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THE STREET VENDOR AND WORKING CONDITIONS IN SÃO LUÍS (MA):CONTRIBUTIONS OF ERGONOMICS TO THE INFORMAL COMMERCE ENVIRONMENT

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Abstract

Informal trade is a reality in the surroundings of cities, including São Luís (MS), characterized mainly by the work of street vendors and the workstations they create in squares, streets, avenues and main points of flow of people. This context can be influenced by ergonomics, considering the working conditions for the sale of various types of products (food, beverages in general, utensils, clothing, etc.). Thus, this research aims to describe a scenario related to the aspects that can be explored by ergonomic interventions, that is, the preliminary problematization (demand analysis) regarding the situation of the working conditions of street vendors. Systematic observations and structured interviews of the vendors' activities were carried out, in addition to the classification of artifacts used for the sale of various products. It was possible to recognize that the profile of salespeople, in general, is made up of men, with a low level of education and who work under inadequate conditions (exposed to bad weather, environmental factors, with workstations that do not consider the principles of ergonomics - biomechanical, anthropometric, informational, among others)..

Keywords: Informal Commerce, Street Vendors, Problematization (Demand Analysis), Ergonomics..

1. INTRODUCTION

Informal work is understood as that activity developed without any direct involvement or regulation by the state, thus there is no employment relationship between worker and employer (dos SANTOS, 2016). According to Krein & Proni (2010), the informal worker can dedicate himself to various activities and also has an ease to move between them, whether it is selling, reselling products or services or even producing other products.

In Brazil, the informal market has grown even more due to the economic changes that the country has undergone since the 90s, a period marked by the opening of the economy to the flow of trade and the reduction of industrial jobs, which raised the unemployment rate and

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caused many Brazilians to resort to the streets to ensure self-sustenance (NERI, 2000). In more recent data before the pandemic caused by Covid-19, the Continuous National Household Sample Survey (PNAD) developed by the Brazilian Institute of Geography and Statistics (IBGE), it was recorded that almost 15% of the population lived in conditions of unemployment, representing almost 14 million unemployed Brazilians.

With the pandemic, the situation has been getting even worse with the reduction of jobs and the closure of commercial establishments, directly affecting the economy and the form of income guarantee for several families (CARVALHO, 2020). Still in the context of informal work, Cunha (2006) and Santos and Melo (2011) describe that from the 70s onwards the term "informal" was used to qualify non-stable income from economic activities that were not part of the state's regulation. According to the IBGE (2012), the highest rates of informality are found in the north and northeast regions, in 2021, for example, it was recorded that the number of self-employed workers rose to 23.5 million, measuring an increase of 4.7% compared to data from previous years. In the same year, the state of Maranhão led with the highest informality rate among the other states in Brazil in the months of January, February and March, attributing that almost 62% of the population lives in the informal economy.

The main characteristics of informality, according to the International Labor Organization (ILO), is that the individual who performs such an activity owns his own work tools, his stocks and qualifications for performance; the use of autonomous labor force and/or family production, so that not only can the worker employ himself, but also engage family members; the absolute control of the producer and all his work processes, among others (CACCIAMALI, 1994). Dos Santos (2016) highlights that informal work is deprived of legal benefits related to social security, such as retirement, legislation and, mainly, the lack of coverage regarding health protection, since in most cases the sellers themselves produce artifacts that have functionalities in relation to the activity of commercialization of various types of products (such as: food, beverages in general, equipment, utensils, etc.), not paying attention to the technical criteria that take into account, for example, comfort, usability, and safety at work, and other aspects related to ergonomics and design.

In general, street vendors have characteristics in common, they usually have a basic level of education (elementary or high school), often due to the lack of opportunity for a dignified education (ALFERS, 2009). In a survey carried out by Macedo (2020) in São Luís (MA), mainly in the most central region of the city, it was found that the average age of workers was 44 years, ranging from 20 years to 67 years for men and between 30 and 58 years for women, with most of the salespeople's population consisting of men. Regarding the working

day, the author noted a variation between 3 and 12 hours per day, and almost 60% of them had between 7 and 9 hours of working hours. In addition to long hours in activities, there is also exposure and conflicts related to the inspection of government agencies, as well as robberies, assaults, violence in the workplace, and uncertainty about their occupation (dos SANTOS, 2016).

It is in this context that the situation of the worker in informal commerce gains more visibility, being the focus of studies and research aimed at improving working conditions, taking into account ergonomic criteria. VASCONCELOS et al (2015) identified that the informal market is configured as a large-scale sector that directly involves human beings in improvised jobs, the authors focus on the figure of the churros seller and through the research, conclude that the artifact of the churros seller has several problems related to the use and ergonomics of the worker, Thus, they aim at an analysis that is configured in a conceptual project, establishing a possible design solution for this class of informal workers. Melo et al (2015) conducted a research that analyzed and recommended improvements in the workstation of a street vendor of *cases* for cell phones, taking into account criteria such as principles of anthropometry, biomechanics and environmental factors, resulting in a proposal for ergonomic redesign for the station.

Considering these issues, this article intends to describe artifacts collected in various commercial regions of São Luís (MA) through the classification of Use, Shape and Type according to Löbach (2001), the categorization of the artifact according to Valese (2007) and the classification of products and services of the National Institute of Industrial Property (INPI, 2018), as well as the use of criteria from the ergonomics literature for the description and detailing of the context related to the workstations of street vendors in the central region of the city.

2. THE WORK OF STREET VENDORS

According to Mitullah (2003), in many countries informal work through street vendors is a source of employment and income for many people, but in common, these activities are not recognized in national economic statistics, since it is seen as a clandestine activity that puts the healthy economy of countries at risk. According to the author, to carry out the activities of street vending, these vendors resort to simple structures, technology and productions, producing their own jobs.

For Singer (2000), these unofficial working conditions, seen as "underemployment, disguised unemployment, survival strategy" are maintained by the ability to construct artifacts based on the specific needs of each worker. These artifacts are products that express the cultural particularities in which they are inserted, enabling them to carry out tasks and circumvent situations that prevent them from carrying out their work. Oliveira (2009) describes that the reality of street vendors shows that, even if these workers perform their activity with a certain autonomy, they are still limited in terms of the process of managing their activities, needing to work long hours to achieve a monthly family income - the largest portion without the basis of labor legislation - and in precarious conditions that, Possibly, they can generate negative conditions for the seller's health. In view of the divergences related to the conceptualization of informality, some studies have sought to categorize informal workers based on their profile, Alves (2006), for example, classifies the worker into two groups, the traditional informal workers, which refers to generally temporary conditions, acting on the supply and demand of labor, being directly linked to the number of unemployed. The self-employed are linked to commercial activities, such as the street vendor, who act on the circulation and consumption of goods and services, creating a relationship between consumers and sellers.

Costa (2007) describes that even though work in its general context can be considered as a producer of health and a means for the participation of individuals in social life, it can still be a factor of negative effects on the lives of workers, causing accidents, illness and even death.

In view of the changes in the context of work after the productive restructuring followed by the economic crises worldwide in the 70s, there was an increase in unemployment that was influenced by these changes, affecting Brazil to this panorama around the 90s, evidencing the growth of the participation of workers in the informal labor market. in which they perform their activities in conditions of risk and danger, characterizing the precariousness of employment, presenting greater occurrences of accidents or other health problems. Studies, such as de Costa (2007), show that the work of the street vendor is often seen as exhausting and extremely discriminating, creating even more gaps so that the type of activity is not taken seriously, nor is there a special look at the health of the vendors, with the recognition that factors such as unemployment, low education and personal qualification, which in turn can have health consequences both in relation to diseases, due to exposure to bad weather or handling of chemical products, and work accidents, such as cuts, falls or burns.

Costa (2007) describes that street vendors are exposed to health problems associated with the work performed, including back pathologies, headache and pain in the upper and lower limbs resulting from poor posture, weight transport and expropriation of artifacts used to help

in the sales activity. These findings corroborate the study by Pick et al (2002), which presents the conditions of women in the informal sales sector, describing complaints of headaches and musculoskeletal problems, in addition to the discomfort resulting from the work environment.

Thus, it can be noted that, even in conditions of informality regarding labor issues, the environment of informal commerce and street vendors requires the performance of ergonomics, as this reality is an autonomous possibility of obtaining income that collaborates with the movement of the popular market and, mainly, with the generation of income that sustains families and more families in poor or underdeveloped regions that lack educational and teaching opportunities and offer of formal jobs. Therefore, in view of the issues related to the health of this class of workers (street vendors), the intervention of ergonomics is essential to improve working conditions, of jobs as a whole.

3. THE CONTRIBUTION OF ERGONOMICS AND THE CONTEXT OF INFORMAL WORK

It is possible to find in the literature research carried out in Brazilian cities, focusing on informal work with ergonomics as its main contribution. Such research has highlighted ergonomic constraints related to the working conditions of salespeople, such as working hours, tasks performed and the job in general, as well as artifacts produced for the sale of numerous products, from food, beverages, handicrafts, electronics, among others.

Arai et al. (2003) focused on street vendors in the city of Rio de Janeiro, who sold drinks and cookies on the city's beaches. The results showed a prolonged work characterized by ambulation, both in the day and night shifts, in addition to exposure to environmental factors (noise, toxic materials and lighting) and to bad weather. In addition, there were reports of discomfort/pain in muscle groups (back, shoulders and knees), load handling, physical and mental stress. In a study conducted by da Silva et al. (2021) with street vendors in Boa Vista (RR), specifically with people from Venezuela, it was possible to highlight: ocular erythema, hearing wear, sunburn, discomfort/pain in body segments. In Maceió (AL), in a survey carried out with sugarcane juice sellers, ergonomic constraints related to the workplace were found, such as: inadequate occupational postures (resulting from the use of the artifact and its transport), exposure to bad weather and also to smoke and dust (dos SANTOS et al., 2016).

Finally, the contribution of Macedo (2020) is cited, with the research carried out focusing on street vendors in the main commercial areas of São Luís, investigating the processes involved in the production of artifacts produced to circumvent the situation of unemployment, using Popular Base Design (DBP) as a term for this type of occurrence, based on Andrade's

(2009) intention to present the issues of popular design as a discipline in the academic environment, given the relationship of these popular designs with the material sphere. As a result, there was a categorization of 6 groups of artifacts that had the most occurrence in the capital (snack and water cart, bike snack, countertop, display and fruit cart) and technical recommendations in the field of ergonomics for each group found.

In this context, in which research applies the knowledge of ergonomics for improvements and implementations in the activity of the street vendor, it is possible to perceive the materialization of what Guérin (2012) describes regarding the purpose of ergonomics, since the author presents as an objective the understanding of work with a focus on its possible transformation, taking criteria directly linked to the health and safety of workers, in order to guarantee both the effectiveness and the quality of the work.

So, when it comes to the figure of the street vendor in relation to his job and the artifacts produced by him, in order to optimize the process of commercialization of products, he produces and transforms in the material sphere his own support for the sale of products in general, naturally using tacit and empirical knowledge as a guide, their traditional knowledge. However, it is also notorious, in certain situations, the interference of technical knowledge as a reference to optimize the possibility of accidents and undesirable developments during the performance of sales activities (marketing of products).

4. METHODS AND TECHNIQUES

This article can be considered as content of the applied research type, which aims to find solutions to everyday problems, with a descriptive character that, according to Lakatos and Marconi (1991), presents aspects of investigation, registration, analysis and interpretations of current phenomena. Thus, it covers the description of the work context of street vendors, specifically in the city of São Luís (MA). It can also be considered a qualitative approach, where Neves (1996) describes employment when one wants to better understand the social process in order to visualize the whole context, having an empathetic look in order to better understand the phenomenon (informal commerce and the work of street vendors considering the principles of ergonomics, envisioning a preliminary problematization as a possible demand for ergonomic interventions).

For data collection, systematic observations were carried out, through photographic records, described by Moraes & Mont'Alvão (2010) as planned, structured or controlled. In this case, the target of the observations were the places in the city of São Luís where there were

street vendors (streets, squares, avenues), arriving at a geographical mapping of the main ones found. The data collection period took place between January and March 2019, before the pandemic caused by the coronavirus (COVID-19). To survey the working conditions of street vendors, a semi-structured interview was applied that presented guidelines regarding the personal data of the vendors (such as name, age, education, income and family composition, and work data, such as place of work, workload and work routine), in addition to a specific agenda on the survey of technical data related to the jobs ("do you feel any discomfort or discomfort/pain during transport or sale?"; "In which body segment do you feel discomfort/pain?" and if; "Are there any accidents occurring during work?"). In total, 29 salespeople were interviewed and the results were tabulated in an Excel spreadsheet, being grouped by order and frequency of response.

To carry out data collection, a Free and Informed Consent Form was applied, as well as the preservation of the identity of the participants and all care regarding the possible related risks, following the favorable opinion of the Research Ethics Committee number 3,696,667.

To ensure a better understanding of the data collected, the use of an initial classification based on the typification of the artifacts found (VALESE, 2007), the classification of use, shape and type of the artifact (LOBACH, 2001) and the classification of products and/or services offered by sellers (INPI, 2021) was considered, in addition to the use of ergonomics literature (IIDA & BUARQUE, 2016; GRADJEAN, 1998; DUL & WEERDMEESTER, 2001) to evaluate the conditions of workstations and artifacts (environment, work organization, product ergonomics issues – management, anthropometry, biomechanics, informational ergonomics).

5. RESULT AND DISCUSSION

5.1. Mapping and personal data of sellers

The results showed that in São Luís there is the presence of informal commerce, reflecting a great possibility of artifacts that were produced to circumvent various types of needs of the sellers and a possibility for the implementation of technical knowledge. The mapping of the artifacts made it possible to record the places with the highest occurrences of the informal sector on the island, such as the city center, on Grande, Santana and Central Market streets, as well as other regions where a focus of informal sales was perceived, such as the coastal region and neighborhoods such as João Paulo, Cidade Operária and Germany.

Basically, the salespeople's profile was presented as follows: most were male, working time between 2 and 40 years (with working hours ranging from 6 to 12 hours per day) and, as

for education, most of them had completed high school, receiving up to one minimum monthly wage (highlighting being the main source of income in the family).

5.2. Classification and classification of artifacts and working conditions (demand analysis)

In advance, it is possible to perceive the vulnerability of workers in terms of working conditions, such as exposure to bad weather, noise and accidents, or in terms of inspection and seizure of the products that are sold. According to Valese (2007) the artifacts can be fixed, when the seller does not have the objective of moving in search of customers, and mobile, when the artifacts have smaller dimensions to facilitate the seller's mobility, of the artifacts surveyed 62.3% of the artifacts are mobile and 37.7% represent the fixed artifacts, those that even if they have components for mobility, are not used for this purpose (Figure 1).

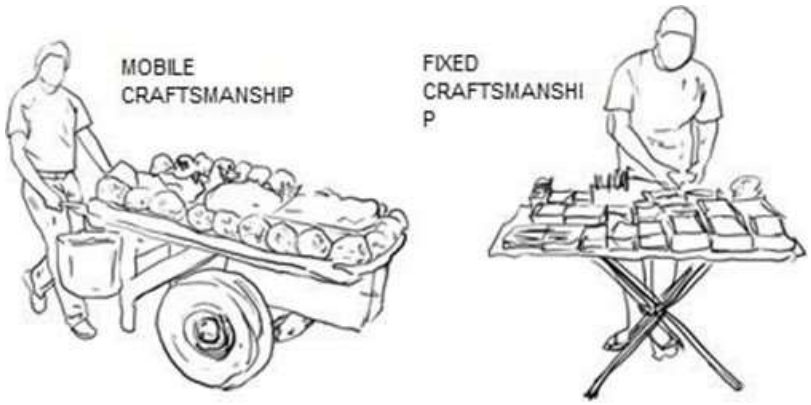
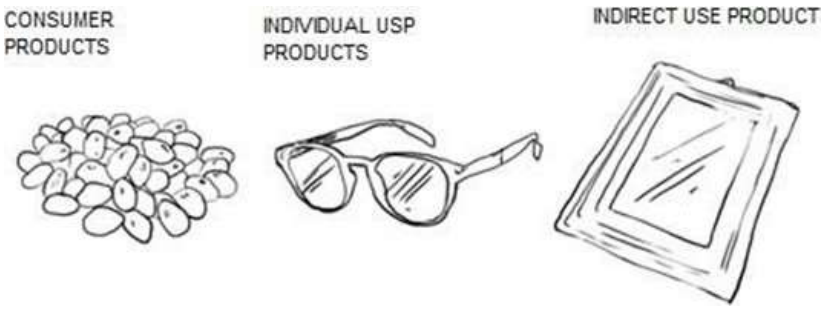


Figure 1. Types of artifacts. Source: the authors

Regarding Löbach's (2001) classification, the author considers the relationship between user and product in 4 ways: 1. Consumer products, those that cease to exist after use, 2. Products for individual use, 3. Products for use for certain groups and 3. Products for indirect use. Of the workers interviewed, 66.7% sell consumer products, 23.3% products for individual use and 10% products for indirect use. Relating the sampling based on the Löbach (2001) classification to the INPI (2021) classification of products and services, it can be seen that the percentage



66.7% refers to food consumption, with an inclination towards classes 31, related to the sale of various fruits, 32, related to the sale of beverages such as water and soda, and 30, focused on the sale of snacks in general and sweets.

Figure 2. Types of products. Source: the authors

Figure 3 presents some examples of mobile artifacts from the fruit cart and snack cart groups, it is observed that this type of artifact leads the worker to maintain a standing posture for a long time, there is no seat for rest or for the variation of occupational postures.

Figure 3. Vendors with movable artifacts. Source: the authors

According to Iida & Buarque (2016), maintaining the posture standing for a prolonged time, requiring high energy consumption and all static work of the muscles to maintain the position, which can cause fatigue and tiredness in the limbs, especially the lower limbs. It is also noted that there is an anthropometric inadequacy regarding the height of the carts, since they were created by tacit knowledge, they were not technically adapted to the salesperson, having a dimension that results in exceeding the maximum reach of the worker, making him stay in an uncomfortable position that, together with the force exerted to pull the cart, can compromise his muscles and cause pain or injuries in the shoulder regions. According to CHAFFIN et al., (2001), it should be considered that in the action of pulling/pushing that the force is applied close to the waist region, the other also advises that the composition and size of the cart casters can improve mobility. Result

On the other hand, in fixed artifacts, where in most of the occurrences recorded, in addition to the seller also spending a lot of time in the standing posture, the size of the artifact contributes to long-term problems (figure 4).

Figure 3. Vendors with fixed artifacts. Source: the authors

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Iida (2005) clarifies that many of the anthropometric measurements, when applied, require a combination of the minimum and maximum measurements of the population, in the case of these artifacts, this criterion is not taken into account, in this way, it becomes harmful to the health of the seller, since the author complements by describing that the ideal height for a standing workbench, as the example of the P01 artifact, it should be based on the elbow height and the type of work that this seller performs, having a recommendation that the surface of the countertop be 5 cm to 10 cm below the level of the elbows. For Couto (2002), when a bench is used for moderate or light work, without the salesperson having to exert a great visual effort, measurements from 1.09m to 1.18m can be used.

The first case of the figure comprises an artifact that, in addition to having a lower dimension than recommended, makes the seller make a greater effort to reach the products he sells. As already mentioned, the effort on the musculoskeletal structure can lead to pain, caused by lateral and frontal inclinations of the trunk, generating fatigue more quickly, so Couto (2002) recommends standardization to the maximum horizontal range for the smallest measurement based on anthropometry, which is 0.66m. The result of the interview pointed out that the function, use and materials vary according to each of the artifacts used in the salespeople's jobs. The Fixed artifacts are positioned in a place that facilitates their assembly/disassembly, while the Mobile artifacts are built with the structure of a cargo cart, with casters, usually with handling areas for transport.

As for discomfort/pain, 62.1% of the salespeople stated that they felt some type of discomfort, with the back having the highest percentage (61.9%), perhaps as a consequence of the main posture assumed during the marketing process (standing, for a long time). The

interviewees also reported exposure to bad weather (sun, rain, wind, etc.) and, finally, high levels of stress as a result of the professional relationship with consumers during the marketing process.

6. FINAL CONSIDERATIONS

Informality is inserted within a global context, and there are several authors in various areas who are interested in and study this theme, which is of great relevance to the world economy (Arai et al. 2003; Dos SANTOS et al., 2016; Macedo, 2020). Research on unemployment rates and on informality confirms this growing interest in the subject, especially among poor countries and those in socio-economic development.

Informal activity is an alternative for those who cannot get formal employment. The results showed that in São Luís there is the presence of informal commerce in several urban spaces, essentially, in places with high traffic of people.

Street vendors work in the activity of commercialization (sale), often because they cannot find a job in the formal sector. The largest portion is male. Most of them have completed high school, and many have a reduced level of education, attributing to this the fact that they cannot get a job. Even so, the informal sale of products can be understood as a source of income, often the main one for many families.

It was also possible to observe that the priority of these workers is to obtain income, and this makes them work long hours, be exposed to bad weather, handle objects (artifacts, products) with excessive weights and with functionalities that do not consider the principles of ergonomics, without concern for their own health. Often, using objects (artifacts, products) with mechanisms/operations, which instead of helping in the better execution of the activity, cause discomfort/pain during the performance of the activity.

From the results found, it is possible to present an excerpt of information that problematizes items that can serve as a reference for the performance of ergonomics in the universe of work and the interaction of the street vendor (user) with the artifacts produced by them, which are used as support for the commercialization of products in urban regions, specifically in São Luís (MA).

Seeking a better fit between the street vendor, the workstation and the artifact used to sell products. Such as, for example, the sizing of the artifacts, the height of movable countertops and handling dimensions (handle or handle), also related to the footrest. In summary, the

application of ergonomic intervention methodology is considered relevant for a better understanding of ergonomic diagnosis, highlighting the main ergonomic constraints and the proposal for improvements.

Finally, it is considered important to relate the context of street vendors with regard to the Pandemic caused by the coronavirus. Such a context is evidenced as another challenge to street vendors and the concern about economic self-sustenance, and should also be an order of concern regarding the application of ergonomics and design.

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