

BALANCE ABILITY TESTING AND FALL RISKS IN ELDERLY

Petr PETR, Brigita JANEČKOVÁ, Ester PONCAROVÁ, Hana KALOVÁ,
Marie VOŠTOVÁ, Zdena TRÍSKOVÁ

Abstract: *The authors present a brief interim report concerning the field examination of the capability of keeping the equilibrium and occurrence of the risk of falls in a sample of the senior population (28 persons) in conditions of the senior home Borovany near České Budějovice with caregiving service. A reference group included staff members of the City Council České Budějovice and of the caregiving service of the company Ledax - centre Trhové Sviny and working in Borovany. The interim results demonstrate a dramatic situation of the risk of falls in the examined population, where the risk of falls is increased by a factor higher than five, compared to the normal situation. Whereas in the general population, it is to expect normal results of the test of the equilibrium and gait according to Tinetti, i.e. 27–28 points of 28, which is also the result shown in our reference group (27.7 points on average), the population examined - housed in the old people's home – has a score of 15 points. After exclusion of 8 probands with results within the normal etalon, i.e. 27–28 points, there were 20 probands, whose results were beyond the normal standard having average score in the equilibrium and gait test according to Tinetti 9.6 points of 28. The authors systematically continue performing the field examination. They attempt to establish an international cooperation in this examination. In the work, they present a complete diagnostic tool according to Tinetti in the original English as well as topically used Czech version. Possible misunderstanding or unclearness caused by wide distribution of the diagnostic tool by Tinetti and its many variants in different national languages is also briefly noted. The presented interim results already point out a higher risk of fall in seniors and offer a starting point for reasonable consideration of actual needs of nursing and caregiving in these persons. The authors expect that the results will be taken into account in appropriate considerations and in the decision process concerning the personnel in relevant facilities including the compilation of personal normative.*

Key words: *Aging; Risk of falls; Balance ability; Mary Elizabeth Tinetti*

1 Introduction

The ability to maintain balance is a critical factor in avoiding of falls and subsequent injuries. This phenomenon is particularly evident in the elderly (Lord et al., 2001). The risk of falling is one of the main risks in seniors, in both, which stay at home or in institutional care homes (Klán, Topinková, 2003; Tinetti, 2003). One of the main ways, how to assess the risk of falls, presents a careful analysis of individual cases in their occurrence and quantification of past/present falls (Třísková - personal consultation).

To strengthen of the preventive approach to falls risk is certified, as a diagnostic tool by Tinetti (Tinetti, 2003; Topinková, 2005; Hajkova, 2010). By evaluating of individual score in this tool is possible to determine the individual risk of falling for individual respondent. After processing of the results from the entire group of respondents it is possible also to identify a group risk of falls in the investigation sample. In this way we can predict in advance the risk of falls on the one hand and the necessity of a nursing care and activities on the other hand, including staffing demands.

Diagnostic Tool by Tinetti

In Annex we present the original version of the already world-famous diagnostic instrument. In our research study we used the Czech version of the tool processing of Topinková (2005).

We would like to indicate possible hazards related to international and inter-institutional comparability of survey results, that come from a large variety of used national versions of the Tinetti instrument (Köpke, Meyer, 2006). These authors recommend to use in the conditions of the Czech Republic the named version published by Topinková (2005).

2 Objective

The main objective of the presented study was to find out effective preventive strategies in the context of fall risks in elderly persons in senior homes. In the research question we predict that the risk of falling down is double higher in elderly persons (experimental sample) then in middle age persons (the control sample).

In our research question we proposed that age of probands is in significant correlation with test results of Tinetti diagnostic tool.

3 Methodology (project characteristics, research organization)

The experimental sample (clinic group) consisted of 28 people staying in a senior home Borovany. There were 2 men and 26 women there. The average age of these persons was 83.6 years. The average age of men was 80.5 years, of women 83.8 years.

The control sample consisted totally of 27 people, of 1 man and of 26 women. Of these 18 persons were employees of the Health Care Department of Statutory City of České Budějovice with a mean of age 49.78 years, including 1 man aged 49 years and 17 women with an average age of 49,82 and after that 9 women, which were working in the firm Ledax Nursing Services like workers of the senior home Borovany, with an average age of 42.61 years.

What's the ratio of men and women are both samples well comparable, the predominance of women is numerically almost identical. From the view of the average age, the experimental sample consisted of older persons, the control sample of middle aged persons. All persons were examined by Tinetti diagnostic tool. All results were checked by the same one worker. After that individual results of probands were analysed. The score of 27 to 28 is classified as normal. Furthermore arithmetic averages were calculated and tabulated. Data are expressed in the part of results.

4 Results and discussions (procedure)

Average score results by Tinetti analysed in the control sample was in the sum of 27.7 points out of 28 possible. We can conclude that the result of the control group is in the “normal area”, which is given by the standard 27 - 28 points inclusive.

Average score results by Tinetti analysed in the experimental sample was in the sum of 15 points out of 28 possible. The critical value is presented of 19 points. Scores below this critical value represent a five-fold increase in the risk of falling. When we excluded results of 8 probands with the standard normal score (i.e. 7 people with a score 28 points and 1 person with a score of 27 points, we obtain a subset of 20 subjects with not normal risk of falls. Average score results by Tinetti of this subset represented 9.6 points (see Table 1).

Table 1 Summary score of the Tinetti test achieved in the present research study in experimental and in the control samples (Petr, Janečková et al., Falls. Tinetti diagnostic tool)

Series	n	x score	RR
General population	NA	27 – 28 (incl.)	1
Control group	27	27.7	1
Probands, total 5	28	15	higher than
Probands, subgroup (estimation)	20	9,7	10

Meaning of abbreviation:

n = number of members of the group

NA = Non-applicable

X score = arithmetic mean value of the individual scores of the risk of fall assessed after Tinetti

RR = relative risk of fall, compared with standard population

On the base of attempt results we can discuss that the risk of falling for the experimental sample, i.e. the total risk for the nursing care for the treatment group in our assessment of the situation is certainly higher than fivefold. If there is a critical threshold for such risk is set as "less than 19 points," and the group is averaging 15 points, the risk situation probably as primarily evident.

The similar results we could found out certainly in the retrospective analyse, in analysis of reports of casual incidents occurring falls. The using of diagnostic tools by Tinetti has a major advantage in the possibility to achieve a preventive, pro-active approach in nursing process, in establishing of a plan of nursing care in terms of the actual implementation ("delivery") of this care. After selection of probands in experimental group and exclusion of persons with normal fall risk (i.e. standard 27 - 28 points inclusive) we can identify the subset of people with an average score of 9.6 points, where the risk of fall can be qualified guess on the order of at least one decimal order higher than in the general population.

5 Conclusions

In a sample of 28 people staying the type of senior home care, the authors demonstrate at least five-fold increased risk of falls compared to the normal population. These probands have a score of 15 points out of 28 possible, the critical value indicating already a fivefold increase of the risk of falling is below the 19 points. After exclusion of probands with fall risk scores in the standard level, i.e. 27 - 28 points, in the selected subset of 20 persons we can analyse the average score of 9.6 points.

These results lead to the conclusion, that the risk of falls in this population is substantial, dramatically worse than in the general population. All considerations and planned activities related to equipment and personnel caring service in senior homes should accept these facts from the view of falls prevention. Diagnostic Tool by Tinetti can serve as a fall risk assessment and the evaluation of adopted and implemented measures and interventions having prevention characteristic.

Acknowledgement

Authors thank to Mr. Mgr. Petr Podhola, Deputy Mayor of České Budějovice and to Mr. Ing. Karel Chalupa, Director of Nursing Services Company Ledax, for their kind support, helpfulness and valuable advice in this investigation.

6 References

Hájková, I. (2010). *Dotazníkové metody ve fyzioterapii se zaměřením na vybrané aspekty diagnostiky a terapie*. Olomouc: Bakalářská práce. FTK UP Olomouc.

Klán, J., Topinková, E. (2003). Pády a jejich rizikové faktory ve stáří. *Česká geriatrická revue*. 2: 38–43.

Köpke, S., Meyer, G. (2006). The Tinetti Test. Babylon in geriatric assessment. *Gerontol Geriat* 39: 288–291.

Lord, S.R., Sherrington, C., Menz, H.B. (2001). *Falls in Older People. Risk factors and Strategies for Prevention*. Cambridge: Cambridge University Press.

Tinetti ME (2003). Preventing of fall in Elderly Persons. *N Engl J Med*. 348: 42–49.

Topinková E (2005). *Geriatric pro praxi*. Praha: Galén.

7 Contact (Correspondent author address)

Assoc. Prof. MUDr. Petr PETR, PhD.

Hospital České Budějovice,

Department of Clinical Pharmacology,

České Budějovice

E-mail: petr@nemcb.cz