Relationship between physical fragility and socio-demographical and clinical factors of elderly performing driving license testing

Relação entre fragilidade física e fatores sociodemográficos e clínicos dos idosos que realizam teste para habilitação veicular

Relación entre la fragilidad física y los factores sociodemográficos y clínicos de pacientes ancianos sometidos a la prueba para obtención de la licencia vehicular

Maria Helena Lenardt
Clovis Cechinel
Maria Angelica Binotto
Nathalia Hammerschmidt Kolb Carneiro
Tânia Maria Lourenço

1. Universidade Federal do Paraná.
Curitiba, PR, Brazil.

ABSTRACT
Objective: To investigate the association between the condition of the physical fragility and the socio-demographic and clinical characteristics of elders performing driving license testing. Methods: This is a transversal quantitative study, performed in traffic medicine clinics. Criteria of inclusion of elders: age equal or higher to 60 years old; scheduled to driving license testing, and suitable cognitive and physical capacity to perform the tests. The sample was composed by 172 seniors from January to July 2015. Tests were used to evaluate the physical fragility, together with a socio-demographic and clinical questionnaire. Results: 56.4% of the candidates are considered pre-fragile, and there was a significant association between fragility and marital status ($p = 0.0327$) and use of alcohol ($p = 0.0417$). Conclusion: The prevalence of pre-fragility demonstrates a necessity to manage this public, aiming to attenuate functional decay, and as a consequence, to contribute to safer driving conditions.

Keywords: Fragile elder; Physical aptitude; Driving license exam; Demographic data; Pathology.

RESUMO
Objetivo: Investigar a associação entre a condição da fragilidade física e características sociodemográficas e clínicas de idosos que se submetem ao teste de habilitação veicular. Métodos: Estudo quantitativo transversal, realizado nas clínicas de medicina de tráfego. Critérios de inclusão do idoso: ter idade igual ou superior a 60 anos; estar agendado para os testes de habilitação e apresentar capacidade cognitiva e física para a realização dos testes. A amostra foi constituída por 172 idosos no período amostral de janeiro a julho de 2015. Foram aplicados testes para avaliação da fragilidade física e questionário sociodemográfico e clínico. Resultados: 56,4% dos candidatos são pré-frágeis e houve associação significativa entre fragilidade física e estado civil ($p = 0,0327$) e uso de bebidas alcóolicas ($p = 0,0417$). Conclusão: A prevalência de pré-fragilidade evidencia uma necessidade de sua gestão, com o objetivo de atenuar o declínio funcional e consequentemente contribuir para uma condução mais segura.

Palavras-chave: Idoso fragilizado; Aptidão física; Exame para habilitação de motoristas; Dados demográficos; Patologia.

RESUMEN
Objetivo: Investigar la asociación entre la fragilidad física y las características sociodemográficas y clínicas de ancianos sometidos a la prueba para obtención de la licencia vehicular. Métodos: Estudio cuantitativo transversal, realizado en clínicas de medicina de tránsito. Criterios de inclusión del anciano: tener edad igual o superior a 60 años; estar programado para los exámenes y presentar capacidad cognitiva y física para la realización de las pruebas. Participaron 172 ancianos entre enero y julio de 2015. Fueron aplicadas pruebas para evaluación de la fragilidad física y cuestionario sociodemográfico y clínico. Resultados: El 56,4% de los candidatos son pre-frágiles y hubo asociación significativa entre fragilidad física y estado civil ($p = 0,0327$) y uso de bebidas alcohólicas ($p = 0,0417$). Conclusión: La prevalencia de pre-fragilidad evidencia la necesidad de una gestión, con el objetivo de atenuar el déficit funcional y, consecuentemente, contribuir para una conducción más segura del auto.

Palabras clave: Anciano Debilitado; Aptitud Física; Examen para Licencia Vehicular; Datos Demográficos; Patología.
INTRODUCTION

Driving a vehicle is a complex task that requires the full capacity to perform a series of movements, whichever are weather and track conditions, in a continuous environment\(^1\). There are countless medical conditions that influence driving skills, being the physical fragility an important issue to be evaluated, specially in elder people.

Researchers define fragility in different formats. Many of these definitions are based on strength and physical impairment of the senior person\(^2;3\); others, when associated to chronic diseases, renal illnesses, stroke, cardiac insufficiency, hip and knee osteoarthritis, and depression\(^4;6\).

This present study deals with the physical fragility defined as a medical syndrome with multiple causes and determinants, which is observed by the lack of strength and resistance, and by the reduction of physiological function, increasing the vulnerability of the individuals, having higher dependency and/ or risk of death\(^6\).

The evaluation of fragility proposed by Fried et al, consists in the measurement of five biological characteristics of the elders, which include the decrease of walking speed and handgrip, non-intentional weight loss, reduction of physical activity and self-reported state of fatigue/exhaustion. The elder who presented three or more of these characteristics is considered fragile, and those who present one or two are considered in a previous stage (pre-fragility); the ones that do not present any of the components is defined as non-fragile\(^2\).

The phenotype for fragility was operated by the Cardiovascular Health Study (CHS), who studied 5,317 elders above the age of 65, with annual evaluations and observations of the following elements: illnesses, hospitalizations, falling, inability, and mortality. The study demonstrated that 6.9% of the studied population was fragile\(^6\).

Brazilian and international literature did not show any association to physical fragility and driving, a justification to perform the study of this medical syndrome within the mentioned context, in order to optimize the opportunities to the elders, and to guarantee a general safer driving conditions. The professionals from geriatrics and gerontology can work in multi-professional teams, assuming an important role identifying pre-fragile and fragile elders, working in prevention, in stabilization, or even in the reversal of the fragile status.

Fragility is usually associated to some socio-demographical characteristics, such as: advanced age\(^7\), low schooling\(^7\), low income\(^8\), being a female\(^9\), lack of social support\(^10\), and unfavorable socio-economical and health conditions\(^11\), which, many times, are ignored by health teams and traffic physicians. It is also associated to clinical facts, such as falling\(^12\), hospitalizations\(^13\), number of illnesses\(^14\), and use of medication\(^15\), being the last two able to also compromising driving skills.

Many pathologies affect driving skills, harming the individual's subsystems: vision (cataract, diabetic retinopathy, macular degeneration, glaucoma), cardiovascular (angina pectoris, heart failure), respiratory (sleep apnea, chronic obstructive pulmonary disease), neurological (cognitive deficits, dementia, Parkinson), psychiatric (depression, psychosis), metabolic, and musculoskeletal\(^16\).

Based on the observations build, this study aims to investigate the association between the physical fragility and the socio-demographical and clinical characteristics of elders during driving license testing.

METHODS

This is a quantitative cross-section study, with a sample built from January 31\(^{st}\) to July 31\(^{st}\) 2015. The research took place on traffic clinics, the place were the tests of physical and mental fitness and/or psychological evaluation for driving licenses take place, in the municipality of Curitiba, Brazil. The criteria of inclusion of the clinics were: they must be accredited to perform the mentioned exams; they must have adequate physical space to perform those tests.

During the stage of project design, were 54 regularly accredited clinics, which were placed in order by a simple draft (random selection). In order to proceed, the name and the directions for the clinic were written down in pieces of paper, and then they were drafted. After this procedure, the clinics were classified with letters and crescent numbers, from C1 to C54, and in this sequence, they were evaluated based on the criteria of inclusion.

Considering the inexistence of data related to the number of elders supported by the clinic, and the impartial and equitable distribution of the elders among the clinics, it was defined a standard number of individuals (35 elders) to be interviewed and collected in each clinic. The data collection started in the clinics C1, C3, C4, C5, and C6 having no more than 35 candidates per clinic. Clinic C2 was excluded because it was not observed an adequate physical environment to perform the tests.

When the data gathered from 35 elders was reached in one clinic, the process then moved to the following clinic on the drafted list. More than 35 elders were asked to participate in every clinic, but not all accepted to be part of the research. In the last clinic, due to the end of the sample period, only 32 elders participated in the study. In total, 189 elders were invited to participate, and from those, 17 denied participation, resulting a sample of 172 elders.

The flowchart of the stages to compose the sample of elders can be seen in the Figure 1.

The criteria of inclusion of elders were: to be 60 years old or higher; to be scheduled to a driving license test; to be able to answer the study’s questionnaire. In regards to the criteria of exclusion: to present physical illnesses, issues or symptoms that, by any reason, impede the individual to answer the questionnaire or to perform the tests.

As a first moment, the scheduling system of the clinics was used to observe the age of the users and to select potential participants of the study. Data collection was performed in two
To evaluate the walking speed, the protocol CAAE 34689914.8.0000.0102, approval CEP/SD Research in Human Beings, from the Health Sciences Sector, was granted. The statistical significance value was set to evaluate the interest variables and physical fragility. The statistical analysis was performed using the Excel® 2015 and SPSS version 20.0 softwares. Descriptive statistics, nonparametric chi-square, and Cochrán tests were used to evaluate the association between the interest variables and physical fragility. The statistical significance value was set at $p < 0.05$.

The research was approved by the Committee of Ethics in Research in Human Beings, from the Health Sciences Sector, under protocol CAAE 34689914.8.0000.0102, approval CEP/SD 833460. The ethical principals of volunteered and consented participation of each individual and clinic were observed, according to the guidelines present on the Resolution 466, of the Brazilian National Health Council, from December 12th 2012.

The access to the accredited clinics, as well to the Brazilian National Registry of Qualified Drivers (Renach, in Portuguese) was granted after the circular letters #2383/2014 COOHO/DIMP and #5103.2014 COOHO/SEME, which was sent to the clinics and to the institution that regulates them.

RESULTS

189 elders were invited to participate in the research, however 17 of them refused to take part. Hence, the sample produced had 172 elders, an average age of 67.73 ± 6.55 years, being $n=120$ (70.67%) males; and $n = 52$ (29.23%), females. None of them was considered fragile ($n = 0$; 0%); the pre-fragile were $n = 97$ (56.40%); and $n = 75$ (43.60%) were seen as non-fragile. The age of the sample was homogeneous, with a coefficient of variation of 9.68%, a concentration ratio between 60 and 72 years old, in approximately 75% of the sample. There was no association between physical fragility and age ($p = 0.0765$).

It is possible to observe on Table 1 that there is a significant percentage of elders who are married or having a partner ($n = 118$ (68.60%), living with the partner with/without children $n = 117$ (68.02%), Caucasian $n = 152$ (88.37%), and high level of schooling (above High School education) $n = 103$ (46.33%). The variable individual income was predominantly between 1 to 5 minim wages $n = 89$ (51.74%). The permanence of these individuals in the labor market, in formal and/or informal positions, was observed in $n = 90$ (52.32%). In the present study, the association of fragility and socio-demographic characteristics was significant only regarding the marital status ($p = 0.0327$).

On Table 2, it is possible to observe a high percentage of individuals that declares illnesses $n = 117$ (66.67%). Among the non-transmissible chronic diseases, the most prevalent were Systemic Arterial Hypertension (SAH), Diabetes Mellitus (DM) and the dyslipidemia in both subgroups, in proportions of 46.39%, 16.49%, and 14.43% among the pre-fragile, and 36%, 16%, and 14.67% among the non-fragile, respectively. There was no association between physical fragility, diseases, and life styles, except for the use of alcohol ($p = 0.0417$).

On Table 3, it is possible to confirm a prevalence of falling, dizziness, and the use of assistive technologies, thus with no association between fragility and these variables.

In Table 4, it is seen that 43.3% of the pre-fragile elders use 2 to 4 drugs regularly, a number that is above the non-fragile (40%). In all subgroups, there is a numerical superiority on the frequency in which medication is taken by the pre-fragile. Polyparmacy was observed in 5.34% of the non-fragile; 6.19% of the pre-fragile demonstrated the same status. When associated to the amount of medications taken to physical fragility, there was no statistical significance ($p = 0.7516$).
Table 1. Association between the level of physical fragility of elders and socio-demographic characteristics. Curitiba, Brazil, 2015

| Variable                | Classification                     | Pre-fragile | Non-fragile | Total | p-value |
|-------------------------|------------------------------------|-------------|-------------|-------|---------|
| Gender                  | Male                               | 67          | 53          | 120   | 0.8214* |
|                         | Female                             | 30          | 22          | 52    |         |
| Marital Status          | Married                            | 64          | 51          | 115   | 0.0327**|
|                         | Divorced                           | 7           | 14          | 21    |         |
|                         | Single                             | 6           | 3           | 9     |         |
|                         | Widow(er)                          | 17          | 7           | 24    |         |
| Living with Partner     |                                    | 3           | 0           | 3     |         |
|                        | Partner and grandchildren          | 7           | 1           | 8     | 0.2326**|
|                        | Partner                            | 35          | 36          | 71    |         |
|                        | Partner and children               | 27          | 19          | 46    |         |
|                        | By himself                         | 18          | 11          | 29    |         |
|                        | Children                           | 10          | 8           | 18    |         |
| Schooling               | Illiterate/Incomplete Elementary   | 11          | 6           | 17    | 0.6598* |
|                        | Complete Elementary/Incomplete     | 16          | 12          | 28    |         |
|                        | Middle/Incomplete High             | 12          | 12          | 24    |         |
|                        | Complete High/Incomplete College   | 29          | 17          | 46    |         |
|                        | Complete College                   | 29          | 28          | 57    |         |
| Income                  | No income                          | 7           | 5           | 12    | 0.9687* |
|                        | > 0 MW to ≤ 1 MW                   | 10          | 5           | 15    |         |
|                        | > 1 MW to ≤ 3 MW                   | 33          | 28          | 61    |         |
|                        | > 3 MW to ≤ 5 MW                   | 15          | 13          | 28    |         |
|                        | > 5 MW to ≤ 10 MW                  | 18          | 13          | 31    |         |
|                        | > 10 WM                            | 14          | 11          | 25    |         |
| Ethnicity               | Caucasian                          | 87          | 65          | 152   | 0.7142**|
|                        | Mixed                              | 5           | 5           | 10    |         |
|                        | Afro-descendent                    | 4           | 2           | 6     |         |
|                        | Asian                              | 1           | 3           | 4     |         |
| Working Conditions      | Yes                                | 47          | 43          | 90    | 0.5079* |
|                        | No                                 | 50          | 32          | 82    |         |
| Retirement              | Yes                                | 70          | 53          | 123   | 0.8291* |
|                        | No                                 | 27          | 22          | 49    |         |
| Pension                 | Yes                                | 18          | 8           | 143   | 0.2151* |
|                        | No                                 | 77          | 66          | 86    | 0.3147**|
|                        | NR                                 | 2           | 1           | 3     |         |

* Chi-Square test, p < 0.05; ** Cochran test - G test, p < 0.05; * Indicated G test p-value 0.3147 - first value for p tested only valid answers (Yes and No); this p-value also tested the NR category; Bold: significant variables.

**DISCUSSION**

The absence of fragile elders diverges from other studies in seniors in the same community, which demonstrated percent values of 4.9% and 15.3%. The lack of these seniors in this study is justified by the clinical characteristics and by the reason that lead them to the studied clinics, which is the renewal of driving licenses. Besides there was no presence of fragile elders, the prevalence of pre-fragility was 56.40%, a significant higher value when compared to international studies, which presented percentage values of 42.3%, 47.6%, 40%, and 45.5%.

When comparing the results of the pre-fragile elders group to other Brazilian studies, the results are approximate. In a study
Table 2. Association between the level of physical fragility of elders and the diseases and self-reported habits. Curitiba, Brazil, 2015

| Variable                     | Classification | Pre-fragile |      | Non-fragile |      | Total |      | p-value  |
|------------------------------|----------------|-------------|------|-------------|------|-------|------|----------|
| Diseases                     | Yes            | 67          | 69.07| 50          | 66.67| 117   | 0.7373* |
|                              | No             | 30          | 30.93| 25          | 33.33| 55    |       |          |
| Heart Attack                 | Yes            | 6           | 6.19 | 1           | 1.33 | 7     | 0.0888** |
|                              | No             | 91          | 93.81| 74          | 98.67| 165   |       |          |
| Angina                       | Yes            | 2           | 2.06 | 0           | 0    | 2     | 0.1286** |
|                              | No             | 95          | 97.94| 75          | 100  | 170   |       |          |
| Congestive heart failure     | Yes            | 1           | 1.03 | 1           | 1.33 | 2     | 0.8550** |
|                              | No             | 96          | 98.97| 74          | 98.67| 170   |       |          |
| Peripheral vascular disease  | Yes            | 0           | 0    | 1           | 1.33 | 1     | 0.1966** |
|                              | No             | 97          | 100  | 74          | 98.67| 171   |       |          |
| Chronic emphysema            | Yes            | 2           | 2.06 | 2           | 2.67 | 4     | 0.7949** |
|                              | No             | 95          | 97.94| 73          | 97.33| 168   |       |          |
| Attrite                      | Yes            | 6           | 6.19 | 4           | 5.33 | 10    | 0.8121** |
|                              | No             | 91          | 93.81| 71          | 94.67| 162   |       |          |
| Cancer                       | Yes            | 4           | 4.12 | 5           | 6.67 | 9     | 0.4600** |
|                              | No             | 93          | 95.88| 70          | 93.33| 163   |       |          |
| Diabetes                     | Yes            | 16          | 16.49| 12          | 16   | 28    | 0.9305* |
|                              | No             | 81          | 83.51| 63          | 84   | 144   |       |          |
| Hypertension                 | Yes            | 45          | 46.39| 27          | 36.00| 72    | 0.1707* |
|                              | No             | 52          | 53.61| 48          | 64.00| 100   |       |          |
| Hypothyroidism               | Yes            | 14          | 14.43| 8           | 10.67| 22    | 0.4633* |
|                              | No             | 83          | 85.57| 67          | 89.33| 150   |       |          |
| Dyslipidemia                 | Yes            | 14          | 14.43| 11          | 14.67| 25    | 0.9656* |
|                              | No             | 83          | 85.57| 64          | 85.33| 147   |       |          |
| Use of alcohol               | Yes            | 11          | 11.34| 17          | 22.67| 29    | 0.0417** |
|                              | No             | 86          | 88.66| 57          | 76.00| 143   |       |          |
| Smoking                      | Yes            | 6           | 6.19 | 9           | 12   | 15    | 0.1802* |
|                              | No             | 91          | 93.81| 66          | 88   | 157   |       |          |
| Used to smoke                | Yes            | 18          | 18.56| 16          | 21.33| 34    | 0.6502* |
|                              | No             | 79          | 81.44| 59          | 78.67| 138   |       |          |

* Chi-square test, \( p < 0.05; ** Cochran test - G test, \( p < 0.05 \)

regarding the Fragility of Brazilian Elders (Estudo Fibra)⁴, at the Unicamp campus, pre-fragility varied from 47.7% in Ivoti, to 55.5% in Paraíba. Yet, a study produced in Belo Horizonte⁶, with the objective to investigate the aspects associated to fragility found 46.3% of pre-fragile elders; and another research in Curitiba⁷ evaluated the quality of life in elders in Primary Health Care, finding 56.7% of pre-fragile individuals.

Some other Brazilian studies also found pre-fragile rates above this research, such as: the Fibra (Santa Cruz)⁸, which investigated the characteristics, prevalence, and factors associated to the fragility in 391 elders, finding 60.1% pre-fragile individuals; and the research conducted in Lafaiete Coutinho⁹, a municipality with low Human Development Index (HDI), evaluating the fragility in 316 elders enrolled in the Family Health Strategy program, finding 58.7% elders in pre-fragility condition.

The expressive percentage value of elders in pre-fragile situation identified in the present study demonstrates the importance of interventions in this stage, aiming to higher possibility and effectiveness to interrupt and/or to revert the state, and consequently, having a safer driving condition for longer.
Identifying those cases during the driving license exams could generate more frequent evaluations, which could set shorter validity of the license in order to force the individual to be more present. Furthermore, some authors point out that pre-fragile elders tend to respond better to intervention actions than the fragile ones24.

The management of physical fragility encompasses four interventions done by a multi-professional team, which are only together to perform the required actions, such as: the use of exercises (resistance and aerobic); caloric and protein support; use of vitamin D; and the reduction of polypharmacy6.

The age of elders is frequently related to physical fragility, however in this research it was not observed a relationship between these items (p = 0.0765). In a systematic review, aimed to highlight the prevalence of fragility in elders in a community of individuals of 65 years old or higher, it was found a significant association between age and fragility (value for p < 0.001)25. A study that took place in the City of Mexico, with 1,933 elders of the community found association between age and fragility (value for p < 0.001)9. There was also a significant association (p < 0.01) between these elements in a large population study, with 7,439 elders, in the United States of America18.

Besides the deficit of Brazilian studies in the topic, two researches showed similar results to the international ones. The study Fibra demonstrated a significant association between fragility and age (p = 0.027)9. Another research21, with a sample size of 203 individuals, who were users of the Basic Health Care program also demonstrated a correlation with a result of the value of p < 0.01.

The present study showed that 66.86% of the elders are early-elders, with ages varying from 60 to 69 years old, being the average 67.73 ± 6.55 years old. From these, the majority was married and/or lived with a partner, which there was a statistical association between physical fragility and marital status (p = 0.0327). This is an information to be investigated in the future, as this research uses a cross-section methodology and it does not provide arguments to infer about the finding. The result corroborates with a study performed in the Limburg province, south of Holland, with 8,684 participants above 65 years old, which found 68.6% of elders who were married or living with a partner20.

In this study, it is seen that the prevalence of widow(er) is 9.33% among the non-fragile, and 17.53% of pre-fragile individuals, numbers similar to the findings of the previously mentioned study20, with a prevalence of 17.5% among the non-fragile, against 37.7% of the fragile. Another study27, performed in Spain, with 640 elders, aimed to evaluate the prevalence of fragility and associated factors, shows widowhood associated to fragility.

The non-transmissible chronic diseases (NTCD) were present in 68.02% of the elders, being the majority found with Systemic Arterial Hypertension (SAH) 41.86% and Diabetes Mellitus (DM) 16.27%. There was no significant level of relationship between physical fragility and SAH (p = 0.1707). Similar data was found in Barueri and Cuiabá, in a study with 761 elders of those communities, in which p = 0.11528.

The Cardiovascular Health Study (CHS) demonstrated frequency distributions similar to the ones found: 42.9% for SAH and 15.8% for DM, and showed a statistical association between these two components and fragility (p < 0.001)2. A longitudinal

---

Table 3. Association between physical fragility and variables observed. Curitiba, Brazil, 2015

| Variables          | Classification | Pre-fragile | %   | Non-fragile | %   | Total | p-value |
|--------------------|----------------|-------------|-----|-------------|-----|-------|---------|
| Falling            | Yes            | 4           | 4.12| 8           | 10.67| 12    | 0.0949* |
|                    | No             | 93          | 95.88| 67          | 89.33| 160   |         |
| Dizziness          | Yes            | 1           | 1.03| 1           | 1.33 | 2     | 0.8550**|
|                    | No             | 96          | 98.97| 74          | 98.67| 170   |         |
| Assistive Tech.    | Yes            | 2           | 2.06| 1           | 1.33 | 3     | 0.7074***|
|                    | No             | 94          | 96.91| 74          | 98.67| 168   | 0.5244* |
|                    | NR             | 1           | 1.03| 0           | 0    | 1     |         |

* Chi-square test, p < 0.05; ** Cochran test - G test, p < 0.05; * Found G test p-value 0.7074 - the first p-value only analyzed valid answers (Yes or No); the second p-value included the NR category.

Table 4. Association between physical fragility of elders and the number of medications taken. Curitiba, Brazil, 2015

| Number of medications | Pre-fragile | %   | Non-fragile | %   | Total | p-value |
|-----------------------|-------------|-----|-------------|-----|-------|---------|
| Does not take any     | 25          | 25.77| 25          | 33.33| 50    | 0.7516  |
| Take 1 medication     | 24          | 24.74| 16          | 21.33| 40    |         |
| Take from 2 to 4 medications | 42      | 43.30| 30          | 40.00| 72    |         |
| Polypharmacy (5 or more medications) | 6      | 6.19 | 4           | 5.34 | 10    |         |

* Cochran test - G test, p < 0.05.
study performed in the USA with 7,439 elder patients with ≥ 65 years old, found percentage values above: 64.1% SAH and 23.8% DM, with statistical association between these pathologies and physical fragility.

Due to the high incidence of SAH in elders, this element is considered a condition of risk to safe driving. Due to this fact, the institute responsible to evaluate drives certain driving procedures to individuals according to their own blood pressure levels. The guidelines follow the consensus built by the Brazilian Association of Traffic Medicine (Abramet, in Portuguese).

Despite there is no significant level of relationship between DM and physical fragility in this research, it is necessary to discuss the issue, once 16.27% of the evaluated individuals self-reported DM, and it is an element of risk to safe driving, specially the type I.

The variable “use of medication” (p = 0.8948) did not present significant association to physical fragility, however it was seen that 70.94% used some sort of medication; and 5.81%, the polypharmacy. The closes value found in literature was an epidemiological study based on the population regarding the use of medication in the Metropolitan Area of Belo Horizonte, with 1,598 elders. It was seen that 72.1% used medication, and among them, 14.3% of polypharmacy. Similar data were found in a study with 811 elders 60 years old or older in a municipality in the south of Brazil, which found 72.3% used some sort of medication; 13.9% of polypharmacy.

The study Sabe in the municipality of São Paulo found higher numbers when evaluating 1,115 elders ≥ 65 years old: 89% of the participants used medication, and polypharmacy was found in 36% of the individuals. These data corroborate to a study performed among seniors in the municipality of Rio de Janeiro, whichpointed out 85% of the elders used medication, being polypharmacy found in 32.7% of them.

In regards to polypharmacy, the results found in the present study are justified due to the lowest age average of the studied population, and by the omission from the candidates, once polypharmacy can influence in the judgment of the traffic physician during the driving license test.

The prevalence of falling was 6.97%, being 4.12% in the group of non-fragile elders; and 10.67% among the pre-fragile ones, a significantly lower result when compared to other studies about fragility. In the present study there was no significant statistical association between these elements (p = 0.0949). The prevalence of falling in a population study in the United States of America with 7,439 elders ≥ 65 years old was 30.5%, being 18.1% among the non-fragile, and 32.9% in the pre-fragile ones, with a statistical significance of p < 0.001. In the SABE study, in the municipality of São Paulo, almost half (49.7%) of the elders mentioned falling in the past 12 months.

The results related to dizziness also demonstrated a considerably low result (1.16%), contrary to the literature. The symptom was found in 24% of 1,087 North-American elders aged 72 years old or older in New Haven/Connecticut. In another research, with 620 elders (ages > 65 years old) recruited randomly in a registry office and analyzed for two years, there was the result of 29.2% of seniors mentioning dizziness in the past 6 months, increasing the results according to the age. The frequency was 27% in elders who were 70 years old; 54% among the 90 year-old or older individuals.

The presence of dizziness is observed in the clinical evaluation of traffic medicine through a specific question, and in the case of a positive answer, the examiner is required to ask for an otoneurological exam to evaluate the safety condition of the prospect driver, reason enough to justify the low prevalence over the analyzed population.

In regards to life habits, it was seen that the frequency of non-fragile elders who use alcohol was twice the amount of pre-fragile individuals, n = 22.67% and n = 11.34%, respectively. There was a significant association (p = 0.0417) between the consumption of alcohol and physical fragility. In a research in Spain, with 2,086 participants, evaluated the association between fragility and use of alcohol, which found that the consumption of alcohol only during meals and under the Mediterranean standard of alcohol consumption leads to a lower risk of physical fragility.

CONCLUSION

Concluding, physical fragility was not found in this research. However, 56.4% of the candidates to the driving license were in a previous condition (pre-fragility). There was a significant association between physical fragility and marital status, and use of alcohol.

The high prevalence of pre-fragile signs the necessity of an effective management of the medical syndrome, which must start at least during the test for physical and mental fitness for the driving license exams, in order to ensure the specific driving skills and ideal driving performance. The management of physical fragility will only be reached through the integration of services and professionals aimed to work in an interdisciplinary format.

The understanding of some of the cause-and-effect relationships among the variables observed is more complex due to the nature of the cross-section research, thus longitudinal studies can better explore these relationships and demonstrate the evolution of elders to fragility and safe driving.

It is important to mention that the omission of data by the participants may interfere in the accuracy of the results to evaluate their physical fragility. Despite that, it is expected that the findings of the present study reduce the lack of investigations in the topic, bringing to a new light the understandings of factors related to physical fragility and safe driving practices.

ACKNOWLEDGMENTS

To Coordination for the Improvement of Higher Education Personnel (CAPES; doctoral scholarship: Maria Angélica Binotto and Nathalia Hammerschmidt Kolb Carneiro) and the Araucaria Foundation for Supporting Scientific and Technological Development of Paraná (Notice 09/2015, Protocol 45784, Senior Scholarship Program: Maria Helena Lenard).
26. Veld LP, Van Rossum E, Kempen GI, de Vel HC, Hajema K, Beurskens AJ. Fried phenotype of frailty: cross-sectional comparison of three frailty stages on various health domains. BMC Geriatr. [on line]. 2015 Jul; [cited 2016 Jan 10];15:77. Available: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4496916/pdf/12877_2015_Article_78.pdf

27. Jürschik P, Nunin C, Botigüe T, Escobar MA, Lavedán A, Viladrosa M. Prevalence of frailty and factors associated with frailty in the elderly population of Lleida, Spain: the FRALLE survey. Arch Gerontol Geriatr. [on line]. 2012 Nov; [cited 2016 Jan 10];55(3):629-31. Available: http://www.ncbi.nlm.nih.gov/pubmed/?term=Prevalence+of+frailty+and+factors+associated+with+frailty+in+the+elderly+population+of+Lleida%2C+Spain%3A+the+FRALLE+survey

28. Ricci NA, Pessoa GS, Ferriolli E, Dias RC, Perracini MR. Frailty and cardiovascular risk in community-dwelling elderly: a population-based study. Clin Interv Aging [on line]. 2014 Oct; [cited 2015 Dec 10]; 9:1677-85. Available: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4199970/pdf/cia-9-1677.pdf

29. Conselho Nacional de Trânsito - CONTRAM. Resolução nº. 267, de 15 de fevereiro de 2008. Dispõe sobre o exame de aptidão física e mental, a avaliação psicológica e o credenciamento das entidades públicas e privadas que tratam o art. 147, I e 1º a 4º e o art. 148 do Código de Trânsito Brasileiro. Diário Oficial da União [periódico na internet], Brasília (DF). 15 fev 2008. [cited 2015 Jan 11]; Disponível: http://www.denatran.gov.br/download/resolucoes/resolucao_contran_267.pdf

30. Loyola Filho AL de, Uchoa E, Lima-Costa MF. A population-based study on use of medication by the elderly in Greater Metropolitan Belo Horizonte, Minas Gerais, Brazil. Cad. Saúde Pública [on line]. 2006 Dec; [cited 2015 Nov 04];22(12):2657-67. Available: http://www.scielo.br/scielo.php?script=sci_arttext&pid=S0102-311X2006001200015&lng=en. http://dx.doi.org/10.1590/S0102-311X2006001200015

31. Dal Pizzol T da S, Pons E da S, Hugo FN, Bozzetti MC, Sousa M da LR de, Hilgert JB. Use of medication by the elderly in urban and rural areas in southern Brazil: a population-based study. Cad. Saúde Colet. [on line]. 2012 Jan; [cited 2015 Oct 06]; 28(1):104-14. Available: http://www.scielo.br/scielo.php?script=sci_arttext&pid=S0102-311X2012000100011&lng=en. http://dx.doi.org/10.1590/S0102-311X2012000100011

32. Carvalho MFC, Romano-Lieber NS, Bergsten-Mendes G, Secoli SR, Ribeiro E, Lebrão ML, et al. Polifarmácia entre idosos do Município de São Paulo - Estudo SABE. Rev. bras. epidemiol. [on line]. 2012; [cited 2016 Jan 10];15(4):817-27. Available: http://www.producao.usp.br/bitstream/handle/BDPI/39830/S1415-790X2012000400013.pdf?sequence=1

33. Rozenfeld S, Fonseca MJ, Acúrcio FA. Drug utilization and polypharmacy among the elderly: a survey in Rio de Janeiro City, Brazil. Rev. Panam. Saúde Pública [on line]. 2008; [cited 2016 Jan 10];23(1):34-43. Available: http://www.ncbi.nlm.nih.gov/pubmed/?term=Rozenfeld+S%2C+Fonseca+MJ%2C+Acúrcio+FA.+Drug+utilization+and+polypharmacy+among+the+elderly%3A+a+survey+in+Rio+de+Janeiro+City%2C+Brazil.

34. Tinetti ME, Williams GS, Gill TM. Dizziness among older adults: a possible geriatric syndrome. Ann Intern Med. [on line]. 2000 Mar; [cited 2016 Jan 10]; 132(5):337-44. Available: http://www.ncbi.nlm.nih.gov/pubmed/?term=Tinetti+ME%2C+Williams+GS%2C+Gill+TM.+Dizziness+among+older+adults%3A+a+possible+geriatric+syndrome.+Ann.+Intern.+Med

35. Gassmann KG, Rupprecht R, Lang E, Schöffski O, Mühlberg W, Sieber C, et al. Dizziness in an older community dwelling population: a multifactorial syndrome. J Nutr Health Aging. [on line]. 2009 Mar; [cited 2015 apr 10];13(3):278-82. Available: http://www.ncbi.nlm.nih.gov/pubmed/?term=Gassmann+KG%2C+Rupprecht+R.+Dizziness+in+an+older+community+dwelling+population

36. Conselho Nacional de Trânsito - CONTRAM. Resolução nº 517 de 29 de janeiro de 2015. Altera a Resolução CONTRAN nº 425, de 27 de novembro de 2012, que dispõe sobre o exame de aptidão física e mental, a avaliação psicológica e o credenciamento das entidades públicas e privadas de que tratam o art. 147, I e 1º a 4º, e o art. 148 do Código de Trânsito Brasileiro. Diário Oficial da União [periódico na internet], Brasília (DF). 29 jan 2015; [cited 2015 Jul 29]. Disponível: http://www.denatran.gov.br/download/resolucoes/Resolucao5172014.pdf

37. Ortolá R, García-Esquinas E, León-Muñoz LM, Guallar-Castillón P, Valencia-Martín JL, Galián I, et al. Patterns of Alcohol Consumption and Risk of Frailty in Community-dwelling Older Adults. J Gerontol A Biol Sci Med Sci. [on line]. 2016 Feb; [cited 2016 Feb 10];71(2):251-58. Available: http://biomedgerontology.oxfordjournals.org/content/71/2/251.full.pdf+html