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THE IMPACT OF POLYPHARMACY AND COMPLIANCE WITH STOP / START CRITERIA ON THE RISK OF FALLS IN ELDERLY PATIENTS IN HOSPITAL

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A retrospective analysis of medical records of 100 patients aged 59 years and older, who were on treatment at the Geriatric Centre of Clinical Hospital #3 of the Republic of Sakha, has been done. The study reveals a link between compliance with the STOP / START criteria, polypharmacy, compliance with treatment standards and protocols, and falls in elderly patients.

Keywords: polypharmacy, adverse drug reaction, STOP/START criteria, patient of elderly age, falls in the elderly.

Introduction. Improving the quality of life and increased longevity have led to increased requirements for at-tending elderly patients. The treatment of patients over 65 years of age requires an individual approach due to the physiological characteristics of aging, the burden of diseases accumulated with old age and a modified response to prescribed pharmacotherapy.

According to the UN the dynamics of the rapid growth of number of the elderly in population is expected, who already make up a significant part of the population in most developed countries, and globally could double by 2050 (from 962 million to 2.1 billion) [11]. One of the manifesta-tions of dangerous adverse drug reactions in groups of older age patients is a drug-induced fall [3]. According to the forecasts in the near future the dependency ratio in this country will in-crease by 8% (from 21% in 2009 to 30% in 2035) [8], therefore, the issue of forecasting the risk of falls and preventing their traumatic effects seems to be topical [5].

World Health Organization (WHO) points out that in many cases the health care system is not ready to meet the needs of the elderly suffering from multiple chronic diseases [1, 2, 4]. The treatment of each elderly or senile patient is always difficult to determine a mandatory risk / benefit assessment due to the large number of mutually affecting and often unpredictable factors [2, 7, 12-13]. Particularly the administration of several drugs leading to a state of polypharmacy greatly increases the risk of developing adverse drug reactions due to inter-drug interactions, re-duces adherence to medication in patients, triggers the pathological mechanisms of serious ad-verse events, contributes to reduced strength and poor health conditions [10]. When prescribing drugs in geriatric practice one must remember that senior citizens tend to have serious adverse drug reactions [5].

As L.B. Lazebnik et al. noticed, simultaneous administration of five drugs increases frequency of drug interactions to 50%, and the risk reaches 100% with taking 10 drugs or more [4]. STOP/START criteria are used to audit drug prescriptions in order to optimize pharmacotherapy, reduce the development of USE and improve the quality of life in elderly patients in several countries of Europe, Asia, America and Australia. The successful use of these criteria both for research and for practical clinical purposes in a number of countries in Europe, Asia, America and Australia demonstrates that the STOP/START criteria have truly global significance [5].

The Objective of the Study: Improving the quality of life and increasing longevity in the elderly and senile population of the Republic of Sakha (Yakutia) by measures to reduce the risk of falls in this category of patients (compliance with STOP/START criteria, the treatment standards and protocols).

The Materials and Methods. We have undertaken a retrospective analysis of 100 medical records (hereinafter referred to as medical histories) of patients 59 years old and older who were on hospital treatment at the Geri-atric Centre of Clinical Hospital #3 of the Republic of Sakha during the 3rd quarter of 2019 to find the relationship between the polypharmacy (prescribing 5 or more drugs [11]) and compli-ance with the STOP/START criteria (recommendations of the National Health Service of the United Kingdom (NHS), 2014, revised in 2015), as well as to identify the dependence of compli-ance/inconsistencies of the treatment standards and protocols (account form #313/y «the Map of the Peer Review of Pharmacotherapy Quality» (the Consultation Protocol, dated November,01, 2003) and the risk of falls. The risk of falls in each patient has been determined upon his/her ad-mission to hospital treatment with the use of the special Morse scale [9].

Statistical analysis of the results of

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pharmacological expertise has been carried out with the help of the IBM SPSS Statistics 23 application package. Descriptive statistics of the quantity data are given as average values with standard deviation. The quality data are presented in the form of absolute and relative frequencies. The relationships between the studied indicators have been considered with the use of the contingency tables. In order to assess the statistical significance of frequency differences in the studied groups the Pearson Chi-square criterion with significance level-has been used. The threshold level of the statistical significance we adopt is 0.05.

Results: The analysis of 100 medical histories has been undertaken: of 61 women (61%) and 39 men (39%). The average age is 75.05 ± 8.143 years. The average age of the women is 74.21 ± 8.335 years, the average age of the men is 76.36 ± 7.758 years. The prescription of 5 or more drugs (polypharmacy) has been noted in 42 cases (42%).

According to the results of the study, violation of the STOP criteria is observed in 12 cases (12%). When comparing the frequency of detection of non-compliance with the START criteria in the groups of patients with different levels of risk of falls, in cases of non-compliance with the criteria of START-therapy, the proportion of the patients with a high risk of falls increases by 25.1% (Table 3), while the proportion of the patients with no risk of falls is reduced by 35.3%. The significance level is p = 0.008, which is statistically significant. Thus, compliance with the criteria of START-therapy leads to a significant reduction in the risk of falls.

According to the results of comparing the frequency of detection of non-compliance with the STOP criteria in the groups of patients with different levels of risk of falls, in cases of non-compliance with the criteria of STOP-therapy, the percentage of the patients with a high risk of falls increases by 5.3% (Table 2), while the significance level is p = 0.868, which is statistically insignificant.

According to the results of the analysis of compliance with the treatment standards and protocols and the risk of falls in elderly patients, in the case of partial non-compliance with the treatment standards and protocols the proportion of the patients with a high risk of falls increases by 9.7% (Table 4) with the significance level p = 0.328, which is statistically significant.

According to the results of the study of the occurrence frequency of different levels of risk of falls in the groups of patients with 5 or more drugs, in the patients with polypharmacy, the per-centage of the patients with a high risk of falls decreases by 4.3% (Table 1), with the significance level p = 0.516, which is statistically insignificant.

Considering the obtained data several conclusions can be drawn about possible causal relation-ships between age, polypharmacy, compliance with the STOP/START criteria and falls in senile patients: the risk of falls increases with age; there is a connection between the compliance with the START criteria and the risk of falls, this indicator is statistically significant; there is a con-nection be-

Table 1

START Criteria and the Levels of Risk of Falls in the Elderly Patients

START- therapy	Risk of Falls						X^2	p
	no risk		low risk		high risk			
	frequencies	% in line	frequencies	% in line	frequencies	% in line		
no violation	64_a	75.3	$14_{a.b}$	16.5	7_b	8.2	9.698	0.008
violation of therapy	6_a	40.0	$4_{a.b}$	26.7	5_b	33.3		

X^2 – the Pearson Chi-square criterion. p - significance level Subscripts indicate the presence or absence of statistically significant frequency differences.

Table 2

STOP Criteria and the Levels of Risk of Falls in the Elderly Patients

STOP Criteria	Risk of Falls						X^2	p
	no risk		low risk		high risk			
	frequencies	% in line	frequencies	% in line	frequencies	% in line		
no violation	62_a	70.5	16_a	18.2	10_a	11.4	0.283	0.868
violation of therapy	8_a	66.7	2_a	16.7	2_a	16.7		

Table 3

Compliance with the Treatment Standards and Protocols and the Levels of Risk of Falls in the Elderly Patients

Compliance with the Treatment Standards and Protocols	Risk of Falls						X^2	p
	no risk		low risk		high risk			
	frequencies	% in line	frequencies	% in line	frequencies	% in line		
yes	44_a	72.1	12_a	19.7	5_a	8.2	2.230	0.328
not fully	26_a	66.7	6_a	15.4	7_a	17.9		

Table 4

Polypharmacy and the Levels of Risk of Falls in the Elderly Patients

Polypharmacy (more than 5 drugs)	Risk of Falls							
	no risk		low risk		high risk		X^2	p
	abs.	%	abs.	%	abs.	%		
No	38_a	65.5	12_a	20.7	8_a	13.8	1.321	0.516
Yes	32_a	76.2	6_a	14.3	4_a	9.5		

tween compliance with the STOP criteria and the risk of falls, this indicator is not sta-tistically insignificant due to the small sample of patients; there is a connection between the state of polypharmacy and the risk of falls, this indicator is statistically insignificant due to the small sample of patients; there is a connection between compliance with the treatment standards and protocols and the risk of falls; this indicator is statistically insignificant due to the small sample of patients.

Conclusions: 1. Compliance with the state of polypharmacy, STOP criteria, compliance with the treatment standards and protocols leads to reduction in the risk of falls in elderly and senile patients.

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