Pattern and Factors Associated with Medicine Usage in Middle-aged Adults: a Population Based Cross-Sectional Study

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Aim: The present study analyzes the adherence phenomenon and possible correlations between active individuals and their educational status on the prevalence of medicine use in the population of a young and developing country such as Kosovo.

Materials and methods: This is an observational, cross-sectional, research study including a total number of 162 subjects aged 40-65 years residents of Kosovo. Gender distribution was: 32.7% males and 67.3% females. Assessments of medication adherence and compliance, the level of physical activity (PA), and education were made by reliable and validated questionnaires.

Results: Analyzing medication compliance, of 162 interviewed subjects, 29.6% (32.1% males and 28.4% females) and 27.2% (22.6% males and 29.3% females) responded that they sometimes forget to take their medicines, or that they stop taking them for reasons other than forgetting. Meanwhile, 40.1% declared that they usually stopped the medicine only because they felt better, 38.9% claimed to have stopped the medicine because they believed they felt worse, whereas more than half of our study responders declared having problem with buying the medicine.

Regarding PA, significantly better results (p<0.05) in medicine use were shown by subjects with higher PA level in our population. Additionally, higher levels of education correlated with lower amount of medication consumption.

Conclusion: The results of this study suggest for certain lack of adherence, difficulties and information related to medicine use. Consequently this raises the need for public education on the medication adherence and life style factors such as PA for the success of the treatment.

INTRODUCTION

Medicines are probably one of the biggest achievements of our species, and yet, their irrational usage is gradually becoming a global concern.1 The right usage of medicines represents the appropriate dosage for the necessary amount of time and for the lowest possible price2, while adherence presents a concept defined as “the degree to which the person’s behavior corresponds to the recommendations received from a health care provider”.3 Both these phenomena are closely related to the general knowledge, credibility and complexity towards treatment4, consequently being an important predisposing factor in the success of the therapy. According to an evaluation of the WHO5, 50% of patients with chronic illness in developed countries respect the recommendations of treatments, while in developing countries this phenomenon is increased because of the poor access to health care or medications and inadequate diagnosis, with possible consequences also in the economy of respective countries.

There are many factors that might be affecting the spam of medicines usage, such as gender, age, physical activity (PA) level, education level, BMI5 and which should be carefully analyzed during therapy ordination. In modern world, PA is already seen as an important component of a healthy life6, with recent studies having demonstrated the effect of PA level in predicting mortality of patients suffering from chronic conditions7,8, the association of
lower PA with mortality rates in elderly\textsuperscript{9} or even finding out that the metabolic equivalent of task (MET – Metabolic Energy Requirement in hours/week) was inversely associated with the risk of digestive tract cancers in men.\textsuperscript{10}

Considering the above mentioned facts, our question raises upon the adherence phenomenon and possible correlation between active individuals and their educational status on the prevalence of medicines use in a population of a young, low-income, post conflict and developing country such as Kosova.

Referring to the fact that we’re analyzing a healthcare system in transition, we assume that the compliance with the recommendations regarding medicines use will be lower. Whereas, we believe that individuals with high educational level and those with moderate to high physical activity will be more careful regarding medicines usage.

MATERIALS AND METHODS

Participants

In this observational, cross-sectional study, a total number of 162 subjects (32.7% males and 67.3% females) aged 40-65 years, non-hospitalized, residents of Prishtina (urban area) participated.

Subjects were recruited on the principle of first come, once they fulfilled the inclusion criteria (age group and residency in Kosova), based on the announcements in local medias (TV and radios) and social networks (Facebook and Twitter).

All the interested subjects older or younger than the set age, those not living in Kosova, those hospitalized and with long term immobilization were excluded from the study.

This age group was particularly chosen because it’s the one with the most common chronic drug use, now that the overall population is getting older and consequently diagnosed with co-morbid conditions and more drug use\textsuperscript{11}, the increasing prevalence of poly-pharmacy by age\textsuperscript{3} and the increasing risk of drug-drug interactions and adverse effects with the number of drugs used\textsuperscript{12}.

Assessments of Drug usage, the level of physical activity, and education

The form of data collection was observational method, collecting primary data directly from patients.

BMQ1 (Brief Medication Questionnaire 1) combined with additional questions for adherence of medicines use from Medication Adherence Questionnaire (MAQ)\textsuperscript{13,14} was used to evaluate medicine usage.

PA level was measured with self-administered IPAQ (International Physical Activity Questionnaire) by weighting each type of activity by its energy requirements (MET) for the last seven days, translated and updated in Albanian from Boshnjaku A et al.\textsuperscript{15,16} Based on this questionnaire, all the subjects were classified on three groups according to the level of PA (low, moderate and high).\textsuperscript{15}

Listed questionnaires were previously translated and validated in Albanian by Boshnjaku et al. (2015) and Krasniqi E et al. (2016). Every participant was interviewed through filling these questionnaires.

The level of education amongst study participants was evaluated based on five different levels: 0 - no formal education; 1 - elementary education; 2 - high school; 3 - graduate school; 4 - post graduation studies.

Statistical analysis

Graph Pad Prism 6 program for statistical analysis was used with a statistical significance set at $p<0.05$.

Descriptive statistics was generated for all the study variables, including the mean average for continuous variables and relative frequencies for categorical variables.

Ethical consideration

This research is planned and implemented in accordance with local and international regulations. Permission to conduct the survey was issued from the Committee of Ethical and Professional Issues of University Clinical Center of Kosova (UCCK), of 12.03.2015 by protocol No. 797.

RESULTS

Participants characteristics as shown in our previous study\textsuperscript{17}, resulted in no differences observed in age and weight between male (55.15±7.12 and 78.21±13.25, respectively) and female participants (54.27±5.1 and 75.52±11.01, respectively), and significant differences in height and body mass index (BMI) between males (173.06±7.51 and 26.05±3.73, respectively) and females (164.52±5.58 and 27.95±4.36, respectively).

When comparing PA levels between genders (from 1 – low PA, to 3 – high PA), significantly higher ($p<0.05$) results were recorded in females (2.4±0.68) comparing to males (1.9±0.83) (Table 1).

Table 2 shows that 66.66% of the subjects answered not having problems remembering medication doses that they used compared to subjects declaring to have this problem (21.60% and 11.72%, respectively). The same condition was
Table 1. PA level of participants

| Physical activity level (MET score 1, 2 or 3) | Male (n=53) | Female (n=109) | P | Total (n=162) |
|--------------------------------------------|------------|----------------|---|--------------|
| Physical activity level                    | 1.92 ± 0.83| 2.41 ± 0.68    | P<0.05 | 2.26 ± 0.76  |

MET – metabolic energy requirement.

Table 2. Difficulties in medicine use by study subjects, in total and by gender

| None=0        | A little=1 | A lot =2 |
|---------------|------------|----------|
| Total, n (%)  | Total, n (%) | Total, n (%) |
| M, n (%)      | F, n (%)    | M, n (%) | F, n (%) | M, n (%) | F, n (%) |
| Is it hard to remember all the doses?    | 108 (66.66%) | 30 (56.60%) | 102 (62.96%) | 21 (39.62%) | 5 (21.60%) | 37 (69.81%) | 15 (28.30%) | 73 (45.06%) | 8 (37.74%) | 27 (63.26%) | 12 (22.64%) | 19 (17.43%) |
| Do you have unwanted side effects from the medicines? | 102 (62.96%) | 3 (20.37%) | 37 (69.81%) | 5 (21.60%) | 58 (35.80%) | 7 (33.94%) | 25 (45.06%) | 31 (19.13%) | 8 (37.74%) | 11 (10.10%) | 15 (17.43%) |
| Is it hard to pay for the medicines?      | 58 (35.80%) | 7 (33.94%) | 37 (69.81%) | 5 (21.60%) | 58 (35.80%) | 7 (33.94%) | 25 (45.06%) | 31 (19.13%) | 8 (37.74%) | 11 (10.10%) | 15 (17.43%) |

Table 3. Adherence to medicine use by study subjects, in total and by gender

| No=0 | Yes=1 |
|------|-------|
| Total, n (%) | Total, n (%) |
| M, n (%) | F, n (%) | M, n (%) | F, n (%) |
| Do you sometimes forget to take your medication? | 14 (70.37%)| 8 (29.63%) | 36 (67.92%) | 7 (32.08%) | 78 (71.56%) | 22 (28.44%) |
| People sometimes miss taking their medication for reasons other than forgetting. Were there any days when you did not take your medicine? | 118 (72.84%)| 4 (27.16%) | 41 (77.36%) | 2 (22.64%) | 78 (71.56%) | 22 (28.44%) |
| When you feel that your health condition is under control, do you sometimes stop taking your medicines? | 97 (59.88%) | 5 (40.12%) | 31 (58.49%) | 2 (41.51%) | 66 (60.55%) | 4 (39.45%) |
| Have you ever cut back or stop taking your medicine without telling your doctor because you felt worst when you took it? | 99 (61.11%) | 63 (38.89%) | 33 (62.26%) | 33 (37.74%) | 6 (60.55%) | 33 (37.74%) |

*significant at p<0.05; M: males; F: females.

found when making gender based comparisons, where 62.96% of the total population answered that they had no side effects from the medicines they used compared to 20.37% and 16.66% having a little, respectively, a lot side effects. Instead, 45.06% and 19.13% declared that they have little, respectively big problem related to the cost of the medicines versus 35.80% to whom the cost was not a problem at all (Fig. 1).

Interestingly, it was found that 29.63% of all the study subjects sometimes forget to take their medicines, in a significant difference (p<0.05) with the subject declaring the contrary. Meanwhile 27.16% declared that they stopped taking the medicines for reasons other than forgetting compared to 72.84% that didn’t. Whereas 40.12% and 38.89%, declared
Table 4. Physical activity level and medicine utilization

|      | PA1 Total, n (%) | PA2 Total, n (%) | PA3 Total, n (%) |
|------|-----------------|-----------------|-----------------|
|      | M, n (%)        | F, n (%)        | M, n (%)        | F, n (%)        | M, n (%)        | F, n (%)        |
| Physical activity | 31 (19.14%) | 57 (35.18%) | 74 (45.68%) |
| Medicine utilization (n) | 3.55 | 3.08 | 2.86 |

PA1, PA2, PA3 – physical activity level 1, 2, 3; M: males; F: females.

Table 5. Education level and medicine use by study subjects

|      | 0 Total, n (%) | 1 Total, n (%) | 2 Total, n (%) | 3 Total, n (%) | 4 Total, n (%) |
|------|---------------|---------------|---------------|---------------|---------------|
|      | M, n (%) F, n (%) | M, n (%) F, n (%) | M, n (%) F, n (%) | M, n (%) F, n (%) | M, n (%) F, n (%) |
| Educational level | 6 (3.70%) | 15 (9.26%) | 70 (43.21%) | 57 (35.19%) | 14 (8.64%) |
| Medicines utilization (n) | 1.33 | 3.33 | 3.13 | 3.21 | 2.78 |

M: males; F: females.

Figure 1. Difficulties in using medicine by all study subjects.

Figure 2. Adherence to medicine use by all study subjects.
that they stopped using the medicines because they believed that their health condition was under control, respectively they felt worse after they took it, versus 59.88% and 61.11% that anyhow continued to use the medicines per doctor’s recommendation (Table 3, Fig. 2).

Referring to Table 4, there are significant differences (p<0.05) found in medicine utilization between subjects that have different levels of PA. It can be seen that subject belonging to PA1 use significantly greater number of medicines compared to subjects belonging to PA2 or PA3; the same is observed when comparing subject belonging to PA2 and PA3 (Fig. 3).

When comparing the educational level and medicine use (Table 5), subjects with the higher education level had the lowest number of medicine use (2.78), being followed by subjects belonging to middle school education level (3.13 medicines), and those with graduation studies (3.2). Interestingly, the higher number of medicine use (3.33) was found in subjects with only elementary education.

DISCUSSION

To our knowledge, this is the first study to show some data regarding medication adherence, compliance and the relationship between PA and educational level with the medicines utilization in either Kosovo or other regional countries. Analyzing medications compliance, from 162 interviewed subjects, 29.6% (32.1% males and 28.4% females) and 27.2% (22.6% males and 29.3% females) responded that they sometimes forget to take their medicines, respectively they stop taking them for reason other than forgetting. In comparison with the higher results from a national survey on the use of medicines (NSUM) in Malaysia (another developing country), 69.1% (67.5% males and 70.0% females) and 42% (40.2% males and 43.1% females) reported to ever forgetting the prescribed medicine as indicated respectively have chosen not to take the prescribed medicine.18 Meanwhile, 40.1% in our study declared that they stopped the medicine only because they felt better, whereas 70% of the population in a survey in Oman declared the same19 staying in line with studies showing the high percentage of patients non-adherent with the medication therapy regimen20. Except for those subjects, 38.9% claimed to have stopped the medicine because they believed they felt worse, similarly to a study in Hong Kong, where 19.7% respectively 34.4% resulted being non-compliant or partly compliant with the therapy.21

This is worrying, since compliance to the medication therapy and prescribers recommendation is crucial for the clinical goals of the therapy itself. In addition, the situation regarding compliance deteriorates even more when considering that more than half responders in our study declared having problem with buying the medicine. Furthermore, it should be mentioned that regarding compliance, there is no significant difference seen in between genders of our study subjects.

Significantly better results in medicines usage in subjects with higher PA level was found in our population, which is consistent with other similar studies claiming the impact of PA in morbidity and in medicines usage in other populations from both developing and developed countries.7,8,22-24 This emphasizes the importance of PA for general health, including here good outcomes in even some certain chronic diseases.25 In fact, there are studies claiming that active individuals may have different cultural background, being less likely to be influenced by external factors23, but still future investigation in this respect should be done. It was interesting to see that the general level of physical activity amongst mature adults (40-65 years of age) in a developing and lower middle income country such as Kosova26 was quite high (2.26±0.762 in total, 2.4±0.68 in females and 1.9±0.83 in males).

When analyzing the educational level and medicines usage within adults aged 40-65, we found that higher levels of education were correlated with lower amount of medication consumption, when excluding those with no formal education at all (illiterate people). Thus, the higher level of education of the individual, the higher will be the chances of rationale usage of medicines.
comparing with similar studies, educational level in general was significantly associated to parameters such as subject understanding the proper use of medicines and better awareness of medicines side effects\textsuperscript{18}, but still, in developed countries such as Spain there are studies that found no influence of educational level in medicines utilization.\textsuperscript{27} This particularly presents an important factor when ideating and planning local as well as national health and medication awareness rising campaigns in our country.

We are aware that this study has a couple of limitations, including the fact that the evaluation was made based on self-reported assessment, consequently subject actual behavior can’t be verified.

CONCLUSION

From this study it can be estimated that difficulties and adherence to medicines use should be taken into proper account from the prescribers. Since the possibility of impact of non-compliance to therapy through the path of achieving the goal of the treatment can be seen, it should be a special call from health care providers at the time of therapy administration. This should be taken into consideration from the policy makers, patients and physicians, since it reflects the quality of healthcare and among other results in economic impact.

Whereas, educational level and PA were found to be in an inverse relationship with the amount of medicine use by our study subjects. It is important that these factors are modifiable factors, leaving space for future improvement (when needed), and consequently the independent role of these factors should be taken into consideration while promoting safe usage of medicines. Due to the fact that physical inactivity and medicine use are highly prevalent in modern societies, the increased risk of medicine use among subjects who do not reach PA international guidelines is relevant for public health, even when only low prevalence ratios are detected.\textsuperscript{23} Resulting from this, a recommendation of this study would be building strategies for the awareness raising in the importance of PA in general health condition and the consequences in medicines use. This would be important for general population of different groups (ages, genders, races, nationality etc), and especially for the health care professionals advising their patients regarding the importance of PA in the treatment’s success. Additionally, investing in health promotion through physical education (PE) would be ideal, with studies already suggesting the engagement of PE teaching by provision of school-based extra-curricular patient.\textsuperscript{28}

The results of this study suggest a certain lack of adherence, difficulties and information related to medicine use. Consequently this raises the need for public education on the medication adherence and life style factors such as PA in the success of the treatment, which should be the basic parts of campaigns and education programs. These programs, based on our study finding related to educational level of the subject, should be build and focused depending on groups with different levels of education.

CONFLICT OF INTEREST

Authors claim no conflicts of interest.

REFERENCES

1. Akl OA, El Mahalli AA, Elkahky A, et al. WHO/INRUD drug use indicators at primary healthcare centers in Alexandria, Egypt. Journal of Taibah University Medical Sciences 2014:9(1):54-64.
2. WHO policy perspectives in medicines. Promoting rational use of medicine: core components. WHO Report. 2012. Geneva: World Health Organization.
3. Sabaté E. Adherence to long-term therapies: evidence for action. World Health Organization, 2003.
4. Morisky DE, Ang A, Krousel-Wood M, et al. Predictive validity of a medication adherence measure in an outpatient setting. J Clin Hypertens (Greenwich) 2008;10(5):348-54.
5. Bardel A, Wallander MA, Svärdssudd K. Reported current use of prescription drugs and some of its determinants among 35 to 65-year-old women in mid-Sweden: A population-based study. J Clin Epidemiol 2000;53(6):637-43.
6. Mijnarends DM, Koster A, Schols JM, et al. Physical activity and incidence of sarcopenia: the population-based AGES-Reykjavik study. Age Ageing 2016;45(5):614-20.
7. Myers J, Prakash M, Froelicher V, et al. Exercise capacity and mortality among men referred for exercise testing. N Engl J Med 2002;346:793-801.
8. Blair SN, Kohl HW 3rd, Barlow CE, et al. Changes in physical fitness and all-cause mortality. A prospective study of healthy and unhealthy men. JAMA 1995;273(14):1093-8.
9. Yohannes AM, Baldwin RC, Connolly M. Mortality predictors in disabling chronic obstructive pulmonary disease in old age. Age Ageing 2002;31:137-40.
10. Keum N, Bao Y, Smith-Warner SA, et al. Association of physical activity by type and intensity with digestive system cancer risk. JAMA Oncol
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2016;2(9):1146-5.

11. Franchini M, Pieroni S, Fortunato L, et al. Polypharmacy among the elderly: analyzing the comorbidity of hypertension and diabetes. Curr Pharm Des 2015;21(6):791-805.

12. Hosia-Randell HM, Muurinen SM, Pitkälä KH. Exposure to potentially inappropriate drugs and drug-drug interactions in elderly nursing home residents in Helsinki, Finland: a cross-sectional study. Drugs Aging 2008;25(8):683-92.

13. Svarstad BL. Brief Medication Questionnaire 1 (BMQ 1). University of Wisconsin System. 2006.

14. Morisky DE, Green LW, Levine DM. Concurrent and predictive validity of a self-reported measure of medication adherence. Med Care 1986;24(1):67-74.

15. Guidelines for data processing and analysis of the International Physical Activity Questionnaire (IPAQ) - Short and Long Forms. 2005.

16. Boshnjaku A, Dimauro I, Krasniqi E, et al. Effect of sport training on forearm bone sites in handball and soccer female players. J Sports Med Phys Fitness 2015;56(12):1503-10.

17. Krasniqi E, Koni M, Kabashi A, et al. Side to side differences between dominant and non-dominant arm’s bone density and isometric handgrip strength in males and females aged 40-65 year old. Mater Sociomed 2016;28(5):333-7.

18. Azemi HM, Akmal AA. A national survey on the use of medicines (NSUM) by Malaysian consumers. Malaysia: quality use of medicines pharmaceutical services division and the Clinical Research Centre Ministry of Health Malaysia; 2012.

19. Abdo-Rabbo A, Al-Ansari M, Gunn CB, et al. The use of medicines in Oman - public knowledge, attitudes and practices. Sultan Qaboos Univ Med J 2009;9(2):124-13.

20. Abou-Auda HS. An economic assessment of the extent of medication use and wastage among families in Saudi Arabia and Arabian Gulf countries. Clin Ther 2003;25(4):1276-92.

21. Chong CK, Chan JC, Chang S, et al. A patient compliance survey in a general medical clinic. J Clin Pharm Ther 1997;22(5-6):323-6.

22. Waller K, Kaprio J, Korhonen T, et al. Persistent leisure-time physical activity in adulthood and use of antidepressants: a follow-up study among twins. J Affect Disord 2016;200:172-7.

23. Bertoldi AD, Hallal PC, Barros AJ. Physical activity and medicine use: evidence from a population-based study. BMC Public Health 2006;6:224.

24. Bergmann GG, Bertoldi AD, Mielke GI, et al. Physical activity, screen time, and use of medicines among adolescents: the 1993 Pelotas (Brazil) birth cohort study. Cad Saude Publica 2016;32(4):e00011715 [Article in Portuguese].

25. DiPietro L. Physical activity in aging: changes in patterns and their relationship to health and function. J Gerontol A Biol Sci Med Sci 2001;56(2):13-22.

26. OECD. DAC List of ODA Recipients. 2014. (accessed on 08.06.2016): http://www.oecd.org/dac/stats/documentupload/DAC%20List%20of%20ODA%20Recipients%202014%20final.pdf.

27. Sans S, Paluzie G, Puig T, et al. Prevalence of drug utilization in the adult population of Catalonia, Spain. Gac Sanit 2002;16(2):121-30.

28. Gallè F, Di Onofrio V, Barbone F, et al. Investigating the role of physical education in physical activity promotion: an Italian multicenter study. J Phys Act Health 2015;13(8):854-60.
Модель и факторы, связанные с приёмом лекарственных средств среди людей среднего возраста: исследование текущего состояния населения

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Цель: В этом исследовании анализируется феномен соблюдения приёма лекарств и вероятные взаимосвязи между представителями активной части населения и их образовательным статусом в отношении распространенности приёма лекарственных средств среди населения такой молодой и развивающейся страны, какой является Косово.

Материалы и методы: Данная работа представляет собой исследование в поперечном разрезе, в котором приняла участие группа из 162 человек в возрасте от 40 до 65 лет, жители Косово. Гендерное распределение составляет 32.7% мужчин и 67.3% женщин. Оценка соблюдения приёма и комплаенса в отношении предписанных медикаментов, уровня физической активности (ФА) и образования была проведена с помощью надёжных и достоверных вопросников.

Результаты: Из 162 участников, опрошенных на предмет комплаенса в отношении медикаментозной терапии, 29.6% (32.1% мужчин и 28.4% женщин) и 27.2% (22.6% мужчин и 29.3% женщин) сообщили, что они иногда забывают принимать лекарства или прекращают принимать их по другим причинам, не имеющих отношения к забыванию.

Кроме того, 40.1% ответили, что они обычно перестают принимать лекарство просто потому, что чувствуют себя лучше, 38.9% заявили, что прекратили приём лекарства, потому что чувствуют себя хуже, в то время как более половины респондентов в нашем исследовании утверждают, что затрудняются купить лекарство.

Что касается ФА, то значительно более высокий показатель (p<0.05) приёма лекарств был установлен у лиц с более высоким уровнем ФА среди нашего населения. С другой стороны, более высокий уровень образования коррелирует с более низким уровнем потребления лекарственных средств.

Выводы: Результаты данного исследования свидетельствуют об известной степени дефицита соблюдения, о затруднениях и отсутствии информации в отношении приёма лекарств. Следовательно, это ставит вопрос об информировании общественности о необходимости придерживаться приёма лекарственных средств и о таких факторах образа жизни, как ФА для успеха лечения.