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Quentin Guillou

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THÈSE D'EXERCICE

Pour le

DOCTORAT DE MÉDECINE DE SPÉCIALITÉ MÉDECINE GÉNÉRALE

Par

Mr GUILLOU Quentin

Né le 3 février 1989, à Paimpol (Côtes d'Armor)

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**SEARCH FOR DECOMPENSATION RISK FACTORS WITHIN THE
EGPRN MULTIMORBIDITY'S DEFINITION THEMES. COHORT
PILOT STUDY, FOLLOW UP AT 21 MONTHS IN NURSING HOME.**

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Table des matières

I- INTRODUCTION	14
II- MATERIEL AND METHOD	17
1- STUDY DESIGN	17
2- STUDY POPULATION	17
A- INCLUSION CRITERIA	17
B- EXCLUSION CRITERIA	18
C- FP'S RECRUITMENT:	18
3- STUDY PROCESS	19
4- JUDGMENT CRITERIA	22
5- PATIENTS' STATUS COLLECTION	22
6- DATA CLEANING	23
7- STATISTICAL ANALYSIS	23
A- CLEANING AND RECODING DATA	23
B- MULTIDIMENSIONAL ANALYSIS: CLUSTERING ET CLASSIFICATION	24
C- SURVIVAL ANALYSIS	24
8- ETHICS	25
III- RESULTS:	26
1- STUDY POPULATION:	26
2- STATUS AT TWENTY-ONE MONTHS :	26
3- CLEANING AND RECORDING DATA:	32
4- CLUSTERING AND CLASSIFICATION :	33
A- CLUSTER 1	35
B- CLUSTER 2	38
C- CLUSTER 3	41
5- SURVIVAL ANALYSIS:	42
A- SURVIVAL ANALYSIS: KAPLAN MEYER METHOD/LOG RANK TEST	42
B- UNI AND MULTIVARIATE ANALYSIS: REGRESSION FOLLOWING COX'S MODEL	45
C- COX'S MODEL VALIDITY:	47
VI- DISCUSSION	47
1- INTERPRETATION OF RESULTS:	47
2- ANALYSIS OF THE DIFFICULTIES ENCOUNTERED :	49
A- LOW NUMBER OF PATIENTS INCLUDED:	49
B- RELEVANCE OF CERTAIN ITEMS OF THE QUESTIONNAIRE:	49
C- SUBJECTIVITY OF THE QUESTION "EXPERTISE OF THE GP":	50
D- CLASSIFICATION OF CHRONIC DISEASES	50
E- STATISTICAL ANALYSIS :	50
F- DATA TRANSMISSION	51
3- LIMITS OF STUDY :	51
A- SELECTION BIAS :	51
B- INFORMATION BIAS :	52
C- CONFUSION BIAS :	52
4- FUTURE PROSPECTS:	53
IV- CONCLUSION	55
BIBLIOGRAPHIE	56
APPENDIX	62

APPENDIX 1: QUESTIONNAIRE USED DURING THE STUDY	62
APPENDIX 2 : SCORE DE RISQUE DE CHUTE ELABORE PAR LE CETAF :	67
APPENDIX 3: MODIFIED DICTIONARY FOR NH COHORT STUDY	69
SERMENT D'HIPPOCRATE	75

RESUME

RECHERCHE DES FACTEURS DE RISQUES DE DECOMPENSATION PARMIL LES THEMES DE LA DEFINITION DE LA MULTIMORBIDITE SELON EGPRN. ETUDE PILOTE DE COHORTE, A 21 MOIS DE SUIVI EN EHPAD.

Introduction :

Du fait du vieillissement de la population, une multitude de pathologies chroniques est en plein essor. La multimorbidité concerne une importante partie de la population aussi bien en ville qu'en Établissement d'Hébergement pour Personnes Âgées Dépendantes. L'objectif de cette étude était d'identifier, à 21 mois, des facteurs de risques de décompensation de la multimorbidité en EHPAD.

Méthode :

De juillet 2014 à décembre 2015, une étude de cohorte prospective observationnelle a été réalisée à l'EHPAD de Lanmeur, dans le Finistère. Les patients correspondant à la définition de la multimorbidité de l'European General Practitioners Research Network (EGPRN) ont été inclus par des médecins généralistes. La décompensation était définie par la survenue du décès ou une hospitalisation d'au moins 7 jours consécutifs. Vingt et un mois après l'inclusion, les patients étaient répartis selon leur statut en deux groupes, "Décompensés" ("D") ou "Rien à Signaler" ("RAS"). Une analyse multivariée suivant le modèle de Cox était réalisée pour identifier les facteurs de risques de décompensation.

Résultats :

Après dix-huit mois de suivi, 64 patients ont été inclus. 35 appartenaient au groupe "D" et 29 au groupe "RAS". L'analyse multivariée selon un modèle de Cox retrouva deux variables statistiquement significatives : la douleur (HR = 2,20, IC 95% [1,10-4,40]) comme facteur de décompensation et l'hygiène correcte (HR = 0,44, IC 95% [0,20-0,94]) comme facteur de protection.

Conclusion :

La douleur semble corrélée au risque de décès ou d'hospitalisation chez les personnes âgées multimorbides résidant en EHPAD alors que l'hygiène correcte parait le diminuer. Les différentes difficultés rencontrées serviront à l'amélioration de la méthodologie. Les résultats seront à confirmer lors d'une étude, plus puissante, à l'échelle européenne.

ABSTRACT

RESEARCH OF THE RISK FACTORS OF DECOMPENSATION AMONG THE THEMES OF THE DEFINITION OF MULTIMORBIDITY ACCORDING TO EGPRN. PILOT STUDY OF COHORT, 21 MONTHS OF MONITORING IN NURSING HOME.

Introduction:

Due to an ageing population chronic diseases are in full swing. Multimorbidity concerns a large part of the population both in outpatients and in Nursing Homes. The objective of this study was to identify, at 21 months of follow up, risk factors for decompensation patients with multimorbidity in nursing homes.

Méthod:

From July 2014 to December 2015, a prospective observational cohort study was conducted at the Lanmeur nursing home in Finistère. Patients meeting the definition of multimorbidity of the European General Practitioners Research Network (EGPRN) were included by their general practitioners. Decompensation was defined as the occurrence of death or hospitalization for at least 7 consecutive days. Twenty-one months after inclusion, patients were divided according to their status into two groups, "Decompensated" ("D") or "Nothing to Report" ("NTR"). A multivariate analysis following the Cox model was performed to identify risk factors for decompensation.

Résultats:

64 patients were included. 35 belonged to group "D" and 29 to group "RAS". Multivariate analysis using a Cox model found two statistically significant variables: pain (HR = 2.20, 95% CI [1.10-4.40]) which emerged as a decompensation factor, while correct hygiene (HR = 0.44, 95% CI [0.20-0.94]) emerged as a protective factor.

Conclusion:

Pain seems correlated to the risk of death or hospitalization in elderly multi-morbid residents residing in nursing homes while correct hygiene seemed to be correlated with its reduction. The encountered difficulties will be used to improve the methodology which would be useful as the results needs to be confirmed in a more powerful study at a European level.

I- INTRODUCTION:

Multi-morbidity is an everyday notion in general practice. It is a global vision of the patient, fundamental competence for general practitioners, as defined by the world organization of national colleges, academies and academic associations of general practitioners (WONCA) (1). Advances in medical care, public health policies and longevity have, in recent decades, increased the prevalence of chronic diseases (2), and also the burden of diseases (3) and the cost of health care (4). As a result, primary care is becoming more complex and additional challenges are added for FP (5). In these conditions that the concepts of comorbidity and multimorbidity have been established.

During the seventies the term comorbidity was first used (6) and was described "any disease or risk factors that may interact with a major disease and aggravate it" (7). This concept was based on disease (8). In 1976, the concept of multimorbidity was at first described in Germany (9). Beginning in 1990, the concept of multimorbidity has been globally established (10). It is accepted as an addition to the concept of comorbidity with the purpose of estimating all conditions in a person (11).

In 2008, the World Health Organization (WHO) characterized multimorbidity as people with two or more chronic conditions (12). An illness is classified as chronic if it is permanent, caused by non-reversible pathological damage, and if it requires a long period of care or rehabilitation. NCDs (noncommunicable diseases) are the leading cause of disability and death worldwide, according to WHO (13).

Improved health conditions and advances in medicine and technology are leading to a significant increase in life expectancy, and also an aging population. At the beginning of January 2017, in France, individuals aged 65 and over represent 19.2% of the population, which is an increase of 3.7 points in 20 years (14). With age, the prevalence rates of multimorbidity increase significantly (15–18). The prevalence of multimorbidity varies, if we consider the entire population, from 20 to 30%; while it varies, among people aged 65 and over, from 55% to 98% (19,20).

This prevalence is profoundly affected by the definition of multimorbidity and the differences in methodologies of the various studies on multimorbidity.

With a review of the literature, the European General Practitioners Research Network (EGPRN), suggested in 2012 an exhaustive definition of the concept of multimorbidity: "Multimorbidity is defined as any combination of chronic disease, chronic) or bio- psychosocial factor (associated or not) or somatic risk factor. Any bio- psychosocial factor, any somatic risk factor, the social network, the burden of diseases, the healthcare consumption, and the patient's coping strategy can function as modifiers (of the effects of multimorbidity) (21). Multimorbidity can modify the health outcomes and lead to an increased disability or decreased quality of life or frailty (21).

This new definition designed for European general practitioners could facilitate the identification of multimorbid patients. This definition has been transcribed in ten European languages and in English (22). This definition is also important for other long-term care physicians and politicians to plan for optimal patient management and to reduce the burden of multimorbidity (23).

On the health system, the burden of multimorbidity is major since there is a considerable effect on increasing disability and dependency, health care use, reduced quality of life, side effects medicines and health costs (24). Multimorbidity is a global indicator of health that provides information other than all diseases considered separately (25).

It is therefore essential now to focus health goals not on diseases in general, but on the patient himself with his illnesses, treatments and risk factors (26). It is also essential to introduce prevention methods against multimorbidity (27).

Research interests

Between 2010 and 2014, residents at the Brest general medicine department carried out several qualitative studies with the intention of extracting different themes of multi-morbidity, under the direction of two general medical researchers (28,29)(30–33). Identifying the factors of multimorbidity was the goal of these studies. Thirteen themes were exposed.

On these results, a quantitative study was conducted to highlight the risk factors for decompensation among the themes of multimorbidity. The peer group team defined decompensation as hospitalization for more than seven days or death.

In 2015, a pilot feasibility study was conducted with nursing home patients meeting the criteria for the definition of multimorbidity (34). In the long term, the aim was to carry out a large-scale study in France and Europe to detect the most discriminating factors of multimorbidity that can cause decompensation.

Research hypothesis

The study hypothesis was that most patients living in nursing homes met the definition of EGPRN and that some criteria or groups of criteria from the definition of multimorbidity are more discriminating than others for identify patients at risk of decompensation.

Research objective

The first objective of this study was to determine which criteria or groups of criteria from the definition of multimorbidity could help identify patients at risk of decompensation.

The second objective was to identify the difficulties encountered in this study.

II- MATERIEL AND METHOD

1- Study design

In 2014, in Lanmeur's nursing home, a pilot feasibility study was first carried out. It was a cohort study, observational, prospective.

The required number of patients was 127 by establishing an alpha risk of 5% and a beta risk of 20% with a non-symmetrical sample (75% / 25%) and a 20% difference was expected on the significant variables.

Of the 127 initially expected only 64 were included for lack of patients meeting the inclusion criteria.

The inclusion lasted 6 months, instead of 3 months originally planned. Data from 64 patients were extracted and analyzed every three months. (at three months, six months, nine months, twelve months, fifteen months and eighteen months)

This thesis was focused on the follow-up at 21 months of the inclusion of the 64 patients' cohort

2- Study population

a- Inclusion criteria

The inclusion criteria had to meet the criteria for the definition of multi-banding according to the definition of EGPRN: "any combination of chronic disease with at least another disease (acute or chronic) or with bio psychosocial factor (associated or not) or somatic risk factor "(any combination of chronic disease with at least one other disease (acute or chronic) or a bio-psychosocial factor (associated or not) or a somatic risk factor For the team, the

biopsychosocial factor meant the factors psychological risk, psychosocial risk factors, lifestyle, demographics (age, gender), psychological distress, socio-demographic characteristics, aging, patient beliefs and expectations, physiology and pathophysiology.

Each included patient had to sign informed consent prior to inclusion and must be monitored over time

b- Exclusion criteria

As for the exclusion criteria, they were patients who did not meet the criteria of the definition of multi-morbidity, the impossibility of a follow-up in the time allotted to the study, patients under legal protection, life-threatening patients whose survival was estimated under three months.

c- FP's recruitment:

FPs could include all multimorbid patients (according to the EGPRN definition) that they met in their office in Finistère.

An email was sent by the team of the first pilot study to all clinical teachers attached to the Department of Family Medicine at the University of Brest.

19 FP accepted which resulted in the inclusion of 96 patients between July and December 2014.

The team recruited 12 new FPs from July to October 2015 to obtain the number of subjects needed.

Thus 35 new patients have joined the study, which includes 131 patients

3- Study process

A second email was sent to the FPs who approved to participate in order to indicate the continuation of the study.

First, informed consent as well as fair and complete information about the study had to be signed by every patient recruited.

Next, referring physicians responded to a questionnaire (appendix 3) on their patient inspecting the potential of decompensation risk factors found in the themes and subtopics of multimorbidity (table 1).

Table 1: Themes and subthemes of the multimorbidity

THEMES	SUBTHEMES
Chronic disease	Chronic condition Chronic diseases Complexity characteristics of chronic disease Psychosomatic disease
Acute disease	Acute condition Acute disease Complexity characteristics of acute disease Reaction to severe stress and acute disorders
Biopsychosocial factors and somatic risk factors	Demographic risk factor Lifestyle Patients beliefs/expectations Physiopathology Psychological risk factors Psychosocial risk factors Sociodemographic characteristics Somatic risk factors
Coping	Patient's coping strategies

Burden of diseases	Disease morbidity Disease complication
Health care consumption	Use of carers Disease management Health system Health care policy Health care Health care services Malpractice Assessment Medical history Medical procedure Pain Polypharmacy Prevention Symptoms/signs/complaints Treatment or medication Cost of care
Disability	Handicap Functional impairments
Quality of life	Health status Impairment Morbidity implication Quality of life
Frailty	Frailty
Social network	Dependence on social network Family's coping strategies Social isolation Social network Support from social network

Health outcomes	Outcomes Medical research epidemiology Mortality
Core competencies of FP	Holistic approach Practical experience of general practitioners with patients General practitioner, as a lonely expert of multimorbidity Expertise of the general practitioner "Gut feeling"/Intuition Person-centred care Primary care management Specific problem solving skills
Relationship between FP and patient	Communication challenge FP's and patient's experience

Quantitative variables were collected through this questionnaire based on axial and thematic coding to demonstrate the definition of multimorbidity.

The qualitative notions of the themes and subtopics of multimorbidity have been transformed into quantitative variables to simplify the collection of data after the completion of the questionnaire and to reduce confusion.

The variables "cardiovascular risk factor", "risk factor of falling", "assessment of hygiene", "assessment of diet" and "evaluation of physical activity" were extracted by the book feasibility pilot team coding to determine the concept of somatic risk factors. The CETAF score allowed the calculation of the risk of falling (Appendix 2).

Some variables present in the first pilot study: "chronic condition, cost of care, disability, quality of life and health outcome, frailty, physiology, disease and assessment, demographics and aging" were erased as considered no relevant.

The EVALANDGO software accompanied the questionnaire in order to collect the data via internet. The data has been archived on Microsoft Excel.

For the inclusion of the last thirty-five patients, the questionnaire was redesigned (appendix 1), the layout of the questions was changed. The answer to the previous question is essential before answering the next one.

This questionnaire has been validated by a peer group.

4- Judgment criteria

The primary endpoint was the onset of decompensation during follow-up at 21 months for the 64 patients included. Decompensation was determined by a peer group (including physicians, internal and primary care researchers on multimorbidity) as a hospital stay of more than seven days or the patient's death.

The secondary endpoint was the difficulties encountered during the study process.

5- Patients' status collection

The rest of the study process was based on the knowledge of the patients health, at the end of the observation period, of each patient included.

A team analyzed the status of the included patient at 21 months after inclusion and anonymized the data.

The patient was organized in one of two categories: "D" ("Decompensation") or "NTR" ("Nothing to report").

Decompensation is defined by the patient's death or hospitalization for more than 7 consecutive days.

At the beginning of the study, the groups were named "fragile" and "non-fragile" but they were modified after 6 months of follow-up, because of the risk of confusion between "fragile" and "fragility" whose The definition is not consensual between Fried's physical approach and Rockwood's concept of fragility.

The patient's status was collected by email or phone for each PF.

6- Data cleaning

The data has been archived on Microsoft Exel.

Previous statistical analysis, in order to harmonize the data, a data cleaning was done.

The acronyms were used. The grouping of certain diseases into one entity and the removal of others were carried out.

Since this recoding, each patient has had a reassessment of the number of chronic diseases.

All these modifications have been noted in the "dictionary" (Appendix 3).

Some missing data were identified during cleanup and resulted in their replacement with the median value of the group to be included in the statistical analysis.

7- Statistical analysis

a- Cleaning and recoding data

In order to compare the two categories of patients "Decompensation" and "Nothing to report", a two-dimensional analysis was performed for each variable.

For qualitative variables, an exact Fisher test or a Chi2 test was used, with an alpha risk at 5% and a beta risk at 20%.

For quantitative variables, a Student test or Wilcoxon / Mann Whitney test was performed, with similar risk levels to examine the averages or medians between the two groups.

b- Multidimensional analysis: Clustering et classification

Clustering is a multidimensional and descriptive analysis.

To represent the multimorbid population: Patients with similar characteristics were classified into homogeneous groups irrespective of their status at 21 months.

Subsequently, a measure of dissimilarity with the calculation of the Euclidean distance and a hierarchical grouping using the Ward method was practiced.

Then, these results led to the creation of a classification tree called cluster dendrogram to examine the hierarchy of groups.

Subsequently, for each group, carrying out a multiple correspondence analysis (MCA) allowed the identification of the discriminating variables.

Finally, clustering and their projection on factorial designs was possible through the use of hierarchical clustering on the principal components (HCPC).

Qualitative and quantitative variables were applied for each group.

c- Survival analysis

The patients did not all decompensate at the same time. Thus, time had to be taken into account for the survival analysis.

The evaluation of the additional risk brought by the exposure to a risk factor while studying the probability of decompensation at any time of the follow-up was possible by a regression following the model of Cox.

Survival curves for groups "D" and "NTR" were performed using the Kaplan-Meier method, a non-parametric estimate evaluating the survival function.

A univariate analysis with a log-rank test with a p-value of 0.05 was performed in order to know if the two groups were significantly different.

Then, the undefined risk ratios (HR) and their 95% confidence intervals (CI) (univariate analysis) were calculated by a semi-parametric evaluation using the Cox method). They were defined by the association between a variable and the risk factor of decompensation, taking into account the time.

Subsequently, to produce the adjusted HR (multivariate analysis) and their 95% CI, a second model of Cox was produced.

The association between a variable and the decompensation risk factor after adjustment for other variables represents adjusted HR.

The goal was to dodge the confounding factors.

At the end, the verification of the proportional hazards hypothesis defined by the Cox model was carried out by a Chi 2 test allowing, thus, a control of the final model.

8- Ethics

The study was approved by the Ethics Committee of the Faculty of Medicine of the University of Western Brittany.

III- RESULTS:

1- Study population:

From July to December 2014, the first inclusion period was completed: 64 patients were included out of the 127 expected. The status at twenty-one months could be collected for each patient because none of the patients was lost sight of.

From July to December 2015, a second period included another 54 patients. 118 people formed the new cohort. Another thesis will study the data after twenty-one months of follow-up for the 118 patients.

2- Status at twenty-one months :

Twenty-one months after inclusion, 35 patients belonged to group "D" and 29 to group "NTR".

In group "D", 14 were hospitalized seven days or more and 21 died.

The characteristics of the two groups are shown in Table 2.

Table 2: Characteristics of the study population caution the table is not in the page and is not in English

		NTR		Decompensation		Study population		Pvalue Chi2/Fisher
		N	%	N	%	N	%	
<i>Somatic risk factors and disease</i>								
Osteo articular disease	No	10	0,34	12	0,34	22	0,34	1,000
	Yes	19	0,66	23	0,66	42	0,66	
Hypertension	No	7	0,24	10	0,29	17	0,27	0,908
	Yes	22	0,76	25	0,71	47	0,73	
Hypercholestérolémia	No	23	0,79	31	0,89	54	0,84	0,503
	Yes	6	0,21	4	0,11	10	0,16	
Diabetes	No	26	0,90	31	0,89	57	0,89	1,000

	Yes	7	0,16	4	0,09	11	0,13	
<i>Other Qualitative variables</i>								
Psychosomatic diseases	No	21	0,72	25	0,71	46	0,72	1,000
	Yes	8	0,28	10	0,29	18	0,28	
Complexity of chronic disease	No	12	0,41	10	0,29	22	0,34	0,418
	Yes	17	0,59	25	0,71	42	0,66	
Reaction to severe stress	No	13	0,45	14	0,40	27	0,42	0,893
	Yes	16	0,55	21	0,60	37	0,58	
Complication of acute disease	No	21	0,72	19	0,54	40	0,63	0,218
	Yes	8	0,28	16	0,46	24	0,38	
Cardio vascular family risk	No	29	1,00	35	1,00	64	1,00	NI
	Yes	0	-	0	-	0	-	
Overweight	No	19	0,66	21	0,60	40	0,63	0,846
	Yes	10	0,34	14	0,40	24	0,38	
Immunodepression	No	22	0,76	30	0,86	52	0,81	0,494
	Yes	7	0,24	5	0,14	12	0,19	
Postural instability	No	7	0,24	10	0,29	17	0,27	0,908
	Yes	22	0,76	25	0,71	47	0,73	
Risk behaviour	No	29	1,00	32	0,91	61	0,95	0,245
	Yes	0	-	3	0,09	3	0,05	
Suicide risk	No	29	1,00	35	1,00	64	1,00	NI
	Yes	0	-	0	-	0	-	
Addiction	No	26	0,90	30	0,86	56	0,88	0,924
	Yes	3	0,10	5	0,14	8	0,13	
No psychological risk factors	No	3	0,10	7	0,20	10	0,16	0,476
	Yes	26	0,90	28	0,80	54	0,84	
Marital problems	No	29	1,00	35	1,00	64	1,00	NI
	Yes	0	-	0	-	0	-	
Stress at work	No	29	1,00	35	1,00	64	1,00	NI
	Yes	0	-	0	-	0	-	

Family problems	No	25	0,86	33	0,94	58	0,91	0,501
	Yes	4	0,14	2	0,06	6	0,09	
Financial and social insecurity	No	23	0,79	30	0,86	53	0,83	0,731
	Yes	6	0,21	5	0,14	11	0,17	
Death of one or more relatives	No	8	0,28	12	0,34	20	0,31	0,761
	Yes	21	0,72	23	0,66	44	0,69	
Divorce	No	29	1,00	34	0,97	63	0,98	1,000
	Yes	0	-	1	0,03	1	0,02	
Good hygiene	No	14	0,48	26	0,74	40	0,63	0,060
	Yes	15	0,52	9	0,26	24	0,38	
Physical activity	No	26	0,90	34	0,97	60	0,94	0,321
	Yes	3	0,10	1	0,03	4	0,06	
Healthy diet	No	12	0,41	20	0,57	32	0,50	0,315
	Yes	17	0,59	15	0,43	32	0,50	
Aucun (way of life)	No	19	0,66	18	0,51	37	0,58	0,378
	Yes	10	0,34	17	0,49	27	0,42	
Sex	Women	18	0,62	22	0,63	40	0,63	1,000
	Men	11	0,34	13	0,37	24	0,38	
Socio-professionnal category (SPC)	SPC1-Farmer	6	0,21	7	0,20	13	0,20	0,027
	SCP2-artisan	8	0,28	0	-	8	0,13	
	SPC3-executive	2	0,07	2	0,06	4	0,06	
	SPC4-intermediate profession	1	0,03	3	0,09	4	0,06	
	SPC5-Employee	2	0,07	4	0,11	6	0,09	
	SPC6-Worker	7	0,24	10	0,29	17	0,27	

	SPC7- unemployed	3	0,10	9	0,26	12	0,19	
In a relationship	No	23	0,79	29	0,83	52	0,81	0,968
	Yes	6	0,21	6	0,17	12	0,19	
single	No	6	0,21	6	0,17	12	0,19	0,968
	Yes	23	0,79	29	0,83	52	0,81	
children	No	9	0,31	6	0,17	15	0,23	0,313
	Yes	20	0,69	29	0,83	49	0,77	
Coping strategies	No	17	0,59	19	0,54	36	0,56	0,924
	Yes	12	0,41	16	0,46	28	0,44	
Complication of disease	No	19	0,66	17	0,49	36	0,56	0,268
	Yes	10	0,34	18	0,51	28	0,44	
Pharmacologic treatments	No	0	-	0	-	0	-	NI
	Yes	29	1,00	35	1,00	64	1,00	
Treatment with risk	No	18	0,62	20	0,57	38	0,59	0,886
	Yes	11	0,38	15	0,43	26	0,41	
Daily use of psychotropic	No	1	0,03	3	0,09	4	0,06	0,620
	Yes	28	0,97	32	0,91	60	0,94	
Coordination health procedure	No	11	0,38	13	0,37	24	0,38	1,000
	Yes	18	0,62	22	0,63	40	0,63	
Good communication between other careers	No	3	0,10	5	0,14	8	0,13	0,924
	Yes	26	0,90	30	0,86	56	0,88	
Negligence of patient	No	27	0,93	30	0,86	57	0,89	0,589
	Yes	2	0,07	5	0,14	7	0,11	
Victim of iatrogeny	No	18	0,62	28	0,80	46	0,72	0,191
	Yes	11	0,38	7	0,20	18	0,28	
Material for patient at home	No	0	-	0	-	0	-	NI
	Yes	29	1,00	35	1,00	64	1,00	
Human help	No	0	-	0	-	0	-	NI
	Yes	29	1,00	35	1,00	64	1,00	
Lack of time and remuneration	No	22	0,76	24	0,69	46	0,72	0,714
	Yes	7	0,24	11	0,31	18	0,28	

Heavy and complex medical story	No	7	0,24	11	0,31	18	0,28	0,714
	Yes	22	0,76	24	0,69	46	0,72	
Recommended vaccinations	No	0	-	1	0,03	1	0,02	1,000
	Yes	29	1,00	34	0,97	63	0,98	
Proposal of screening	No	23	0,79	29	0,83	52	0,81	0,968
	Yes	6	0,21	6	0,17	12	0,19	
Acceptation of screening	No	24	0,83	28	0,80	52	0,81	1,000
	Yes	5	0,17	7	0,20	12	0,19	
Proposal of therapeutic education	No	27	0,93	34	0,97	61	0,95	0,586
	Yes	2	0,07	1	0,03	3	0,05	
Painful patient	No	23	0,79	22	0,63	45	0,70	0,246
	Yes	6	0,21	13	0,37	19	0,30	
Multiples complaints	No	23	0,79	24	0,69	47	0,73	0,494
	Yes	6	0,21	11	0,31	17	0,27	
Existing entourage	No	0	-	1	0,03	1	0,02	1,000
	Yes	29	1,00	34	0,97	63	0,98	
Supporting entourage	No	7	0,24	5	0,14	12	0,19	0,494
	Yes	22	0,76	30	0,86	52	0,81	
Dependency of entourage	No	6	0,21	5	0,14	11	0,17	0,731
	Yes	24	0,79	30	0,86	53	0,83	
Entourage's coping	No	19	0,66	22	0,63	41	0,64	1,000
	Yes	10	0,34	13	0,37	23	0,36	
Absence of entourage	No	29	1,00	34	0,97	63	0,98	1,000
	Yes	0	-	1	0,03	1	0,02	
Knowledge of the health system	No	8	0,28	9	0,26	17	0,27	1,000
	Yes	21	0,72	26	0,74	47	0,73	
Help to solve complex problems	No	1	0,03	4	0,11	5	0,08	0,366
	Yes	28	0,97	31	0,89	59	0,92	
Help global vision	No	0	-	3	0,09	3	0,05	0,245
	Yes	29	1,00	32	0,91	61	0,95	
Help person-care center	No	1	0,03	3	0,09	4	0,06	0,620

	Yes	28	0,97	32	0,91	60	0,94	
Long time relationship	No	1	0,03	3	0,09	4	0,06	0,620
	Yes	41	0,97	32	0,91	60	0,94	
Intuition	No	14	0,48	15	0,43	29	0,45	0,856
	Yes	15	0,52	20	0,57	35	0,55	
Quality communication	No	2	0,07	4	0,11	6	0,09	0,851
	Yes	27	0,93	31	0,89	58	0,91	
Multimorbidity influence on quality of care	No	8	0,28	7	0,20	15	0,23	0,677
	Yes	21	0,72	28	0,80	49	0,77	

Table legend : Sd = Standard deviation ; Q1 = First quartile ; Q3= Third quartile ; NI= not interpretable

		NTR N=43(48,86%)	Decompensation N=45(51,13%)	Study population N=88(100%)	Pvalue Wilcoxon /Mann Whitney
Quantitative variables					
CETAF score	Median	6,0	5,0	6,0	0,693
	Q1	4	4	4	
	Q3	8	7	8	
Number of biology per year	Median	3,0	3,0	3,0	0,838
	Q1	1	1	2	
	Q3	6	5	7	
Number of acute diseases	Median	0,0	0,0	0,0	0,921
	Q1	0	0	0	
	Q3	1	1	1	
Age	Median	87,0	87,0	87,0	0,434
	Q1	80	77	81	
	Q3	91	90	92	
Number of specialist's consultation per year	Median	1,0	1,0	1,0	0,826
	Q1	0	0	0	
	Q3	2	2	2	

Number of GP's consultation per year	Median	17,5	17,5	19	0,298
	Q1	12	12	12	
	Q3	24	20	28	
Number of medical imaging per year	Median	0,0	0,0	0,0	0,395
	Q1	0	0	0	
	Q3	1	1	2	
Number of treatment	Median	9,0	9,0	10,0	0,807
	Q1	7	7	8	
	Q3	12	12	13	
Total number of disease	Median	8,0	8,0	8,0	0,820
	Sd	2,7	2,2	2,4	
Number of chronic diseases	Median	7,41	7,31	7,36	0,864
	Sd	2,4	2,2	2,3	

Table legend: Sd = standard deviation; Q1 = First quartile; Q3 = third quartile; NI = not interpretable

On the socioprofessional category, the Fisher test showed a significant difference with a p-value = 0.027.

There is no other significant difference, qualitative or quantitative, that is to say with a value $p < 0.05$.

3- Cleaning and recording data:

Data cleaning was performed, using the dictionary (Appendix No. 3), to find and delete some non-discriminating variables. The deletion concerned the following variables:

pharmacological treatment (yes), stress at work (no), human help (yes), equipment for the patient at home (yes). Birth has been changed in age.

The deletion also involved some unnecessary variables: inclusion date and patient identification number.

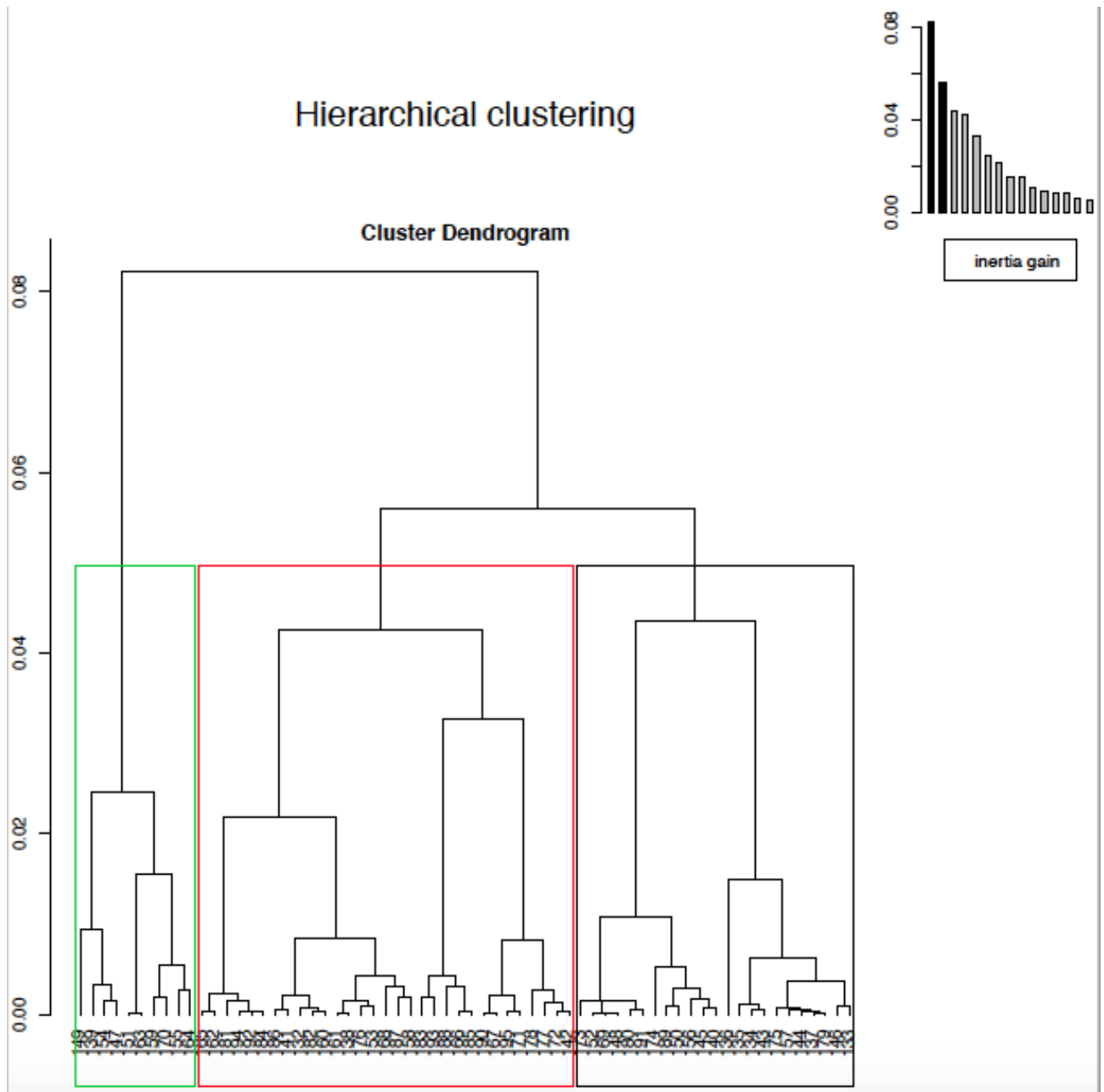
Then, the variables related to the quality of the management of multimorbidity and the self-evaluation (intuition, good communication with other caregivers, coordination procedures, etc.) of the GP were removed (questions 26, 29, 30, 34, 45-52).

The challenge was to confront groups with characteristics.

4- Clustering and Classification :

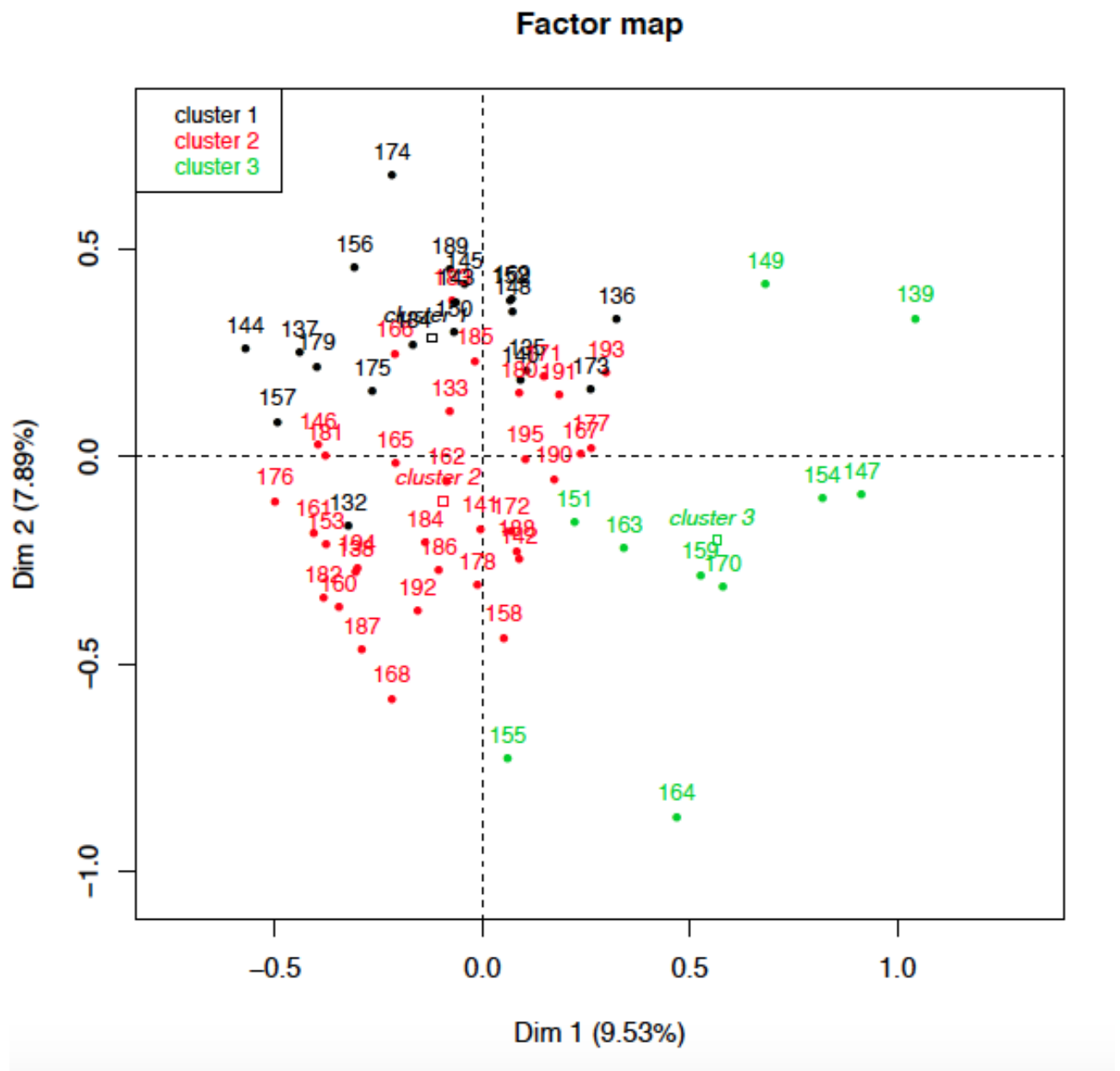
The ascending hierarchical classification began the multidimensional analysis. Each patient was initially singularly taken. The patients were grouped by some characteristics, using the measure of dissimilarity, according to the Euclidean distances. Then, hierarchical groups were realized thanks to the integration of the distance between each patient for each characteristic. This led to a cluster dendrogram or cluster dendrogram (Figure 1).

Figure 1: Cluster Dendrogram



In order to highlight the discriminant variables in the different patient groups, an MCA was performed to assess the similarity and differences between the individuals in the group. Finally, thanks to the results found, the HCPC was carried out and gave a clustering. Three clusters emerged with a gap of 20% compared to the population of the cohort was set. (Figure 2)

Figure 2: HCPC with 3 cluster



a- Cluster 1

Most people in group 1 had chronic diseases (95%), which had adaptive strategies implemented to try to improve such as hygiene and dietary rules or planning (85%), postural instability (95%), heavy or complex medical and surgical history (100%), and at-risk treatment such as VKA / chemotherapy / insulin (70%).

In addition, they had no psychosomatic risk factors (100%) and a healthy lifestyle (65%).

Quantitative variables were also represented by a high CETAF score of 55% in the group.

	% in cluster	% of total	% in the cluster relative to the total	p
Cluster 1				
q18- adaptive strategy : yes	85,00	43,75	60,71	0,000
q4- chronic diseases : yes	95,00	65,63	45,24	0,001
q1- Chronic disease : Hypercholesterolemia : yes	40,00	15,63	80,00	0,001
q24- risk treatment : yes	70,00	40,63	53,85	0,002
q1- chronic diseases: diabetes : yes	30,00	10,94	85,71	0,003
q13- Correct hygiene : yes	65,00	37,50	54,17	0,003
q9- Postural instability : yes	95,00	73,44	40,43	0,007
CETAF score: high risk	55,00	31,25	55,00	0,009
q8- somatic risk factors: overweight : yes	60,00	37,50	50,00	0,016
q40- Pain : yes	50,00	29,69	52,63	0,023
q35- medical or surgical history heavy and / or complex : yes	90,00	71,88	39,13	0,030
q11- psychological risk factors: addictions: no	100,00	87,50	35,71	0,040
q11- psychological risk factors: addictions: yes	0,00	12,50	0,00	0,040
q35- medical or surgical history heavy and / or complex : no	10,00	28,13	11,11	0,030
q40- Pain : yes	50,00	70,31	22,22	0,023
q11- no psychological risk	0,00	15,63	0,00	0,016

factors: no				
q8- somatic risk factors: overweight : no	40,00	62,50	20,00	0,016
q9- Postural instability : no	5,00	26,56	5,88	0,007
q13- Correct hygiene : no	35,00	62,50	17,50	0,003
q1- chronic diseases: diabetes : no	70,00	89,06	24,56	0,003
q24- risk treatment : no	30,00	59,38	15,79	0,002
q1- Chronic disease : Hypercholesterolemia : no	60,00	84,38	22,22	0,001
q4- chronic diseases : no	5,00	34,38	4,55	0,001
q18- adaptive strategy : no	15,00	56,25	8,33	0,000

The population of the cluster had more treatment (13.05 vs 9.97), more chronic disease (8.85 vs 7.36) and more annual visits to the general practitioner (22.45 vs 18.08) than the cohort.

<i>Reduced centered values (average = 0 and standard deviation = 1)</i>	Mean in the cluster (M)	Mean in the cohort	Standard deviation in the cluster	Standard deviation in the cohort	P value
Cluster 1					
q43- number of treatments	13,05	9,97	3,61	3,89	0,000
number of chronic pathologies	8,85	7,36	1,88	2,26	0,000
q20- annual number of consultations at the GP	22,45	18,08	9,94	8,82	0,008

	% in cluster	% of total	% in the cluster relative to the total	p

b- Cluster 2

Patients in group 2 were patients with no psychological risk factors (100%) who were neither anxious nor depressed (58.82%).

They had no hypercholesterolemia (94.12%), no diabetes (97.06%), no overweight (82.25%).

They also had no risk treatment such as VKA / chemotherapy / insulin (85.29%).

They did not use adaptive strategies such as planning or emotional support (79.41%).

There was a moderate risk CETAF (64,73).

Cluster 2				
q24- risk treatment : no	85,29	59,38	76,32	0,000
q18- adaptive strategy : no	79,41	56,25	75,00	0,000
q11- no psychological risk factors: yes	100,00	84,38	62,96	0,000
q8- somatic risk factors: overweight : no	82,35	62,50	70,00	0,001
q4- chronic diseases : no	52,94	34,38	81,82	0,001
q11- psychological risk factors: addictions: no	100,00	87,50	60,71	0,001
q6- Reactions to severe stress : no	58,82	42,19	74,07	0,005
q1- Chronic disease : Hypercholesterolemia : no	94,12	84,38	59,26	0,028
CETAF score: average risk	64,71	51,56	66,67	0,029
q1- chronic diseases: diabetes : no	97,06	89,06	57,89	0,039
q1- chronic diseases: diabetes : yes	2,94	10,94	14,29	0,039
q1- Chronic disease : Hypercholesterolemia : yes	5,88	15,63	20,00	0,028
q6- Reactions to severe stress : yes	41,18	57,81	37,84	0,005
q11- psychological risk factors: addictions: yes	0,00	12,50	0,00	0,001
q4- chronic diseases : yes	47,06	65,63	38,10	0,001
q8- somatic risk factors: overweight : yes	17,65	37,50	25,00	0,001
q11- no psychological risk factors: no	0,00	15,63	0,00	0,000
q18- adaptive strategy : yes	20,59	43,75	25,00	0,000
q24- risk treatment : yes	14,71	40,63	19,23	0,000

<i>Reduced centered values (average = 0 and standard deviation = 1)</i>	Mean in the cluster₃₉ (M)	Mean in the cohort	Standard deviation in the cluster	Standard deviation in the cohort		P value
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Cluster 2						
number of chronic pathologies	8,85	7,36	1,88	2,26		0,010
q43- number of treatments	11,90	9,97	4,39	3,89		0,000

The group 2 population had less chronic disease (6.68 vs 7.36) and had less treatment (8, 15 vs 9.97) than the cohort study.

c- Cluster 3

This population was mainly represented by men (70%), workers (60%), immunosuppressed (60%) who had addictions (60%).

	% in cluster	% of total	% in the cluster relative to the total	p
Cluster 3				
q11- no psychological risk factors: no	100,00	15,63	100,00	0,000
q11- psychological risk factors: addictions: yes	80,00	12,50	100,00	0,000
q8- somatic risk factors: immunodepression : yes	60,00	18,75	50,00	0,002
q11- psychological risk factors: Risk behaviors: yes	30,00	4,69	100,00	0,003
CSP=CSP6-workers	60,00	26,56	35,29	0,019
q14- sex: Men	70,00	37,50	29,17	0,031
q14- sex : Women	30,00	62,50	7,50	0,031
q11- psychological risk factors: Risk behaviors: no	70,00	95,31	11,48	0,003
q8- somatic risk factors: immunodepression : no	40,00	81,25	7,69	0,002
q11- psychological risk factors: addictions: no	20,00	87,50	3,57	0,000
q11- no psychological risk factors: yes	0,00	84,38	0,00	0,000

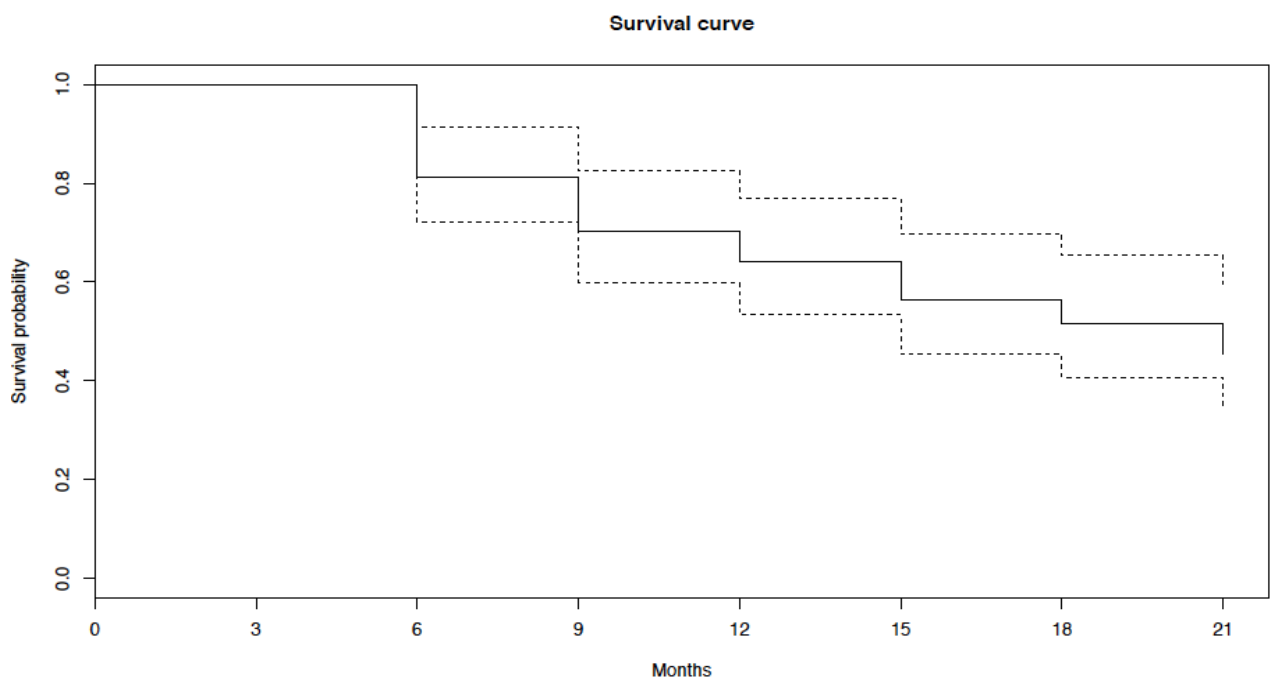
There were no significant quantitative results in this cluster.

5- Survival analysis:

a- survival Analysis: Kaplan Meyer method/Log Rank test

The following curve (Figure 3) represents overall survival. The probability of decompensation after twenty-one months was 45.3% [34.6% -59.3%].

Figure 3: Survival curve



The Kaplan-Meier method allowed to highlight several significant variables ($p < 0.05$) after the confrontation between the groups "D" and "NTR": the pain, the entourage (absent / existing), the correct hygiene and socio-professional category 2 (Artisan, trader, entrepreneur).

These are shown in Figures 4, 5, 6, 7 and 8.

Figure 4 : Painful patient

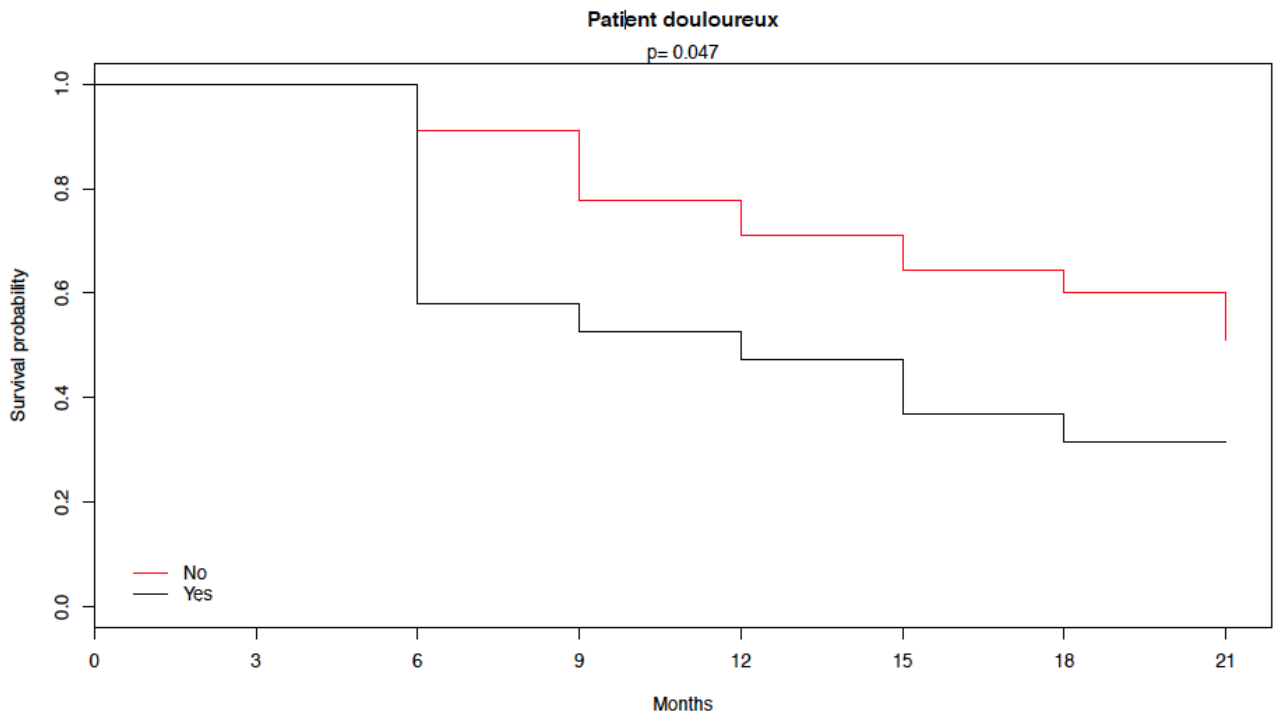


Figure 5 : Absence of entourage:

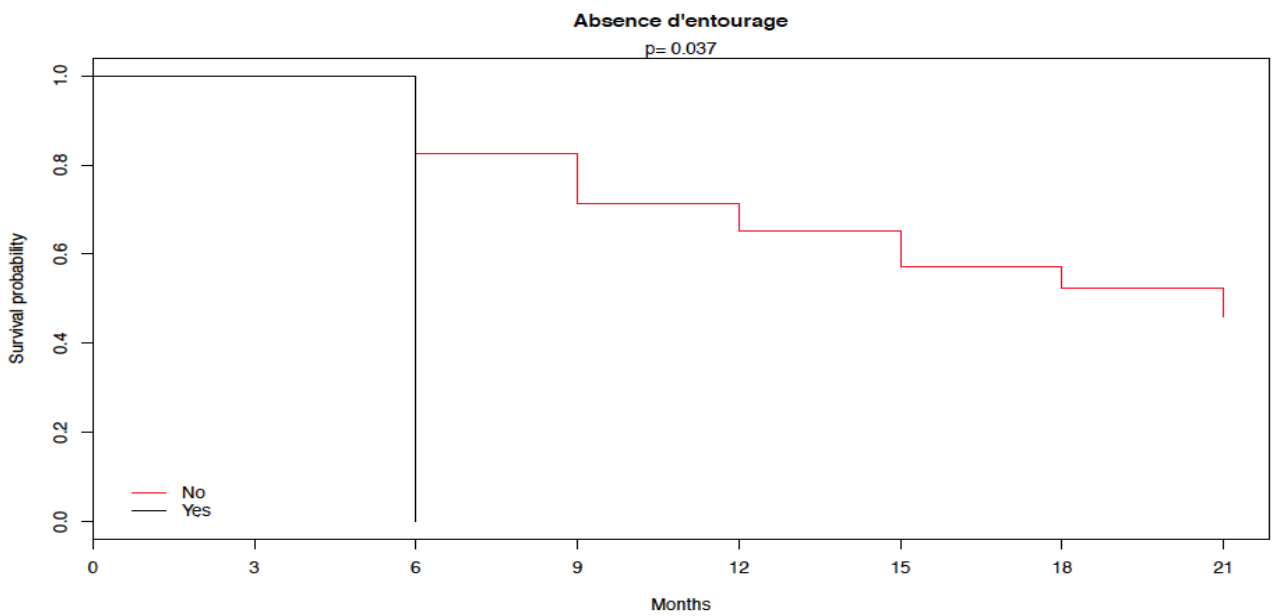


Figure 6 : Existing Entourage

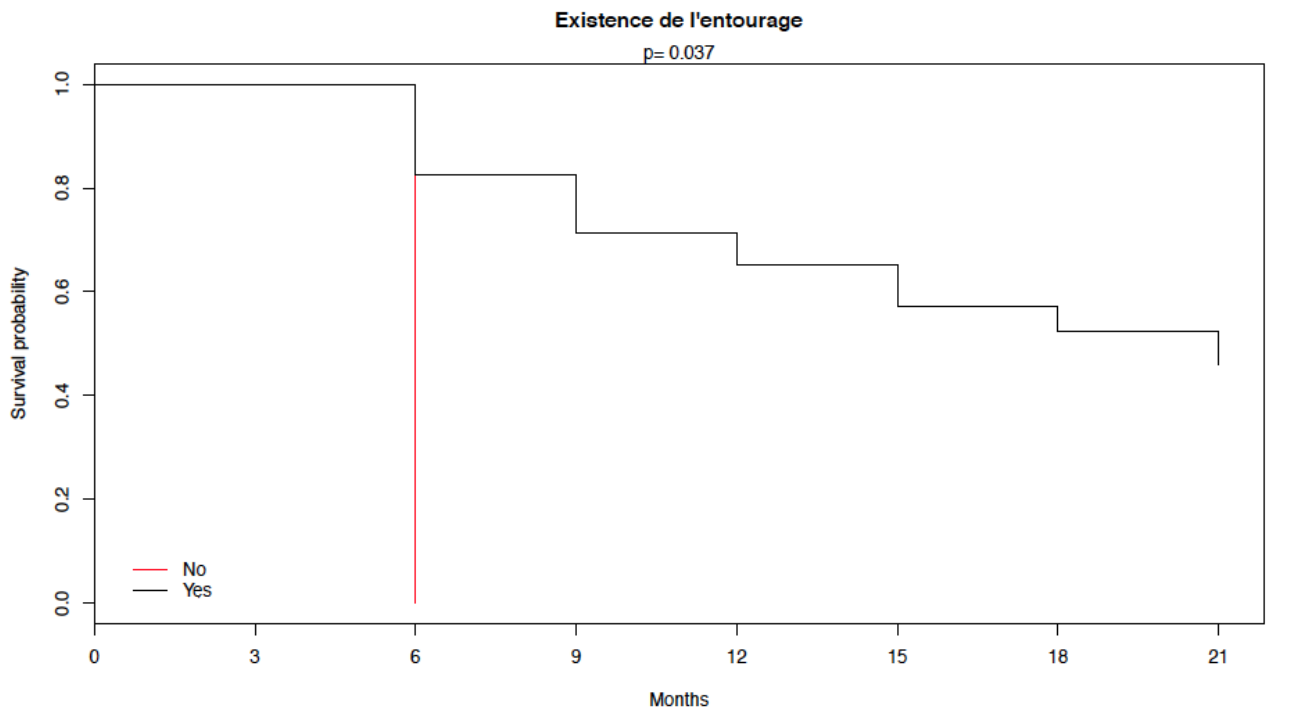


Figure 7 : correct hygiene:

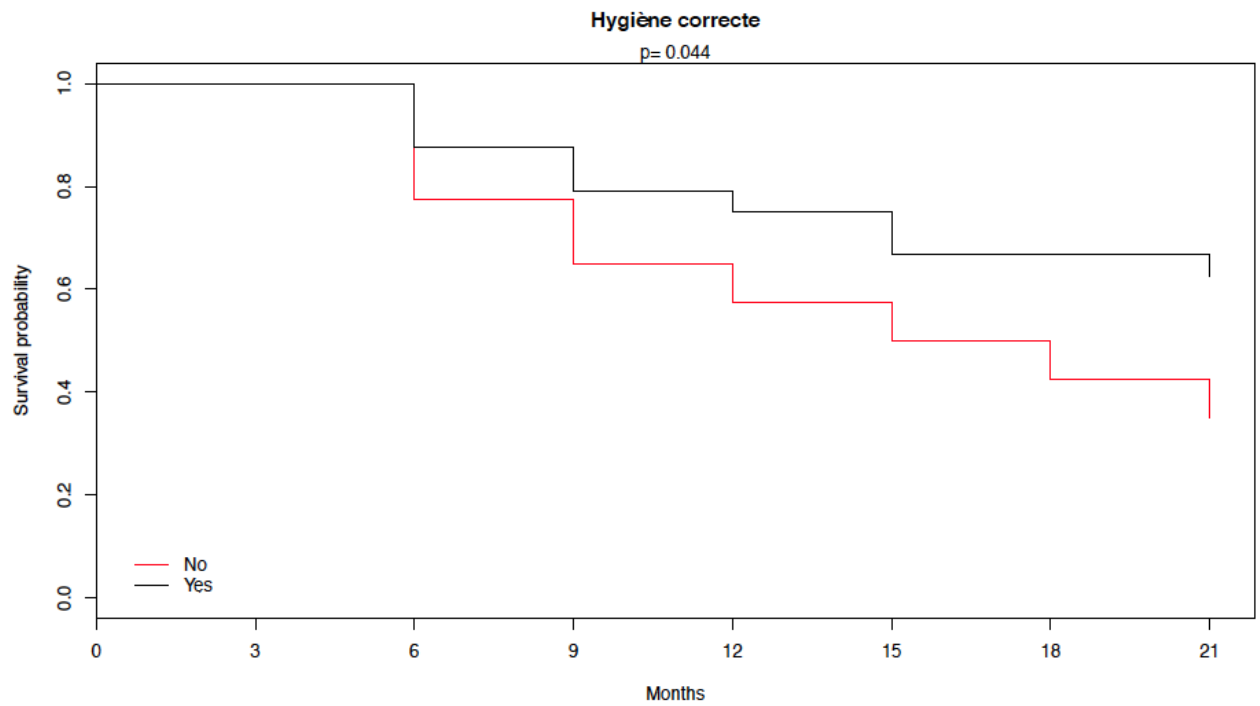
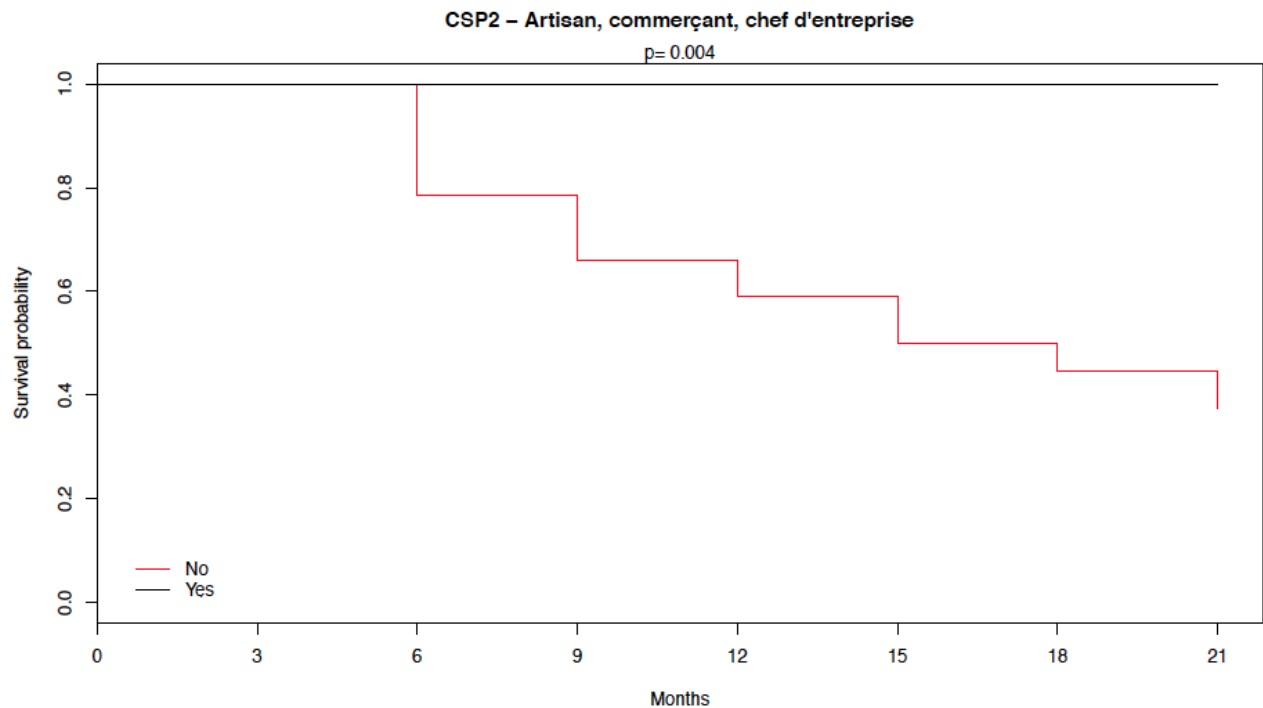


Figure 8 : CSP2 - Artisan, trader, entrepreneur :



Several variables appeared significant during the test of the log-rank:

- Pain: pvalue = 0.047
- Absence of entourage: pvalue = 0.037
- Existing Entourage: pvalue = 0.0037
- correct hygiene: pvalue = 0.044
- CSP2 - Artisan, trader, entrepreneur: pvalue = 0.004

b- Uni and Multivariate analysis: Regression following Cox's Model

The duration of the follow-up is taken into account thanks to the model of Cox.

Univariate analysis revealed the association between a variable and the risk of decompensation.

This association is named undefined risk ratio (HR).

The HR and their confidence interval were on the table 3.

Table 3: Unrefined Hazard Ratio

Variables	HR	CI	p
Pain	2,03	[1,02 ; 4,05]	0,043
Absence of entourage	10,20	[1,29 ; 80,63]	0,028
Existing of entourage	0,1	[0,01 ; 0,77]	0,028
Correct hygiene	0,47	[0,22 ; 1,01]	0,052

He showed that the risk of decompensation was increased if patients were in pain and had no entourage.

On the contrary, the presence of entourage appears as a protective decompensation factor.

The correct hygiene also appears as a protective factor but is not significant ($p > 0.05$) in the univariate analysis.

Then, at the end of the univariate analysis, the significant and relevant variables (pain, absence / existence around, correct hygiene) were integrated into the model.

Thus, for the second time, the Cox model was adjusted in a multivariate analysis. This allowed for an adjusted risk ratio.

The adjusted HRs are exposed on the table 4.

Table 4: HR adjusted

		HR	IC95%	p
Pain	Yes vs No	2,20	[1,10 ; 4,40]	0,025
Correct hygiene	Yes vs No	0,44	[0,20 ; 0,94]	0,034

The multivariate analysis found two significant variables ($p < 0.05$) whose confidence interval does not contain 1: the pain (HR = 2.20, 95% CI [1.10-4.40]) emerged as a decompensation factor while the correct hygiene (HR = 0.44, 95% CI [0.20-0.94]) as a protective factor.

c- Cox's model validity:

In order to verify the validity of the final model, a Chi 2 test tested the proportional hazards hypothesis of the Cox model. The occurrence of the risk of decompensation remained proportional in pain patients and patients with correct hygiene. Indeed, the p value was 0.194. So, the model was valid.

VI- DISCUSSION :

1- Interpretation of results:

At 21 months of follow-up, the results show a significant difference between the "Decompensation" and "Nothing to report" groups for one of the risk factors of decompensation: pain. This risk factor was already significant in the description of the population and in previous studies (35–39). At 21 months, 13 of the 19 patients who were in pain were in the "D" group, 6 being in the "NTR" group. Patients living in nursing homes are 2,2 times more likely to die or to be hospitalized in case of pain. Pain has a high prevalence in nursing home (NH) patients: it is between 27% and 83% according to a large number of studies (40–43). However, it is not taken into consideration by caregivers. This symptom is very often underdiagnosed (42–47). This involves many consequences in negative cascades: the acts of everyday life (48), the Depression (49), sleep, cognitive decline (45). Several explanations can be given for the poor management of pain in nursing homes: the elderly hide their pain for fear of being a burden (50), the public often sees pain as entangled in the evolution of aging (47) and some elderly patients fear analgesics (51). To determine pain in the elderly, there are auto and hetero-assessment scales : numerical rating scales (NRS), visual analog scales (VAS), verbal assessment scales (VRS) and facial pain scales (FPS). For people with severe cognitive impairment or inability to communicate, there are assessment scales,

such as DOLOPLUS-2, Pain Assessment Scale in Advanced Dementia (PAINAD), the list of assessment of pain in people with limited communication capacity (PACSLAC).

In 2000, the HAS (High Authority for Health) recommended the use of DOLOPLUS-2 and ECPA for the elderly (52). The management of pain is a major issue for older people, especially if they are multimorbid. According to the latest investigations, chronic pain would increase mortality, mainly cardiovascular disease and cancer (53–55). However, further research is needed, through other studies, to specify the relationship between the risk of decompensation in multimorbid patients and pain.

This study also found that having a correct hygiene is a protective factor of decompensation in institutionalized patients in Nursing Home. The odds of decompensating for them were 0.44 lower if they had a correct hygiene. Studies have already shown that having a healthy lifestyle (proper hygiene, physical activity and healthy eating) was, for the elderly, a preventative factor for developing various chronic diseases (56,57). A correlation between a sedentary lifestyle and the increased risk of death among older adults was found (58). Indeed, a detailed search in MEDLINE to identify the leading causes of death in the United States, using the 2000 mortality data, has shown that poor diet and physical inactivity may soon take precedence over tobacco (400 000 deaths, 16.6%) (59). In addition, according to the Pomerleau and al. Study, low fruit and vegetable consumption is estimated to cause 2.635 million deaths per year. (60) Studies suggest, then, the use of the mediterranean diet to reduce mortality or reduce the risk of cardiovascular, rheumatoid or cancerous diseases (61). With respect to personal hygiene, no studies have been specifically conducted on the relationship between this and multimorbidity or mortality. That being said, it can still be assumed that poor personal hygiene increases the risk of developing an infection and therefore has a negative effect on multimorbidity.

2- Analysis of the difficulties encountered :

a- Low number of patients included:

In this study, one of the first disadvantages was the small number of patients included. Indeed, the cohort included only 64 of the 127 patients expected. One of the reasons is probably due to the time consuming filling of the questionnaire with these 52 questions. Especially since the workload is already substantial.

According to a Swiss survey of 3044 physicians, the majority of primary care providers recognize the importance of research work. However, time constraints, additional administrative work and the relevance of daily research are the main barriers to their participation in research (62).

German study calls for financial incentives for practitioners to overcome key barriers to participation (63). In addition, coming in person to see the GP would increase the response rate (64).

The second inclusion period included another 54 patients, resulting in a cohort of 118 patients. Another thesis will analyze the 118 patients at twenty-one months.

b- Relevance of certain items of the questionnaire:

The questionnaire was initially created for another study whose patients were outpatients. Some items are therefore not suitable for residents of nursing homes such as unemployment, work stress (item 12), material available to the patient (item 32), available human assistance (item 33) and life in institution (item 41).

c- Subjectivity of the question "Expertise of the GP":

The initial definition of multimorbidity by EGPRN was detailed in 11 themes and sub-themes. The translation and verification by general practitioners of each European country of this definition has led to the creation of two additional themes (65): the use of Wonca's basic skills of general medicine, and the dynamics of the doctor-patient relationship. Through these 2 new themes, 8 subjective questions were added to the questionnaire.

The first problem was that these questions were subjective because a self-criticism about the professional practice of doctors. Thus, during the statistical analysis, the qualitative data could not be converted into quantitative data. In addition, the questions were closed: the possible answer choices were limited to "Yes" or "No". For further studies, it would be wise to ask indirect questions and substitute dichotomous responses for semi-quantitative responses such as "yes totally, yes mostly, yes slightly, not at all".

d- Classification of chronic diseases

In the beginning, when GPs completed the questionnaire, they listed patients' illnesses regardless of nomenclature such as ICD 10 (International Classification of Diseases, tenth version) or ICPC2 (International Classification of Primary Care, second edition).

The lack of consensus on the number and type of diseases to be included in the multimorbidity indices makes the prevalence of multimorbidity very heterogeneous.

Indeed, a systematic review of observational studies has shown that there were 5 to 335 chronic diseases to assess multimorbidity (66).

Thus, the team chose to analyze all chronic diseases referenced by general practitioners. A change was made on redundancies and bad classifications.

e- Statistical analysis :

Due to the large number of variables associated with the small number of patients, the team corrected the statistical analysis according to the number of patients in each group. Indeed, a correction of Yates had to be applied to the Chi 2 test for the comparison of the characteristics of the "D" and "NTR" groups when the number of patients was between 2.5 and 5. Similarly,

if the number was lower at 2.5, the exact Fischer test was used. And if the number of patients was greater than 5, the Chi2 test was performed.

Due to the small number of patients included, statistical tests quickly show their limits.

f- Data transmission

The transmission of data from this relatively long study is not always easy between the different students.

At 18 months, a new statistician succeeded her colleague with slightly different statistical habits.

For future studies, each new participant will have a common schedule file.

3- Limits of study :

a- Selection bias :

Firstly, 4 patients from the nursing home of Lanmeur were not included, even though they met the inclusion criteria and they were not under legal protection: the family refused to participate in the study.

Then, any patient whose estimated survival is less than 3 months was excluded from the study. This subjective criterion was based on the feelings, experience and knowledge of the physician.

Finally, this study is monocentric with patients recruited only at the NH Lanmeur whose residents are not representative of the NH population in France (67). Thus, a multicenter study would improve the power of the study and increase the number of patients included and representativeness.

b- Interpretation bias:

The recruitment was carried out only by the Lanmeur University Center general practitioners. They knew their patients and the purpose of the study. This may have influenced the answers to the questions.

c- Information Bias :

When analyzing the results, several inconsistencies appeared:

-We did not find any family history of cardiovascular disease (question 8) among residents. This is probably due to the fact that they have not been fully recorded in the medical records.

- Because of the difficulty in evaluating the annual number of paramedical services in a Nursing Home, it was chosen, by convention, to three per day for all residents.

- Two patients were screened when they were not offered (questions 37 and 38). The questions must be combined and modified for "Does the patient receive a personal or organized screen test?"

- Regarding the question related to pain (question 40), the evaluation was based on the patient's knowledge, the medical data of the patient's file. A standardized assessment has not been used, which can lead to a risk of subjectivity and a risk of poor evaluation.

- The results of the questionnaire data were retranscribed every 3 months in the EXCEL software by a different person. Similarly, the questionnaire contained 52 items: The risk of transcription error is not negligible.

d- Confusion bias :

- Translations of the themes and subthemes of multimorbidity from English to French may be wrong because of the subtlety of the definition.

- The transformations of qualitative and quantitative variables may be inaccurate.

- By comparing the small size of the cohort to the large number of variables, a modification was made. Some variables considered irrelevant or non-discriminatory have been removed. Without this removal, the results obtained could have been dissimilar.

4- Future prospects:

In order to be more consistent and adequate for residents of retirement homes, a major reworking of the questionnaire for future studies was suggested to be more concise and fair (Appendix 3).

The changes to this new questionnaire are listed in the table below. However, a consensus procedure will have to validate them before they are used.

Table 5 : Difficulties and proposals for further studies

Difficulties	Propositions
Small cohort	<ul style="list-style-type: none"> - 54 patients were included in a second inclusion period from July to December 2015. - Multicenter study -To allow general practitioners different from those of the university center of Lanmeur to integrate the study
<ul style="list-style-type: none"> - Similar answers for each patient for question q13, 22, 23, 32, 33, 41 -Variable number of variables 	<ul style="list-style-type: none"> - Deletion of these questions in the new questionnaire
<ul style="list-style-type: none"> -Difficult to count chronic diseases 	<ul style="list-style-type: none"> - Dictionary was designed to reference chronic diseases (Appendix 3) -A member of the team carries out a second check before the analysis

-No response to cardiovascular family history item	- deleted concept of question 8
-Imbroglia with the question about the screen test	-Gather questions 37 and 38 and substitute them with: "Does the patient receive a personal or organized screen test?"
-Difficulty in collecting the concept of pain	<ul style="list-style-type: none"> - Only the GP was to answer this item, not the team or the nurses. - Take a standardized pain scale - addition of a question on the consumption of analgesics.
-Questions subjectives	<ul style="list-style-type: none"> -Use indirect questions -Use intermediate answers

This study, on a small sample, showed some statistical limits especially in terms of power.

Despite these methodological flaws, correct hygiene is a protective factor, while pain has emerged as a risk factor for decompensation.

In subsequent studies at 6 months, 9 months, 12 months, 15 months and 18 months, the pain was already apparent (35–39).

This result must still be interpreted even with the small number of patients included and the absence of use of standardized pain scale.

The general practitioner has a key role in the management of pain because of his medical knowledge and that of his patient and his follow-up.

This notion seems to be closely related to the morbidity of the patient.

Future studies will focus on an additional 24-month analysis on the same cohort as well as a cohort analysis of 118 patients after 21 months of follow-up.

The power of this latest study will be higher.

This will confirm, perhaps, the results of this thesis and possibly other variables will emerge.

IV-CONCLUSION :

Multi-morbidity is an essential element in the care of the elderly by the general practitioner, whose number is constantly increasing, particularly in Nursing Home.

This follow up at 21 months, although imperfect with its many biases, suggests correct hygiene as a protective factor and confirms pain as a risk factor for decompensation according to the definition of the multimorbidity of EGPRN in persons residing in long-term institutions.

To confirm these results, more powerful studies will be needed. This could help to improve prevention and the consequences multimorbidity and the care of elderly patients in retirement homes.

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APPENDIX :

Appendix 1: questionnaire used during the study

Nom prénom patient :

Nom du Médecin :

1) Lister les pathologies chroniques du patient selon la CIM 10 (CIM 10 en lien :

<http://taurus.unine.ch/icd10>)

- Pathologies ostéo-articulaires
- Hypertension artérielle
- Hypercholestérolémie
- Diabète
- Aucune de ces maladies

2) Autres pathologies (selon la CIM 10) si aucune noter RAS (ne pas noter en codage)

3) Existence de pathologies psychosomatiques

- Oui
- Non

4) Existence de caractéristiques complexes des pathologies chroniques (Ex : diabète déséquilibré, risque élevé de décompensation cardiaque, alcoolisme, dépression ...)

- Oui
- Non

5) Lister les pathologies aiguës du patient selon la CIM 10 (anémie, hématome, idées suicidaires, bronchite...) si aucune, noter RAS

6) Réactions à un stress sévère (anxiété, panique, dépression...)

- Oui
- Non

7) Existence de complication(s) des pathologies aiguës (exemple : OAP secondaire à un IDM, détresse respiratoire sur bronchite aigüe...)

- Oui
- Non

8) Quels sont les facteurs de risque somatiques du patient ?

- Antécédents familiaux cardio-vasculaires
- Surpoids
- Immunodépression (cancer, alcoolisme, traitement immunosuppresseur)
- Aucune de ces réponses
-

9) Instabilité posturale (Est-ce que le patient est capable de tenir sur une jambe sans bouger les bras pendant les 5 premières secondes // A ne tester que chez les patients marchant, l'expertise du médecin sera considérée comme valable pour les patients alités)

- Oui

Non

10) Nombre de chutes au cours des douze derniers mois

0

1

2

3 et plus

11) Quels sont ses facteurs de risque psychologiques ?

Conduites à risque (sports extrêmes, relations sexuelles à risque, conduite automobile...)

Risque suicidaire

Addiction(s)

Aucune de ces réponses ou aucun facteur de risque

12) Quels sont ses facteurs de risque psychosociaux ?

Chômage

Conjugopathie

Stress au travail

Problèmes familiaux

Précarité financière et sociale

Décès d'un ou plusieurs proche(s)

Divorce

Aucune de ces réponses

13) Mode de vie (cocher l'item si oui sinon cocher la dernière case)

Hygiène correcte

Activité physique

Alimentation saine

Aucune de ces réponses

14) Sexe

Homme

Femme

15) Date de naissance

16) Catégories socioprofessionnelle (selon INSEE) A noter que la notion de chômage est recueillie par ailleurs. Ainsi en cas de recherche d'emploi noter la profession recherchée.

Agriculteur / exploitant agricole

Artisan, commerçant, chef d'entreprise

Cadre et professions intellectuelles supérieures

Professions intermédiaires

Employés

Ouvriers

Sans activité (ex: femme au foyer)

17) Situation familiale

En couple

Célibataire

- Enfant(s) vivant ou non au domicile (cocher si oui)

18) Le patient met-il en place au moins une stratégie adaptative parmi les suivantes ? (En entendant par stratégies adaptatives les moyens que le patient met en œuvre pour essayer d'aller mieux : mise en place de règles hygiéno-diététiques, planification, soutien instrumental, soutien émotionnel, expression des sentiments, réinterprétation positive, acceptation, déni, blâme, humour, religion, distraction, utilisation de substances)

- Oui
 Non

19) Le patient présente-il des complications de ses pathologies ? (En entendant par complication une décompensation aiguë de ses pathologies chroniques, une situation de fin de vie ou de la iatrogénie (aléa thérapeutique et donc non imputable au médecin))

- Oui
 Non

20) Quel est le nombre annuel de consultations ou visites du patient au généraliste ?

21) Quel est le nombre annuel de consultations de patient aux spécialistes ?

22) Quel est le nombre de recours annuel du patient aux paramédicaux (IDE à domicile, kinésithérapeute, podologue...)

23) Le patient bénéficie-t-il de traitements pharmacologiques ?

- Oui
 Non

24) Bénéficie-t-il de traitement à risque ? (AVK, chimiothérapie, insuline, traitement chirurgical lourd...)

- Oui
 Non

25) Utilisation quotidienne de traitements psychotropes (aide au calcul du score de chute)

- Oui
 Non

26) Mettez-vous en œuvre des procédures de coordinations de soins pour ce patient ? (Réseaux, interaction avec des correspondants multiples : spécialistes, psychologues...)

- Oui
 Non

27) A combien d'EXAMENS BIOLOGIQUES votre patient a-t-il recouru annuellement ? (En entendant examens réalisés EN DEHORS de la surveillance thérapeutique habituelle (HbA1c, INR, pré chimiothérapie ?) et EN DEHORS du suivi de ses pathologies chroniques (cirrhose, insuffisance rénale, diabète) exemple de diagnostic de pathologie aiguë : sérologie IST...)

28) A combien d'EXAMENS D'IMAGERIE votre patient a-t-il recouru annuellement ? (En entendant les examens réalisés EN DEHORS de la surveillance thérapeutique habituelle et EN DEHORS du suivi de ses pathologies chroniques (cirrhose et échographie abdominale) exemple de pathologie aiguë : Fracture)

29) Pensez-vous qu'en ce qui concerne votre patient, la communication avec les autres intervenants de santé est bonne ?

- Oui
- Non

30) Pensez-vous avoir déjà été négligent envers la santé de votre patient ?

- Oui
- Non

31) Votre patient a-t-il été victime de iatrogénie suite à un traitement inadapté (surdosage ou mésusage) ?

- Oui
- Non

32) Votre patient bénéficie-t-il de matériel à disposition (lit médicalisé, Montauban, télé alarme)

- Oui
- Non

33) Votre patient bénéficie-t-il d'aides humaines (IDE, AS, aides ménagères, assistante sociale)

- Oui
- Non

34) Avez-vous une impression de manque de temps ou de rémunération pour une prise en charge optimale de votre patient ?

- Oui
- Non

35) Pensez-vous que votre patient a des antécédents médicaux ou chirurgicaux lourds et/ou complexes ?

- Oui
- Non

36) Votre patient a-t-il bénéficié des vaccinations recommandées (selon le calendrier vaccinal 2014)

- Oui
- Non

37) Avez-vous proposé à votre patient les dépistages systématiques organisés (cancer colorectal avec le test Hemoccult, cancer du sein avec la mammographie) ?

- Oui
- Non
- Patient rentrant dans le cadre d'un dépistage personnalisé

38) Votre patient a-t-il accepté les dépistages systématiques organisés ou personnalisés ?

- Oui
- Non

39) Avez-vous proposé une éducation thérapeutique à votre patient ? (Réseau diabète, AVK...)

- Oui
- Non

40) Votre patient est-il douloureux ?

- Oui
- Non

41) Votre patient vit-il en institution ? (EHPAD, foyer logement, hébergement temporaire)

- Oui
- Non

42) Votre patient présente-il des plaintes multiples ? (Patient toujours dans la plainte, vivant mal sa multimorbidité entraînant une consommation de soins importante) ?

- Oui
- Non

43) Combien de traitements prend-t-il ? (Chiffre du nombre de traitements actif et chronique)

44) Caractéristiques de l'entourage de votre patient :

- Existence de l'entourage (cocher si oui)
- Entourage soutenant (cocher si oui)
- Dépendance de l'entourage (dépendance = maintien à domicile impossible en absence de l'entourage) (cocher si oui)
- Mise en place de stratégies adaptatives
- Absence d'entourage

45) Pensez-vous que bien connaître le système de santé vous a aidé à mieux suivre ou détecter la multimorbidité de votre patient ?

- Oui
- Non

46) Pensez-vous que l'habitude à résoudre des problèmes complexes (combinant maladies et facteurs psycho-sociaux) vous a aidé à mieux suivre ou détecter la multimorbidité de votre patient ?

- Oui
- Non

47) Pensez-vous qu'avoir une vision globale de toutes les maladies de votre patient vous a aidé à mieux suivre ou à détecter sa multimorbidité ?

- Oui
- Non

48) Pensez-vous que pratiquer des soins centrés sur les attentes et les besoins de votre patient vous a aidé à mieux suivre ou détecter sa multimorbidité ?

- Oui
- Non

→ Total : /12

Catégories de risque selon le score :

De 0 à 3 : risque faible

De 4 à 6 : risque modéré

De 7 à 12 : risque élevé

Aide au remplissage du score de risque de chute :

Question 2 : Situation familiale

→ **La situation familiale a vocation à identifier tout signe d'isolement.**

Est considérée comme personne en famille toute personne :

- Vivant chez ses enfants
- Qui héberge un ascendant ou un descendant
- Qui héberge une tierce personne

Question 3 : Souffrez-vous d'arthrose ?

Cette question concernant l'état de santé permet de repérer tout signe d'arthrose → **Demander à la personne si elle souffre d'arthrose (sur déclaration)** Est concernée comme personne souffrant d'arthrose une personne qui déclare :

- Avoir de l'arthrose mais qui n'en souffre pas car elle prend des médicaments
- Avoir de l'arthrite
- Avoir des rhumatismes

Question 4 : Avez-vous chuté au cours des 12 derniers mois ? Si oui, combien de fois ?

→ **La chute est définie comme « le fait de se retrouver involontairement sur le sol ou dans une position de niveau inférieur par rapport à sa position de départ »**

Question 5 : Consommation de psychotropes au cours des deux derniers jours

→ demander à la personne si elle a consommé des médicaments psychotropes (sur déclaration) Est considéré comme médicament psychotrope toute substance consommée :

- Pour dormir
- Pour l'anxiété
- Pour l'angoisse
- Pour la dépression

Appui unipodal (changement de position des bras dans les 5 premières secondes) :

→ **Le test unipodal** consiste à se maintenir debout sur une jambe. La position des bras (en balancier le long du corps, au niveau des hanches) est laissée libre au sujet lors du test . Le

changement de position des bras consiste à observer si dans les 5 premières secondes du test, le sujet a essayé de se mettre en équilibre (balancier avec 1 ou les 2 bras)

Appendix 3: Modified dictionary for NH cohort study

DICTIONNAIRE EHPAD	
Statut à 9 mois	H = hospitalisé DCD = décédés H et / ou DCD = statut de patient « fragile » ou « décompensé » RAS = ni hospitalisé ni décédé
Score CETAF	Score sur 12 : risque faible (0-3) modéré (4-6) élevé (7-12) Femme (2) Seul (1) Arthrose (1) 1 chute/an (2) ou 2 chutes/an (4) ou 3 chutes/an (6) Psychotrope (1) Test appui monopodal échec (1)
Abréviation	AOMI : artériopathie oblitérante des membres inférieurs BPCO : broncho pneumopathie chronique obstructive DMLA : dégénérescence maculaire liée à l'âge AIT : accident ischémique transitoire AVC : accident vasculaire cérébral SAS : syndrome d'apnée du sommeil PTH : prothèse totale de hanche
PATHOLOGIES CHRONIQUES	
Pathologies ostéoarticulaires	Englobe « fracture », « ostéoporose », « prothèse articulaire », « tassement », « arthrose », « arthrotomie », « ostéotomie », « luxation », « arthroplastie », « algodystrophie ». Si une de ces réponses à la question « pathologie chronique » et « non » répondu à la question « pathologie ostéoarticulaire » : modification par « oui » à la question « pathologie ostéoarticulaire » et mise entre parenthèse du nom de ces pathologies.
Nombre de pathologies chroniques	Addition des pathologies de la question 1 (pathologies ostéoarticulaires, hypertension artérielle, hypercholestérolémie et diabète) et du nombre de pathologies de la question 2 (autres pathologies chroniques) Absence de pathologie ostéoarticulaire = 0 Présence d'une ou plusieurs pathologies ostéoarticulaires = 1
Non admis dans pathologie chronique car qualifié de facteur de risque plutôt que de maladie chronique)	« Tabagisme » « Hyperuricémie » « Ostéopénie » « Accident ischémique transitoire »
Non admis dans pathologie chronique	« Hystérectomie » « Appendicectomie » « Hernie inguinale »

	« Cholécystectomie » « Primo infection tuberculeuse » « Insuffisance rénale aiguë sur rhabdomyolyse » « CIVD » « Encéphalopathie de Gayet Wernicke »	
Pathologie limite avec facteur de risque Admis dans pathologie chronique	« Hypercholestérolémie » « Hypertension artérielle »	
Homogénéisation des terminologies	Nouvelle terminologie	Ancienne terminologie
	Cardiopathie ischémique	« Angor », « syndrome coronarien aigu »
	Troubles cognitifs	« Démence à corps de Lewy », « Alzheimer », « démence parkinsonienne », « troubles mnésiques », « démence mixte », « démence vasculaire »
	Trouble du rythme et/ou de la conduction	« Fibrillation auriculaire », « extrasystoles auriculaire », « pace maker », « bloc auriculo-ventriculaire »
	Maladie veineuse thromboembolique	« Thrombose veineuse profonde », « embolie pulmonaire »
	Insuffisance veineuse	« Varices »
	Epilepsie	« Comitialité », « état de mal épileptique »
	Pathologie du système urinaire	« Vessie neurologique », « infections urinaires à répétition », « incontinence urinaire », « sonde à demeure »
	Hypothyroïdie	« Thyroïdectomie »
	Polype colique	« Adénome tubuleux de bas grade » « diverticulose »
	Exogénose	« OH »
	Tumeurs cutanées	Carcinome basocellulaire
Pathologies proches ou conséquences l'une de l'autre comptant pour une pathologie	Nouvelle terminologie	Ancienne terminologie
	Troubles cognitifs	= « Alzheimer » + « leucoaraïose »
	Troubles cognitifs	= « troubles cognitifs » + « leucoaraïose »
	Cécité œil gauche	= « rétinopathie diabétique » + « cécité œil gauche »
	Insuffisance respiratoire chronique	= « Insuffisance respiratoire chronique » + « BPCO » et/ou « dilatation des bronches » et/ou « fibrose » et/ou « asthme »
	Plaies chroniques	« Escarres » +/- « pied du diabétique » +/- « ulcères veineux/artériels »
	Syndrome de korsakoff	« Syndrome de korsakoff » + « exogénose chronique »
	AOMI	« Endartériectomie »
	Syndrome de	« DMLA évoluée » + « Hallucinations »

	Charles Bell	
Pathologies associées comptant pour deux pathologies	Nouvelle terminologie	Ancienne terminologie
	AVC Hémiplégie	« AVC avec hémiplégie séquellaire »
	AVC Aphasie	« AVC avec aphasie séquellaire »
	Démence et hallucinations	« Troubles cognitifs avec hallucinations »
PATHOLOGIES AIGUES		
Non admis dans pathologie aigue car déjà dans pathologie chronique	« Tumeur du tragus » « Cancer pulmonaire » « Anémie ferriprive »	
AUTRE		
Nombre de chute	« 0 » = 0 « 1 » = 1 « 2 » = 2 « 3 » = supérieur ou égal à 3	
Modification des réponses de la question 37	Proposition de dépistage organisé ou personnalisé : réponse oui/non/perso → modification des 4 réponses « perso » par « oui »	

Appendix 4 : New questionnaire for NH

1- **Sexe**

- Homme
 Femme

2- **Date de naissance :**

3- Le patient présente :

- Arthrose
 Hypertension artérielle
 Hypercholestérolémie
 Diabète
 Dépression
 Tabac
 Surpoids/obésité
 Immunodépression (cancer, traitement immunosuppresseur)
 Antécédents familiaux CV

4- **Autres pathologies chroniques** en cours (à lister, cf. dictionnaire des maladies) :

.....
.....

5- Existence de **caractéristiques complexes des pathologies chroniques** (Ex : diabète déséquilibré, risque élevé de décompensation cardiaque...) :

- Oui
 Non

Je ne sais pas

6- **Antécédents médicaux et chirurgicaux** (= pathologies terminées, exemple fracture du col du fémur, cholécystectomie, pneumopathie...) A lister

.....

7- Jugez-vous ces antécédents médicaux **lourds et/ou complexes** ?

Oui

Non

8- **Le motif de consultation** du jour/ dernier motif de consultation est (cochez et précisez le motif) :

Pathologie aigüe simple (ex : cystite) :

Complication d'une pathologie chronique (ex : Œdème pulmonaire aigu sur insuffisance cardiaque chronique) :

Complication d'une pathologie aigüe (ex : détresse respiratoire sur pneumopathie) :

.....

Autre (renouvellement d'ordonnance / administratif / suivi) :

9- Le patient (cochez la ou les propositions) :

Présente ou a présenté une pathologie psychosomatique

Est multi plaintif

Aucune des propositions

10- Le patient présente **un trouble de l'adaptation à un stress** (au moindre stress / nouvelle pathologie / mauvaise nouvelle) de type : anxiété majeure, dépression réactionnelle, idées suicidaires :

Oui

Non

Je ne sais pas

11- Le patient est capable de **mettre en place une stratégie adaptative** (règles hygiéno-diététiques, planification, soutien émotionnel, expression des sentiments, réinterprétation positive, acceptation, déni, blâme, humour, religion, distraction, utilisation de substance) :

Oui

Non

Je ne sais pas

12- Nombre annuel de recours (si aucun : notez « 0 », si ne sait pas : notez « ? ») :

Au généraliste : ...

Aux spécialistes : ...

13- Procédures de **coordinations de soins** mises en place pour ce patient ? (Réseaux, interaction avec des correspondants multiples : spécialistes, psychologues...)

Oui

Non

Je ne sais pas

14- EN DEHORS DE LA SURVEILLANCE THERAPEUTIQUE ET DU SUIVI HABITUEL DES MALADIES CHRONIQUES, Nombre d'**examens** :

▪ Biologiques par an : <1 1 à 3 4 à 6 7 à 12 >12

▪ Radiologiques par an : <1 1 à 3 >3

15- Le patient est-il **douloureux** ?

- Oui
 Non

Si oui, quel(s) traitement(s) prend-t-il ? ...

16- **Traitements médicamenteux** (si aucun : notez « 0 », si ne sait pas : notez « ? »)

- Nombre de traitements en cours : ...
 Nombre de traitements à risque (AVK, insuline, chimio...) : ...
 Utilisation quotidienne de psychotrope : oui non je ne sais pas

17- Nombre de **chutes** ces 12 derniers mois : 0 1 2 3 ou plus

Instabilité posturale (=incapable de tenir en appui monopodal plus de 5 secondes sans bouger les bras) : oui non

18- Le patient présente (cochez la ou les propositions) :

- Des conduites à risque
 Un risque suicidaire
 Une addiction
 Aucune des propositions

19- Le patient :

▪ Réalise les **dépistages organisés** :

- oui non pas d'indication au dépistage je ne sais pas

▪ Est à jour de ses **vaccins** :

- oui non je ne sais pas

▪ A bénéficié d'une **éducation thérapeutique** (AVK/diabète...) :

- oui non je ne sais pas

20- Quels sont ses **facteurs de risque psychosociaux** ? (cochez la ou les propositions justes) :

- Conjugopathie
 Divorce
 Problèmes familiaux
 Décès d'un ou plusieurs proches
 Précarité financière et sociale

21- **Catégorie socio professionnelle** (selon INSEE), cocher la profession prédominante exercée avant le passage à la retraite (cochez la proposition) :

- Agriculteur / exploitant agricole
 Artisan, commerçant, chef d'entreprise
 Cadre et professions intellectuelles supérieures
 Professions intermédiaires
 Employés
 Ouvriers
 Sans activité (ex : femme au foyer)

22- Caractéristiques de l'**entourage** :

- Entourage aidant et soutenant (stratégie adaptative : aide le patient dans ses démarches administratives, peuvent alerter quand ça ne va...)
 Entourage existant mais non soutenant
 Absence d'entourage

23- Ces compétences vous aident-elles à **appréhender la multimorbidité** de votre patient ?

- La connaissance du système de santé

oui complètement oui dans l'ensemble oui un peu non

- L'habitude à résoudre des problèmes complexes

oui complètement oui dans l'ensemble oui un peu non

- La vision globale des maladies de votre patient

oui complètement oui dans l'ensemble oui un peu non

- Les soins centrés sur les attentes et besoins du patient

oui complètement oui dans l'ensemble oui un peu non

- L'attention portée aux facteurs bio-psycho-sociaux

oui complètement oui dans l'ensemble oui un peu non

- L'intuition

oui complètement oui dans l'ensemble oui un peu non

- Une communication de bonne qualité

oui complètement oui dans l'ensemble oui un peu non

SERMENT D'HIPPOCRATE

« Au moment d'être admis à exercer la médecine, je promets et je jure d'être fidèle aux lois de l'honneur et de la probité.

Mon premier souci sera de rétablir, de préserver ou de promouvoir la santé dans tous ses éléments, physiques et mentaux, individuels et sociaux.

Je respecterai toutes les personnes, leur autonomie et leur volonté, sans aucune discrimination selon leur état ou leurs convictions. J'interviendrai pour les protéger si elles sont affaiblies, vulnérables ou menacées dans leur intégrité ou leur dignité. Même sous la contrainte, je ne ferai pas usage de mes connaissances contre les lois de l'humanité.

J'informerai les patients des décisions envisagées, de leurs raisons et de leurs conséquences. Je ne tromperai jamais leur confiance et n'exploiterai pas le pouvoir hérité des circonstances pour forcer les consciences.

Je donnerai mes soins à l'indigent et à quiconque me le demandera. Je ne me laisserai pas influencer par la soif du gain ou la recherche de la gloire.

Admis dans l'intimité des personnes, je tairai les secrets qui me seront confiés. Reçu à l'intérieur des maisons, je respecterai les secrets des foyers et ma conduite ne servira pas à corrompre les mœurs.

Je ferai tout pour soulager les souffrances. Je ne prolongerai pas abusivement les agonies. Je ne provoquerai jamais la mort délibérément.

Je préserverai l'indépendance nécessaire à l'accomplissement de ma mission. Je n'entreprendrai rien qui dépasse mes compétences. Je les entretiendrai et les perfectionnerai pour assurer au mieux les services qui me seront demandés.

J'apporterai mon aide à mes confrères ainsi qu'à leurs familles dans l'adversité.

Que les hommes et mes confrères m'accordent leur estime si je suis fidèle à mes promesses ; que je sois déshonoré et méprisé si j'y manque. »

GUILLOU (Quentin): SEARCH FOR DECOMPENSATION RISK FACTORS WITHIN THE EGPRN MULTIMORBIDITY'S DEFINITION THEMES. COHORT PILOT STUDY, FOLLOW UP AT 21 MONTHS IN NURSING HOME.

Th. : Med. : Brest 2018

ABSTRACT: BACKGROUND : Due to an ageing population chronic diseases are in full swing. Multimorbidity concerns a large part of the population both in outpatients and in Nursing Homes. The objective of this study was to identify, at 21 months of follow up, risk factors for decompensation patients with multimorbidity in nursing homes. **METHODS :** From July 2014 to December 2015, a prospective observational cohort study was conducted at the Lanmeur nursing home in Finistère. Patients meeting the definition of multimorbidity of the European General Practitioners Research Network (EGPRN) were included by their general practitioners. Decompensation was defined as the occurrence of death or hospitalization for at least 7 consecutive days. Twenty-one months after inclusion, patients were divided according to their status into two groups, "Decompensated" ("D") or "Nothing to Report" ("RAS"). A multivariate analysis following the Cox model was performed to identify risk factors for decompensation. **RESULTS :** 64 patients were included. 35 belonged to group "D" and 29 to group "RAS". Multivariate analysis using a Cox model found two statistically significant variables: pain (HR = 2.20, 95% CI [1.10-4.40]) which emerged as a decompensation factor, while correct hygiene (HR = 0.44, 95% CI [0.20-0.94]) emerged as a protective factor. **CONCLUSION :** Pain seems correlated to the risk of death or hospitalization in elderly multi-morbid residents residing in nursing homes while correct hygiene seemed to be correlated with its reduction. The encountered difficulties will be used to improve the methodology which would be useful as the results need to be confirmed in a more powerful study at a European level.

KEYWORDS:

MULTIMORBIDITY
DECOMPENSATION
RISK FACTOR
PILOT STUDY, COHORT
NURSING HOME
PAIN
LIFESTYLE

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