still does not have a sufficient number of medical laboratories at all level that mentioned above. Therefore, the Timor-Leste Institute of Health Sciences (ICS in Portuguese), a private

university, took the initiative to contribute human resources in biomedical laboratory sciences to the country.

The Objective of the STUDY

To establish an assessment of human resources in the health sector, especially in the medical laboratory profession, the researchers conducted a set of interviews with people occupying different functions in the medical laboratory in three different municipalities: Covalima, Ermera, and Viqueque. The interviews were conducted with the head of the community health centers, the director of the health services, several medical laboratory professionals, and patients who were at the time in the practice and the health centers while the research was taking place. The research was focused on human resource planning in the health sector, especially in the medical laboratory profession. This assessment was carried out to know the current status of the medical laboratory professional in the health sector in Timor-Leste in general, as well as the workload in the health centers, and to collect the patients' observations of the daily activity of the health care provided, especially the medical laboratory activities. This study aims to identify the main problems of medical laboratory professionals currently working in health facilities in the country, in the selected municipalities in Timor-Leste.

Material and Methods

A qualitative research strategy was chosen since it was important for this study to collect all possible information through health professionals. As for the type of research (Research Design), preference was given to bibliographic research and case study. Interviews and observation were used as data collection instruments. The study had been conducted in July 2020. 35 respondents participated in the study including municipal directors, community health center (CHC) heads, laboratory technicians, and patients who visited in CHCs.

The research techniques favored for this study were researcher participation in the research; about interviews, about interview, although a pre-structured script was favored, a semi-structured was chosen to obtain as much information as possible.

Questionnaires in interview form were used for data collection. All the data was collected and analyzed. In this research, the data of this study is explained descriptively.

Results

In Timor-Leste, all respondents argued that human resources in the medical laboratory at the municipal level are very limited. Each community health center has only one medical laboratory technician and one graduate available in the laboratory from 2007 to 2020; all workers have been working for more than 10-15 years, without any career progression or the possibility to continue their studies. Most medical laboratory workers are seen to perform well in the services they provide to the community. These health workers have also developed their skills and knowledge through training in laboratory diagnosis and medical laboratory practice. The municipality had a strategic plan to provide for these professionals to continue studying for degrees, but taking into consideration the allocated budget, this has not yet been possible as shown in table one.

Municipal directors argued that all medical laboratory staff has been working for the Ministry of Health for 10 to 15 years. All health staff work by laboratory section, in urine analysis, malaria detection, tuberculosis (TB), hemoglobin test, pregnancy test, HIV/AIDS test, and hepatitis test. For malaria, blood and urine testing is used the microscopic test. However, rapid diagnostic tests (RDT) for HIV and hepatitis are required. In addition, urine also requires a dipstick test to identify color, pH, glucose, etc. Many laboratory diagnostic parameters need to be tested at health facilities. The same activity was also conducted at the mobile clinic and Integrated Community Health Services. These activities are conducted once a month for the communities living in the periphery.

On the other hand, medical laboratory technicians stated that although they have been working for more than 12 years, decision-makers still do not consider them a priority to pursue their studies in higher education. In this case, medical laboratory technicians need to continue studying to increase their level of education from Diploma One (Vocational Technical Course) to Diploma Three (Bachelor) in medical laboratory science. Most of the respondents' answers are found in Table 2.

The medical laboratory technicians currently working at the CHC level hoped that they would be able to continue their studies to obtain diploma three in a medical laboratory. They also argued that they have been serving the community for more than 12 years, but the government, through its decision-makers, is not serious about recruiting new staff for skill enhancement. Laboratory technicians generally feel that they need to acquire more skills in advanced or modern medical laboratory diagnosis instead of working daily with basic tests that are available at the CHCs. In summary, there is a need for a professional development program for health professionals at the medical laboratory level, and there is an urgent need to hire more medical laboratory professionals because the current human resources cannot meet the strong daily demand from patients and the request from doctors.

In Covalima Municipality, two CHCs (Tilomar and Maucatar) do not have medical laboratory technicians. However, other CHCs like Zumalai, Fatululik, Fatumea have medical laboratory technicians to serve patients. In Viqueque and Ermera municipalities, most CHC cadres have a medical laboratory technician who has a higher diploma in the clinical laboratory.

Patients who participated in the research also stated that they need more laboratory technicians to be placed in health posts to serve the community in the villages and sub-villages. Patients from Covalima Viqueque and Ermera municipalities argued that the villages and sub-villages need more medical laboratory technicians to serve the community because the distance from each village is about 5 - 15 kilometers for the community to access laboratory services. Geographically, the community cannot access public transport and has to walk about 2 - 5 hours to reach the health centers. For more information, Table 3 can be consulted.

Patients who visited the health facilities stated that the workload of the medical laboratory professional is so high that it becomes ineffective in serving the community. All agreed that a shortage of professional workers prevails. Therefore, patients who agreed to be interviewed recommended recruiting more health personnel, especially medical laboratory professionals, if possible. On the other hand, patients also suggested that if possible, medical laboratory

professionals should be hired in health posts to serve the community because the distance from each village is about 10 to 20 kilometers for the community to access medical laboratory services. Patients interviewed also stated that they need more laboratory professionals at health posts to serve the community in the villages and sub-villages. Patients from Covalima, Viqueque, and Ermera municipalities stated that the villages and sub-villages need more laboratory technicians to serve the community.

Discussion

Human resources are an important element in the medical sector, especially in the medical laboratory. The constraints are many and varied, but there is essentially a lack of qualified graduates from well-accredited academic institutions. The heavy workload in health centres with very limited human resources is another sensitive issue at this time in Timor-Leste. Medical laboratory assistants also need to continue their studies to increase literacy levels in this area, to move from medical health analysts and medical laboratory assistants to laboratory technologists and scientists. Although the efforts of the Timor-Leste Ministry of Health in this area are acknowledged, it is understood that, in the light of these interviews, the medical laboratory centres need to carry out a program to upgrade their staff, which presupposes a plan for technical professional training and lifelong learning, and to hire new staff so that they can speed up the provision of health services to the community, particularly the municipalities in question in this study, the corresponding villages and sub-villages.

Limitation of Medical Laboratory Technicians at the CHC level

According to the respondents of this study, three health directors, six heads of health centers, and nine medical laboratory workers indicated that the shortage of human resources, especially medical laboratory workers, has been dramatically affecting the processes of medical analysis and treatment of patients. All requests for tests have to be confirmed with a laboratory test. However, there is a shortage of human resources in medical laboratories. Therefore, it is necessary to recruit more medical laboratory professionals to be placed in health centers, with special urgency in the health center of Tilomar, Covalima municipality, which has no health professional, not to mention the whole country which has no laboratory analyst.

The Workload of Medical Laboratory Technicians at CHCs

Most medical laboratory workers are grade one (1) from secondary (vocational) medical laboratory school. Many tests are requested from the laboratory, such as malaria tests, tuberculosis tests, urine tests, and basic haematological diagnosis, among many others. Thus, all tests are not diagnosed in one day, it takes two days or more to get a diagnosis. Patients are usually referred to go to health centres to obtain laboratory diagnosis the next day.

Need for a Lifelong Learning Programme

Based on the results obtained from the interviews conducted with medical laboratory workers and management teams, it can be firmly indicated that investing in education is the most important thing in the future. To obtain the diploma three (3) degree in a medical laboratory, a programme aimed at increasing the knowledge, skills and experience in this scientific field is necessary. On one hand, it is

necessary to have a university course that guarantees the training of health professionals with quality; on the other hand, it is not enough just to provide a course in the area, quality must be recognized at an international level. In this sense, it is necessary to invest in training and improve the teaching and learning processes in this area. Therefore, increasing the number of medical laboratory professionals will automatically meet the demand for professionals in this area, solving all the difficulties faced by health centers, as well as the level of quality of health posts.

Conclusion

Human resources are an essential factor in any professional field, but they are vital in the medical health field. Through this study, it was possible to determine that the number of medical laboratories and qualified human resources determines the effectiveness of laboratory diagnosis. It is possible to indicate four factors that need to be improved at the level of medical laboratory centers in Timor-Leste: the reduced number of staff, the excessive workload of laboratory professionals, the need for lifelong learning and the integration of new qualified and highly qualified staff into the national medical laboratories. Based on the data found, firstly, it is concluded that the reduced number of medical laboratory workers, especially in the municipalities that were the objective of this study, has drastically affected the effectiveness and efficiency of the laboratory service in the health centers. In some cases, there are no specialists in the medical laboratory area in Timor-Leste.

Secondly, the workload of health professionals in health centers, including the health post and mobile clinic, is excessive and as such has compromised the efficiency and effectiveness of laboratory diagnosis. Therefore, in some health centers, it takes several days to perform a diagnostic test and also to prepare a report. This has compromised the efficiency of diagnoses and the speed required to proceed with the various, sometimes extremely urgent, medical treatments which are put on hold.

Thirdly, all the respondents expressed that there is a need to increase the level of literacy at the medical laboratory level (technical, continuing and lifelong learning) to improve their knowledge, skills and competencies of the professional in the various functions they perform in the medical laboratory. The various professionals have never had the training to deepen their knowledge in a time frame of 15 to 10 years, an unsustainable situation. In the same way, it is necessary to develop a lifelong learning program for those professionals who meet the desired profile for higher education, going from a 1st-degree graduate (professional technical course) to a 3rd-degree graduate (bachelor) or graduate.

Finally, the fourth point is umbilically linked to the previous point, and generally meets all the other previous points: not only is it necessary to train more health professionals in the various areas of medical laboratory analysis, but it is also necessary to proceed with a policy of hiring qualified and highly qualified professionals to meet the demand of the various patients who come to the various health centers in the country.

The hiring of more health professionals would not only fill a serious gap that exists throughout the country, which is, precisely, the lack of health professionals in medical laboratories, but would also enable the creation of a framework for training and empowerment of the various health professionals who for 15 years have not yet had

the opportunity to increase their knowledge in this very problematic area and, above all, to update their techniques and skills in an area that undergoes scientific and technological transformations innovations every day.

Annexes

Table 1: Answers from the Municipal Directors

No	Questions	Answers
1	How many medical laboratory professional workers are in each health center in your municipality?	All CHCs have a medical laboratory technician except the CHC with beds, which has 3 laboratory technicians.
2	What is the education level of medical laboratory professionals?	Most of them are holders of degree 1 diplomas in laboratory analysis. However, 2 to 3 professionals have completed their studies in Indonesia with a degree 3 (bachelor) diploma.
3	How is the service of medical laboratory professionals?	So far, the results have been reliable with basic laboratory diagnoses such as malaria, tuberculosis, etc.
4	Is there a specific strategic plan to increase the level of education?	We have a strategic plan that foresees lifelong learning, but the limit of the budget allocated to medical education has not allowed the realisation of the EP in that aspect.
5	We have a plan but the budget has been very limited.	We have a plan but the budget has been very limited.

Most of the municipal directors responded that the majority of medical laboratory professionals currently working in the Community Health Centres (CHC) at the municipal level have a grade one (1) diploma in a medical laboratory. They have been employed by the Ministry of Health of Timor-Leste since 2007.

Table 2: Responses from Medical Laboratory Technicians Currently working in health Facilities

No	Questions	Answers
1	How many medical laboratory professionals work in this health centre?	1 Laboratory analyst with degree 1.
2	What is the workload like in this health centre?	Heavy, with many diagnostic lab parameters and not enough staff.
3	Do you need more medical laboratory technicians?	Yes, of course. Absolutely.
4	How many years have you been working for this health centre?	More than 10 years
5	Do you want to continue studying?	Yes, sure.

The same point that was made by the municipal directors is also stated by the medical laboratory technicians. Most of them hold a grade one (1) diploma in a medical laboratory. They have been in

the service of the Ministry of Health since 2007. They need to continue studying to increase their knowledge in this area and acquire more skills.

Table 3: Random Patients who Participated in the Research

No	Questions	Answers
1	How are the health centre services to the community?	Most health professionals are good. The services are good.
2	How is the performance of the medical laboratory technicians?	Good.
3	Do you think that the Human Resources that you have available are sufficient?	We need more medical professionals because the results of the laboratory analysis always take 1 to 3 days.
4	How is the daily performance of the medical laboratory service?	Good
5	What is the attitude of the medical laboratory professional in treating the patient?	Good

Most of the health professionals are doing a good job in the health facilities analysed. However, in the laboratory section, test results are almost always delayed due to the limited number of medical laboratory professionals. We need more medical professionals because laboratory test results always take 1-3 days. It is strongly recommended that the government recruit more health workers, especially medical laboratory technicians and that it invests in a programme of valorization and training of the health professionals it has available in the various health centers to continue to acquire more skills and knowledge in this very delicate area.

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Conflict of Interest: None

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He is a young scientist in medical laboratory. He has contributed various research and publication in biomedical science. Currently, he is working as head of department (equivalent national director) of exacts and natural science, National Institute for science and technology, Timor-Leste. He also a full-time lecturer at department of Biomedical Laboratory Science, Dili Health Science Institute, Timor-Leste. Meanwhile, he is working as principal investigator in a collaborative study between Menzies School of Health Research in Timor-Leste, Ministry of Health and Dili Health Science Institute with project entitled” The Use of Highly Sensitive Diagnostic and Typing/Sequencing Technology in the Pursuit of Malaria Elimination in Timor Leste”.

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