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Chapter

Inhospital Outcome of Elderly Patients in an Intensive Care Unit in a Sub-Saharan Hospital

Martin Lankoande, Papougnezambo Bonkoungou, Oubian Soulemane, Ghislain Somda and Joachim Sanou

Abstract

People living more and more longer and elderly is growing and that requires change in health system including geriatric care to be innovative. The aim of this study was to analyze causes and prognosis of older patients admitted in an intensive care unit (ICU) in Sub-Sahara area. A retrospective study over 5 years of patients aged 65 years and above admitted in ICU of Yalgado Ouedraogo was carried out. Of the 2116 patients admitted in ICU, 237 (11.2%) were older. The mean age was 71.7 ± 6.1 years. Males were predominant (sex ratio = 2.4). Medical history was present in 80.6%. The Charlson mean score was 4.8 ± 1.8. Patients with coma represented 42%. Ambulatory Simplified Acute Physiologic Score (ASAPS) up to 8 was recorded in 49%. Medical diseases (60%) like nervous system (37.9%) were reported. Stroke and general surgery were the main affection. Globally treatment was based on fluid management and oxygen supply. During ICU stay, complications occurred in 37.5% like acute respiratory distress syndrome (ARDS) in 10.5%. The mean length of stay was 5.3 ± 7.4 days. The elderly mortality was 73%; those 90% died within 7 days. In multivariate analysis, shock (odds ratio: OR = 2.2, $p = 0.002$), severe brain trauma (OR = 9.6, $p = 0.002$), coma (OR 5.8 $p < 0.003$), surgical condition (OR = 4.2, $p = 0.003$), ASAPS ≥ 8 (OR = 4.3, $p = 0.001$), complication occurring (OR = 5.2, $p = 0.001$), and stroke (OR = 3.7, $p = 0.001$) were independent risk factors of death. Elderly patients are frequently admitted in ICU with high mortality.

Keywords: elderly, intensive care unit, mortality, Burkina Faso

1. Introduction

People aged 65 or 60 years and above are considered older [1], respectively, in developed countries and in Africa [1]. The world population grows older in most regions. In the year 2012, the global population reached 7 billion, and 562 (8%) millions of them were older. In 2015, the elderly rose by 55 million representing 8.5% of the world population [2]. In Africa, the rate of elderly (6.6% in 2015) will reach 9.6% in 2050 [2]. Like in other countries older people are increasing in Burkina Faso. This demographic transition increase health care needs especially health-care facilities, policies and training. Critical patients have increased risk because of associated morbidities [3]. These people are characterized by their frailty with risk of death. This high risk met in anesthesia and intensive care raises some voice

around the world particularly in the UK where some actions like implementation of perioperative medicine were planned. The physician has a major role for health-care improvement for multimorbid and frail patients [4]. In Burkina Faso, intensive care services need to be implemented. Government-adopted politics and some physicians are in specialization in foreign countries. No guidelines are available on older patient care in our countries, and patients are treated like other patients. More and more older patients are admitted in ICU and most died. In order to reduce the number of deaths, more information need to be identified for a better evidence-based action. The aim of this study was to analyze causes and prognosis of older patients admitted in the ICU of Yalgado Hospital in Burkina Faso.

2. Methods and materials

2.1 Setting and population

A retrospective study was carried out among patients aged ≥65 years in the ICU of the teaching hospital Yalgado Ouedraogo over 5 years (January 1, 2011–December 31, 2015). The Yalgado Ouédraogo Hospital is 800-bedded hospital where no specialist in geriatric is available. The ICU is an 8-bedded unit and is poorly equipped. Data recorded after approval by the Ethical and Research Committee (Ethical and National Scientific Research and Technology Center, ENSRTC) include sociodemographic, comorbidities, diagnosis, causes of ICU admission, Glasgow Coma Score, the Ambulatory Simplified Acute Physiologic Score (ASAPS), Charlson Comorbidity Score, sepsis, shock on admission, length of stay (LOS), management, and outcome. The ASAPS [5] is a scale used for gravity evaluation for ICU patients. Patients were categorized into three groups of age (65–74 years or "young old," 75–84 or "old old," and >85 or oldest old).

2.2 Statistical analysis

Quantitative data were presented as mean and standard deviation. Their variations were analyzed using ANOVA test. Qualitative data are presented as numbers and percentages and variations analyzed using the chi-square test. Chi-square test helped to compare survivors to non-survivors with $p \leq 0.05$. Analysis was performed with the Epidemiologic Info package 7.1.5.0.

3. Results

Among 2116 patients admitted in ICU, 237 (11.2%) were older. The mean age was 71.7 ± 6.1 years; the sex ratio was 2.4. A total of 173 deaths were observed (73%). Demographic and facility characteristics of deaths of patients are summarized in **Table 1**.

Comorbidity was identified in 80.6%. The Charlson mean score was 4.79 ± 1.83 [IC 95%; 2–12]. The mean score of Glasgow scale was 4.8 ± 1.2. Medical history and comorbidity are described in **Table 2**. Among the patients, 42% were admitted with coma. The ASAPS ≥8 was recorded as 49%. Clinical data are summarized in **Table 3**. Medical condition (60%) and nervous disease (37.9%) were the main diagnosis. Neurology disease and general surgery were the main affection by specialty (**Figure 1**). Stroke was the most frequent (27.4%) followed by peritonitis (**Table 3**). Intensive care was based on fluid, pain killers, and oxygen supply.

Characteristic		Frequency	Percentage
Age (years)	65–74 years	167	70.5
	75–84 years	58	24.5
	More 84 years	12	5
Gender	Male	167	70.5
	Female	70	29.5
Residency	Urban	159	67.1
	Rural area	78	32.9
Profession	Retired	48	32.6
	Housewife	37	25.2
	Farmer	31	21.1
	Public/private	31	21.1
Referral facilities	District hospital	107	45.1
	Regional hospital	39	16.5
	Dispensary	3	1.3
	Teaching hospital[a]	19	8
	Private hospital	69	29.1

[a]*Teaching Hospital (YO: 8; Blaise Compaoré Hospital: 6; Sourou Sanou Hospital = 5).*

Table 1.
Demographic characteristics of patients (n = 237).

Medical history		Frequency	Percentage
High blood pressure		120	50.6
Diabetes		56	23.6
Ulcer		15	6.3
Heart disease		9	3.8
Kidney failure		8	3.4
Stroke		4	1.7
Asthma		4	1.7
HIV/AIDS		3	1.3
Lymphoma		2	0.8
Live cancer		2	0.8
Esophagus stenosis		1	0.4
Esophagitis		1	0.4
Liver abscess		1	0.4
Goiter disease		1	0.4
None		60	25.3
Charlson score	<3	25	10.5
	4–5	139	58.6
	6–7	53	22.3
	≥8	20	8.4

Table 2.
Past history and comorbidity (N = 237).

Clinical data	Number	Percentage
Admission condition		
Medical condition	183	77.2
Surgical condition	54	22.8
Diseases		
Stroke	65	27.4
Prostate tumor	27	11.4
Sepsis	26	10.9
Trauma/burn	25	10.5
Bowel obstruction	13	5.5
Heart disease	18	2.5
Diabetic acute metabolic complications	20	8.4
Kidney failure	16	6.7
Other[a]	27	11.4
Total	237	100
Complications		
Sepsis	25	10.5
Acute respiratory distress syndrome	38	42.7
Shock	15	6.3
Coma	19	21.3
Bed sores	8	3.4
Acute pulmonary edema	5	2.1
Pulmonary aspiration	5	2.1
Pulmonary embolism	1	0.4
Other[b]	5	2.1
Outcomes		
Death in ICU	173	73
Transfer to other ward	48	20.2
Hospital discharge with physician authorization	10	4.2
Discharge without physician authorization	6	2.5
Total	237	100

[a]Other: anemia (n = 3), dehydratation (n = 2); [b]Hernia, blood disorder, ulcer, hydronephrosis, asthma, skin disease, leukemia.

Table 3.
Diagnosis and outcome of patients (n = 237).

During hospitalization, complications occurred in 37.5%, and ARDS was the most frequent (10.5%). In total, 173 older patients died (73%). The length of stay was 5.3 ± 7.4 days [IC 95%; 1–58] (**Table 4**).

Most patients were between 64 and 74 years old. There was significant difference in terms of group of age, between patients with a Charlson score up to 8 versus less than 8 (p = 0.001) and those with complications occurring in ICU versus no

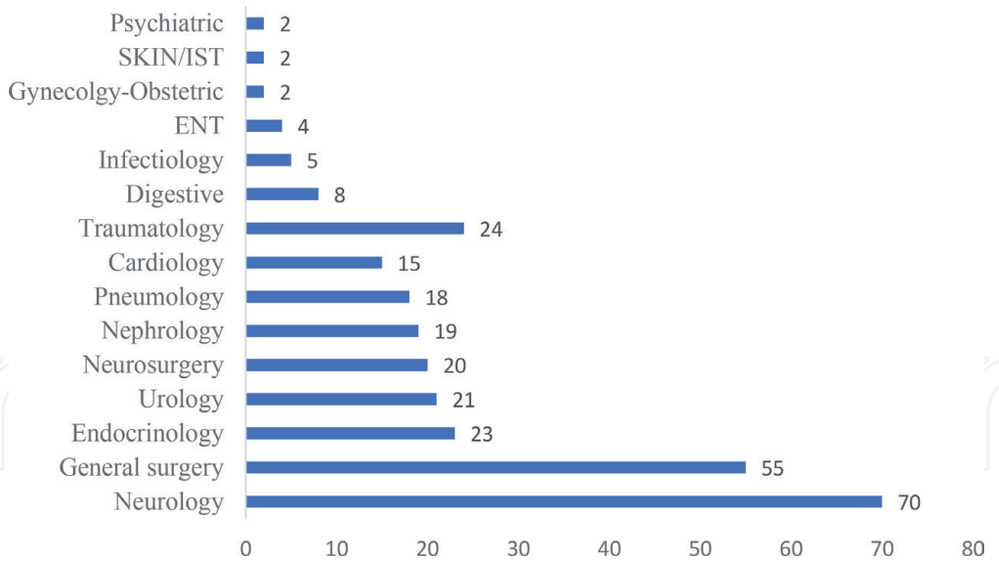

Figure 1.
Nature of disease (n = 237).

Characteristics	All patients (N = 237)	Non-survivors (n = 173)	Survivors (n = 64)	P value
Age (mean; years)	71.7 ± 6.1	71.6 ± 5.9	72.1 ± 6.4	0.5
Age group (%)				
65–74	167 (70.4)	123 (73.6)	44 (26.3)	0.7
75–84	58 (24.5)	42 (72.4)	16 (27.6)	0.9
85 above	12 (5.1)	8 (66.6)	4 (33.3)	0.6
Gender				
Male (n = 167)	167 (70.4)	127 (76.05)	40 (23.9)	0.1
Female (n = 70)	70 (29.6)	46 (65.7)	24 (34.3)	
Residency area				
Urban	159 (67.1)	97(61)	62(39)	0.3
Rural	78 (32.9)	62(79.5)	16(20.5)	
Reference specialty (%)				
Emergency service	134 (56.4)	108 (80.6)	26 (20.4)	0.001
Medicine	21 (8.8)	14 (66.6)	7(33.8)	0.4
Surgery	54 (22.8)	49 (90.7)	5(9.3)	0.003
Reasons for admission				
ACS	133 (56.1)	109 (81.9)	24 (18)	<0.001
Poor condition	6 (2.5)	3 (50)	3 (50)	0.3
Burn	11 (4.6)	7 (63.64)	4 (36.4)	0.4
ARDS	9 (3.8)	7 (77.7)	2 (22.2)	1
Shock	78 (32.9)	47 (60.3)	31 (39.7)	0.002
Charlson score (Median)	4.8 ± 1.8	4.6 ± 1.7	5.09 ± 2.04	0.12
≥ 8	20 (8.4)	11 (55)	9 (45)	0.03
< 8	217 (91.6)	103 (47.4)	76 (52.6)	0.4
Glasgow coma score (mean value)	9.64 ± 4.01	8.9 ± 3.8	11.8 ± 3.6	0.03
< 8	42.06	69 (88.4)	9 (11.5)	<0.001
≥ 8	57.9	58 (68.2)	76 (31.8)	
ASAPS (mean)	7.9 ± 3.5	8.6 ± 3.5	5.8 ± 2.6	<0.001
ASAPS ≥8		150 (87)	13	
ASAPS <8		109 (63.5)	36.6	
Diagnosis				
Stroke	65 (27.4)	57 (87.69)	8 (12.31)	0.001

Characteristics	All patients (N = 237)	Non-survivors (n = 173)	Survivors (n = 64)	P value
Peritonitis	22 (9.3)	18 (81.82)	4 (18.18)	0.4
AMCD[A]	20 (8.4)	10 (50)	10 (50)	0.01
SBT[B]	19 (8)	18 (94.74)	1 (5.26)	0.02
Bowel obstruction	13 (5.5)	7 (53.85)	6 (46.15)	0.1
Burn	10 (4.2)	6 (60)	4 (40)	0.4
Severe infection	10 (4.2)	8 (80)	2 (2)	0.7
Prostatic adenoma	9 (3.8)	5 (55.56)	4 (44.44)	0.2
Heart disease	6 (2.5)	4 (66.67)	2 (33.33)	0.6
Prostatic cancer	5 (2.1)	1 (20)	4 (80)	0.01
Inguinal hernia	5 (2.1)	3 (60)	2 (40)	0.6
Other[C]	53 (22.4)	36 (67.92)	17 (32.0)	0.1
Complications occurred in ICU				
Yes = 89	89 (37.5)	80 (89.9)	9 (10.1)	<0.001
No = 148	148 (62.5)	93 (62.8)	55 (37.2)	
Mechanical ventilation	2 (0.8)	2 (100)	0	Ki = 0.7
Length of stay (mean)	5.3 ± 7.4	5.2 ± 8	5.5 ± 5.1	0.8

ACS, alteration of consciousness; ARDS, acute respiratory distress syndrome, [A]AMCD, acute metabolic complication of diabetes; [B]SBT, severe brain trauma, [C]Other disease, ASAPS: ambulatory simplified acute physiologic scale.

Table 4.
Comparison of survivors and non-survivor's patients (n = 237).

Variables	65–74 years n = 167 (70.4%)	75–84 years n = 58 (24.5%)	Over 84 years n = 12 (5.1%)	P value
Age (mean; years)	68.3 ± 2.8	78.2 ± 2.5	86.6 ± 1.6	<0.001
Gender				
Male (n = 167)	118	40	9	0.9
Female (n = 70)	49	18	3	
Reasons for admission				
ACS	92	33	6	0.9
Poor condition	68	26	5	0.6
Burn	7	2	1	0.7
ARDS	13	6	0	0.4
Shock	11	4	2	0.4
Charlson score	4.5	5.1	6.3	0.001
≥ 8	12	5	3	0.1
< 8	155	53	9	
Glasgow score (mean)	9.7 ± 4.02	9.4 ± 4.1	8.8 ± 3.5	0.6
< 8	12	5	3	0.1
≥ 8	155	53	9	
ASAPS (Mean)	7.9 ± 3.8	8.08 ± 2.9	8.1 ± 2.7	0.9
ASAPS ≥8	65	25	8	0.1
ASAPS <8	77	22	4	0.4
Complications in ICU				0.01
Yes = 89	65	19	5	0.6
No = 148	102	39	7	
Mechanical ventilation	2	0	0	0.6
Length of stay (LOS)	5.3 ± 6.8	5.6 ± 9.2	2.7 ± 2.2	0.4
Death	123 (73.6)	42 (72.4)	8 (66.6)	0.2

ACS, Alteration of consciousness; ARDS, Acute respiratory distress syndrome; ICU, Intensive care unit; ASAPS, Ambulatory simplified acute physiologic scale.

Table 5.
Comparison of patients according to age group (n = 237).

Diagnosis	Adjusted OR (CI 95%)	p
Medical condition without coma	Reference	
Surgery	4.2 [2.4–10.3]	0.003
Coma at admission	2.9 [1.6–5.4]	0.001
Coma in ICU	5.8 [2.3–14.6]	0.001
Shock during admission	2.2 [1.6–4.0]	0.002
ASAPS ≥8	4.3 [1.1–8.5]	0.001
Stroke	3.7 [1.6–8.7]	0.001
Severe brain trauma	9.6 [1.2–75.1]	0.02
Complications in ICU		0.001
No	Reference	
Yes	5.2 [2.4–11.3]	0.001

ACS, alteration of consciousness; ARDS, acute respiratory distress syndrome; ICU, intensive care unit; ASAPS, ambulatory simplified acute physiologic scale.

Table 6.
Risk factors for ICU mortality of elderly patients.

complications occurring (p = 0.01) (**Table 5**). In multivariate analysis, surgery, coma, shock, stroke, and severe brain trauma were independent risks factors of death (**Table** 6).

4. Discussion

Older patients accounted for 11.2% of ICU admission. This rate is comparable to the 10% of Owojuyigbe et al. [6] findings in Nigeria but less than the findings in the United States (42–52%). Better health-care system organization, life expectancy improvement explains high prevalence in developed countries. In Burkina Faso, the elderly accounted 2.4% of the population [7]. Elderly mortality (73%) is high compared to Belayachi et al. [8] reports (44.7%) in Morocco and Wade et al. [9] (42.8%) at Senegal. The high mortality reported in developing countries compared to developed countries may be due to inadequate care, late consultation, poverty, and poor equipment of ICU.

The mean age (71.7) in this study was comparable to Owojuyigbe et al. [6] report (73 years) and Belayachi et al. [8] report (72 years). In Porto, Abelha et al. [10] reported 64.1 years. The age varies according to regions and studies. Patients were mostly males, but there is no correlation between gender and outcome in this study. In other studies, [8], [10] report similar finding, while Fowler et al. reported higher mortality with female patient [11]. In this study, the majority lives in urban area (67.1%) and was retired (32.6%). Patients were referred from district hospital (45.1%). In Burkina Faso, district hospitals are so far to the National Referral Hospital, and patients travel so far in poor condition that causes delay to care and worsens prognosis. In our study, 49.4% had high Charlson comorbidity score. Older patients have many comorbidities which reduce their capability, increase disability, decrease quality of life, and increase risk of death [12]. In the literature, it has been reported that the pooled mortality risk for elderly people with multimorbidity was high compared with those with one chronic disease or none [12, 13]. Alteration of consciousness was found in 56.1% and shock in 32.9%. Our findings were comparable to those reported by Vosylius et al. [14]. ASAPS ≥8 was recorded in 49%. The

delay to consult and care worsens patient condition. Medical condition was the main diagnosis, and stroke was most frequent (27.4%) followed by peritonitis. Our findings are different with Belayachi et al. [8] who found that respiratory infections were most predominant. Diagnoses vary according to study, social environment, and countries [6, 8, 11, 14].

Advanced age alone does not preclude successful outcome [9]. In multivariate analysis, independent risk factors were surgical conditions, coma, shock during admission, ASAPS ≥8, stroke, and severe brain trauma. These findings are comparable to literature reports [9, 3, 15]. There is no difference between age groups in terms of mortality. The mean LOS was short, while 46.6% of patients died within 3 days and 90% of patient died within a week. For patients over 84 years, LOS was shorter, and inhospital mortality was less than in patients aged less than 84 years. The family usually refuse care and discharge once a poor outcome is pronounced. This explains the relatively low mortality rate and short stay of this group of
age. Elderly patients living in rural area die more than those in urban area, but this rate is not significant. The overall poor outcomes may be due to late consultation and poor quality of care due to the inadequate facilities and equipment and lack of medications due to poverty. Even most of our patients live in urban area and was retired care are not generally provided continuously because of financial barrier. Retired people do not have insurance in public hospital but only in private sector which does not have ICU. Delay to consultation may be related to limited education, traditional healing practice, poverty, and poor transportation. In Africa elderly consider conventional medicine as for infant and their family geriatric disease is associated to end of live. That sometime delay use of conventional medicine. The LOS was short in our study compared to other study (Belayachi et al. [8], 6.6 days; Fuchs et al., 9 days), but some authors found a longer LOS (12.9–23 days) [10, 16]. In our study mortality was high (73%) compared to literature [10, 11, 14, 15]. Comorbidity, frailty, low number of physicians and nurses, insufficiency of skills, lack of equipment, and insurance are some hypotheses to explain mortality. Geriatric training implementation, a good follow-up, and perioperative medicine implementation can reduce admission in ICU. In order to improve elderly care, we need to make policies, sensitize people for early consultation, and implement universal health coverage. Our study showed that most patients have comorbidities. Multimorbidity is especially common among older adults, and its negative consequences include higher disability, decrease in quality of life, and increased risk of death. The insufficiency of follow-up, limitation of skills on geriatric care, and insufficiency of hospital equipment increase risk of death.

Most of the people of Burkina Faso live in the rural area and are farmers. Cultural and financial barriers are most important in this area where people practice traditional healing because they consult later to modern health services. Diagnosis is mostly performed at an advanced condition where treatment is compromised. So the universal health coverage is not implemented, and people have to make direct payment before care. Even with most people who are living in the urban area and retried, the social security of our country does not give possibility of prepayment but only reimbursement and this situation delay care. In response to the recommendations of the World Health Organization and United Nations Assembly on Aging, our country made policies and defines laws to protect older people in the year 2015, but these laws are still unimplemented because of the lack of decree. By promoting specialization in geriatry, implementation of policies protecting older people, Burkina Faso government demonstrated a will to promote elderly well-being and health care. The national program of social protection of older people initiated in 2016 will improve health care with a better follow, universal health promotion. In the particular case of intensive care services, the national society of anesthesiology must implement perioperative medicine course. More commitment and investment

are needed to enhance of the elderly care. This study has limitations due to retrospective character and long-term outcome data missing. The impact of hospitalization, biologic abnormality, the APACHE, and SOFA score on outcome was not evaluated. This study showed that most of those who live in urban area raise an issue of representativeness for the population, and we cannot generalize these findings.

5. Conclusions

Older patients were frequently admitted in the ICU of Yalgado hospital. Patients are mostly "young old" but have comorbidities. Patients were admitted with the serious condition. LOS was short which indirectly means poor management with early death. Mortality is high. The main factors of death are shock, severe brain trauma, coma, surgical condition, complication occurring, and stroke. The public must be sensitized to consult early and respect medical advices. Health-care worker must improve their skills and adapted care to older people. The implementation of geriatric center can allow improved care for a low rate of death.

Conflict of interest

None.

Notes/thanks/other declarations

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Author details

Martin Lankoande[1*], Papougnezambo Bonkoungou[2], Oubian Soulemane[1], Ghislain Somda[3] and Joachim Sanou[2]

1 Regional Hospital of Koudougou, Burkina Faso

2 Teaching Hospital Yalgado Ouedraogo, Burkina Faso

3 Distric Hôpital of Gayérie, Burkina Faso

*Address all correspondence to: m.hamtaani@gmail.com

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