



Evaluation of the Degree of Knowledge About Quervain's Tenosynovitis and its Labor Influence in Dental Students Who Perform Internships at the Dental Care Unit of the Regional Autonomous University of Los Andes, Ecuador

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| Article History | Abstract |
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| Received: 06 June 2023 Revised: 05 Sept 2023 Accepted: 11 Sept 2023 | <p><i>Musculoskeletal diseases have experienced a progressive increase in recent years due to excessive workload, which has generated a series of health problems that have become one of the main causes of absenteeism and decreased productivity. Repetitive occupational trauma of the hand, in particular dorsal flexion of the wrist has been identified as one of the main reasons underlying these conditions. In order to assess the level of preventive knowledge about musculoskeletal diseases related to cumulative trauma, a study was conducted with tenth semester students of UNIANDES. An evaluation format was designed to measure variables such as pain, sensitivity and functional assessment. The objective was to provide students with the necessary knowledge about this syndrome, the probability of developing such pathology and preventive methods to counteract it in the future. Data collection made it possible to identify the factors that influence quality care and how they affect long-term job performance. For this purpose, a 12-item structured questionnaire was developed to assess the level of knowledge about Quervain's Tenosynovitis.</i></p> |
| CC License CC-BY-NC-SA 4.0 | Keywords: <i>Timely prevention, Musculoskeletal diseases, Occupational trauma</i> |

1. Introduction

The profession of Dentistry or stomatology, has the peculiarity of being a discipline of knowledge put at the service of the population that requires attention in the care of their oral health, a condition that requires extensive theoretical knowledge, development of skills and manual skills to be applied in practice with interventions that demand movements and ergonomic positions to prevent the operator from suffering conditions that in the long term, It can result in conditions that require the interruption of the practice of the profession due to injuries caused by bad positions that may cause temporary or definitive disqualification of the professional, depending on the damage suffered.

It can be considered that the development of interventions in dentistry, is a manual work and, as such, is exposed to present various pathologies that occur in the development of the maneuvers of dental care, which suggests that a significant importance should be assigned to the proper ergonomic application of the maneuvers and the appropriate instruments for the adequate and efficient performance of the intervention of the professional because the well-being of the staff, guarantees

that it minimizes the risks inherent to Dentistry, keeping manual skills and abilities in optimal condition.

There is also a relationship of the person with the work environment: this environment will modify their behavior and customs, by acquiring bad habits in the dental work that is characterized, among its many peculiarities to be developed in a reduced work area, complex and difficult to access, which becomes a real precision work that requires techniques with high concentration capacity and constant attention focus to avoid the manifestation of a pathology.

The topics of occupational risk prevention receive special attention for the understanding of professionals when starting the activities trying to make a genuine prevention, avoiding repetitive movements devoid of logical sense and the incorrect use of static or dynamic instruments, therefore the sampling population focuses on 43 tenth semester students of UNIANDES covering a multidisciplinary topic that not only covers biological knowledge but also also a biomechanical knowledge

Among the pathologies of the dental profession are those that manifest as: Pathologies due to physical overload, at the level of the hand: carpal tunnel syndrome, trigger finger, Quervain's tendinitis, etc., our work will be responsible for analyzing Quervain's syndrome. 1

The most notable physical examination of the upper limb lies in the hand from which come the appearance of a wide variety of pathological states over time, a repetitive activity originates different dysfunctions such as diminishing or annulling its mobility, its examination process lies in its shape, size, position, movements of force and sensitivity. 2

The hand, being a tool with a mechanical and at the same time sensitive functionality, allows said limb to perform in the various positions of the space of its distal portion, structures such as the wrist, metacarpal and fingers originate.

Two positions of the fingers are mentioned, one in anatomical form in which they are extended and adducted while in the normal resting position it forms an arch due to the flexion that originates, the fingers present dynamic production movements by a repeated mobility are abduction and adduction which are defined with respect to the longitudinal axis of the index fingers, Middle, ring and menique acting as a unit unlike the longitudinal axis of the thumb is rotated at 90 ° presenting movements perpendicular.

De Quervain's syndrome presents as an inflammatory disorder involving involvement of the short extensor, the adductor longus tendon and the sheath comprising both tendons of the thumb to the consultation patients report intense pain gradually or suddenly in the base ² wrist radiating towards the thumb and forearm that prevent normal abduction movements, flexion and extension the most frequent cause of its origin the overuse of this joint 3

Tenosynovitis described in 1895 by Fritz De Quervain (Swiss surgeon) describes it as an inflammation of tendons at the base of the thumb altering the movements of the thumb up and down to produce a cyst of synovial fluid causing the appearance of a snap when performing the different movements factors such as counterresistance, Bad positions and repetitive movements usually affect the area mentioned to the upper extremity. The etiology of origin comes from inflammatory degenerative diseases, clinically recognized as fluid that surrounds the tendons below the sheath the trauma produced by repetition the irritation of the nerve produces paresthesia in the dorsal area of the thumb extending to the index finger. 4

The most affected area is the first dorsal compartment of the short extensor of the thumb and the abductor longus of the thumb by means of anatomical studies demonstrated a large number of individuals presents the characteristic sectioned dorsal compartment that explains a greater tendency to produce Quervain's tendinopathy when performing an activity that requires abduction and repetitive extension. 5

De Quervain's disease is the result of intrinsic degenerative mechanisms complementing with extrinsic inflammatory mechanisms being the result in changes of synovial lining between the tendons and the retinaculum clinically it is associated with systemic diseases such as rheumatoid arthritis and

gout some doctors refer to Quervain's syndrome when relating it to tenosynovitis is known as stenosing tenosynovitis which is the pathological process of Quervain's tenosynovitis being the primary change thickening of the extensor retinaculum of the first dorsal compartment. The history of trauma added to dentistry is based on unaccustomed repetitive efforts such as firm grip and hand movements in a radial direction and by increased tensile load presented a gradual onset 6

The average age of onset between the fifth and sixth decade appearing six times more in women one of the maneuvers that helps them differentiate them from osteoarthritis of the metacarpal joint is known as Finkelstein's maneuver is the diagnostic sign 7

The symptomatology of Quervain is located on the radial side of the wrist the Finkelstein test itself to determine a specific sensitivity referred and this area occasionally by exploratory physical examination will eventually find the presence of a node in the first compartment presenting anatomical importance since each of the tendons must be identified and released by various treatments. 8

2. Materials And Methods

The research was carried out to the students of tenth semester of the Uniandes, located in the province of Tungurahua (road to Baños km 5 1/2) of the canton Ambato, For the collection of information was taken into account a population of 43 students of tenth semester who study the career of dentistry of the UNIANDES legally enrolled.

The prevalence study based on inappropriate postures and body attitudes that affect propensities such as sedentary lifestyle and fatigue in this case recommends measures to maintain the quality of life and ensure the quality of patient treatment, population sampling performed on subjects who perform manual work generating a large amount of superfluous effort associated with repetitive displacement activities causing unproductive movements, An important aspect of the professional's cognitive manual skills is based on the psychomotor capacity of the advisable maneuvers and maneuvers that should not be executed from a health perspective.

For data collection, a survey format was developed that structures 12 items by an epistemological evaluation quantifying the level of knowledge about Quervain's tenosynovitis its predominant symptomatology that in the long term will cause functional disability in the affected anatomical area, it is worth noting the tension exerted on the instruments in which untrained people tend to suffer two defects when using the instrument away from the active part and manage it without adequate support.

In the context of this study, clinical features that are important for an in-depth understanding of the phenomenon of pain were explored. As a central variable of research, pain was meticulously examined, considering both its intensity and its chronicity.

To assess pain intensity, the renowned Visual Analogue Verbal Pain Scale was used, a validated method widely used in the scientific literature. This scale provides a graphical representation where participants indicate their level of pain in a continuous line, using verbal terms to describe their perception, ranging from "no pain" to "excruciating pain." This approach allows quantitative data to be obtained that facilitates comparison and statistical analysis.

In addition, the chronicity of pain was taken into account, an essential dimension to understand its impact on the health and well-being of individuals. The pain was classified into categories of mild, moderate or severe based on its topography, that is, whether it was located in a specific region of the body or radiated to other areas. This distinction is relevant, as radiating pain can involve greater complexity in terms of diagnosis and treatment.

The participating students make up a population of exclusion due to the short period of time of work in the clinic, the collection of information was based on the care they provided to each patient and the activity they carried out in each area.

3. Results and Discussion

Analysis of the Survey on Quervain's Tenosynovitis Syndrome and Its Impact on The Work Area Applied in The Dental Care Unit "UNIANDES"

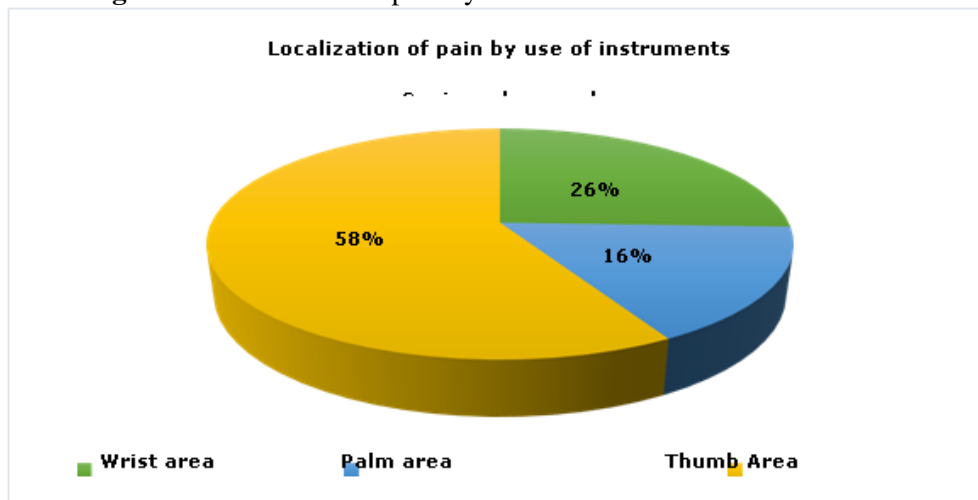
Based on the application of a survey format applied to 43 tenth semester students of the "UNIANDES", the analysis of the information obtained in a descriptive way was initiated in order to know the degree of knowledge of Quervain's Tenosynovitis and its impact on the labour area, obtaining the following results:

Discomfort or Pain During the Use of Sonic and Manual Instruments

The use of force is a quantifiable risk factor, which means the greater the force applied in each repetition, the greater the likelihood of task-related damage.

The total population surveyed (100%) reported that they have felt some kind of discomfort or pain in their hand during the use of sonics and manuals for long periods of time. The results obtained in Graph 1 show that in 58% of students the pain is located in the thumb area, followed by 26% in the wrist area and 16% in the palm area of the hand.

Figure 1. Localization of pain by use of sonic and manual instruments



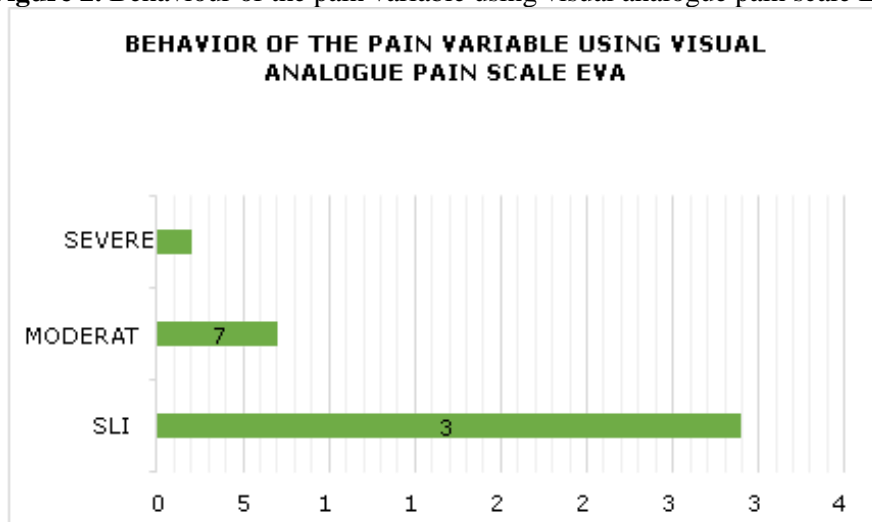
Source: Survey of tenth semester students of UNIANDES

Behaviour of the Pain Variable Using Visual Analogue Pain Scale Eva

A VAS psychometric response scale was used, classifying it into three levels from 1-3 mild, 4-7 moderate, 8-10 severe.

In graph 2. The intensity with which students suffer pain or discomfort in the hand during manipulations manual and sonic instruments is identified 79% (34 students) state that they feel a mild intensity, 16% (7 students) moderate and 5% (2 students) reported severe damage.

Figure 2. Behaviour of the pain variable using visual analogue pain scale Eva

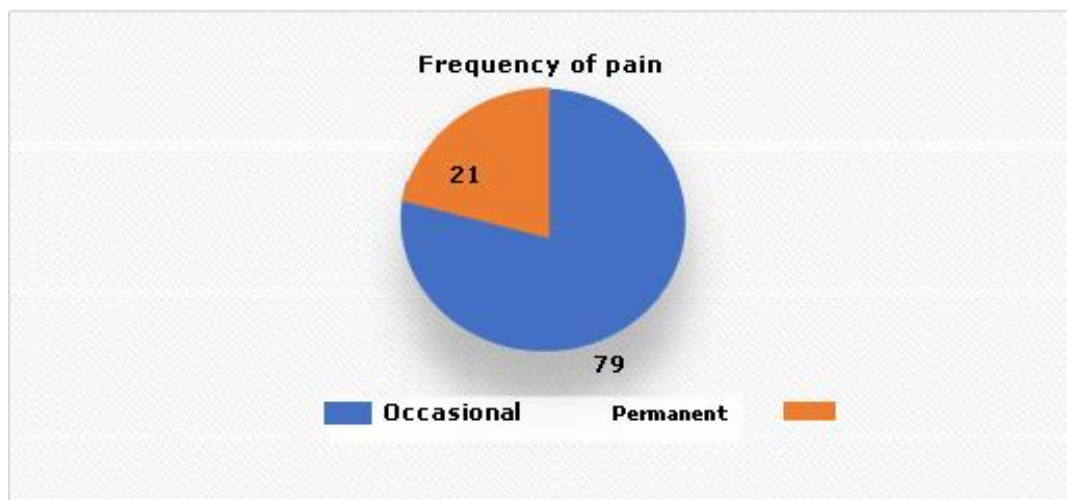


Source Survey applied to tenth semester students of UNIANDES

Frequency of pain

Frequency of repetitive actions at least 2 times per minute constitute a parameter of repetitive motion configured as a risk factor. Graph 3 shows the results corresponding to the frequency of the presence of pain where it is shown that 34 students representing 79% of the total surveyed present pain occasionally while 9 students representing 21% present pain permanently.

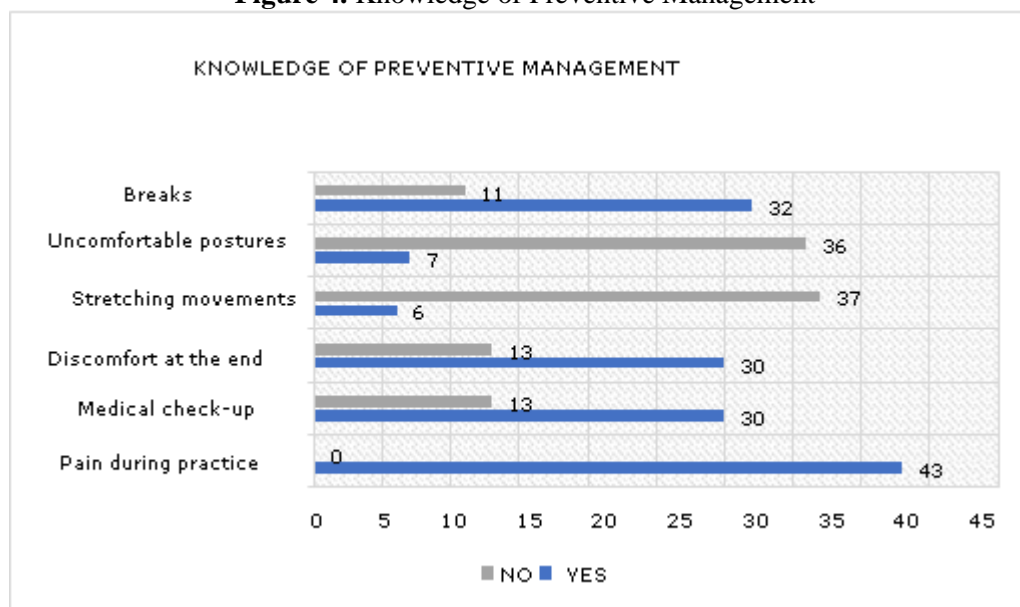
Figure 3. Frequency of pain



Source: Survey of tenth semester students of UNIANDES

Knowledge of preventive management.

Figure 4. Knowledge of Preventive Management



Source: Survey of tenth semester students of UNIANDES

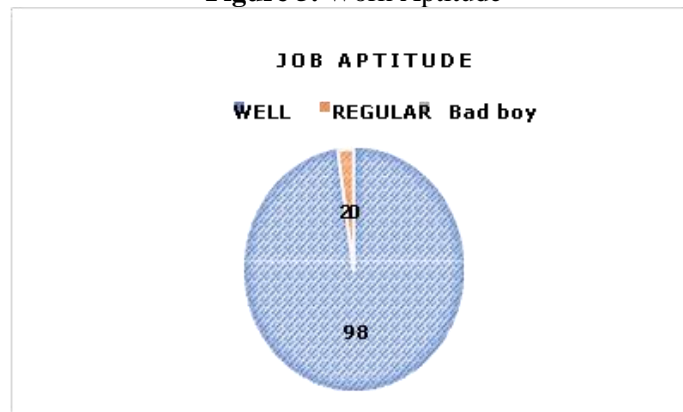
Indicated above that a repetitive traumatic effect causes significant structural wear incorporating a rest time relative to the compromised body areas constitutes a preventive measure of the first order ensuring a safety factor for the operator during the development of this research, data were collected from a survey applied to a group of students, the results revealed that all the students surveyed, that is, 100%, reported having experienced discomfort during the manipulation of dental instrumental

equipment. However, only 70% of the participants (30 students) have sought medical attention due to this type of discomfort (10,11,12). It was also observed that 70% of the students surveyed carry out stretching movements at the end of dental practices. However, it is important to note that only 14% of participants are aware of the proper movements that should be performed with the wrist and forearm to minimize possible injuries and associated discomfort.

In relation to the postures adopted during the clinical practices, it was found that 84% of the students surveyed reported performing uncomfortable postures. This situation can be a major risk factor for the development of long-term musculoskeletal discomfort and injury. On the other hand, it was observed that 74% of the students surveyed take breaks or breaks during clinical practices. This practice is relevant, as it helps mitigate fatigue and reduce the risk of injury associated with prolonged exposure to static postures and repetitive movements.

Work aptitude

Figure 5. Work Aptitude



Source: Survey of tenth semester students of UNIANDES

Graph 5 shows the level of response of students to work capacity and 98% of students said they have good work capacity in the face of physical demands and finally 100% of the population said they want to know the preventive actions of the appearance of Quervain's Tenosynovitis Syndrome

The professional risk and the demands of the workplace are risks that have always been a challenge for health professionals in the management of pain, being the work overload one of the physical factors that stand out in the appearance of tendinitis that comes from a repeated tension in the tendon in contact with sonic and manual instruments that damage the musculoskeletal system leading to its effect on body movement.

The injury of Quervain's tenosynovitis is produced by an extension and repeated flexion affecting the synovial fluid becoming insufficient generating friction in the tendon, manifesting the first symptoms of inflammation: pain and heat causing the movement to become forced starting with deterioration of fibrous tissues and ending in a chronic clinical picture that makes movement impossible, inflammation produces a stenosis of the synovial osteofibrous canal located in the radial styloid through which the tendons of the long abductor and short extensor of the thumb run. It occurs by combining strong grips with repeated or forced ulnar and radial turns or deviations of the hand (9,13,14).

Clinically the pain appears on the outer surface of the wrist, increasing when performing bowing, extension and separation movements of the thumb in advanced stages the pain remains constant during the rest period, in the physical examination appears a subcutaneous intumescence at the height of the radial styloid.

The qualification of tenosynovitis as an occupational disease through clinical examination refers to manipulation of objects of more than 1kg, more than 10 objects manipulated per minute or more than 20 repetitions per minute analyzed by methods of ergonomic evaluation of posture and movements of hand and wrist (9,15,16,17).

The hands should not only be understood as simple structures but as the executor of the movement that gives us information about the relationship with life through sensory perceptions focused on the handling of dental instruments, agreeing if the specific pathology is causing damage to the skeletal muscle was questioned the location of pain and if it is caused by the continuous use of sonic instruments showing three graphs in reference to the area Hand in hand the most common mistake that most regularly commit untrained students already mentioned arises from the pressure exerted on instruments whether static or dynamic should be taken into account general guidelines and recommended standards, as an advisable guideline in the maneuver where a certain type of tension is exerted fingers 4 and 5 are the main axis of support comprising around a general recommendation in turn considering the implementation of the use Preventive therapy in the onset of pain which incurs in pain-mitigating physiotherapies

4. Conclusion

There is a notable lack of knowledge on the part of students about the behaviours and characteristics of Quervain's tenosynovitis and about the ergonomic implementation guidelines being that it can mean one of the best long-term strategies to reduce the appearance of tendon injuries and implement measures such as optimizing work schedule and performing specific exercises counteract the accumulation of microtraumas. It is necessary for the new generations to carry out specific clinical trials of the pathology avoiding knowledge biases. It is essential to establish a care protocol that prevents the development of bad postural habits that cause the appearance of Quervain's Tenosynovitis Syndrome, which as described above, would position the dental professional in a condition of temporary or persistent disability, if the disease is allowed to establish or continue causing permanent damage. Finally, with the data collected, it is not possible to obtain a diagnosis of the pathology since a therapeutic clinical and physical review is necessary.

References:

1. Carrión Bolaños JA. (2012). Health risks in dental professionals. *Gaceta Dental*, 1(1). <https://gacetadental.com/2012/01/riesgos-para-la-salud-en-profesionales-de-la-odontologia-24896/>
2. Guarderas C, Peñafiel W, Arias Castillo VA, Vazquez Villegas GA. (1995). *Upper limb examination*. In: El examen médico: Texto de Enseñanza Semioteoría Integrado General y Especial (3rd ed.). Quito: Universidad Central de Quito.
3. Drake RL, Vogl AW, Mitchell AW. (2008). *Gray - Anatomy for students* (2nd ed.). Barcelona: Elsevier.
4. Shapiro DP. (2013). *Electromyography and Neuromuscular Disorders* (3rd ed.). Philadelphia: Elsevier.
5. Swigart CR, Fishman FG. (2018). *Carrie R. Kelley and Firestein: Treatise on Rheumatology* (1st ed.). Spain: Elsevier.
6. Hogrefe C, Martin Jones E. (2018). Chapter 107: Tendinopathy and Bursitis. In: *Rosen's Emergency Medicine: Concepts and Clinical Practice* (9th ed.). Philadelphia: Elsevier.
7. Swigart CR, Fishman FG. (2017). Pain in the hand and wrist. In: *Firestein G, Budd R, Gabriel S, McInnes I, O'Dell J* (Eds.), *Treatise on Rheumatology* (1st ed.). Spain: Elsevier.
8. McCabe SJ. (2018). Occupational hand disorders. In: Neligan P (Ed.), *Plastic Surgery* (4th ed.). Philadelphia: Elsevier.
9. David R, María del Carmen G, et al. (2012). Occupational diseases related to musculoskeletal disorders: Tendinitis and tenosynovitis of the thumb. *DDC-TME-10*. <https://www.insst.es/documents/94886/361599/DDC-TME-10.+Tendinitis+y+tenosinovitis+del+pulgar+-+A%C3%B1o+2012/72624f72-c9d7-4d45-8923-b822d44b128e>
10. Ortiz BET, Del Pilar Araujo Escobar E, Andachi JWS. (2021). Legal analysis of the abandonment of causes typified in the General Organic Code of Processes, based on sets of numbers of 2-tuples. *University and Society*, 13(S1), 146–156. <https://rus.ucf.edu.cu/index.php/rus/article/view/2019>
11. Muñoz DAF. (2021). Study for the packaging and artisanal production of the chocolate drink from Ambato. *University and Society*, 13(S1), 157–164. <https://rus.ucf.edu.cu/index.php/rus/article/view/2020>
12. Arias EJJ, Ruiz DVP, Zambrano LOA. (2021). Technological solution to improve security in the transport of products through electronic devices. *University and Society*, 13(S1), 165–171. <https://rus.ucf.edu.cu/index.php/rus/article/view/2021>
13. Vazquez MYL, Ricardo JE, Vega-Falcon V. (2022). Artificial intelligence and its application in the teaching of Law. *Estud Desarro Soc Cuba Am Lat*, 10, 368–380. <https://revistas.uh.cu/revflaco/article/view/148>
14. Estupiñán Ricardo J, Leyva Vázquez MY, Marcial Coello CR, Figueroa Colin SE. (2021). Importance of the preparation of academics in the implementation of scientific research. *Conrad*, 17(82), 337–343. http://scielo.sld.cu/scielo.php?pid=S1990-86442021000500337&script=sci_arttext&lng=en

15. Ricardo JE, Silva Vazquez GO. (2019). Sex education for parents of children with mental retardation, a way to consolidate it. *RMC*, 4(3), 137–144. <https://revistas.utb.edu.ec/index.php/magazine/article/view/685>
16. Arias IFB, Manzo ADM, Piza IAC. (2021). The assessment of environmental pollution at the cantonal level. *University and Society*, 13(S1), 172–179. <https://doi.org/10.24054/2021v13s1.2022>
17. Ayala JMB, Cando JLM, Arevalo DFM. (2021). Analysis of the consequences of immigration in the canton of Santo Domingo, Ecuador. *University and Society*, 13(S1), 180–188. <https://doi.org/10.24054/2021v13s1.2023>