Multidimensional frailty in older people in general practitioners' clinical practice: the SELFY-MPI SIGOT project

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Abstract

The multidimensional prognostic index (MPI) is a comprehensive geriatric assessment (CGA) tool exploring the multiple domains of older subject. The knowledge and the diffusion of self-assessment tools for identifying frailty in general medicine is still limited. The aim of our study is to determine the prevalence of frailty using a multidimensional frailty screening tool (SELFY-MPI) in a cohort of older adults, belonging to the general practitioner's (GPs) experience.

In the frame of a national educational program organized by the Italian Geriatric Hospital and Community Society (SIGOT), expert geriatricians carried-out local courses addressed to GPs, focused on multidimensional approach in primary care. A cross-sectional study of the SELFY-MPI, based on eight different domains, in the general practitioners' outpatient clinic was performed among 50 GPs. SELFY-MPI risk score was used for dividing the participants in robust, pre-frail, or frail.

A total of 526 participants (mean age: 77.7 years; females=55.3%) fulfilled the SELFY-MPI. The participants were, on average, independent in the activities of daily living, had a good mobility, but they reported some cognitive difficulties, and they can be considered at risk of malnutrition. A high prevalence of comorbidities and polypharmacotherapy was also present. The 20.2% of the sample lived alone, suggesting a potential social frailty. The mean SELFY-MPI score was 0.26±0.17: therefore, 21.67% of the participants were categorized as pre-frail, and 3.99% as frail.

Pre-frailty and frailty are common in GPs experience. SELFY-MPI is a feasible screening tool for multidimensional frailty in the GPs clinical practice.

Introduction

Geriatric medicine is giving more and more attention to the identification of optimal prognostic tools to improve clinical decision making.[1] In fact, it is widely known that the prognosis of older people is not only associated to the presence of diseases, but also to other factors such as functional, cognitive, biological, and social aspects.[2]

In this context, comprehensive geriatric assessment (CGA) seems to be able to effectively explore all these domains, to better determine the prognosis in frail older people.[3] The multidimensional prognostic index (MPI)[4] is an aggregate index derived from the CGA that in several studies have shown to be an excellent predictor of short and long-term mortality, but also of other health outcomes important in older people such as institutionalization, hospitalization, re-hospitalization and access to home care servicesacross different settings and conditions.[5]

Recently it has been reported that the well-being of older people suffering from chronic diseases is well represented by the perception that the patient has of his own state of health.[6] Many self-assessment tools have already been validated for other medical conditions (e.g., obesity),[7] whilst the self-assessment of frailty is poorly explored, even if it can guarantee an adequate screening tool for this condition in order to obtain an early diagnosis of frailty itself.[8,9] Recently, in the context of the EFFICHRONIC project, the SELFY-MPI, a self-administered multidimensional frailty assessment tool was developed and validated.[10-12] However, the literature regarding the use of self-assessment tools for identifying frailty in general medicine is still limited.

Given this background, the aim of our study is to determine the degree and the prevalence of self-assessed frailty by means of a multidimensional frailty screening tool (SELFY-MPI) in a cohort of older adults,

belonging to the general practitioner's (GPs) experience to implement the use of multidimensional tools in GPs' clinical practice and promote active and healthy aging programs, for the prevention of frailty in the older individuals.

Materials and Methods

Data source and subjects

All individuals of both sexes aging 65 years and more accessing to a GP's outpatient clinic were eligible for this cross-sectional study. Only people affected by severe dementia were excluded. The presence of a caregiver was allowed to assist the participants in filling out the SELFY-MPI questionnaire. Given the nature of the study, i.e., a survey carried out by means of an anonymous questionnaire filled out by the older subjects freely and without direct relationship with the staff of the medical practice, the local ethics committee did not request any form of consent from the participants.

Structure of the project

Briefly, as shown in Figure 1, experts of the *Società Italiana Geriatria Ospedale e*

Territorio (SIGOT) held a meeting in Genoa, Italy, with twenty senior geriatricians, trained in CGA and MPI. Following this initial meeting, the senior geriatricians prepared in the region where they work a meeting with at least ten GPs. During these meetings, the senior geriatricians explained the MPI and the SELFY-MPI and the importance of multidimensional approach to older people. Each physician participating in the initiative planned to collect ten questionnaires among all older people accessing to his/her outpatient clinic for any reason. These meetings and the subsequent data collection took place between October 2018 and April 2019.
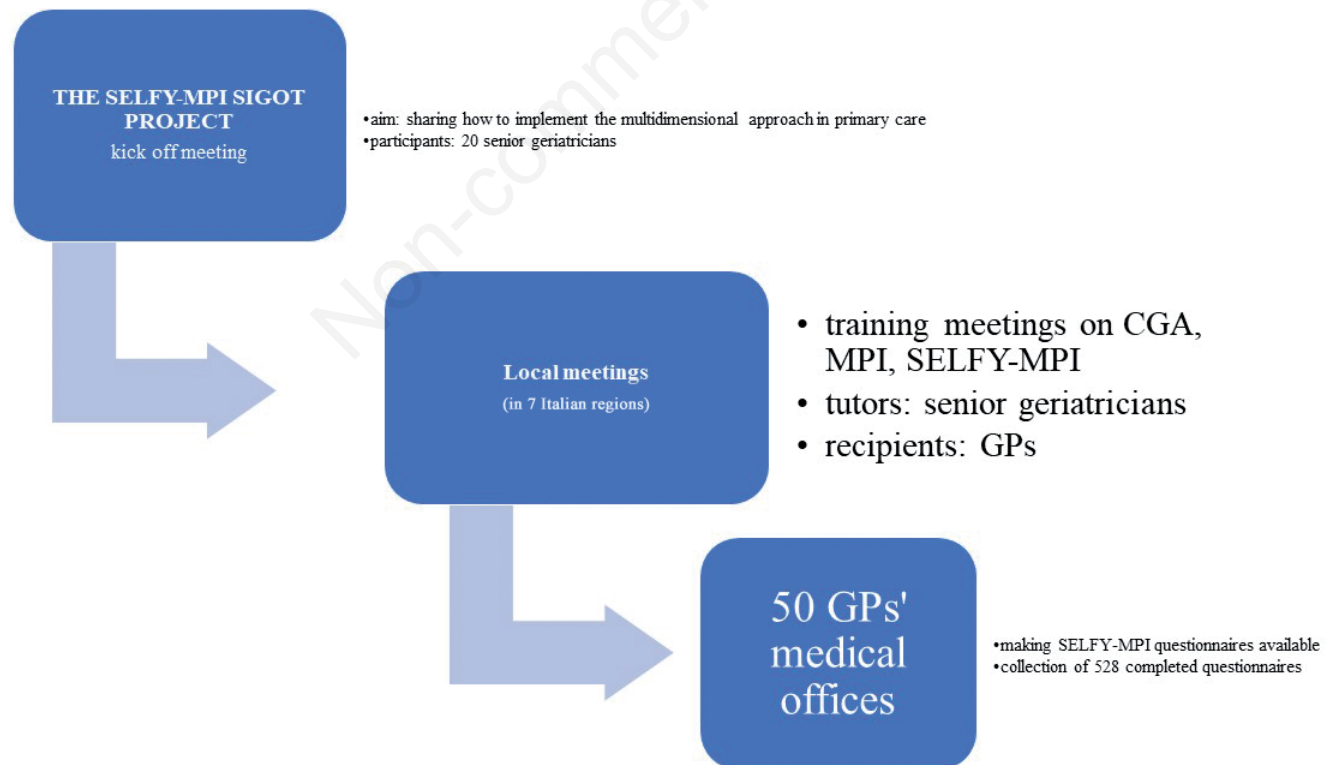
SELFY-MPI

Similarly, to the domains of the MPI,[4] the SELFY-MPI[10-12] considered the following domains:

- Functional status assessed through the Barthel ADL[13] scale that includes the ability in feeding, bathing, personal hygiene, dressing, fecal and urinary continence, and toilet use. This scale can be self-administered.[14]
- Mobility assessed through the Barthel Mobility scale[13] that includes transfer from bed to chair or wheelchair, walking and going up and down the stairs.

This scale can be self-administered.[14]
- Independence by means of the Lawton's IADL scale,[15] as reported earlier. It is also possible to self-administer this scale.[16]
- Cognitive status assessed through the self-administered cognitive screening test (test your memory).[17] It is a validated 10-task cognitive test exploring several domains, including memory, semantic knowledge, and visuospatial skills. The score ranges from 0 to 50, higher scores indicating better cognitive function.[16]
- Nutritional status investigated with the MNA-SF.[18] A validated self-administered MNA-SF was used.[19]
- Number of medications.
- Comorbidity: CIRS comorbidity is the number of health problems/diseases that are so severe to require chronic drug therapies in 13 aspects of health.[20] CIRS can be consequently self-assessed by reporting health problems/diseases that require medications for their treatment.
- Co-habitation status, categorized as living alone, with family/formal caregiver, in nursing home.

Similarly to the original MPI, a tripartite hierarchy was used with 0=no problems, 0.5=moderate problems and 1=severe problem, i.e., higher values indicating higher level of severity of the domain. The sum of

Figure 1. Organization of the project. CGA, comprehensive geriatric assessment; GP, general practitioner; MPI, multidimensional prognostic index; SELFY-MPI, self-administered multidimensional prognostic index; SIGOT, *Società Italiana di Geriatria Ospedale e Territorio* (Italian Geriatrics Society - Hospital and Community).

the calculated scores from the eight domains was divided by 8 to obtain a final SELFY-MPI risk score ranging from 0=no risk to 1=high risk of mortality. For the aims of this work, we used as cut-offs 0.33 and 0.66 for creating three groups: <0.33 (robust), 0.33-0.66 (pre-frail), and >0.66 (frail), in agreement with the original classification of the MPI.[4] The median time required to complete the SELFY-MPI is about 15 min. The SELFY-MPI was calculated having available at least five domains over eight.

Statistical analysis

Means and standard deviations (SD) were used to describe quantitative measures, while percentages and counts were used for categorical variables. Characteristics of the study participants at the baseline were evaluated using generalized linear models for continuous variables. Range and mean values for continuous variables and absolute numbers and percentage were reported in the descriptive analysis of the examined parameters. All the analyses were made using SPSS 20.0.

Results

Overall, 50 GPs from seven Italian regions collected 528 SELFY-MPI questionnaires filled in by older subjects of both sexes belonging to the GPs' clinical practice. Two participants were excluded since MPI was not possible to be calculated. The sample as whole aged a mean of 77.7±7.0 years (range: 65-98 years), with a slightly higher prevalence of females (55.3%).

Table 1 shows the main characteristics of the participants included. On average, the participants were independent in the ADL and IADL, and had a good mobility. At the same time, they reported, on average, some cognitive difficult, as shown by the TYM score and they can be considered at risk of malnutrition. Finally, they had a high prevalence of comorbidities, and they used about four medications/daily, with a range between 0 and 14. The 20.2% of the sample lived alone, suggesting a potential social frailty. Therefore, as shown in Table 2, older

participants can be considered at high risk of frailty according to the single domains, particularly in comorbidities (43.0% had 3 or more medical conditions requiring medications) and number of medications (15.4% of the sample consumed 7 or more drugs each day). At the same time, 54.4% of the population can be considered at medium risk of cognitive decline and 29.3% at risk of malnutrition.

Combining these data derived from the comprehensive geriatric assessment, the mean SELFY-MPI score was 0.26±0.16, with a range between 0 and 0.81. Consequently, as reported in Figure 2, 74.33% were categorized as robust, *i.e.*, in MPI-1 group, 21.67% as pre-frail (MPI-2), and 3.99% as frail (MPI-3).

Discussion

In this research including 526 older participants belonging to the GPs experience, we found that the prevalence of frailty, as

Table 1. Descriptive characteristics of the sample included.

Parameter	Mean (SD) or prevalence (%)	Range
Age	77.7 (7.0)	65-98
Females (%)	291 (55.3)	-
ADL	3.9 (9.1)	0-50
IADL	3.5 (3.0)	0-8
Mobility	2.8 (7.3)	0-40
TYM score	36.7 (9.8)	0-50
MNA-SF	11.7 (2.5)	0-14
CIRS-SI	2.4 (1.6)	0-10
Number of medications	3.9 (2.9)	0-14
Living alone (%)	106 (20.2)	-
SELFY-MPI score	0.26 (0.17)	0-0.81

ADL, activities of daily living; IADL, instrumental activities of daily living; TYM, test your memory; MNA-SF, mini nutritional assessment short form; CIRS-SI, cumulative illness rating scale, severity index; MPI, multidimensional prognostic index.

Table 2. Prevalence, as percentages, of single domains values in the sample.

Domain	Low risk=0	Medium risk=0.5	High risk=1	Missing
ADL	91.3	8.6	0.2	-
IADL	32.9	13.7	53.4	-
Mobility	92.6	5.1	2.3	-
TYM score	36.3	54.4	9.3	-
MNA-SF	62.2	29.3	7.6	1.0
CIRS-SI	10.6	49.0	43.0	-
Number of medications	48.9	7.9	15.4	7.8
Living	63.3	1.3	20.2	15.2

ADL, activities of daily living; IADL, instrumental activities of daily living; TYM, test your memory; MNA-SF, mini nutritional assessment short form; CIRS-SI, cumulative illness rating scale, severity index; MPI, multidimensional prognostic index.
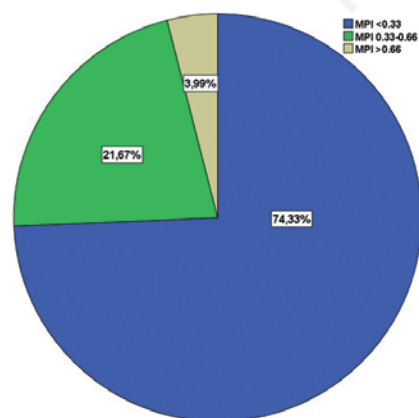
indicated by a self-assessment tool, *i.e.*, the SELFY-MPI was about 4%, whilst 21.67% can be considered at high risk of frailty and its consequences. To the best of our knowledge this is the first work regarding the use of a self-reported tool for detecting frailty in primary care setting, a setting that is increasing in attention for the early identification of frailty and pre-frailty.

SELFY-MPI is one of the few self-assessed screening tools for detecting frailty in older people. In the validation study, in 167 individuals, we reported that this tool highly agreed with the MPI done by trained health professionals (geriatricians and geriatric nurses), indicating that it can be used as screening tool in older people, also because requires about 15 min for the execution.[12]

In a recent systematic review and meta-analysis it has been reported that the overall prevalence of multidimensional frailty, *i.e.*, MPI-3 was 26.8%, but significant differences existed across settings being this estimate higher in nursing home and lower in population-based studies.[21] At the same time, in population-based studies, probably the population nearer to that of our present research, frailty affected 13.3% of the participants and pre-frailty 33.7%.[21] The prevalence of frailty and pre-frailty in the current project were lower for several reasons. First, people included in this research were able to go to their GP's outpatient clinic, even if sometimes with a caregiver, whilst population-based studies also included people that cannot be able to walk. Moreover, people with severe dementia were excluded and it is widely known that these people had significant higher MPI values than those not affected by this condition.

However, we believe that the research presented in this work is important for several reasons. First because it identified a cohort of older persons that can have a hidden frailty. These people were able to go to their GPs ambulatories and, therefore, somebody could think that were independent and a low risk/presence of frailty. On the contrary, about one quarter of the older people included are at higher risk of disability and its consequences. Furthermore, it is important to analyze the single domains that contributed to frailty. Even if these participants were substantially independent in the ADL/IADL and mobility, on average they revealed possible cognitive difficulties, they were at risk of malnutrition, and they used about a mean of four medications/daily, with some individuals taking 14 medications/day. All these factors are widely known as possible risk factors for developing frailty and for increasing the risk of the transition from frailty to disability. For example, cognitive decline/impairment is a strong predictor of frailty[22] and disability.[23] Moreover, malnutrition could be considered as the *primum movens* of frailty and its consequences, until mortality,[24] representing at the same time a window for early nutritional and physical exercise interventions: malnutrition and risk of malnutrition are, in fact, reversible conditions if appropriately treated. For example, the supplementation with amino acids is useful in treating not only malnutrition, but also frailty, particularly in men.[25] Finally, we can consider polypharmacy as another potential target of a multidimensional approach to older persons in primary care settings. A large literature, in fact, has reported that high use of medications is associated with a higher risk of frailty in older people.[26]

We believe that our data might have important clinical implications since, for example, in older community-dwellers, CGA could be used for preventing the transition from robustness, identified in our studies by the MPI-1 group, to pre-frailty and frailty, and their consequences. Therefore, the physician should purpose some preventive interventions, such as vaccinations, increasing physical exercise, higher adherence to a healthy diet.[21] In other cases, such as in MPI-2 or MPI-3, the geriatrician should prevent the transition from frailty to disability and finally to death. For reaching these aims other interventions are usually needed, such as decreasing unnecessary medications, improving nutritional status, resolving social issues and optimize functional status suggesting, for example, specific life-style changes or rehabilitative interventions.

The results of this study must be interpreted within its limitations. First, the people included were able to access to the GP's outpatient clinic: therefore, older people having higher MPI values could be excluded indicating a possible selection bias. Second, the nature of our study is cross-sectional, and we did not explore the value of SELFY MPI in predicting negative outcomes. However, it must be remembered that SELFY MPI is a screening and not a diagnostic tool.

Conclusions

In conclusion, our data collected in older people attending on GP's ambulatories indicate that pre-frailty and frailty are common conditions that should be identified early to allow effective and personalized management based on the multidimensional profile of the individual elderly.

Our study represents another step in more developing and diffusing comprehensive geriatric assessment in primary care setting, in which this competence is highly requested for better tailoring therapies and interventions.

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Figure 2. Prevalence of robustness, pre-frailty, frailty according to the multidimensional prognostic index (MPI).

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