UNIVERSITY MOHAMMED V – RABAT
FACULTY OF MEDICINE AND PHARMACY OF RABAT

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HEALTH RELATED QUALITY OF LIFE TRAJECTORIES OF PATIENTS IN A MOROCCAN ACUTE MEDICAL UNIT: A LATENT CLASS GROWTH MODELING APPROACH

THESIS

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BY

Mr. ADNANE EL KHATTATE
Born on the 21st April 1990 in Agadir

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اهْدِنَا الصِّرَاطَ الْمُسْتَقِيمَ

صِرَاطَ الَّذِينَ أَنْعَمْتَ عَلَيْهِمْ
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الضَّالِّينَ

وَلَسَوْفَ يُعْطِيكَ رَبُّكَ
فَتَرْضَى

اللهم صل على سيدنا محمد وعلى آل سيدنا محمد
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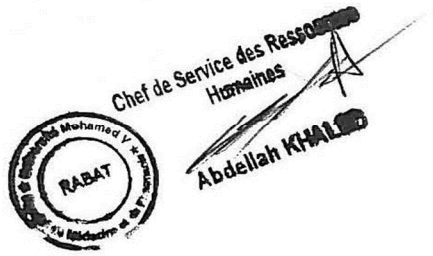

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DEDICATIONS:

وَوَصَّيْنَا الإِنسَانَ بِوَالِدَيْهِ حَمَلَتْهُ أُمُّهُ وَهْنًا عَلَى وَهْنٍ وَفِصَالُهُ فِي عَامَيْنِ أَنِ اشْكُرْ لِي وَلِوَالِدَيْكَ إِلَيَّ الْمَصِيرُ

سورة لقمان

And We have enjoined upon man [care] for his parents. His mother carried him, [increasing her] in weakness upon weakness, and his weaning is in two years. Be grateful to Me and to your parents; to Me is the [final] destination.

Translation of the meanings of
Aya 14 Surat Luqman

اللَّهِ

First and foremost, I dedicate this work to that which I call god; Allah, the Entirely Merciful, the Always Merciful. Every word I thought of, every formulation I imagined and every language I spoke failed me when I tried to express my gratitude. Every time, I think of Allah, I think of that loving force, which made bees and flees, which made mountains and seas, which made universe and law, and I remember that It made me. I wasn't always the best that I could be, I didn't always live up to The Knowledge It taught me, but if there is one thing left for me to do, I know, for sure, that it will be trying to be the best man I could be, just to be grateful for it and to It.

الْحَمْدُ لِلَّهِ رَبِّ الْعَالَمِينَ

My beloved Mother, my beloved Father,

There are a lot of things I would love to say, not necessarily to them, but about them. I intend for it to be a teaching lesson, to anyone trying to learn the art of parenting. My parents, didn't tell me to do or to be this or that, they were what they wanted me to be and what I wish I could be. My parents didn't try to live their unfulfilled dreams through me; instead they liberated me to life, to My Life. My parents never pushed me to strive for over achievement, they let me step into the space which I could call mine, where I could feel good and be good. My parents never tried to hide an ugly truth or a suffering from me; instead they taught me how to face it with grace and dignity. My parents loved me beyond any measure and never lost any moment to show it to me and to anyone around me.

Father taught me that a man is not a man by hiding his feelings or fitting into a social standard defining manliness but by what he stands for, how he cares for his loved ones and how he serves them. He made me true to who I am.

Mother taught me the healing strength of forgiveness. Watching her be who she is made me realize that kindness is for the strongest, those who can spread love without any return. She made me realize how I can stand for myself and never let anybody violate or defile what I am, all while being kind and gentle. I learnt to say No when it was a No and to never betray myself.

Being parented by such beings made me someone who doesn't pursue happiness, who doesn't need to be cool or want money, not even someone who strives for excellence. It made me a man of impact. Whether I could perceive it, measure it, or not, impact is all I live for, all I wish for, because I know how a loving impact feels.

To the beloved memory of my brother Ahmed,

When I think of him, I think of kindness and service. His loss was, and still is a scar, but I never wish for it to heal. It was the breach that let light inside me. It was what cleaned the dusts of arrogance that accumulated in my heart. Those eyes of his, that face which enlightened every room he entered and that quirkily cute laughter of his will always be warm memories that I will wrap myself in when the days get colder. May he rest in the Mercy of Allah.

To my big brother, M'hmd Elhassane,

We rarely see eye to eye, that's for sure. But what I know for sure, love is always there and will always be. I love you as you are and I wish you could let people see what you let me see. You are a second father to me, and don't be fooled, not as good as the first, but you are definitely trying to head for that direction. And that, my love, is something big!

To Mama Fatma-Salka,

Since I could remember, you were more than my sister, you were my second mother. I love you, I care for you more than anyone could imagine. The memories I had with you, the memories I am building with you, the intimacy we share makes me feel good, really really good. And I thank you for the delightfully exquisite taste you passed down to me. After all those years, even if you don't do it physically, you are still the one who dresses me up, every morning.

To Hayat,

You are fun, when you want to be. You bring the thrill to my life. You are the sister to always crack a joke to lighten up the mood. I know you are not selfless, and that is a euphemism, but I really love you like you are, and wish you could love yourself less, because we already do.

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You understand me more than anybody does. You are my confidante sister. You are a whole support system for me and for all the family. You are the piece holding that mystery tourbillion setting of ours all together, functioning as smoothly as it can. I wish I could steal you from space and time, put you in my heart and hide you forever after; because that is where you belong and that is the only space that deserves you. I simply and unapologetically adore you.

To Moufida,

I never realized the importance of good marriages before you. I am so glad you were the one for my brother and that he was the one for you. I didn't gain a sister in law, I gained a sister. I love you more than you can imagine. And assure you that if he ever thinks of changing you, I will make it my duty to make their life together miserable. Yes, I love you that much.

To Aahd, Kenza, Meryem, Myriam and Me,

We are and will always be the only S.S.A.F.P.L. members. We grew up together, we ached together, we fought together (and with each other), we travelled together, we cried together, we shared food (and that's something; I don't share food) and most importantly we loved each other more than, even we could have ever expected. We have been a blessing in our lives. We have been rainbows in our clouds. We have not only been good friends; the best friends, we were spiritual partners. I don't know about you, but you brought me closer to Allah. Every shared moment was a whole spiritual journey that people should die for. I will always love you. And that is the only time I am sure when saying it to someone who is not my own blood. Always.

To Taha Baiz,

You bring out the best in me; that is big. You are the friend everybody should pray to have, but rarely deserve. I hope you are always well. And I pray that we could walk in the light all together like we always wished and imagined.

To Zinah,

You see me. I still remember it as if it was yesterday, the first day we met. Friendship was instantly established. So much warmth, so much love, I felt. And from that day I loved you and I loved those you loved. But beyond anything I trust you, and always will.

To the loving memory of Uncle Mohamed Fadel

To the loving memory of Uncle Hmednah

To the loving memory of Uncle Moulay Youssef

Men who were role models for me. Men who gave me advice, who loved me as if I was their own son. They will always live in my heart.

To Khalti Bouchra, Khalti Assyia, Khalti Aïcha, Khalti Naïma, Tata Khadija Massrour, Khalti Rachida, Khalti Ibtissam, Aami Hassane Sabah, Aami Mohamed Bizrane, Aami Benissa Benchaouch, and Adnane Rhanim,

Thank you for taking me as a son (not you Rhanim), thank you for loving me as one, thank you for giving me the best friends I will ever have and thank you for opening you lives and hearts to me.

To The Gorgeous People; Mohammed, Taha, Amine, Mehdi, Imane, Sara, Zainab, Meriem and Amal,

Thank you for making the medical school years a big fun party.

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ABBREVIATIONS

AMU	Acute Medical Unit
APP	Average group posterior probability
AQoL	Assessment of Quality of Life
ASCOT	Adult Social Care Outcome Toolkit
BIC	Bayesian Information Criterion
CCI	Charlson comorbidity index
EQ-5D-3L	Euroquol 5 Dimensions 3 levels
EQ-VAS	Euroquol Visual Analog Scale
GCS	Glasgow coma scale
GDP	Gross domestic product
GFR	Glomerular filtration rate
HR-QoL	Health related quality of life
HUI	Health Utility Index
ICECAP-A	ICEpop CAPability measure for Adults
ICU	Intensive care unit
LCGM	Latent class growth modeling
OCC	Odds of correct classification
QoL	Quality of life
QWB-SA	Quality of Wellbeing Self Administered
SD	Standard deviation
SF-36	Short Form 36
SF-6D	Short Form 6 Dimensions
Vs.	Versus
WHO	World Health Organization
WHO-QoL	World Health Organization Quality of Life

INTRODUCTION

The quality of life (QoL) concept has spilled a lot of ink as a determinant of wellbeing after a period where the only indicators that mattered to states and policy makers were Mortality, Morbidity and the way they impacted gross domestic product (GDP). In fact, 'The importance, multicontextuality and growth of QoL may be assessed by looking at the number of citations in urban, biological, medical, psychological and social database literature. For example, in 1969, there are 0 citations in Urban, 1 in Biosis, 1 in Medline, 3 in PsycLIT and 2 in Sociofile; in 1995 we can find, respectively, 112, 1379, 2242, 187 and 137 citations. From these cumulative frequencies, we can conclude that there has been a constant increase of interest in QoL in different scientific fields, but while in the urban, psychological and social fields we observe an arithmetical progression, growth in biological and medical literature has been exponential.'[1] And these numbers have been growing ever since.

This urged the scientific community to find definitions of what might be the quality of life in spite of the abstractness and amorphousness of the concept. Fernandez-Ballesteros stated that 'we can – in accordance with Birren and Dieckmann – establish what is not quality of life: QoL is not equivalent of quality of environment, is not equal to the quantity of material goods, is not equivalent to the physical health status, or the quality of health care, just as it is distinct from subjective constructs such as life

satisfaction, morale or happiness.'[1] Further she cites Brown et al. who emphasizes that 'QoL is, actually, the product of the dynamic interaction between external conditions of an individual's life and the internal perception of those conditions.'[1]
One of the broadest definitions of the QoL is the one that was proposed by the World Health Organization (WHO) in 1947: 'as individuals' perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns. It is a broad ranging concept affected in a complex way by the person's physical health, psychological state,level of independence,social relationships, personal beliefs and their relationship to salient featuresof their environment.' [2]

Working from these attempts to define QoL, we conclude to a general, and the mainly accepted characteristic of QoL: the multidimensionality. But in this particular work, the emphasis is going to be on the health dimension as an important factor of patient's wellbeing, commonly referred to as health related quality of life (HR-QoL).
To approach this subject, some questions must be answered:

- Why is the health related quality of life (HR-QoL) important?
- How can we assess the heath related quality of life (HR-QoL)?
- What is an acute medical unit (AMU) and what makes it so particular?

A. Why is the health related quality of life (HR-QoL) important?

Good health was defined by WHO's constitution as a state of complete physical, social and mental well-being, and not merely the absence of disease or infirmity.[2]

'Health related quality of life can be defined in multiple ways, but there is agreement that HR-QoL is the functional effect of a medical condition and/or its treatment upon a patient's physical, social, and emotional well-being (quality of life).'[3]

This notion has gained main interest in research and healthcare as an important determinant of the outcome, since more and more people tend to live with chronic medical conditions. This is the result of the great medical and technological progress that the world has known. Hence, the shift in paradigms of healthcare priorities and objectives, where the ultimate goal became the maintenance or the improvement of the QoL of people.[4], [5] Moreover, in the Moroccan society HR-QoL has always had a centric place in people's lives. And what better example than the traditional proverb and prayer 'May God sustain, only, health and safety' (الله يرزق غير الصحة والسلامة) to demonstrate it.

Nevertheless, the fact that health - according to the WHO's definition - is multidimensional, makes the HR-QoL concept as multidimensional and hard for grasp. Still, major breakthroughs in the conceptualization of HR-QoL and standardization of measures resulted tofunction being the most essential dimension of HR-QoL and should include physical, social and role function. The other essential dimensions are

mental health and general health perception. Vitality, pain and cognitive function are also important domains of HR-QoL.[5]

Overall, the importance of the QoL and HR-QoL of life as well as their multidimensionality, drove the research to try to find pertinent tools of measurement, that are as reliable as possible when measuring a very subjective notion, like perception of one's QoL.

B. How can we assess the heath related quality of life (HR-QoL)?

Many tools have been developed through the years to measure HR-QoL. Patient reported outcomes measurement helped incorporate patient's voice into health care decision-making, changing dramatically the dynamics of clinical practice and research.[5] Some of these tools are disease specific, measuring HR-QoL in a well-defined population. While others are generic HR-QoL outcome measurement, which are applicable to all people irrespective of the type and nature of the diseases they have, thus, facilitating comparison between different groups of people, treatments or services. Moreover, one can observe that these tools can be wellbeing measurements (ASCOT, ICECAP-A, WHO-QoL, etc.) or HR-QoL measurements (EQ-5D, HUI 3, SF 36, SF-6D, etc.). The difference is that the latter measure physical, social and psychological dimensions, while the first contain additional dimensions such as purpose in life and achievement, security, and freedom.[5]–[7]

Instruments for measuring HR-Qol can be differentiated into preference based and non-preference based. Preference based instruments typically incorporate scoring algorithms which are based upon the preferences of a general population sample for the health and/or quality of life states defined by the instrument elicited using one or more valuation methods such as the visual analogue scale, time trade off, person trade off, standard gamble and discrete choice experiments.[7], [8]In this review, we are going to focus on the most used generic preference-based HR-QoL measurement tools, for which utility score existed and that have proved clinical usefulness by not only being valid, appropriate, reliable, responsive, and able to be interpreted, but also being simple, quick to complete and easy to score.[5], [9], [10]

a- Health Utility Index (HUI):

HUI is a family of generic health profiles and preference-based systems for the purposes of measuring health status, reporting health-related quality of life and producing utility scores. It is the product of more than 30 years of research at McMaster University.[11], [12]

The first version of HUI, HUI1, was developed to evaluate outcomes for very-low birth-weight infants. From this early work a core set of the most important attributes was determined for HUI2 to address, specifically, the global morbidity burden of childhood cancer reflecting both the form and severity of cancer sequelae. Since then, it has been applied in different groups of population with various ages and health conditions. HUI3 was developed to address some concerns about the definitions of HUI2, to be applicable in both clinical and general population studies, and to have structural independence among the attributes. The HUI2 classification system includes 7 attributes – Sensation, Mobility, Emotion, Cognition, Self-Care, Pain and Fertility – each with 3 to 5 levels. The HUI3 classification system is comprised of 8 attributes – Vision, Hearing, Speech, Ambulation, Dexterity, Emotion, Cognition and Pain – each with 5 or 6 levels of ability/disability. HUI is currently defined as including both HUI2 and HUI3 systems, which together describe almost 1,000,000 unique health states. The questionnaires are answered by the patient or his proxy.[6], [12](Appendix 1 – page 76)

b- Short form 36 / Short Form 6 Dimensions:

The short form 6 dimensions (SF-6D) is derived from the health-related quality of life questionnaire, the Short Form 36. The latter has no obvious ordinal relationship between its multi-level scoring items which makes it hard for calculating utility indexes.[13]

The short form-36 health survey (SF-36) is one of the most widely used generic health status measure and it was developed in the United States[14]. The SF-36 has been used in a variety of patient populations, it has demonstrated excellent reliability and validity when employed with diverse medical conditions and increasingly has been used in critically ill populations[15]. The SF-36 is a multipurpose survey of general health status consisting of 36 items that measure eight scales or health concepts: physical functioning, physical role, bodily pain, general health, vitality, social functioning, emotional role and mental health. Each scale is scored from 0 to 100 with a higher score reflecting a better quality of life. Experience with this questionnaire has been gained in a number of settings including primary care. The SF-36 is also suitable for self-administration, or for administration by an interviewer in person or by telephone.[14], [15]

The SF-6D has six dimensions: physical functioning, role limitations, social functioning, pain, mental health and vitality. The classification system consists of four to six levels on each of the six attributes, giving a total of 18,000 health states. [13], [16](Appendix 2 - page 82)

c- Assessment of Quality of Life (AQoL):

AQoL instruments are health-related multi-attribute utility quality of life instruments. It is the product of research at The University of Melbourne in Australia. Initially they were designed for use in economic evaluation studies. However, their use is now broader. The uniqueness of the AQoL among utility descriptive systems arises from the use of contemporary psychometric procedures during construction and initial validation of the descriptive system. To date, four AQoL instruments have been developed; AQoL-4D; AQoL-6D; AQoL-7D and AQoL-8D.[17]–[19]AQoL-8D contains 35 items which load onto eight dimensions. The first three dimensions; independent living; pain and senses are related to the physical super-dimension. The remaining five; mental health; happiness; coping; relationships and self worth are related to the psycho-social super-dimensions. The 35 items of the AQoL-8D define $2.4x10^{23}$ health states.[20]

d- Quality of Wellbeing Self Administered (QWB-SA):

The QWB-SA is based on the interview version of the QWB, the oldest preference-based instrument for estimation of quality-adjusted life years. The QWB-SA is a comprehensive measure including several HR-QoL components.[21]

The questionnaire covers three areas. In the first section the presence or absence of 19 chronic symptoms or problems (e.g. blindness, hearing problems) is assessed. This section is followed by 25 acute physical symptoms (e.g. headache, coughing), and 14 mental symptoms and behaviors (e.g. sadness, anxiety). The remaining section

contains three separate scales of self-reported levels of functioning; mobility; physical activity and social activity. With the exception of the list of chronic symptoms or problems in the first section, respondents identify symptoms, problems, or behaviors that have affected them over the past three days. The items of QWB-SA only describe 945 health states.[22], [23]

e- EuroQuality of Life (EuroQol) 5 Dimensions:

The EuroQol 5Dimensions (EQ-5D)was introduced by EuroQol Group in 1990.[24] Since then, it became the most commonly applied generic preference based instrument and is recommended for health technology assessment by the National Institute for Health and Clinical Excellence. [25], [26]

The EQ-5D comprises five dimensions: mobility, self-care, usual activities, pain/discomfort, and anxiety/depression. The original measure had three response categories/levels including no problems, some/moderate problems, and severe/extreme problems on each domain. This creates a total of 243 possible combinations of unique health states. These combinations are linked to pre-determined preference-weighted scores yielded from direct utility elicitation such as a time trade-off or visual analog scale (VAS) approaches. Health utility values generated from the EQ-5D generally range from -0.59 to 1; 0 equivalent of death, 1 equivalent of perfect health and health utility values inferior to 0 represent health states considered worse than death. The EQ-5D is often administered with the EQ-VAS where respondents report their self-rated valuation of their health state on a scale of 0–100. In 2014, an EQ-5D 5Levels was launched.

The most attractive features of the EQ-5D instrument include its brevity, the fact that it is cognitively simple and that it tends to provide wider scoring range. In addition, it is available in more than 150 official languages and offers several

population weights (e.g., different value sets for the UK, France, Germany, Netherlands, Denmark, Spain, Japan, USA, etc.).[25]

The Moroccan Arabic EQ-5D-3L version, was adapted and validated by Khoudri et al. in 2012.[27](Appendix 3 – page 83)

EQ-5D is the most sensitive instrument for measuring pain.[26] It was found to be more responsive to deteriorations in health than improvement and to a large change in health found in a moderate-to-severe condition than to a small change in a mild condition.[16] It could also be argued that EQ-5D is more suitable for individuals receiving health-focused interventions such as those in hospital where the primary objective is the maintenance of/or improvement in health. But, there is no such evidence to indicate that there are differences in quality of life perceptions between hospitalized/ambulatory and non-hospitalized adults.[28] Moreover, a study suggests that the use of EQ-5D will discriminate against services that primarily affect psychosocial health. [25]

Alternatively, a Meta analysis that included 145 studies identified only four conditions where EQ-5D was not responsive; alcohol dependency; schizophrenia; limb reconstruction and hearing impairment. Also, it emphasizes that the EQ-5D had higher responsiveness than other instruments; utilities' improvements for patients with different severity levels were higher with the EQ-5D.[25]

C.Particularity of an acute medical unit:

AMUs are designated hospital wards specifically staffed and equipped to receive medical inpatient presenting with acute medical illness from emergency departments and/or the community for expedited multidisciplinary and medical specialist assessment, care and treatment for up to a designated period (typically between 24 and 72 h) prior to discharge or transfer to medical wards.[29] These units are supervised by consultants with an interest in acute general medicine, feature multidisciplinary teams that comprehensively assess and manage both medical illness and functional disability, and, in many instances, are geographically co-located with emergency departments and key diagnostic services such as pathology and radiology.[29], [30]

While AMUs have local and national peculiarities in organization and operation, all share several common objectives and patient flow characteristics, which confer potential flow-on benefits for patients, clinicians and health services as a whole. These include the following: more appropriate and timely assessment, diagnosis and treatment of patients leading to reduced length of stay; more organized work environment with standardized admission and discharge processes; reduced overcrowding in emergency departments and avoidance of unnecessary admissions; improved bed management and smoother patient flows; increased staff job satisfaction and more effective use of resources for the hospital as a whole.[31]

In the UK, the Royal College of Physicians of London since 2001 has repeatedly recommended the establishment of AMUs to provide hospitals with defined medical cover for acute general medicine in order to respond more effectively and safely to the increasingly complex demands placed on the hospital with regard to acute medical care.[31], [32]

In morocco, only one AMU has been established so far, and that in Ibn Sina hospital university of Rabat. Soufi et al. found that only 30% of patients admitted to that AMU stayed less than 6 days in it before discharge to home or transfer to another ward.[33] It is a deviation from the main purpose of AMU dictated by the Moroccan context where AMU is no longer an expedited assessment and treatment initiating unit but a tampon ward absorbing hospital deficit. In fact, the inpatients admitted tend to have acute medical conditions for which the management depends of another ward where no vacant bed is available, acute undiagnosed illness or an acute decompensation of underlying disease in a context of multimorbidity.

Quality of life of patients with chronic medical conditions [34]–[38] and patients admitted to intensive care units [39]–[43] has been widely studied, while characteristics of those acutely ill have rarely been investigated in developing counties. Therefore, the impact of the acute episode on QoL and short-term and long-term survival deserves to be thoroughly investigated.

The aims of the present study were:

- To describe charecteristics of patients hospitalized in an AMU during study period.
- To identify trajectories of HR-QoL for patients hospitalized in AMU over 18 months of follow-up.
- To determine the factors associated with trajectory class membership.

MATERIALS AND METHODS:

A. Type of the study:

This was a prospective cohort study.

B. Study location:

This was a survey of patients conducted in an acute medicine department of Rabat University Hospital. The unit admits approximately 950 patients annually with an average age of 40 years. Patients are admitted mainly from the emergency unit.

The service comprises 5 single rooms and 4 common rooms (6 beds per room) and admits patients exhibiting different medical illnesses.

The study was approved by the local ethics committee and informed consent was obtained from all patients.

C. The study period:

Inpatients' data were collected during the period from: June 2014 to April 2016. It included inpatients of this AMU from June 2014 to September 2014. Then the follow-up period of all subjects (at 1 month, 3 months, 6 months and 18 months from discharge) ended up on April 2016.

D. Inclusion and Exclusion criteria:

The study was conducted among patients aged more than 17 years consecutively admitted to AMU during study period.

Patients with serious physical or mental pathologies, such as terminal disease and psychosis that could make the comprehension and completion of the questionnaire difficult, were excluded.

Patients for whom the first EQ-5D was not completed were excluded from latent class growth modeling (LCGM).

E. Patients' collected data:

a- Patients' characteristics:

1- Socio-demographic and anthropometric charecteristics:

Age: by years

Gender: Male and Female

Marital status: Married and Unmarried subjects. The unmarried include: Single, divorced or widowed patients.

Distance hospital-residence: Expressing how far does the patient lives from the hospital in Kilometers.

Educational level: Whether the patient has been at primary school, secondary school/college or never.

Phone number:

2- ***Patients' comorbidities:***

Anterior hospitalization: Whether the patient had been previously hospitalized or not

History of chronic disease: Whether the patient has a history of cardio-vascular disease, diabetes, chronic renal failure, neoplasia, chronic respiratory failure or not.

Charlson Comorbidity Index (CCI):Based on "The International Classification ofDiseases (ICD)" the Charlson Comorbidity Index has been developed to classify and weight the patients' comorbidities allowing a prediction of the outcome and/or mortality risk.[44]

It was first developed in 1987 by Charlson et al.[45]. In 1994 they updated the CCI by combining the age in the index [46]. In 2010, Quan et al. readjusted the comorbidity conditions and reweighted them to keep only 12 items instead of 19 in the previous index.[47]

In our study, we used the age-adjusted CCI version of 1994 with 19 comorbidities. (Appendix 4 – page 87)

A CCI score equal to 0, means that the patient has no comorbidity condition and is strictly aged less than 50 years old.

3- Discharge diagnosis:

Sepsis: Systemic inflammatory response syndrome occuring in the presence of infection clinically or bacteriologically documented.

Cardiovascular emergencies: were considered as cardiovascular emergencies all cases with: exacerbation of heart failure, acute coronary syndrome, arrhythmia, acute pericarditis, endocarditis, cardiogenic shock and/or deep venous thrombosis

Endocrine and metabolic emergencies: were considered as endocrine and metabolic emergencies all cases with: diabetic ketoacidosis, Hyperosmolar non ketotic coma, acute adrenal insufficiency, dehydration, dyscalcemia, acute renal failure and/or hepatic failure (acute/chronic).

Respiratory emergencies: were considered as respiratory emergencies all cases with: acute respiratory distress syndrome, acute severe asthma, pulmonary embolism, pneumonia, sarcoidosis and/or chronic respiratory failure exacerbation.

Neuro-psychiatric emergencies: were considered as neuro-psychiatric emergencies all cases with: cerebral vascular accident, encephalopathy and/or neuroleptic malignant syndrome.

Hematologic and Systemic disease emergencies: were considered as hematologic and systemic disease emergencies all cases with: anemia, lymphoma, leukemia, neutropenic fever, sickle cell attack, pancytopenia, essential thrombocytemia, aplastic anemia and/or paroxysmal nocturnal hemoglobinuria.

Other: all other diagnosis not including those previously mentioned

4- Clinical characteristics at admission:

Consciousness disorder (based on GCS): Whether the patient had a GCS < or = to 14 at admission to AMU. Glasgow Coma Scale (GCS) is a neurological scale used to assess the impairment of consciousness depending on the response to different stimuli.[48](Appendix 5 – page 89)

5- Paraclinical characteristics at admission:

Natremia: Serum sodium level in mmol/L

Creatinine clearance (based on *MDRD* -Modification of Diet in Renal Disease-equation):

Creatinine Clearance = [(186 x CREAT^-1,154) x (AGE^-0,203)] (x 0,742 for female)

Creatinine clearance : in ml/min/1,73m^2

Age: in years

Creatinine: in mg/dL

Glycemia: Serum glucose level in g/L

CRP (C - reactive protein): Serum C-Reactive Protein level in mg/L

Hemoglobinemia: Serum hemoglobin level in g/dL

Blood leukocytes: Serum leukocytes level in elements/mm^3

Platelets: Serum platelets level in elements/mm^3

6- ***Evolution:***

i. *Intensive care unit (ICU) transit:*

Whether the patient has spent some time during his hospitalization in an intensive care unit (ICU) before AMU stay, during his AMU stay or has been transfered to an ICU.

ii. *Mortality:*

Mortality in hospital:

Includes patients who died during their hospital stay, either in AMU or after transfer to another ward.

Mortality at 1 month:

Includes patients who died in the AMUor the hospital AND patients who died 1 month or less after discharge from the AMU.

Mortality at 3 months:

Includes all patients who were dead during the period from: the AMU stay to 3 months' follow-up.

Mortality at 6 months:

Includes all patients who were dead during the period from: the AMUstay to 6 months' follow-up.

Mortality at 18 months:

Includes all patients who were dead during the period from: the AMUstay to 18 months' follow-up.

b- Instruments:

EQ-5D-3L and EQ-VAS [27], [49]are already available in a consented Moroccan Arabic version which has avoided us the translation.

The EQ-5D comprises five dimensions: mobility, self-care, usual activities, pain/discomfort, and anxiety/depression. The original measure had three response categories/levels including no problems, some/moderate problems, and severe/extreme problems on each domain. This creates a total of 243 possible combinations of unique health states. These combinations are linked to pre-determined preference-weighted scores yielded from direct utility elicitation such as a time trade-off or visual analog scale (VAS) approaches. Health utility values generated from the EQ-5D generally range from -0.59 to 1; 0 equivalent of death, 1 equivalent of perfect health and health utility values inferior to 0 represent health states considered worse than death. The EQ-5D is often administered with the EQ-VAS where respondents report their self-rated valuation of their health state on a scale of 0–100. (Appendix 3 – page 83)

In our study, EQ-5D-3L items and EQ-VAS were collected at quarterly follow-up intervals:

- Before the acute illness that has motivated the visit to the AMU:

The survey was filled by direct interview. First, we proposed to the patient to fill the survey. When they were not able to fill it because of a very low educational level or blindness we asked the questions and filled it on their behalf. When the patient was suffering from confusion/dementia/psychosis or deafness with impossibility to communicate, the survey was not filled and it was notified.

- 3 months after discharge from the AMU: the follow-up was done by phone calls.
- 6 months after discharge from the AMU: the follow-up was done by phone calls.
- 18 months after discharge from the AMU: the follow-up was done by phone calls.

The utility index scores were calculated using as anchor UK population weights.

F. Statistical analysis:

Of the 229 participants included in the analysis, missing information on all data was 8%. To use all the data from the 229 participants and test whether missingness (assuming that these values were missing at random)[50] influenced the results, we carried out multivariate imputation by chained equations that included all conventional predictors. We created 15 imputed datasets and fitted each model separately on each. Results from the analysis of each imputed dataset were combined with Rubin's rules[51].

Continuous variables are expressed as mean ± standard deviation (SD) or as median ± interquartile range value. Normality of data distribution was evaluated using the Kolmogorov-Smirnov test. Categorical variables are expressed as frequency and percentage and compared by use of $\chi 2$ test.

The statistical analysis proceeds in three steps: ***First***, we used linear and latent class growth models LCGM to disaggregate individuals into HRQoL trajectory classes and quantify these trajectories. LCGM is a semi-parametric group-based modeling technique that can be used to identify clusters of individuals that follow a similar pattern of change on a variable over time [52]. This identification was conducted through group-based trajectory modeling using semi-parametric mixture models with censored-normal distributions[52], [53]. Using the **traj** procedure of Stata, [54]As we had no a priori hypotheses regarding the number of sub-populations of HRQoL growth trajectories or their shape, the number and shape of trajectories was determined by several factors. To identify the optimal number of trajectories, we fit models of increasing complexity and selected the model with the number of trajectories that best

fit the data. Model selection was based on the Bayesian Information Criterion (BIC) as a measure of goodness-of-fit [55], [56]. We tested between 2 and 4 trajectories; improvements in model fit were determined by comparing the value of the BIC between a simple model and a more complex model (a more complex model was favored if the absolute value of the BIC was lower). A smaller BIC is indicative that the more complex model is a better fit for the data. The shape of each trajectory was defined by assessing the statistical significance of cubic and quadratic terms. To account for missing data and provide better estimates, subjects were included when at least 1 data point value was available. The traj procedure assumes that all missing data are missing at random and does not require that all subjects have data at all time points to be included in the analysis. Additionally, missing information on covariates does not result in a dropped data point by stat.

To evaluate trajectory model fit; we used the average group posterior probability (APP), and the odds of correct classification (OCC). Group-based modeling assigns each subject a posterior probability, which measures an individual's probability of belonging to a particular group given the measured variable across time. Thus, the closer the APP is to 1, the better the model fit. An APP greater than 0.7 for all groups is generally recommended [57], [58].

The OCC compares the odds of correctly classifying subjects into group based on the maximum probability classification rule (APP), correcting for the OCC based on random assignment. The OCC would equal 1 for a given trajectory group. Higher OCCs indicate a better fitting model and an OCC above 5.0 for all groups shows good assignment accuracy [53].

Next, we identified baseline patient characteristics associated with trajectory class membership. Once identified, we compared trajectories according to several sample characteristics. Chi-square analyses (for categorical data) or ANOVAs (for continuous data) were used to test for significant differences between baseline variables based on their trajectory groups although interpretation of these profiles is somewhat limited given that group memberships are probabilistic [52]. Associations between trajectory class and baseline covariates were identified using polynomials logistic regression [59]. Univariate relationships between patient characteristics and HR-QoL trajectory classes were first tested using two-sided non-parametric Kruskal–Wallis tests prior to multivariate model inclusion.

Finally, multivariate analyses were conducted to determine associations between risk factors and joint trajectory groups (high trajectory of HR-QoL vs. others). To select the predictors included in the multivariate models, variables with p-value lower than 0.05 in the univariate analysis were tested in multivariate analysis. Multivariate analysis was performed using Stepwise logistic regression models.

Statistical analyses were carried out in SPSS Statistics for Windows version 20.0 (IBM Corp), and were STATA version 14 (Stata Corp, College Station, TX). All probabilities were two tailed, and significance was set at $p<0.05$. We adhered to the TRIPOD statement for reporting [60].

RESULTS:

A. Descriptive Analysis:

A total of 349 patients were screened for participation in the study. 98 patients for whome data collecting was not possible were excluded. 251 patients were included in study population. Only 229 patients were included in the latent class growth modeling, the other 22 were excluded because the first EQ-5D-3L was not collected.

a- Flow chart:

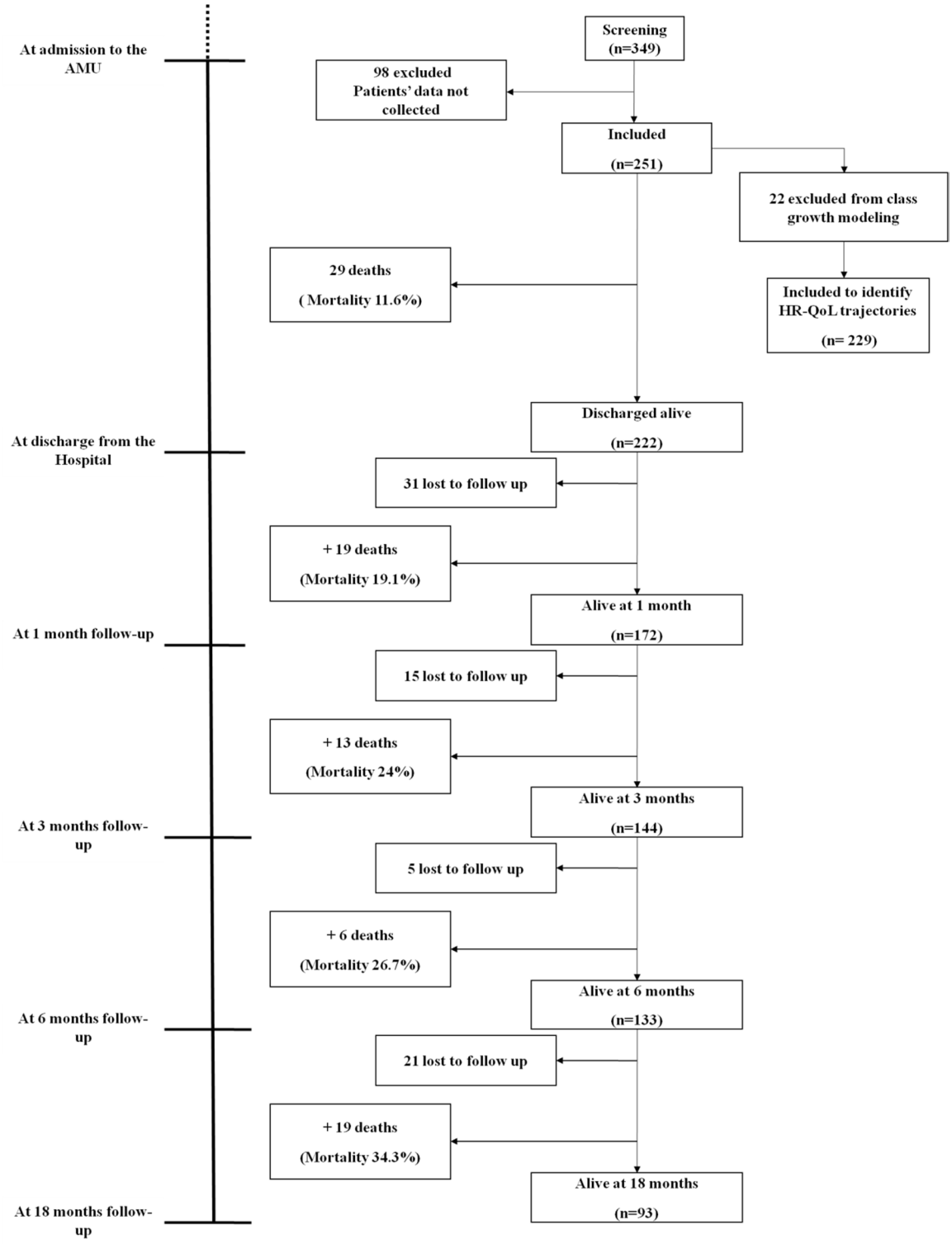

Figure 1: Study participants' flow-chart

b- Study population's characteristics:

1- Socio-demographic and anthropometric characteristics:

Age:

The mean age of the study population was 55.6 ±18.9 with the youngest patient being 17 and the oldest being 90.

Gender:

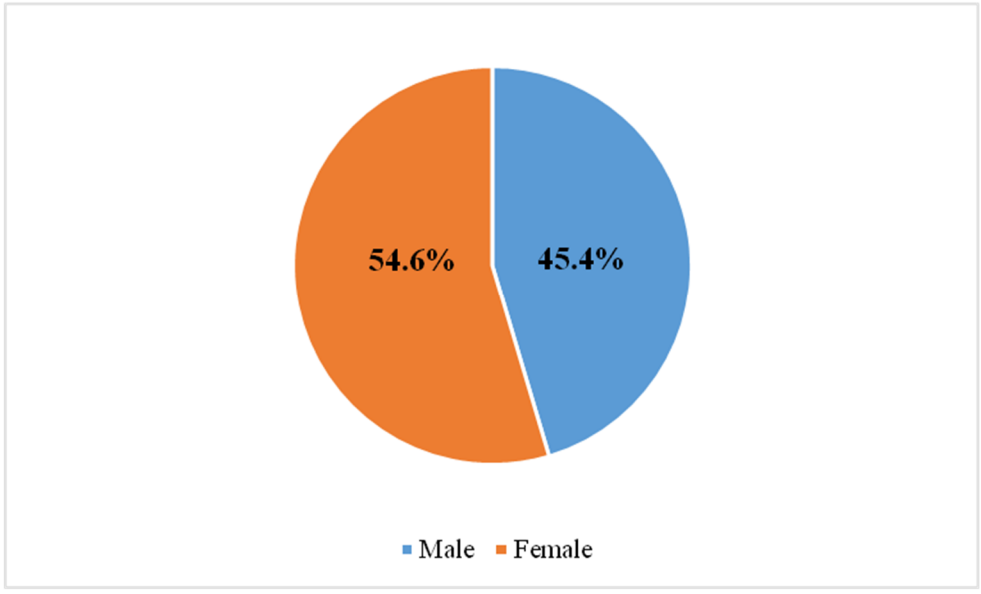

Figure 2: Gender distribution of the study population

Marital status:

Those who were married represented 55 per cent of the study poulation.

Distance hospital-residence:

The median distance between hospital and residence was 13.0 [2.0-64.7] Km.

Educational level:

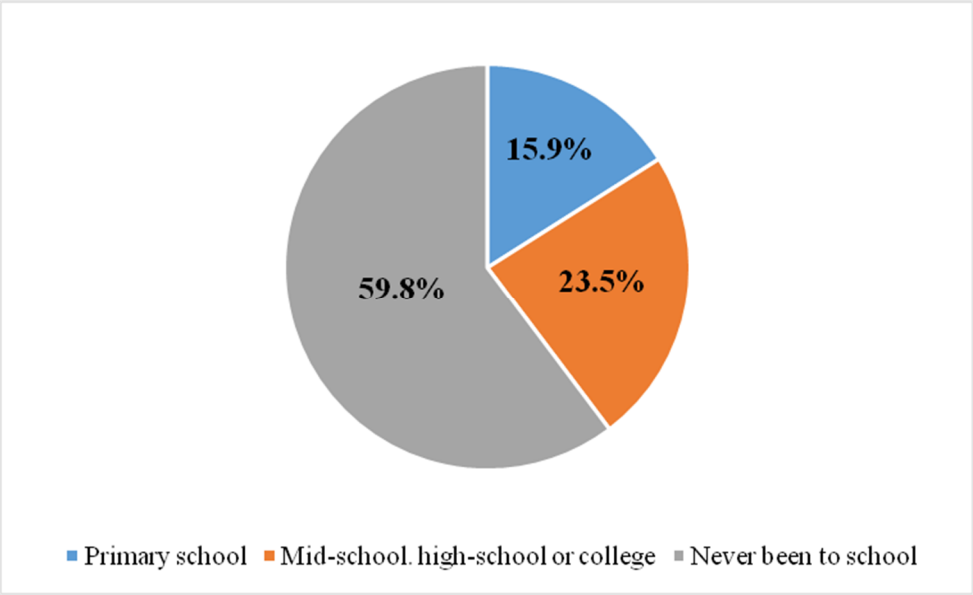

Figure 3: Educational level distribution of the study population

2- Patients' comorbidities:

Anterior hospitalization:

Those who were previously hospitalized represented 57.8 per cent of the study population.

History of chronic disease:

History of chronic disease was prensent in 67.7 per cent of the cases.

Charlson Comorbidity Index (CCI):

CCI median for the study population was 2 [0-4].

Table 1: Patients' comorbidities

	All Patients n=251
Anterior hospitalization n(%)	145 (57.8)
History of chronic disease n(%)	170 (67.7)
Charlson Comorbidity Index (Median [IQR])	2 [0-4]

3- Discharge diagnosis:

Discharge diagnosis of patients admitted to AMU are represented in Figure 4 below.

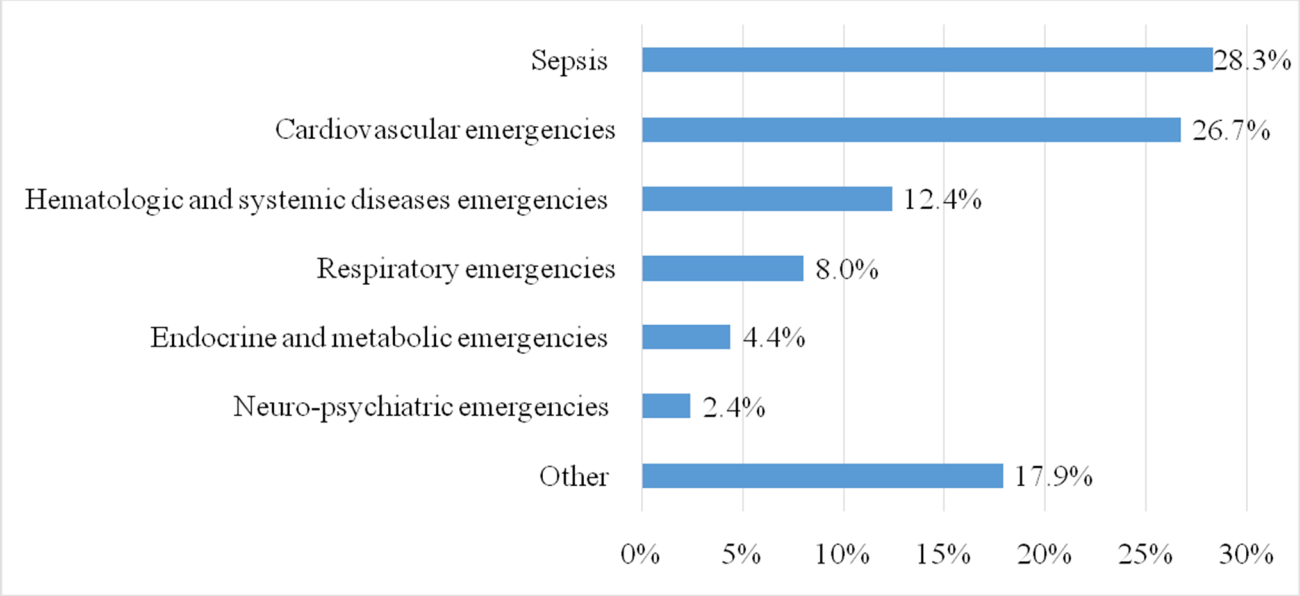

Figure 4: Discharge diagnosis of the study population

4- Clinical characteristics at admission:

Consciousness disorder (based on GCS):

Patients who had conciousness disorder at the moment of admission to AMU represented 13.8 per cent of study population.

5- ***Paraclinicalcharacteristics at admission:***

Paraclinical characteristics of study population are presented in Table 2.

Table 2: Paraclinical characteristics of the sample at admission

	All Patients n=251
Natremia in mmol/L (Mean ±SD)	134.6 ±7.3
Creatinine clearance based on MDRD in ml/min/1.73m2 (Mean ±SD)	69.6 ±47.2
Glycemia in g/L (Mean ±SD)	1.5 ±1.0
CRP in mg/L (Mean ±SD)	99.6 ±97.3
Hemoglobinemia in g/dL (Mean ±SD)	10.7 ±3.1
Blood leukocytes 10^3 elements/mm3 (Mean ±SD)	15.8 ±36.3
Platelets 10^3 elements/mm3 (Mean ±SD)	247.6 ±138.0

6- ***Evolution:***

i. Intensive care unit (ICU) transit:

Patients who transited through ICU represented 12.4 per cent of study population.

ii. Mortality:

Mortality rates during period hospital stay-18 months follow up are presented in Table 3.

Table 3: Mortality over the study period

	All Patients n=251
Mortality in hospital n (%)	29 (11.6)
Mortality at 1 month n (%)	48 (19.1)
Mortality at 3 months n (%)	61 (24.3)
Mortality at 6 months n (%)	67 (26.7)
Mortality at 18 months n (%)	86 (34.3)

c- HR-QoL Trajectories:

1- Description of EQ-5D index and EQ-VAS:

The means and maximum/minimum values of EQ-5D index and EQ-VAS are showed in Table 4.

Table 4 EQ-5D index and EQ-VAS over study period

		before acute illness n=251	3 months follow-up n=143	6 months follow-up n=132	18 months follow-up n=94
EQ-5D Index	Mean ±SD	0.46 ± 0.5	0.57 ± 0.4	0.61 ± 0.4	0.61 ± 0.5
	Minimum	-0,59	-0,59	-0,59	-0,59
	Maximum	1	1	1	1
EQ-VAS	Mean ±SD	61.5 ± 31.3	73.3 ± 26.4	77.9 ± 24.1	77.9 ± 24.1
	Minimum	0	0	5	10
	Maximum	100	100	100	100

2- ***EQ-5D index trajectories:***

The statistical analysis helped identify three distinct EQ-5D Index trajectories; *stably low* included 37 patient (16.2%), *stably moderate* included 70 patients (30.6%) and *high initially increasing* with 122 patients (53.2%).

Figure 5 shows these trajectories and **Table 5** and **Table 6** their statistical accuracy.

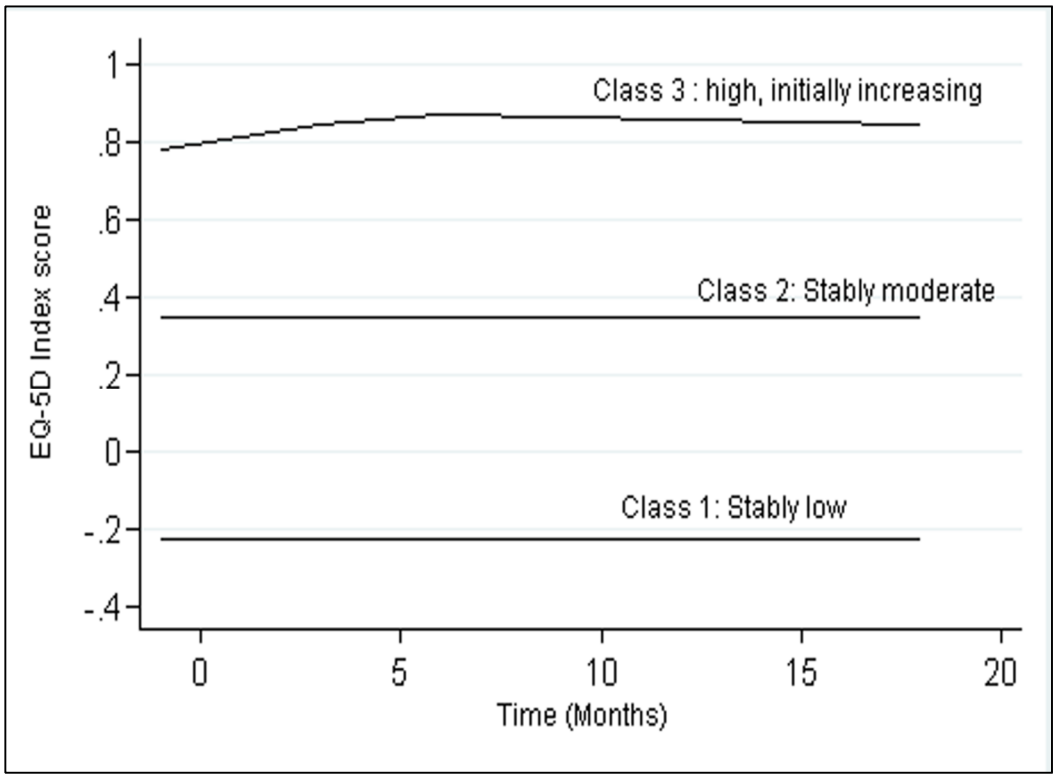

Figure 5: HR-QoL trajectories of patients enrolled in the analysis based on EQ-5D Index

Table 5: Model fit statistics: EQ-5D index trajectory

	BIC	APP	OCC
EQ-5D Index trajectory	-502		
Stably low		0.74	0.16
Stably moderate		0.73	0.33
High, initially increasing		0.86	0.51

Table 6: Censored-normal model parameter estimates EQ-5D index trajectory using a 3-class solution

	Coefficient	Standard error	Prob
EQ-5D Index trajectory			
Stably low			
Intercept	-0.27862	0.12	0.01
Stably moderate			
Intercept	0.35415	0.11	0.001
High, initially increasing			
Intercept	0.92	0.05	0.0000
Linear	0.03	0.02	0.02
Quadratic	-0.02	0.001	0.05

3- EQ-VAS Trajectories:

Three EQ-VAS trajectories were distinguished; *low increasing*, *moderate initially increasing*, and *high initially increasing* with, respectively, 68, 111 and 50 patients representing in the same order 29.7%, 48.5% and 21.8% of the participants included in LCGM analysis. Figure 6 below shows these trajectories and Table 7 and Table 8 their statistical accuracy.

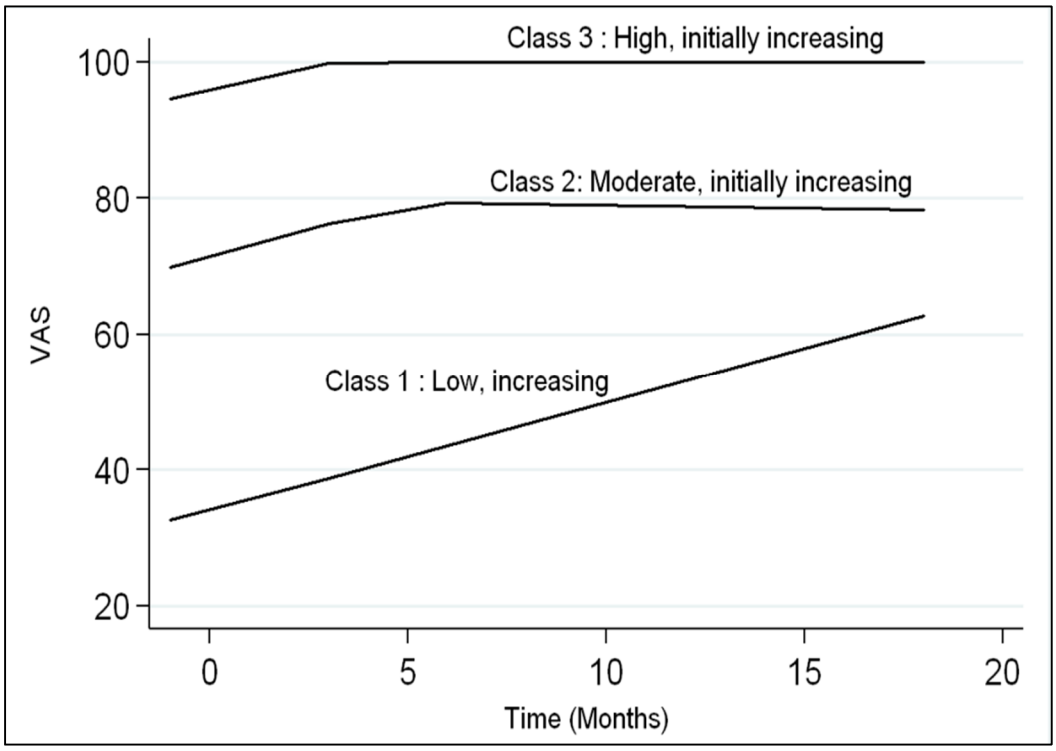

Figure 6: HR-QoL trajectories of patients enrolled in the analysis based on EQ-VAS

Table 7: Model fit statistics: EQ-VAS trajectory

	BIC	APP	OCC
EQ-VAS trajectory	-2022		
Low increasing		0.83	0.32
Moderate,initially increasing		0.81	0.47
High, initially increasing		0.85	0.20

Table 8: Censored-normal model parameter estimates EQ-VAS trajectory using a 3-class solution

	Coefficient	Standard error	Prob
EQ-VAS trajectory			
Low increasing			0.0000
Intercept	33	4.02	
Linear	1.7	0.4	
Moderate, initially increasing			
Intercept	73.7	3.4	0.0000
Linear	2.28	0.9	0.02
Quadratic	-0.092	0.04	0.06
High, initially increasing			
Intercept	121	6.3	0.0000
Linear	9.5	3.5	0.01

Model fit is calculated by comparing the BIC from a simpler model to that from a more complex model.

B. Comparative Analysis: Comparison of patients' characteristics in trajectory classes:

a- EQ-5D index trajectory classes:

1- Socio-demographicand anthropometric characteristics:

Mean age was significantly higher in stably low trajectory. Patients who were 70 years or older represented 40.5% of patients falling into stably low trajectory while they represented only 32.9% and 21.3% of patients falling in stably moderate and high initially increasing trajectories, respectively.

The proportion of females in stably low trajectory was higher than the other two trajectories.

The percentage of patients who have never been to school were higher in stably low trajectory compared to the others

Table 9 shows in detail the comparison of socio-demographic and anthropometric characteristics between EQ-5D index trajectories.

Table 9: Comparison of the socio-demographic and anthropometric characteristics according to EQ-5D index trajectories

	Stably low n=37	Stably moderate n=70	High initially increasing n=122	Chi-square/F-test
Age (Mean ±SD) in years	**61.9 ±14.2**	**55.2 ±19.6**	**51.4 ±18.2**	**0.008**
≤40 years n(%)	**3 (8.1)**	**18 (25.7)**	**41 (33.6)**	
41-69 years n(%)	**19 (51.4)**	**29 (41.4)**	**55 (45.1)**	
≥70 years n(%)	**15 (40.5)**	**23 (32.9)**	**26 (21.3)**	
Gender n(%)				**0.04**
Female	**25 (67.6)**	**39 (55.7)**	**59 (48.4)**	
Male	**12 (32.4)**	**31 (44.3)**	**63 (51.6)**	
Marital status n(%)				0.4
Unmarried	14 (37.8)	31 (44.3)	42 (34.4)	
Married	23 (62.2)	39 (55.7)	80 (65.6)	
Distance hospital-residence (Median [IQR]) in Km	42.9 ±65.0	53.3 ±102.9	61.5 ±111.5	0.6
Educational level				**0.005**
Never been to school	**29 (78.4)**	**41 (58.6)**	**64 (52.5)**	
Primary school	**4 (10.8)**	**14 (20.0)**	**21 (17.2)**	
Mid-school. high-school or college	**4 (10.8)**	**15 (21.4)**	**37 (30.3)**	

2- Patients' comorbidities:

The rates of patients with anterior hospitalization, history of chronic disease and CCI median were higher in stably low trajectory. (Table 10)

Table 10: Comparison of the patients' comorbidities according to EQ-5D index trajectories

	Stably low n=37	Stably moderate n=70	High initially increasing n=122	Chi-square/F-test
Anterior hospitalization n(%)	**26 (70.3)**	**49 (70.0)**	**59 (48.4)**	**0.003**
History of chronic disease n(%)	**30 (81.1)**	**55 (78.6)**	**66 (54.1)**	**<0.001**
Charlson Comorbidity Index (Median [IQR])	**3.1 ±1.9**	**2.4 ±2.2**	**1.7 ±1.9**	**<0.001**

3- Clinical characteristics at admission:

No significant difference in the rates of consciousness disorder was detected between different trajectory classes. (Table 11)

Table 11: Comparison of the clinical characteristics at admission according to EQ-5D index trajectories

	Stably low n=37	Stably moderate n=70	High initially increasing n=122	Chi-square/F-test
Consciousness disorder n(%)	5 (13.5)	6 (8.6)	15 (12.3)	0.9

4- Paraclinical characteristics at admission

Creatinine clearance mean was lower in stably low trajectory and hemoglobinemia was lower in both stably low and stably moderate trajectories compared to high initially increasing trajectory. (Table 12)

Table 12: Comparison of the paraclinical characteristics at admission according to EQ-5D index trajectories

	Stably low n=37	Stably moderate n=70	High initially increasing n=122	Chi-square/F-test
Natremia in mmol/L (Mean ±SD)	133.9 ±7.8	133.1 ±7.3	135.0 ±6.9	0.2
Creatinine clearance in ml/min/1.73m2 (Mean ±SD)	**53.8 ±55.0**	**66.6 ±50.8**	**79.9 ±42.2**	**0.008**
Glycemia in g/L (Mean ±SD)	1.5 ±1.0	1.6 ±1.1	1.5 ±1.0	0.6
CRP in mg/L (Mean ±SD)	90.8 ±91.9	101.0 ±95.9	109.1 ±113.4	0.6
Hemoglobinemia in g/dL (Mean ±SD)	**10.4 ±2.9**	**9.7 ±3.3**	**11.3 ±2.9**	**0.002**
Blood leukocytes 10^3 elements/mm3 (Mean ±SD)	12.0 ±16.1	15.4 ±22.8	19.9 ±51.5	0.5
Platelets 10^3 elements/mm3 (Mean ±SD)	246.3 ±119	264.7 ±156	234.4 ±124	0.3

5- Evolution:

Patients who transited through ICU represented 21.6% of patients in stably low trajectory against only 7.1% for stably moderate trajectory and 7.4% for high initially increasing trajectory. (Table 13)

Table 13: Comparison of the evolution according to EQ-5D index trajectories

	Stably low n=37	Stably moderate n=70	High initially increasing n=122	Chi-square /F-test
ICU transit n(%)	**8 (21.6)**	**5 (7.1)**	**9 (7.4)**	**0.03**

b- EQ-VAS trajectory classes:

1- Socio-demographic and anthropometric characteristics:

Mean age was significantly higher in low increasing trajectory.

Female gender represented 67.6% of patients in low increasing trajectory against 52.3% for moderate initially increasing trajectory and 38% for high initially increasing.

The highest proportion of patients who have never been to school was the highest in low increasing trajectory.

Patients in low increasing category lived nearer to the hospital. (Table 14)

Table 14: Comparison of the socio-demographic and anthropometric characteristics according to EQ-VAS trajectories

	Low increasing n=68	Moderate initially increasing n=111	High initially increasing n=50	Chi-square/F-test
Age (Mean ±SD) in years	**61.3 ±16.1**	**52.6 ±18.5**	**48.4 ±18.6**	**<0.001**
Gender n(%)				**0.001**
Female	**46 (67.6)**	**58 (52.3)**	**19 (38.0)**	
Male	**22 (32.4)**	**53 (47.7)**	**31 (62.0)**	
Marital status n(%)				0.5
Unmarried	27 (39.7)	43 (38.7)	17 (34.0)	
Married	41 (60.3)	68 (61.3)	33 (66.0)	
Distance hospital-residence (Median [IQR]) in Km	**33.1 ±61.7**	**54.9 ±93.2**	**89.3 ±149.6**	**0.01**
Educational level				**0.02**
Never been to school	**48 (70.6)**	**61 (55.0)**	**25 (50.0)**	
Primary school	**11 (16.2)**	**16 (14.4)**	**12 (24.0)**	
Mid-school. high-school or college	**9 (13.2)**	**34 (30.6)**	**13 (26.0)**	

2- Patients' comorbidities:

Patients in low increasing trajectory had significantly higher comorbidities than those in the other trajectories. (Table 15)

Table 15: Comparison of the patients' comorbidities according to EQ-VAS trajectories

	Low increasing n=68	Moderate initially increasing n=111	High initially increasing n=50	Chi-square/F-test
Anterior hospitalization n(%)	**41 (60.3)**	**73 (65.8)**	**20 (40.0)**	**0.05**
History of chronic disease n(%)	**52 (76.5)**	**82 (73.9)**	**17 (34.0)**	**<0.001**
Charlson Comorbidity Index (Median [IQR])	**2.9 ±2.1**	**2.1 ±2.0**	**1.2 ±1.8**	**<0.001**

3- Clinical characteristics at admission:

No significant difference in the rates of consciousness disorder was detected between different trajectory classes. (Table 16)

Table 16: Comparison of the clinical characteristics at admission according to EQ-VAS trajectories

	Low increasing n=68	Moderate initially increasing n=111	High initially increasing n=50	Chi-square/F-test
Consciousness disorder based on GCS n(%)	6 (8.8)	13 (11.7)	7 (14.0)	0.4

4- Paraclinical characteristics at admission:

Patients in low increasing trajectory had lower creatinine clearance and high platelets count than the others. (Table 17)

Table 17: Comparison of the paraclinical characteristics at admission according to EQ-VAS trajectories

	Low increasing n=68	Moderate initially increasing n=111	High initially increasing n=50	Chi-square /F-test
Natremia in mmol/L (Mean ±SD)	133.6 ±7.6	134.2 ±7.3	135.3 ±6.4	0.4
Creatinine clearance based on MDRD in ml/min/1.73m2 (Mean ±SD)	**65.4 ±49.2**	**68.3 ±47.8**	**87.5 ±43.9**	**0.03**
Glycemia in g/L (Mean ±SD)	1.6 ±1.1	1.5 ±1.1	1.2 ±0.8	0.1
CRP in mg/L (Mean ±SD)	89.6 ±98.8	107.3 ±106.2	114.5 ±109.7	0.4
Hemoglobinemia in g/dL (Mean ±SD)	10.6 ±2.9	10.4 ±3.2	11.5 ±3.4	0.1
Blood leukocytes 10^3 elements/mm3 (Mean ±SD)	13.1 ±15.1	20.5 ±53.5	15.9 ±26.9	0.5
Platelets 10^3 elements/mm3 (Mean ±SD)	259.4 ±133	258.5 ±143	198.1 ±101	0.01

*5- **Evolution:***

The highest rate of ICU transit was among patients in low increasing trajectory. (Table 18)

Table 18: Comparison of the evolution according to EQ-VAS trajectories

	Low increasing n=68	Moderate initially increasing n=111	High initially increasing n=50	Chi-square/F-test
ICU transit n(%)	**11 (16.2)**	**9 (8.1)**	**2 (4.0)**	**0.02**

C. Factors associated with trajectory class membership:

a- Univariate analysis:

1- Factors associated with EQ-5D index trajectory classes membership:

i. Socio-demographic and anthropometric characteristics:

Higher age, female gender and absence of school attendance raised significantly the odds of belonging to stably low trajectory vs. high initially increasing. (Table 19)

Table 19: Adjusted associations of socio-demographic and anthropometric characteristics measured at trial entries with EQ-5D index trajectory classes

	Stably low vs. high initially increasing			Stably moderate vs. high initially increasing		
	OR	95% C.I.	p-Value	OR	95% C.I.	p-Value
Age	**1.03**	**[1.01-1.05]**	**0.003**	1.01	[0.9-1.03]	0.1
Gender						
Male	1			1		
Female	**2.2**	**[1.0-4.8]**	**0.04**	1.3	[0.7-2.4]	0.3
Marital status						
Unmarried	1.2	[0.5-2.8]	0.5	1.4	[0.7-2.5]	0.2
Married	1			1		
Distance hospital-residence	0.9	[0.9-1.0]	0.2	0.9	[0.9-1.0]	0.7
Educational level						
Never been to school	**4.3**	**[1.4-13.2]**	**0.01**	1.6	[0.7-3.3]	0.1
Primary school	1.7	[0.3-7.7]	0.4	1.6	[0.6-4.0]	0.2
Mid-school, high-school or college	1			1		

Polytomous logistic regression using class 3 (high, initially increasing) as the reference category.

OR : odds ratio; CI : confidence interval.

ii. Patients' comorbidities:

Anterior hospitalizations, history of chronic disease and higher CCI raised significantly the odds of belonging to stably low trajectory and stably moderate vs. high initially increasing trajectory. (Table 20)

Table 20: Adjusted associations of patients' comorbidities measured at trial entries with EQ-5D index trajectory classes

	Stably low vs. high initially increasing			Stably moderate vs. high initially increasing		
	OR	95% C.I.	p-Value	OR	95% C.I.	p-Value
Anterior hospitalization						
Yes	**2.2**	**[1.05-5]**	**0.02**	**2.5**	**[1.3-7.7]**	**0.003**
No	1			1		
History of chronic disease						
Yes	**3.6**	**[1.4-9]**	**0.005**	**3.1**	**[1.5-6.1]**	**0.001**
No	1			1		
Charlson Comorbidity Index	**1.3**	**[1.1-1.6]**	**<0.001**	**1.2**	**[1.0-1.4]**	**0.01**

Polytomous logistic regression using class 3 (high, initially increasing) as the reference category.

OR : odds ratio; CI : confidence interval.

iii. Clinical characteristics at admission:

Consciousness disorder showed no associations with trajectory class membership. (Table 21)

Table 21: Adjusted associations of clinical characteristics at admission measured at trial entries with EQ-5D index trajectory classes

	Stably low vs. high initially increasing			Stably moderate vs. high initially increasing		
	OR	95% C.I.	p-Value	OR	95% C.I.	p-Value
Consciousness disorder						
Yes	1			1		
No	0.8	[0.2-2.4]	0.7	2.2	[0.6-6.9]	0.1

Polytomous logistic regression using class 3 (high, initially increasing) as the reference category.

OR : odds ratio; CI : confidence interval.

iv. Paraclinical characteristics at admission:

Higher creatinine clearance decreased the odds of belonging stably low trajectory vs. high initially increasing. Higher hemoglobinemia decreased the odds of membership to stably moderate trajectory vs. high initially increasing. (Table 22)

Table 22: Adjusted associations of paraclinical characteristics at admission measured at trial entries with EQ-5D index trajectory classes

	Stably low vs. high initially increasing			Stably moderate vs. high initially increasing		
	OR	95% C.I.	p-Value	OR	95% C.I.	p-Value
Natremia	0.9	[0.9-1.0]	0.5	0.9	[0.9-1.0]	0.1
Creatinine clearance	**0.9**	**[0.9-0.9]**	**0.03**	0.9	[0.9-1.0]	0.08
Glycemia	1	[0.6-1.5]	0.8	1.1	[0.8-1.6]	0.2
CRP	0.9	[0.9-1.0]	0.2	1	[0.9-1.0]	0.8
Hemoglobinemia	0.8	[0.7-1.0]	0.07	**0.8**	**[0.7-0.9]**	**<0.001**
Blood leukocytes	1	[1.0-1.0]	0.2	1	[1.0-1.0]	0.6
Platelets	1	[1.0-1.0]	0.5	1	[1.0-1.0]	0.1

Polytomous logistic regression using class 3 (high, initially increasing) as the reference category.

OR : odds ratio; CI : confidence interval.

v. Evolution:

Patients who transited through ICU had 3 times the odds of belonging to stably low trajectory, while no association with stably moderate trajectory membership was found. (Table 23)

Table 23: Adjusted associations of patients' evolution measured at trial entries with EQ-5D index trajectory classes

	Stably low vs. high initially increasing			Stably moderate vs. high initially increasing		
	OR	95% C.I.	p-Value	OR	95% C.I.	p-Value
ICU transit						
Yes	**3.4**	**[1.2-9.7]**	**0.01**	0.9	[0.3-3]	0.9
No	1			1		

Polytomous logistic regression using class 3 (high, initially increasing) as the reference category.

OR : odds ratio; CI : confidence interval.

2- *Factors associated with EQ-VAS trajectory classes membership:*

i. *Socio-demographic and anthropometric characteristics:*

Higher age, female gender, closeness to hospital and absence of schooling increased the odds of being in low increasing trajectory versus high initially increasing. (Table 24)

Table 24: Adjusted associations of socio-demographic and anthropometric characteristics measured at trial entries with EQ-VAS trajectory classes

	low increasing vs. high initially increasing			moderate initially increasing vs. high initially increasing		
	OR	95% C.I.	p-Value	OR	95% C.I.	p-Value
Age	**1.04**	**[1.02-1.06]**	**<0.001**	1.01	[0.9-1.03]	0.1
Gender						
Male	1			1		
Female	**3.4**	**[1.6-7.3]**	**0.002**	1.9	[0.9-3.5]	0.09
Marital status						
Unmarried	1.1	[0.5-2.5]	0.8	1.1	[0.5-2.3]	0.7
Married	1			1		
Distance hospital-residence	**0.9**	**[0.9-0.9]**	**0.02**	0.9	[0.9-1.0]	0.07
Educational level						
Never been to school	**2.8**	**[1.1-7.5]**	**0.04**	1.3	[0.4-4.3]	0.6
Primary school	0.9	[0.4-2.2]	0.9	0.5	[0.2-1.4]	0.5
Mid-school. high-school or college	1			1		

Polytomous logistic regression using class 3 (high, initially increasing) as the reference category.

OR : odds ratio; CI : confidence interval.

ii. Patients' comorbidities:

Comorbidity influenced highly belonging to low increasing trajectory and moderate initially increasing trajectory. (Table 25)

Table 25: Adjusted associations of patients' comorbidity measured at trial entries with EQ-VAS trajectory classes

	low increasing vs. high initially increasing			moderate initially increasing vs. high initially increasing		
	OR	95% C.I.	p-Value	OR	95% C.I.	p-Value
Anterior hospitalization						
Yes	**2.3**	**[1.1-4.9]**	**0.03**	**3.1**	**[1.5-6.2]**	**0.002**
No	1			1		
History of chronic disease						
Yes	**6.3**	**[2.8-14]**	**<0.001**	**5.5**	**[2.6-11.3]**	**<0.001**
No	1			1		
Charlson Comorbidity Index	**1.6**	**[1.3-1.9]**	**<0.001**	**1.3**	**[1.1-1.6]**	**0.006**

Polytomous logistic regression using class 3 (high, initially increasing) as the reference category.

OR : odds ratio; CI : confidence interval.

iii. Clinical characteristics at admission:

There was no association between the presence of consciousness disorder at admission and EQ-VAS trajectory class membership. (Table 26)

Table 26: Adjusted associations of the clinical characteristics at admission measured at trial entries with EQ-VAS trajectory classes

	low increasing vs. high initially increasing			moderate initially increasing vs. high initially increasing		
	OR	95% C.I.	p-Value	OR	95% C.I.	p-Value
Consciousness disorder						
Yes	1			1		
No	1.9	[0.6-6.6]	0.3	1.3	[0.5-3.5]	0.6

Polytomous logistic regression using class 3 (high, initially increasing) as the reference category.

OR : odds ratio; CI : confidence interval.

iv. Paraclinical characteristics at admission:

Low creatinine clearance and low hemoglobinemia at admission increased the odds of belonging to low increasing and moderate initially increasing trajectories vs. high initially increasing. High glycemia was only associated to low increasing trajectory membership. (Table 27)

Table 27: Adjusted associations of paraclinical characteristics at admission measured at trial entries with EQ-VAS trajectory classes

	low increasing vs. high initially increasing			moderate initially increasing vs. high initially increasing		
	OR	95% C.I.	p-Value	OR	95% C.I.	p-Value
Natremia	0.9	[0.9-1.0]	0.2	0.9	[0.5-3.5]	0.3
Creatinine clearance	**0.9**	**[0.9-0.9]**	**0.02**	**0.9**	**[0.9-0.9]**	**0.02**
Glycemia	**1.7**	**[1.02-2.8]**	**0.04**	1.6	[0.9-2.6]	0.07
CRP	0.9	[0.9-1.0]	0.3	0.9	[0.9-1.0]	0.6
Hemoglobinemia	**0.9**	**[0.8-0.9]**	**0.04**	**0.9**	**[0.8-0.9]**	**0.03**
Blood leukocytes	1	[1.0-1.0]	0.9	1	[1.0-1.0]	0.2
Platelets	**1**	**[1.0-1.0]**	**0.01**	**1**	**[1.0-1.0]**	**0.02**

Polytomous logistic regression using class 3 (high, initially increasing) as the reference category.

OR : odds ratio; CI : confidence interval.

v. Evolution:

Patients who transited through ICU were 5 times more likely to be in low increasing trajectory than high initially increasing trajectory. (Table 28)

Table 28: Adjusted associations of patients' evolution measured at trial entries with EQ-VAS trajectory classes

	low increasing vs. high initially increasing			moderate initially increasing vs. high initially increasing		
	OR	95% C.I.	p-Value	OR	95% C.I.	p-Value
ICU transit						
Yes	**4.9**	**[0.9-21]**	**0.05**	2.1	[0.4-10]	0.3
No	1			1		

Polytomous logistic regression using class 3 (high, initially increasing) as the reference category.

OR : odds ratio; CI : confidence interval.

b- Multivariate analysis:

1- Factors associated with EQ-5D index trajectory classes membership:

Factors associated with membership to stably low EQ-5D index trajectory vs. high initially increasing were:

- Age ≥41 years
- Lower hemoglobinemia
- ICU transit

Factors associated with membership to stably moderate trajectory vs. high initially increasing were:

- Comorbidity
- Lower hemoglobinemia

OR, 95% CI and p-values of each factor are reported on Table 29.

Table 29: Adjusted associations of patients' characteristics measured at trial entries with EQ-5D index trajectory classes in multivariate analysis

	EQ-5D index					
	Stably low vs. high initially increasing			Stably moderate vs. high initially increasing		
	OR	95% CI	p-value	OR	95% CI	p-value
Age						
≤40 years	1			1		
41-69 years	**6.4**	**[1.3-32]**	**0.02**	1.6	[0.6-4.1]	0.3
≥70 years	**9.3**	**[1.7-49]**	**0.008**	1.1	[0.4-2.4]	0.9
History of chronic disease						
No	1					
Yes	2.1	[0.1-5.8]	0.1	**2.8**	**[0.01-6.4]**	**0.01**
Hemoglobinemia	0.8	[0.05-1.1]	**0.05**	**0.8**	**[0.001-0.9]**	**0.001**
ICU transit						
No	1					
Yes	**5.1**	**[0.01-18]**	**0.01**	1.1	[0.9-4.3]	0.8

Stepwise logistic regression using class 3 (high, initially increasing) as the reference category.

OR : odds ratio; CI : confidence interval.

2- Factors associated with EQ-VAS trajectory classes membership:

Factors associated with membership to low increasing trajectory vs. high initially increasing were:

- Female gender
- Comorbidity
- Low km residence-hospital

Comorbidity was the only factor of belonging to moderate initially increasing trajectory vs. high initially increasing.

OR, 95% CI and p-values of each factor are reported on Table 30.

Table 30: Adjusted associations of patients' characteristics measured at trial entries with EQ-VAS trajectory classes in multivariate analysis

	EQ-VAS					
	Low increasing vs. high initially increasing			Moderate initially increasing vs. high initially increasing		
	OR	95% CI	p-value	OR	95% CI	p-value
Age						
≤40 years	1			1		
41-69 years	1.6	[0.4-6.1]	0.4	0.7	[0.2-1.9]	0.5
≥70 years	3.8	[0.8-17]	0.08	1.1	[0.3-3.8]	0.8
Gender						
Male	1					
Female	**5**	**[1,7-10]**	**0.006**	0.7	[0.3-1.7]	0.2
Distance hospital-residence	**0.9**	**[0.9-0.9]**	**0.01**	0.9	[0.9-1]	0.9
History of chronic disease						
No	1					
Yes	**9.6**	**[3.1-29]**	**<0.001**	**9.5**	**[3.7-24]**	**<0.001**

Stepwise logistic regression using class 3 (high, initially increasing) as the reference category.

OR : odds ratio; CI : confidence interval.

DISCUSSION:

We presented the results of the first study describing charecteristics of patients hospitalized in a Moroccan AMU. We identified trajectories of HR-QoL for patients hospitalized in AMU over 18 months of follow-up and the factors associated with trajectory class membership, using the Arabic version of EuroQol 5D.

This study adds to the litterature by being the first to explore patterns of change in HR-QoL of patients of an AMU by applying a formal statistical procedure to uncover and identify underlying trajectories of HR-QoL : latent class growth modeling.

Using the data collected over 22 months, we identified three EQ-5D index trajectories; stably low, stably moderante and high initially increasing. The majority of study participants fell in the high initially increasing class. (Figure 5) We also identified three EQ-VAS trajectories; low increasing, moderate initially increasing and high initially increasing with the majority of study participants falling in the moderate initially increasing class. (Figure 6)

When compared, the three classes of EQ-5D index trajectories showed statistically significant difference in nine of the baseline patient characteristics that were tested. In the stably low trajectory, the age was higher with 40.5% of the patients

being 70 years or older, the proportion of females was the highest and the majority has never been to school. The patients in this class had the highest rates of anterior hospitalizations and chronic diseases with higher CCI scores. The mean creatinine clearance was at least 13 ml/min/1.73m^3 lower than the other classes while the mean value of hemoglobinemia was lower than in high initially increasing trajectory. The percentage of patients in the stably low trajectory who transited through ICU was three times higher than in the other trajectories. (Table 9, Table 10, Table 12, Table 13)

The three EQ-VAS trajectories showed statistically significant differences in merely the same baseline patient characteristics and similar tendencies with the EQ-5D index trajectories characteristics, except for hemoglobinemia that did not vary strongly between the EQ-VAS trajectories. And mean platelets count was higher in the low increasing class, while, counter intuitively, distance hospital-residence median was lower in the same class. (Table 14, Table 16, Table 17, Table 18)

When measured, using class 3 of EQ-5D index trajectories as the reference category, adjusted associations of patients' characteristics showed higher odds of belonging to stably low trajectory for higher age, female gender, lower educational level and ICU transit. (Table 19, Table 23) An anterior hospitalization, a history of chronic disease and a higher CCI score increased the odds of belonging to either stably low category or stably moderate vs. high initially increasing. (Table 20)
On the other hand, higher creatinine clearance decreased the odds of belonging to stably low trajectory and higher hemoglobinemia decreased the odds of belonging to stably moderate vs. high initially increasing. (Table 22)

Adjusted associations of patients' characteristics measured at trial entries with EQ-VAS trajectory classes, using class 3 as the reference category, showed a strong association of the low increasing trajectory with a higher age, female gender, a lower

educational lever, a lower residence-hospital distance, a higher glycemia and an ICU transit. (Table 24, Table 27, Table 28)

Higher odds of belonging to either low increasing category or moderate initially increasing vs. high initially increasing were associated to, anterior hospitalization, history of chronic disease, higher CCI scores, lower creatinine clearance and lower hemoglobinemia. (Table 25, Table 27)

When put in multivariate model including age, history of chronic disease, hemoglobinemia and ICU transit, only history of chronic disease raised considerably the odds of being in stably moderate EQ-5D index trajectory vs. high initially increasing. In the same model, age superior or equal to 41 years and ICU transit increased the odds significantly of belonging to the stably low trajectory vs. high initially increasing. Meanwhile higher hemoglobinemia decreased significantly the odds of belonging to both trajectories vs. high initially increasing. (Table 29)

In the multivariate model studying association between EQ-VAS trajectory classes and covariates, female gender and low distance hospital-residence raised the odds to be in low increasing class vs. high initially increasing. History of chronic disease increased the odds of belonging to either low increasing class or moderate initially increasing vs. high initially increasing. (Table 30)

All the trajectories for EQ-5D index and 2 out of 3 trajectories of EQ-VAS were stable. This showed that acute illness wasn't able to cut a HR-QoL trajectory and that previous HR-QoL is the most important determinant of its evolution. Feemster et al., who studied the influence of hospitalization or intensive care unit admission on declines in health-related quality of life, also identified prehospital HR-QoL as the most powerful determinant of HR-QoL after hospitalization[61].

The difference in trajectories between the two systems of measurement might be due to the fact that EQ-5D Index is a more objective measurement while EQ-VAS

is a subjective perception of one's own health. Also, EQ-VAS results could have been influenced by an intervention bias. We observed that the lower HR-QoL in EQ-VAS measurement increased considerably while the moderate and high didn't vary stongly. This is supported by a research that used EQ-5D to study effect of telecare on the quality of life and psychological well-being of elderly, suggesting that telecare has the potential to afford small relative benefits on some psychological and HR-QoL outcomes [62].

In univariate analysis, either for EQ-5D Index or EQ-VAS classes, seven factors were associated to lower HR-QoL.

Patients with higher age had significantly higher odds of having lower HR-QoL which is in total concordance with the literature; Parlevliet et al. ended up with the same conclusion [3]. Higher age was found to be most recurent factor linked to a deterioration in HR-QoL after acute illness [3], [63], [64]. The percentage of the global population aged 60 years or over increased from 8.5 per cent in 1980 to 12.3 per cent in 2015 and is projected to rise further to 21.5 per cent in 2050[65]. Similarly, Morocco is entering a new demagraphic dynamic, associated to social and economic development. As stated in the last general census of population and habitat, the percentage of persons older than 60 years went from 8.1 per cent in 2004 to 9.1 per cent in 2014 while the percentage of persons under 15 years old went from 31.2 percent to 28 per cent [66]. This age shift has many repercutions, one of them is the overcrowding of acute medical units (AMUs), older patients account for 12%-24% of AMUs users worldwide[67]. A study done in a tertiary care hospital showed that this population tend to be sicker, to stay longer, and require more admissions in high dependency units compared to their younger fellows[68].

Female gender had at least two times the odds of belonging to lower HR-QoL clusters and patients who have never been to school at least four times. In other studies, including the one conducted by Khoudri et al. in the same ward, female gender was more associated to derioration in HR-QoL after acute illness than male gender[3], [27], [69]. And lower educational level, lower income and a perception of a lack of social support were suggested to negatively influence HR-QoL[69], [70].
Another hypothesis that we can raise, is that the gender is related to age in its upper extreme. Female life expectancy is longer, which explains their predominance among elderly in general population [66], [71]. Therefore, the direct association of gender with QoL should be questionned and furtherly studied.

Anterior hospitalization, history of chronic disease and higher CCI also raised the odds of having a lower QoL. This is due to the fact that these three covariates express high comorbidities, which was found to be one of the most important factors influencing HR-QoL. In fact, diabetes, hypertension, chronical heart failure, chronical obstructive pulmonary disease, dyspnea and depression were proven to be associated to a deterioration in HR-QoL[63], [72], [73]. Furthermore, decline in HR-QoL was observed when the number of comorbidities or the number of treatments needed increased[70], [73].

ICU acquired weakness seems to be a risk factor for worsened QoL as Busico et al. observed in a critically ill Argentinean population [74]. In our study, patients who transited through ICU during their hospitalization were three times more likely to have a lower HR-QoL and that might be due to the severity of the disease and the heaviness of comorbidities these patients usually endure.

Although, studies supported the fact that diabetes alters quality of life [73], [75], hyperglycemia, was linked to lower QoL only in EQ-VAS trajectories. This might be due to the fact that although diabetes, in its mild forms, doesn't alter the dimensions in EQ-5D (the objective measure), the self consciousness that comes with the disease and its treatments could possibly influence the perception of one's QoL. Another hypothesis is the possible difficulty to grasp the notion of VAS that a non educated population might face, which was the case in our study. This is supported by a study done in Singapore that found a difference between the discriminative power of EQ-VAS when administered to two different populations of patients with type 2 diabetes mellitus, one Chinese speaking and the other Singaporean speaking[76].

On the other hand, higher glomerular filtration rates (GFR) (creatinine clearance) and higher hemoglobinemia positively influenced HR-QoL by lessening the odds of belonging to lower HR-QoL classes. The first observation is supported by Kim et al. in their study on QoL in pre-dialysis patients that found a proportional association between GFR and QoL [77].

Contrary to expectations, higher hospital-residence distance reduced the odds of being in the lower classes of EQ-VAS trajectories. The research papers consulted in this matter showed opposite results to those in our study, independently of the type of sicknesses and wards [78]–[80]. Higher expectations from the health care system of those who live near big facilities like university hospital might behind this unexpected result. Also, the patients living far from the hospital could be from the countryside, therefore having a healthier life style than their fellow city dwellers.

When put together, in multivariate analyses, age, gender, comorbidity and ICU transit continued to be factors of belonging to lower HR-QoL trajectories. Higher

hemoglobinemia and higher distance hospital-residence continued to be associated with better HR-QoL independently of other covariates.

In this section, the research to find previous studies about HR-QoL outcomes in AMU or ICU using latent class growth modeling was unsuccessful, which made results' confrontation harder.

This is due to the recent opening of medical science on this statistical method (LCGM). The beauty of this method is that it gave us the opportunity to compare clusters of patients and their evolution through a period of time and not only individuals in particular points of time. With the relatively long term follow-up (18 months), LCGM, made our study original in the context of AMU. Data collection was accomplished by the same observers longitudinally, hence the diminution of inter-observer variability. Measurement bias was controlled by the use of a previously validated version of EQ-5D-3L.

Despite those strengths, our study was weakened by the relatively small sample, the presence of missing values and an observed difficulty to understand the VAS in our study population.

CONCLUSION:

Through this study we attained our objectives to describe characteristics of patients hospitalized in AMU during study period, identify their health related quality of life trajectories over 18 months of follow up and determine factors associated with HR-QoL trajectory class membership.

We identified 3 stable HR-QoL trajectories, backing the fact that previous HRQoL is a more important factor in defining HR-QoL evolution than acute illness which didn't cut HR-QoL trajectories.

Aged patients with low hemoglobinemia and who transited through ICU had the worst HRQoL.

Females, with comorbidities, living far from hospital perceived an amelioration of their, previously low, HRQoL.

We also observed that EQ-5D Index and EQ-VAS could have different discriminative power; a statement to be further tested.

The mere inertia that was observed in HR-QoL trajectories raises some questions. Is it only because of the fact that pre hospital HR-QoL is one of the most important determinants of post hospital QoL? Or is it due to an inadequacy of Moroccan health care system to fulfil the needs of an increasingly aging and demanding population?

ABSTRACT:

Title: Health Related Quality of Life Trajectories of Patients in a Moroccan Acute Medical Unit: a Latent Class Growth Modeling Approach.

Author: Adnane EL KHATTATE

Introduction: The objectives of this study were to identify and describe a set of longitudinal HRQoL trajectories of patients in an AMU, then determine factors associated with trajectory class membership of patients after acute illness.

Methods: This was a prospective cohort study conducted in an acute medical unit of Ibn Sina University Hospital, Rabat, between June and September 2014. Patients aged ≥17 years were included; those unable to complete the questionnaire were excluded. Demographic, medical history, clinical and paraclinical characteristics were recorded at admission. EQ5D-index, EQ-VAS and survival status of patients were collected at admission, 3, 6 and 18 months of follow-up. Latent class growth analysis was applied to identify classes of HRQoL trajectories. Association between baseline covariate and class membership were identified using polynomial logistic regression. Statistical analysis was carried out in STATA 14.

Results: We included 251 patients. The mean age was 55.6 ±18.9 years and women were 54.6%. In-hospital and 18 months follow-up mortality were respectively 11.6% and 34.3%. Three trajectory classes were identified for EQ5D-Index; stably low(16.2%), stably moderate(30.6%), and high initially increasing(53.2%). The three trajectory classes of EQ-VAS were low increasing(29.7%), moderate initially increasing(48.5%) and high initially increasing(21.8%).

Concerning EQ5D-index, comparing to high initially increasing trajectory, factors associated to; a)stably low trajectory membership were: age ≥70years, ICU transit and low hemoglobinemia b)stably moderate trajectory membership were: comorbidity and low hemoglobinemia. Concerning EQ-VAS, comparing to high initially increasing trajectory, factors associated to; a)low increasing trajectory membership were: female gender, Km hospital-residence and comorbidity, b)moderate initially increasing trajectory membership was comorbidity.

Conclusions: We identified 3 stable HRQoL trajectories, confirming that previous HRQoL is more important in defining HRQoL evolution than acute illness. Aged patients with low hemoglobinemia and who transited through ICU had the worst EQ5D-index. Females, with comorbidities, living far from hospital perceived an amelioration of their low EQ-VAS.

Keywords: Acute medical unit (AMU), EQ5D, Health related quality of life (HRQoL), Trajectory.

RESUME:

Titre: Trajectoires Qualité de Vie Liée à la Santé (HRQoL) des Patients dans un Service de Médecine Aigue au Maroc : Méthode de Modélisation de Variable Latente de Croissance
Auteur: Adnane EL KHATTATE
Introduction: Les objectifs de cette étude étaient, d'identifier un ensemble de trajectoires longitudinales de la HRQoL des patients dans un service de médecine aigue, puis de déterminer les facteurs associés avec l'appartenance à une classe de trajectoire après une maladie aigue.
Méthode: C'était une étude de cohorte prospective menée dans un service de médecine aigue du CHU Ibn Sina, Rabat, de Juin à Septembre 2014. Les patients âgés de ≥17 ans ont été inclus; ceux qui étaient incapables de remplir le questionnaire ont été exclus. Les caractéristiques démographiques, d'histoire de la maladie, cliniques et paracliniques recueillies à l'admission. EQ5D-index, EQ-VAS et l'état de survie des patients ont été recueillis à l'admission, 3, 6 et 18 mois de suivi. L'analyse de classe de trajectoire latente a été appliquée afin d'identifier les classes de trajectoires de la HRQoL. Une association entre les covariables de base et l'appartenance à une classe a été identifiée en utilisant la régression logistique polynomiale. L'analyse statistique a été effectuée par STATA 14.
Résultats: Nous avons inclus 251 patients. La moyenne d'âge était 55,6 ±18,9 ans et 54,6%étaient des femmes. La mortalité à l'hôpital et à 18 mois de suivi étaient respectivement 11,6% et 34,3%. Trois classes de trajectoires ont été identifiées pour l'EQ5D-index; constamment basse(16,2%), constamment modérée(30,6%), et élevée initialement croissante(53,2%). Les 3 classes de trajectoires de l'EQ-VAS étaient basse croissante(29,7%), modérée initialement croissante(48,5%) et élevée initialement croissante(21,8%). Concernant l'EQ5D-index, comparés à la trajectoire élevée initialement croissante, les facteurs associés à; a)l'appartenance à la trajectoire constamment basse étaient : l'âge≥ à 70ans, le passage par une unité de soins intensifs (USI) et une hémoglobinémie basse, b) l'appartenance à la trajectoire constamment modérée étaient : la comorbidité et l'hémoglobinémie basse. Concernant l'EQ-VAS, comparés à la trajectoire élevée initialement croissante, les facteurs associés à : a) l'appartenance à la trajectoire basse croissante étaient: le sexe féminin, la distance hôpital-résidence et la comorbidité, b) l'appartenance à la trajectoire modérée initialement croissante était la morbidité.
Conclusions: Nous avons identifié 3 trajectoires stables de la HRQoL, confirmant ainsi que la HRQoL antérieure a un rôle plus important que la maladie aigue pour définir l'évolution de la HRQoL. Les patients âgés ayant une hémoglobinémie basse et un passage par une USI avaient le pire EQ5D-index. Les femmes avec des comorbidités, habitant loin de l'hôpital percevaient une amélioration de leur EQ-VAS initialement bas.
Mots-clés: Service de médecine aigue, EQ5D, Qualité de vie liée à la santé (HRQoL), Trajectoires.

ملخص:

العنوان: مسارات "نوعية الحياة من المنظور الصحي" لدى مرضى مصلحة المستعجلات الطبية
المؤلف: عدنان الخطاط
التمهيد: أهداف هذه الدراسة هي التعرف على مجموعة من المسارات الطولانية ل"نوعية الحياة من المنظور الصحي"، و وصفها عند المرضى في مصلحة المستعجلات الطبية؛ و بعد ذلك تحديد العوامل المرتبطة بالانتماء إلى فئة من المسارات عند بعد مرض حاد.
الطريقة: كانت هذه دراسة استباقية للأتراب أجريت في مصلحة المستعجلات الطبية للمستشفى الجامعي ابن سينا بالرباط، خلال فترة امتدت من يونيو إلى شتنبر 2014. و ضمَت المرضى في سن 17 سنة فما فوق، دون اللذين لم يستطيعوا ملأ الاستبيان، هؤلاء تم إقصاؤهم. سجلت الخصائص السكانية، السريرية، اللاسريرية و التاريخ الطبي للمرضى عند إدخالهم للمصلحة. كما سجل مؤشر EQ5D، EQ-VAS و وضع البقاء عند الإدخال للمصلحة، وكذلك في الشهر الثالث، السادس و الثامن عشر من التتبع. تم تطبيق تحليل فئات المسارات المستترة (Latent class growth analysis) لتعيين فئات المسارات ل"نوعية الحياة من المنظور الصحي". بعدها، تم تحديد الرابطة بين الانتماء لمسار ما و المتغيرات الأساسية، باستعمال الارتداد اللوجيستي متعدد الحدود (Polynomials logistic regression). أنجز التحليل الإحصائي بواسطة STATA 14.
النتائج: تم إدماج 251 مريضا. كان معدل السنَ 55.6±18.9 سنة مع نسبة النساء 54.6%. كانت نسبة الوفيات خلال الاستشفاء و في الشهر الثامن عشر من التتبع 11.6% و 34.3% بالتتالي. تم تحديد 3 فئات من المسارات بالنسبة لمؤشر EQ5D؛ المنخفض باستقرار (16.2%)، المعتدل باستقرار (30.6%) و المرتفع مبدئيا متزايد (53.2%). كما تم تحديد 3 فئات من المسارات بالنسبة لل EQ-VAS؛ المنخفض المتزايد (29.7%)، المعتدل مبدئيا متزايد (48.5%) و المرتفع مبدئيا متزايد (21.8%).
بخصوص مؤشر EQ5D، مقارنة مع المسار المرتفع مبدئيا متزايد، العوامل المرتبطة ب؛ أ) الانتماء للمسار المنخفض باستقرار هي: سن ≤70 سنة، مرور عبر وحدة العناية المركزة و هيموغلوبينيميا منخفضة؛ ب) الانتماء للمسار المعتدل باستقرار هي: أمراض متزامنة و هيموغلوبينيميا منخفضة. أما بخصوص EQ-VAS، مقارنة مع المسار المرتفع مبدئيا متزايد، العوامل المرتبطة ب؛ أ) الانتماء للمسار المنخفض المتزايد هي: الجنس الأنثوي، مسافة طويلة بين المسكن و المستشفى و أمراض متزامنة؛ ب) الانتماء للمسار المعتدل مبدئيا متزايد هي: أمراض متزامنة.
الخاتمة: لقد ميزنا 3 مسارات مستقرة ل"نوعية الحياة من المنظور الصحي"، و لتحديد تطور هذه الأخيرة، تلعب "نوعية الحياة من المنظور الصحي" قبل المرض الحاد دورا أهما من المرض الحاد بعينه. كان للمرضى المسنين اللذين مروا عبر وحدة العناية المركزة و لهم هيموغلوبينيميا منخفضة، أسوأ مؤشر EQ5D. و كانت النساء اللواتي لهن أمراض متزامنة، و قاطنات بعيدا عن المستشفى، تدركن تحسنا في EQ-VAS المنخفض لديهن مبدئيا.
الكلمات الأساسية: مصلحة المستعجلات الطبية، EQ5D، نوعية الحياة من المنظور الصحي، مسارات.

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APPENDIX:

Appendix 1

Health Utility Index (HUI)

HUI Mark 2 (HUI3) Classification System.

ATTRIBUTE	LEVEL	DESCRIPTION
SENSATION	1	Able to see, hear, and speak normally for age.
	2	Requires equipment to see or hear or speak.
	3	Sees, hears, or speaks with limitations even with equipment.
	4	Blind, deaf, or mute.
MOBILITY	1	Able to walk, bend, lift, jump, and run normally for age.
	2	Walks, bends, lifts, jumps, or runs with some limitations but does not require help.
	3	Requires mechanical equipment (such as canes, crutches, braces, or wheelchair) to walk or get around independently
	4	Requires the help of another person to walk or get around and requires mechanical equipment as well.
	5	Unable to control or use arms and legs.
EMOTION	1	Generally happy and free from worry.
	2	Occasionally fretful, angry, irritable, anxious, depressed, or suffering night terrors
	3	Often fretful, angry, irritable, anxious, depressed, or suffering night terrors
	4	Almost always fretful, angry, irritable, anxious, depressed.
	5	Extremely fretful, angry, irritable, anxious, or depressed usually requiring hospitalization or psychiatric institutional care.

ATTRIBUTE	LEVEL	DESCRIPTION
COGNITION	1	Learns and remembers school work normally for age.
	2	Learns and remembers school work more slowly than classmates as judged by parents and/or teachers.
	3	Learns and remembers very slowly and usually requires special educational assistance.
	4	Unable to learn and remember.
SELF-CARE	1	Eats, bathes, dresses, and uses the toilet normally for age.
	2	Eats, bathes, dresses, or uses the toilet independently with difficulty.
	3	Requires mechanical equipment to eat, bathe, dress, or use the toilet independently.
	4	Requires the help of another person to eat, bathe, dress, or use the toilet.
PAIN	1	Free of pain and discomfort.
	2	Occasional pain. Discomfort relieved by non-prescription drugs or self-control activity without disruption of normal activities.
	3	Frequent pain. Discomfort relieved by oral medicines with occasional disruption of normal activities.
	4	Frequent pain; frequent disruption of normal activities. Discomfort requires prescription narcotics for relief.
	5	Severe pain. Pain not relieved by drugs and constantly disrupts normal activities.
FERTILITY	1	Able to have children with a fertile spouse.
	2	Difficulty in having children with a fertile spouse.
	3	Unable to have children with a fertile spouse.

HUI Mark 3 (HUI3) Classification System.

ATTRIBUTE	LEVEL	DESCRIPTION
VISION	1	Able to see well enough to read ordinary newsprint and recognize a friend on the other side of the street, without glasses or contact lenses.
	2	Able to see well enough to read ordinary newsprint and recognize a friend on the other side of the street, but with glasses.
	3	Able to read ordinary newsprint with or without glasses but unable to recognize a friend on the other side of the street, even with glasses.
	4	Able to recognize a friend on the other side of the street with or without glasses but unable to read ordinary newsprint, even with glasses.
	5	Unable to read ordinary newsprint and unable to recognize a friend on the other side of the street, even with glasses.
	6	Unable to see at all.
HEARING	1	Able to hear what is said in a group conversation with at least three other people, without a hearing aid.
	2	Able to hear what is said in a conversation with one other person in a quiet room without a hearing aid, but requires a hearing aid to hear what is said in a group conversation with at least three other people.
	3	Able to hear what is said in a conversation with one other person in a quiet room with a hearing aid, and able to hear what is said in a group conversation with at least three other people, with a hearing aid.
	4	Able to hear what is said in a conversation with one other person in a quiet room, without a hearing aid, but unable to hear what is said in a group conversation with at least three other people even with a hearing aid.
	5	Able to hear what is said in a conversation with one other person in a quiet room with a hearing aid, but unable to hear what is said in a group conversation with at least three other people even with a hearing aid.

ATTRIBUTE	LEVEL	DESCRIPTION
	6	Unable to hear at all.
SPEECH	1	Able to be understood completely when speaking with strangers or friends.
	2	Able to be understood partially when speaking with strangers but able to be understood completely when speaking with people who know me well.
	3	Able to be understood partially when speaking with strangers or people who know me well.
	4	Unable to be understood when speaking with strangers but able to be understood partially by people who know me well.
	5	Unable to be understood when speaking to other people (or unable to speak at all).
AMBULATION	1	Able to walk around the neighbourhood without difficulty, and without walking equipment.
	2	Able to walk around the neighbourhood with difficulty; but does not require walking equipment or the help of another person.
	3	Able to walk around the neighbourhood with walking equipment, but without the help of another person.
	4	Able to walk only short distances with walking equipment, and requires a wheelchair to get around the neighbourhood.
	5	Unable to walk alone, even with walking equipment. Able to walk short distances with the help of another person, and requires a wheelchair to get around the neighbourhood.
	6	Cannot walk at all.
DEXTERITY	1	Full use of two hands and ten fingers.
	2	Limitations in the use of hands or fingers, but does not require special

ATTRIBUTE	LEVEL	DESCRIPTION
		tools or help of another person.
	3	Limitations in the use of hands or fingers, is independent with use of special tools (does not require the help of another person).
	4	Limitations in the use of hands or fingers, requires the help of another person for some tasks (not independent even with use of special tools).
	5	Limitations in use of hands or fingers, requires the help of another person for most tasks (not independent even with use of special tools).
	6	Limitations in use of hands or fingers, requires the help of another person for all tasks (not independent even with use of special tools).
EMOTION	1	Happy and interested in life.
	2	Somewhat happy.
	3	Somewhat unhappy.
	4	Very unhappy.
	5	So unhappy that life is not worthwhile.
COGNITION	1	Able to remember most things, think clearly and solve day to day problems.
	2	Able to remember most things, but have a little difficulty when trying to think and solve day to day problems.
	3	Somewhat forgetful, but able to think clearly and solve day to day problems.
	4	Somewhat forgetful, and have a little difficulty when trying to think or solve day to day problems.
	5	Very forgetful, and have great difficulty when trying to think or solve day to day problems.
	6	Unable to remember anything at all, and unable to think or solve day to day problems.

ATTRIBUTE	LEVEL	DESCRIPTION
PAIN	1	Free of pain and discomfort.
	2	Mild to moderate pain that prevents no activities.
	3	Moderate pain that prevents a few activities.
	4	Moderate to severe pain that prevents some activities.
	5	Severe pain that prevents most activities.

Appendix 2

The Short form-6D

Table 1
The short form-6D[a]

Level	Physical functioning	Role limitations	Social functioning	Pain	Mental health	Vitality
1	Your health does not limit you in *vigorous activities*	You have no problems with your work or other regular daily activities as a result of your physical health or any emotional problems	Your health limits your social activities *none of the time*	You have *no* pain	You feel tense or downhearted and low *none of the time*	You have a lot of energy *all of the time*
2	Your health limits you a little in *vigorous activities*	You are limited in the kind of work or other activities as a result of your physical health	Your health limits your social activities *a little of the time*	You have pain but it does not interfere with your normal work (both outside the home and housework)	You feel tense or downhearted and low *a little of the time*	You have a lot of energy *most of the time*
3	Your health limits you a little in *moderate activities*	You accomplish less than you would like as a result of emotional problems	Your health limits your social activities *some of the time*	You have pain that interferes with your normal work (both outside the home and housework) *a little bit*	You feel tense or downhearted and low *some of the time*	You have a lot of energy *some of the time*
4	Your health limits you a lot in *moderate activities*	You are limited in the kind of work or other activities as a result of your physical health and accomplish less than you would like as a result of emotional problems	Your health limits your social activities *most of the time*	You have pain that interferes with your normal work (both outside the home and housework) *moderately*	You feel tense or downhearted and low *most of the time*	You have a lot of energy *a little of the time*
5	Your health limits you *a little in bathing and dressing*		Your health limits your social activities *all of the time*	You have pain that interferes with your normal work (both outside the home and housework) *quite a bit*	You feel tense or downhearted and low *all of the time*	You have a lot of energy *none of the time*
6	Your health limits you *a lot in bathing and dressing*			You have pain that interferes with your normal work (both outside the home and housework) *extremely*		

[a] The SF-36 items used to construct the SF-6D are as follows: physical functioning items 1, 2 and 10; role limitation due to physical problems item 3; role limitation due to emotional problems item 2; social functioning item 2; both bodily pain items; mental health items 1 (alternate version) and 4; and vitality item 2.

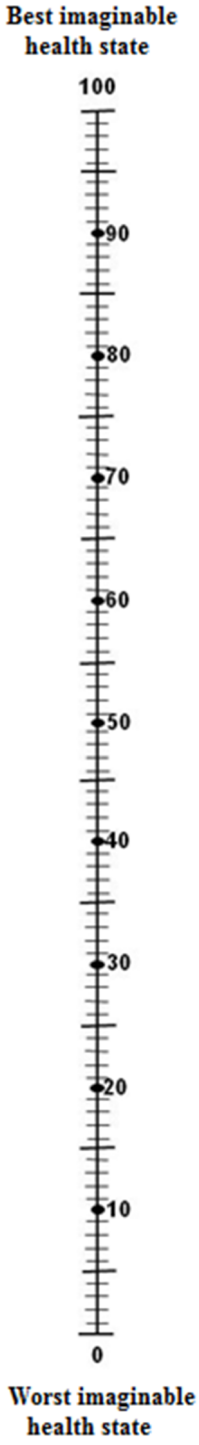
Appendix 3

The UK English version

EQ-5D-3L

By placing a tick in one box in each group below, please indicate which statements best describe your own health state today.
Mobility
I have no problems in walking about (1 point)
I have some problems in walking about (2 points)
I am confined to bed (3 points)
Self-Care
I have no problems with self-care (1 point)
I have some problems washing or dressing myself (2 points)
I am unable to wash or dress myself (3 points)
Usual Activities
(e.g. work, study, housework, family or leisure activities)
I have no problems with performing my usual activities (1 point)
I have some problems with performing my usual activities (2 points)
I am unable to perform my usual activities (3 points)
Pain/Discomfort
I have no pain or discomfort (1 point)
I have moderate pain or discomfort (2 points)
I have extreme pain or discomfort (3 points)
Anxiety/Depression
I am anxious or depressed (1 point)
I am moderately anxious or depressed (2 points)
I am extremely anxious or depressed (3 points)

Visual Analogue Scale



To help people say how good or bad a health state is, we have drawn a scale (rather like a thermometer) on which the best state you can imagine is marked **100** and the worst state you can imagine is marked **0**.

We would like you to indicate on this scale how good or bad your own health is today, in your opinion. Please do this by drawing a line from the box below to whichever point on the scale indicates how good or bad your health state is today

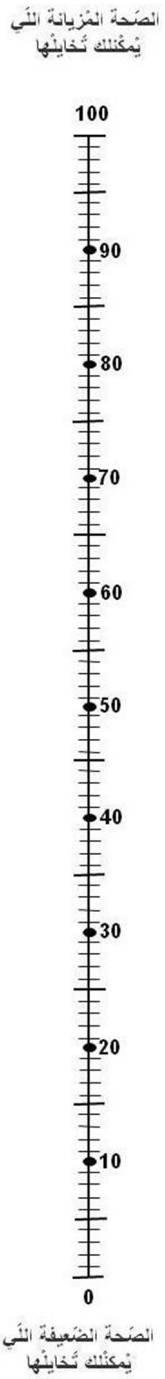
Your own health state is today

The Arabic version

EQ-5D-3L

عافاك دير علامة على مربّع واحْد ڤكل مجموعة دِيال الأجوبة وْ الّلي كايْوافقْ حالْتك الصّحية دْيال اليوم.
الحركة و المشي ما عْندي حتّى مشاكل ڤلمشي عْندي شْويّة دْيال المشاكِل ڤلمشِي أنا قابْطْ الڤراشْ
تْڤدْ براسْكْ وْ تقادّ حاْلتكْ ْنقدْرْنقابْل راسي بوحْدي بْلا مشاكِ عْندي شِويّة دْيال المشاكِل ڤلْغسيل وْ ْلبيسْ الْحوايج ما كانْقدْرشْ ْنغسْلْ وْ ْتلبسْ حْوايجي بوحْدي
الأنشطةاليوْميّة (مثلا الْخْدْمة, الْقراية, شْغالْ الدّار, شْغالْ العائِلة, شْغالْ الْفراْغ, الصّلاة) ما عْنْدي حْتّى مشاكِل فلأنْشِطة دْ يالي اليوْميّة عْنْدي شْويّة دْيال المشاكِل ڤلأنْشِطة دْ يالي اليوْميّة ما كانْقدْرشْ ْندير ْالانْشِطة دْيالي اليوْميّة
ألْحْريقْ/ الرّاحة فالذّات ما فِيّاشْ الْحْريقْ و مْرتاح ْڤداتي فِيّا شْويّة دْيالْ الْحْريق و مامْرتاحش ْڤداتي فِيّا بْزّافْ دْيالْ الْحْريقْ و مامْرتاحش ْڤداتي
القلق / الاكتِئاب ا مْڤلّقْ ما مْكتائب ْنڤلّقْ وْلا مْكتائبْ شْوِيّة ْمڤلّقْ وْلا مْكتائبْ بْزّافْ

Visual Analogue Scale



باشْ نْعاوْنو النّاس يْبدّيْنولينا مْزيانْ حالْتهم الصّحيّة, رْسمْنا واحْد الخطّ مْشْرّطْ (بْحال ميزان السّخانة) فِيه الرّقم 100 هو الصّحة المْزيانة اللّي يْمْكنْك تْخايْلها وْ 0 هو الصّحة الضّعيفة اللّي يْمْكنْك تْخايْلها.

بْغينا عافاكْ تْبيّنْ لينا قْهاد الخطّ المْشرّطْ قْدّاشْ كانت صْحّتْك مْزْيانة وْلا ضْعيفة قْهادْ اليوم.

عافاكْ رْسْم خطّ تيْبدا مْن المربّع اللّي الْتحْت وْ تايْمشي حْتّال شي نْقطة مْن النّقاطي الموجودين فالخطّ المْشرّط وْ اللّي كْتبيّن: حالْتك الصّحيّة ذْيال اليوم

حالْتك الصّحيّة ذْيال اليوم

Appendix 4

Charlson Comorbidity Index

- Clinical comorbidity conditions weighting -

Weight	Clinical conditions
1	Myocardial infarct Congestive cardiac insufficiency Peripheral vascular disease Dementia Cerebrovascular disease Chronic pulmonary disease Conjunctive tissue disease Slight diabetes, without complications Ulcers Chronic diseases of the liver or cirrhosis
2	Hemiplegia Moderate or severe kidney disease Diabetes with complications Tumors Leukemia Lymphoma
3	Moderate or severe liver disease
6	Malignant tumor, metastasis AIDS

- Age weighting -

Age group	Points
0-49 years	**0**
50-59 years	**1**
60-69 years	**2**
70-79 years	**3**
80-89 years	**4**
90-99 years	**5**

A CCI score equal to 0, means that the patient has no comorbidity condition and is strictly aged less than 50 years old.

Appendix 5

Glasgow Coma Scale (GCS)

Patients Responses	Score
Eye Opening Response	
· Spontaneous	**4**
· To Speech	**3**
· To Pain	**2**
· None	**1**
Best Motor Response	
· Obeys Command	**6**
· Localizes Pain	**5**
· Flexor Withdrawal to Pain	**4**
· Abnormal Spastic Stereotypes Flexion Posture	**3**
· Extensor Response at Elbow	**2**
· No Movement	**1**
Verbal Response	
· Oriented Conversation	**5**
· Confused Conversation	**4**
· Inappropriate Words	**3**
· Incomprehensible Sounds	**2**
· No Vocalization	**1**
Total Score Possible	**3 to 15**

Teasdale, C. & Jennett, B. (1974). Assessment of coma and impaired consciousness. A practical scale. Lancet, 2, 81-84.

PHYSICIAN'S OATH

At the time of being admitted as a member of the medical profession:

I solemnly promise that I will devote my life to serve humanity.

I will give to my teachers the respect and gratitude that is their due.

I will practice my profession with conscience and dignity.

The health of my patient will be my first consideration.

I will not betray the secrets that are confided in me.

I will maintain by all the means in my power, the honor and the noble traditions of the medical profession.

My colleagues will be my brothers.

I will not permit considerations of religion, nationality, race, party politics or social standing to intervene between my duty and my patient.

I will maintain the utmost respect for human life from the time of conception.

Even under threat, I will not use my medical knowledge contrary to the laws of humanity.

I make these promises solemnly, freely and upon my honor.

SERMENT DU MEDECIN

Au moment d'être admise à devenir membre de la profession médicale, je m'engage solennellement à consacrer ma vie au service de l'humanité.

Je traiterai mes maîtres avec le respect et la reconnaissance qui leur sont dus.

Je pratiquerai ma profession avec conscience et dignité. La santé de mes malades sera mon premier but.

Je ne trahirai pas les secrets qui me seront confiés.

Je maintiendrai par tous les moyens en mon pouvoir l'honneur et les nobles traditions de la profession médicale.

Les médecins seront mes frères.

Aucune considération de religion, de nationalité, de race, aucune considération politique et sociale ne s'interposera entre mon devoir et mon patient.

Je maintiendrai le respect de la vie humaine dès la conception.

Même sous la menace, je n'userai pas de mes connaissances médicales d'une façon contraire aux lois de l'humanité.

Je m'y engage librement et sur mon honneur.

قسم الطبيب

بسم الله الرحمن الرحيم

في هذه اللحظة التي يتم فيها قبولي عضوا في المهنة الطبية:

أقسم بالله العظيم

أن أراقب الله في مهنتي

وأن أصون حياة الإنسان في كافة أطوارها، في كل الظروف والأحوال،

باذلًا وسعي في استنقاذها من الهلاك والمرض والألم والقلق.

وأن أحفظ للناس كرامتهم، وأستر عورتهم، وأكتم سرّهم.

وأن أكون على الدوام من وسائل رحمة الله، باذلًا رعايتي الطبية للقريب

و البعيد، للصالح والطالح، والصديق والعدو.

وأن أثابر على طلب العلم، أسخِّره لنفع الإنسان لا لأذاه.

و أن أوقر من علمني، وأعلّم من يصغرني، وأكون أخًا لكل زميل في

المهنة الطبية متعاونين على البر والتقوى.

وأن تكون حياتي مصداق إيماني في سري وعلانيتي، نقيًّا مما يشينها أمام الله ورسوله

والمؤمنين.

والله على ما أقول شهيد.

جامعة محمد الخامس – الرباط
كلية الطب والصيدلة بالرباط

سنـة : 2016 أطروحة رقم: 371

مسارات "نـوعية الحياة من المنـظور الصحي" لدى مرضى مصلحة المستعجلات الطبية : تحليل فئات المسارات المستنترة

أطروحة

قدمت ونوقشت علانية يوم

من طرف

السيد: عدنان الخطاط
المزداد في: 21 أبريل 1990 بأكادير

لنـيـل شـهـادة الـدكـتـوراه فـي الطب

الكلمات الأساسية: مصلحة المستعجلات الطبية – EQ5D – نوعية الحياة من المنظور الصحي – مسارات.

تحت إشراف اللجنة المكونة من الأساتذة

السيد رضوان أبوقال أستاذ في الإنعاش الطبي	**رئيس**
السيدة جيهان بلعياشي أستاذة في الإنعاش الطبي	**مشرفة**
السيد نوفل المدني أستاذ في الإنعاش الطبي	**أعضاء**
السيد سميرأحيد أستاذ في الصيدلية	