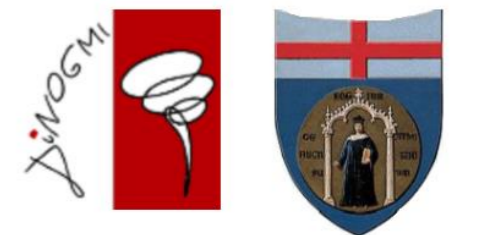# DIAGNOSIS OF DIABETIC NEUROPATHIES IN A LARGE POPULATION OF PATIENTS ACESSING PRIMARY CLINICAL CARE.

A Zuppa [1], C Demichelis [1], M Garnero [1], C Gemelli [1], M Grandis [1], L Benedetti [1], L Reni [1], P Picco [2], P Brasesco [2], B Musolino [2], V Messina [2], A Schenone [1]

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Preliminary data of **prospective study conducted on a large, unselected population of diabetic patients reported by primary care general physicians (GPs):**

Objectives

1. **Prevalence determination of typical and atypical diabetic peripheral neuropathy (DPN)**
2. **Evaluation of symptoms severity**
3. **Coexistence of other causes of neuropathy**

Methods

Since December 2016, we collected data from 10 GPs, who administered the Michigan Neuropathy Screening Instrument (MNSI) in at least 50 consecutively seen diabetic patients (pt), independently on the type of diabetes and the presence of neuropathic symptoms. The data of patients who reached a score of at least 2 points in MNSI were reported to neurologists to evaluate with neurological examination and clinical scales (DN4, VAS and SF 36). If additional clinical signs of neuropathy were present, a neurophysiological study was prescribed.

Results

To date, 85 diabetic patients underwent MNSI, most of them having a type II diabetes. The average age was 72 years, the duration of the disease 11 years and the mean HbA1c level was 7%. **(fig.1)**

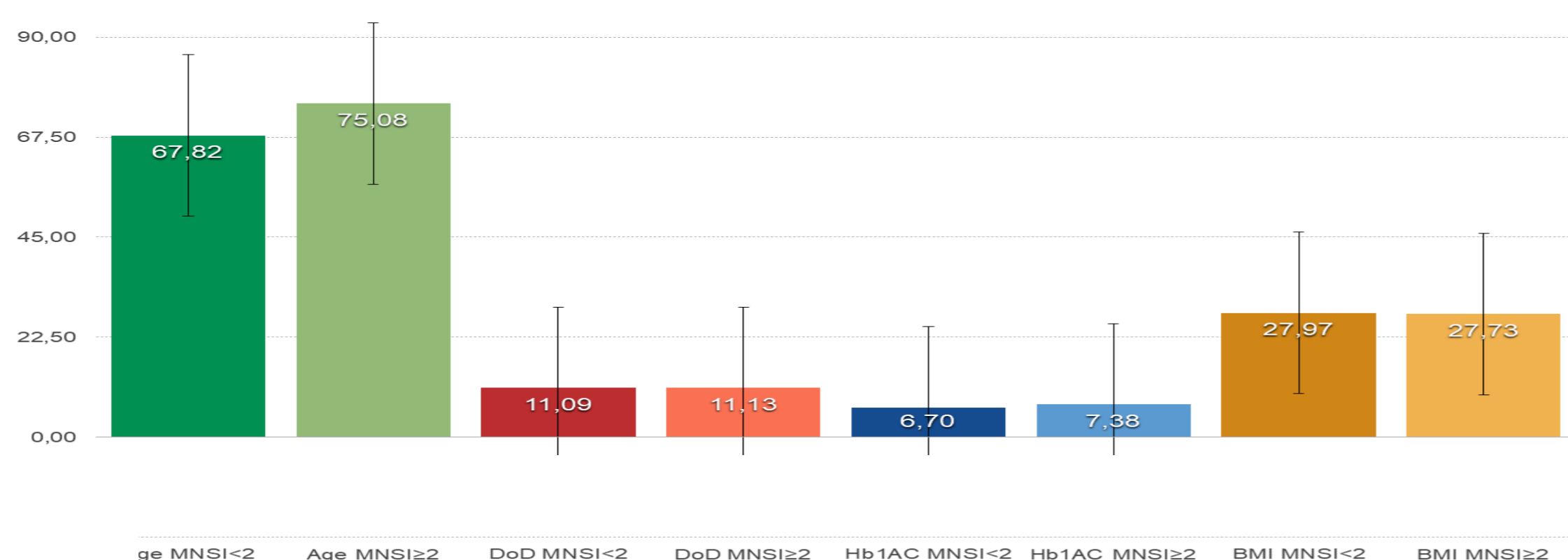| Demographic data	Media	Min	Max
Age	72	38	93
Duration	11	1	12
Hb1ac	7	5	12
BMI	28	18	44

Sex	40-M	45F
Diabetes	1-type I	84-type II

fig.1

Fifty-three (62%) diabetic patients reached a MNSI score of at least 2 points, and were then called for neurological examination and administration of clinical scales (DN4, VAS and SF 36).

Comparing differences between group 2 with MNSI score ≥ 2 (53pt) and group 1 with MNSI <2 (32pt), only average age is statistically related with possibility to find a positive score to Michigan screening test (p<0.05) **(fig. 2)**.

Analyzing MNSI history questionnaire for two groups, we found that the most common symptoms referred were not specific for DPN such as cramps and asthenia. As expected, burning legs (35,8%), numbness (28,30%) and pricking legs (30,18%) were reported especially in subjects with MNSI ≥2 **(fig. 3)**
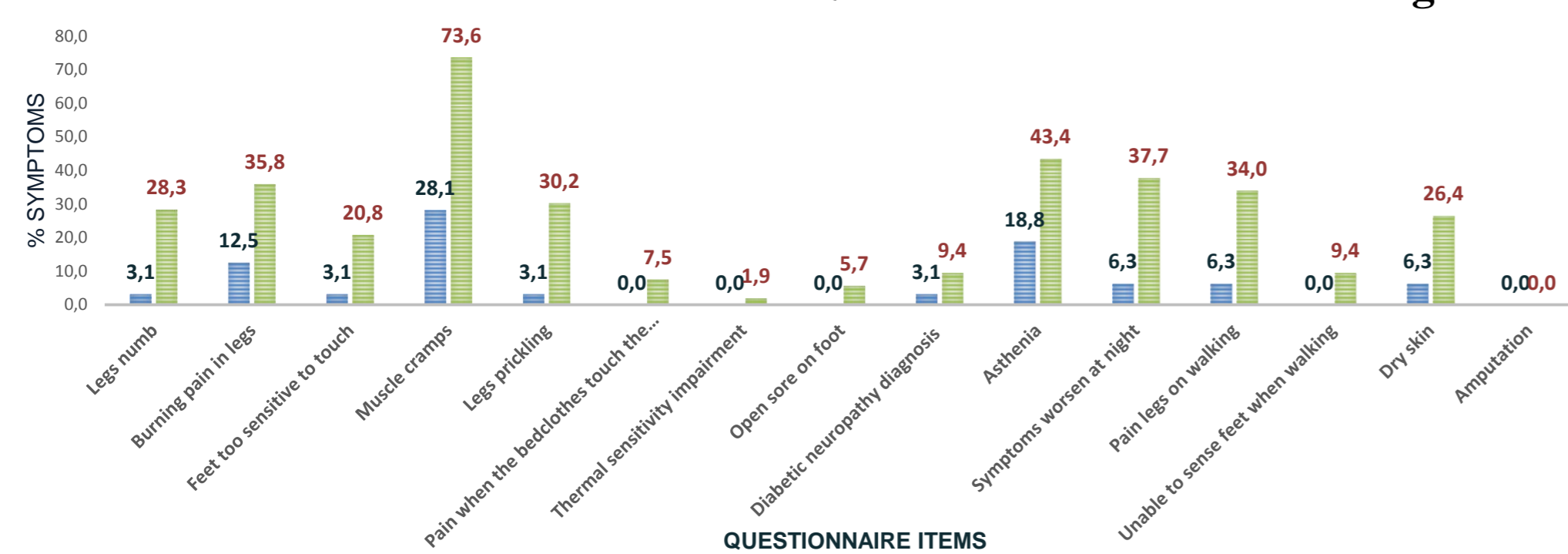

fig.2

fig.3

Physical MNSI examination:

54,7% of patients had abnormalities in foot inspection, 32,01% hypopallesthesia and 26,41% monofilament test positive. **(fig.4)**

MNSI Physical Assessment	0 point	0.5 point	1 point
Foot Inspection	45,2%	0%	54,7%
Reflexes	69,8%	22,6%	7,5%
Vibratory sensation	67,9%	26,41%	5,6%
Monofilament Test	73,5%	26,41%	0%

fig.4

Currently, we have examined 17 of 53 diabetic pt. All of them presented high blood pressure and dyslipidaemia, two patients had serious cardiovascular and cerebrovascular events. Lower limbs obliterans arteriopathy was found in six patients. None had diabetic retinopathy. Only six patients presented kidney microangiopathy. Among other possible causes of peripheral nerves involvement HCV infection (1pt) and ANA 1:60 (1pz) was found.

The neurologic examination showed:
- Distal symmetric limbs hypopallesthesia in 70% of pt
- Achilles reflexes absence in 47% of pt, patellar reflexes reduction in 17,64% of pt; absence of radial reflexes in 23% and bicipital reflexes reduction in 17% of pt. All these reflexes alteration were symmetric
- Paresthesia in 17%
- Seven of them presented dysesthesia
- No one had symptoms and signs of vegetative impairment
- No one had disabilities, limitations in daily life activities related to neurologic conditions.

HbA1c level greater than 6,5 % increased the chance to reveal pathologic signs and symptoms (p <0.01), instead advanced age is not an associated factor (p ns).

The neurophysiological study was prescribed in patients who had MNSI score > 2 and that the neurological examination presented signs of possible peripheral neuropathy.

To date, only six patients underwent neurophysiological studies:
- Normal elettrophysiological pattern (1pt)
- Axonal sensory-motor neuropathy (4pt, **fig.5**)
- Sensory – motor neuropathy with axonal features associated to demyelination involvement (1pt, **fig.6**)

VCM

Nervo / Posizioni	Lat. ms	Amp. mV	Dur. ms	Dist. cm	Vel. m/s
D ULNAR - ADM					
1. Polso	2,30	8,7	5,05	6	
2. Sottogomito	6,75	6,8	6,35	22	49,4
3. Sopragomito	8,80	6,1	6,60	12	58,5
D COMM PERONEAL - EDB					
1. Caviglia	4,40	1,4	5,95	8	
2. Fibula	12,70	0,8	9,25	33	39,8
3. Ginocchio	14,35	0,7	8,90	9	54,5
S COMM PERONEAL - EDB					
1. Caviglia	4,25	0,8	4,90	8	
2. Fibula	13,40	0,3	11,30	37	40,4
3. Ginocchio	15,10	0,3	12,60	10	58,8

VCS

Nervo / Posizioni	Lat. 1 ms	Amp. µV	Dur. ms	Lat. 2 ms	Risp.	Dist. cm	Vel. m/s
D ULNAR - V Dito							
1. Polso	2,45	4,3	1,50	3,15		13	53,1
D SURAL - Mall Lat (ago)							
1. Sura					No	14	
S SURAL - Mall Lat (ago)							
1. Sura					No	14	

fig.5

VCM

Nervo / Posizioni	Lat. ms	Amp. mV	Dur. ms	Dist. cm	Vel. m/s
D ULNAR - ADM					
1. Polso	3,55	7,0	5,20	6	
2. Sottogomito	8,95	4,9	5,45	22,5	41,7
3. Sopragomito	11,20	5,4	5,15	10	44,4
S COMM PERONEAL - EDB					
1. Caviglia	5,00	1,4	3,70	8	
2. Fibula	15,55	1,2	4,15	35	33,2
3. Ginocchio	17,95	1,0	4,20	10	41,7
D COMM PERONEAL - EDB					
1. Caviglia		NO		8	
2. Fibula	12,95	0,1	7,00		
D TIBIAL MALLEOLUS - AH					
1. Caviglia	4,25	0,9	4,70		
2. Poplite	18,50	0,2	10,45	41	28,8

VCS

Nervo / Posizioni	Lat. 1 ms	Amp. µV	Dur. ms	Lat. 2 ms	Dist. cm	Vel. m/s
S RADIAL - I Dito						
1. Polso	1,60	14,9	1,80	2,40	9	56,2
S SURAL - Mall Lat (ago)						
1. Sura	3,45	*5,7	1,45	4,05	12,5	36,2
D SURAL - Mall Lat (ago)						
1. Sura	3,00	*5,6	1,20	3,40	10	33,3

fig.6

Conclusions

- The present data suggest that the use of the MNSI score in an unselected population of diabetic patients seen in a primary care practice reveals an unusually high number of subjects with symptoms and signs resembling DPN (62%). However, only a minority of them at a neurological and instrumental evaluation shows diabetic neuropathy.
- The preliminary results show a possible DPN prevalence of 38% which agrees with Italian estimated prevalence (31%).
- In spite of a high MNSI score, in our population, we found a light neurological impairment with no disability and low impact on health.
- Herein we report a single case of axonal associated to demyelination involvement neuropathy which will have to be furtherly studied.
- SF36, VAS and DN4 scales will be statistically evaluated when the sample will be larger.

Reference: . Moghtaderi A1, Bakhshipour A, Rashidi H; Validation of Michigan neuropathy screening instrument for diabetic peripheral neuropathy. Clin Neurol Neurosurg. 2006 Jul;108(5):477-81. Epub 2005 Sep 16.