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Knowledge about Stroke among Workers in Public and Private Enterprises in Brazzaville and Their Attitudes towards Stroke Victims

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Abstract

Background: Stroke causes multiple complications, sequelae and a high mortality rate. Therefore, it is important to initiate or improve stroke awareness. **Objectives:** To assess knowledge about stroke among workers, explore workers' attitudes towards stroke victims and identify factors influencing knowledge about stroke and workers' attitudes. **Methods:** It was an analytical cross-sectional study. It was conducted from 16 August to 30 December 2020 (4.5 months). It was carried out in public and private enterprises in the formal sector in Brazzaville. It focused on workers aged 19 years and above. The study variables were socio-professional, psychosocial, epidemiological and clinical. **Results:** This study included 543 workers who fulfilled inclusion criteria. The knowledge scores for at least one warning sign and one risk factor were 74% and 77.7%, respectively. The average knowledge scores for warning signs and risk factors were 11.4% and 16.7%, respectively. For prevention measures, average knowledge score was 16.5%. The average score of knowledge for items related to post-stroke life of stroke victims was 78.3%. The average rate of positive attitudes of workers towards stroke victims was 81.4%. The determinants of knowledge about stroke were education ($p = 0.039$) and information ($p = 0.040$). The factors influencing workers' normal attitude were education ($p = 0.023$) and knowledge about stroke ($p < 0.001$). **Conclusion:** Although the attitudes towards stroke victims are overall good, the level of knowledge about warning signs, risk factors and prevention measures is low. Because of this, it is important to organize public regular awareness and education campaigns in order to improve and increase knowledge about stroke.

Keywords

Stroke, Knowledge, Attitudes, Enterprises, Brazzaville

1. Introduction

Stroke is a group of vascular diseases with a multifactorial etiology [1] [2] [3]. It is a medical emergency that requires a coordinated approach to care [4] [5]. All ages are affected by this pathology, whatever the age [6] [7] [8].

Over the past two decades, it has been noted a major advance in the management of stroke [9] [10] [11]. However, the incidence and rates of mortality and sequelae are increasing worldwide each year [12]. To slow the progression of stroke, it is essential to raise awareness about stroke [13] [14].

Stroke awareness is often focused on people aged 65 years and above because about 70% of all strokes occur in this age group [15], but also because their level of knowledge about warning signs and risk factors is low and awareness campaigns do not lead to a clear improvement in their knowledge [16].

The literature reports that approximately 25% of strokes occur in young adults aged 20 to 64 years [17]. There is an increase in the prevalence and incidence of stroke in young adults worldwide [18] [19] [20]. This increase is associated with the increase of multiple causes such as cardiac causes, hematological causes, genetic causes, atherosclerotic occlusive diseases, nonatherosclerotic vascular diseases, infections, hypertension, diabetes mellitus, obesity, dyslipidemia, migraine, drug addiction, excessive alcohol consumption, sedentary lifestyle, smoking, psychological stress, lifestyle [1] [18] [19]. It has been noted that the long-term mortality of young adults with stroke is higher than that of people in the same age group who have not suffered a stroke [19] [21] [22]. Young adults with stroke often face long-term socio-economic difficulties: disruption of family relationships; emotional problems; communication problems; financial problems; professional reintegration problems; deterioration of sexual life; depression; cognitive problems; psychiatric disorders [17] [23]. Taken together, these data show the importance of primary prevention in asymptomatic young adults to reduce the risk of stroke [18] [24].

In Republic of the Congo, there is a National Programme for Prevention and Control of Non-Communicable Diseases. Stroke, which is part of this programme, is a heavy financial burden for patients, households and families (the mean in-hospital cost of stroke care is 13 times the guaranteed minimum wage) [25]. Stroke mortality rate is 25% [25] [26]. Among stroke victims, 32.8% belong to the young adults aged 26 to 55 years [27]. Because of this, and because studies have shown that the 25 - 54 age group is a good predictor of stroke knowledge [28] [29] [30] [31], the productive population at work was selected to determine the level of stroke awareness.

The objectives of this study are to assess knowledge about stroke among work-

ers, explore workers' attitudes towards stroke victims and identify factors influencing knowledge about stroke and workers' attitudes.

2. Methods

This was an analytical cross-sectional study. It was carried out from 16 August to 30 December 2020 (4.5 months). It was carried out in public and private enterprises in the formal sector in Brazzaville, which were registered by the Ministry of Economy, Planning, Statistics and Regional Integration [32].

Inclusion criteria were workers: aged 19 years and above; salaried; in service at the time of the study; who gave consent to participate in the study.

Non-inclusion criteria were: trainees; volunteer workers; workers who have already suffered a stroke; health professionals; workers who partially answered the questionnaire.

The sample size was determined using the Schwartz formula:

$$N = Z^2 P(1-P)/e^2$$

where, N = Sample size; Z = α error (5%), corresponding to critical value of 1.96; e = Margin of error set at 5%; P = Theoretical expected proportion. As no previous study was conducted in Brazzaville, we used the theoretical expected proportion of 39.3% corresponding to the percentage of participants of the Nepal study who had recognized stroke as a disease of the brain [33]. Thus, our sample size (N) was 367 workers.

The one-stage cluster sampling method was used to determine the number of enterprises to be surveyed. To estimate the sample size, the number of enterprises was calculated using the following formula:

$$n = N/X$$

where, n = Number of enterprises to be selected to obtain the sample size; N = Sample size; X = Number of workers in public and private enterprises (n = 13151) divided by Number of public and private enterprises (n = 463). The number of enterprises to be selected to obtain the sample size was 13.

The enterprises were selected by a simple draw without replacement from the 463 public and private enterprises. The workers of a selected enterprise were exhaustively surveyed. The number of workers to be interviewed was 786. Based on inclusion criteria, 243 (31%) workers were excluded from this study. Thus, our study included 543 workers instead of 367 workers estimated on the basis of the theoretical expected proportion.

The information was collected using a semi-open-ended questionnaire, which was developed from validated stroke questionnaires from previous published studies [34] [35] [36]. The adapted study questionnaire was approved by the National Ethics Committee.

The questionnaire was administered to workers, who answered the questions without the intervention of the investigators. Exchanges between the workers and the interviewers took place face to face.

The questionnaire consisted of 3 parts. The first part was focused on socio-economic aspects: age; gender; education level; marital status; types of enterprises; types of professional activities; monthly income level, which was presented as follows: monthly income < 70,000 francs CFA (African Francophone Community) (106.7 Euro) = low level; monthly income ranging from 70,000 francs CFA (106.7 Euro) to 179,000 francs CFA (272.9 Euro) = middle level; monthly income ≥ 180,000 francs CFA (274.4 Euro) = high level. The exchange rate is 1 euro = 655.95 francs CFA.

The second part was focused on knowledge about stroke, with the following items: sources of information; age of the stroke population; types of strokes (cerebral arterial infarction; intracerebral hemorrhage); warning signs/symptoms; risk factors; circumstances of onset; types of treatments (modern medicine treatment; spiritual treatment; traditional treatment using medicinal plants or other products; modern medicine treatment associated with spiritual treatment or traditional treatment using medicinal plants/other products); origins of stroke (natural origin; supernatural or mystical origin); prevention measures; post-stroke life of stroke victims (marriage; sexuality; reproduction).

The third part was focused on attitudes of workers towards stroke victims, with the following items: behavior of workers towards a person with stroke warning signs/symptoms; behavior of workers towards a stroke victim who has returned to work.

The score of an item, expressed as a percentage, was determined by dividing the number of participants who mentioned the correct answer by the total number of participants in the survey. The knowledge score was presented as follows: score < 50% = low knowledge; score ranging from 50% to 69% = moderate knowledge; score ≥ 70% = good knowledge [37].

The data were analyzed using IMB SPSS Statistic 21 (Statistical Package of Social Sciences). Qualitative and quantitative variables were presented, respectively, as percentages (%) and as means. Qualitative variables were compared using the Chi-square test. The Student test was used to compare quantitative variables. Logistic regression was used to determine the factors influencing knowledge about stroke and workers' attitudes.

3. Results

Among the 543 workers who were included in this study, there were 282 (52%) in the formal private sector and 261 (48%) in the formal public sector. **Table 1** presents the socio-economic characteristics of the study population. Men, workers with tertiary education level, workers with middle monthly income level and single and married workers were predominant.

The professional sectors of the study population were: banking, insurance and finance sector (n = 169; 31.1%); transport and logistics sector (n = 161; 29.6%); manufacturing industry sector (n = 94; 17.3%); construction industries sector (n = 90; 16.6%); information and communication sector (n = 26; 4.8%); legal sector (notary and lawyer) (n = 3; 0.6%).

Table 1. Socio-professional characteristics of the study population.

		Mean ± Standard deviation	n (%)
Gender	Female		153 (28.2)
	Male		390 (71.8)
Age		39.1 ± 8.5 years (Range: 20 - 67 years)	
Marital status	Unmarried		271 (49.9)
	Married		257 (47.3)
	Divorced		8 (1.5)
	Widowed		7 (1.3)
Education level	Primary education		13 (2.4)
	Secondary education		187 (34.4)
	Tertiary education		343 (63.2)
Monthly income level	Low		54 (9.9)
	Middle		391 (72)
	High		98 (18)
Types of enterprises	Private enterprise		282 (52)
	Public enterprise		261 (48)
Types of professional activities	Administrative activity		299 (55)
	Manual activity		244 (45)

Of the 543 workers, 536 (98.7%) had heard about stroke. The sources of information were: electronic media (television and radio) (n = 224; 49.5%); relatives of stroke victims (n = 215; 47.5%); personal research (n = 197; 36.3%); health professionals (n = 63; 11.7%); word of mouth (n = 11; 2%).

3.1. Knowledge about Clinical and Preventive Aspects of Stroke

Of the 543 workers, 456 (84%) had indicated that stroke was a disease affecting both young and older populations. Sixty-six (12.2%) workers had stated that stroke was a pathology of the older population. Twenty-one (3.9%) workers had no knowledge about the age of the stroke population.

Regarding types of strokes, 23 (4.2%) workers knew the types of strokes. Five hundred and twenty (95.8%) workers had no knowledge about types of strokes.

Concerning warning signs, 402 (74%) workers knew at least one warning sign of stroke. One hundred and forty-one (26%) workers were unable to identify a warning sign.

On risk factors, 422 (77.7%) workers knew at least one risk factor of stroke. One hundred twenty-one (22.3%) workers had no knowledge about stroke risk factors.

Table 2 presents the data related to knowledge about clinical characteristics of stroke. Cerebral arterial infarction and intracerebral hemorrhage were mentioned by similar numbers of workers. Facial or limb paralysis was the dominant warning sign (n = 364; 67%). Stress was the most known risk factor (n = 372; 68.5%). Disputes and strong emotions were the most mentioned circumstances of stroke occurrence (n = 431; 79.4%).

Table 2. Knowledge about clinical aspects of stroke.

		Correct answers n (%)
Types of strokes	Intracerebral hemorrhage	12 (2.2%)
	Cerebral arterial infarction	11 (2%)
Warning signs and symptoms	Sudden onset of facial or limb paralysis	364 (67%)
	Sudden onset of language disorders	83 (15.3%)
	Memory loss	69 (12.7%)
	Sudden onset of sensitivity disorders	43 (7.9%)
	Sudden onset of severe headaches with no known cause	29 (5.4%)
	Consciousness disorders/Coma	28 (5.2%)
	Sudden onset of balance disorders	26 (4.8%)
	Sudden onset of vision problems in one or both eyes	14 (2.6%)
	Convulsive seizure	11 (2%)
	Sudden onset of weakness in the face, arms or legs	9 (1.7%)
	Sudden onset of bleeding	6 (1.1%)
Risk factors	Stress	372 (68.5%)
	Arterial hypertension	152 (28%)
	Excessive alcohol consumption	93 (17.1%)
	Cigarette smoking	48 (8.8%)
	Sedentary lifestyle	48 (8.8%)
	Obesity	42 (7.7%)
	Diabetes mellitus	28 (5.2%)
	Heart diseases	19 (3.5%)
	Dyslipidemia	17 (3.1%)
Circumstances of onset	Disputes/Strong emotions	431 (79.4¨)
	Sexual intercourse	278 (51.2)
	Cerebral trauma	184 (33.9%)

About types of treatments, 421 (77.5%) workers had indicated modern medicine treatment. Ninety (16.6%) workers had indicated other types of treatments, namely spiritual treatment (n = 8; 1.5%), traditional treatment using medicinal plants or other products (n = 5; 0.9%) and medical treatment associated with spiritual treatment or traditional treatment using medicinal plants or other products (n = 77; 14.2%).

Concerning origins of stroke, 383 workers had mentioned natural origin (84.5%). Twenty-five (5.5%) workers had indicated supernatural origin. For the latter, curse (n = 18; 72% of cases) and divine punishment (n = 7; 28% of cases) were the origins of stroke. Forty-five (10%) workers did not have an answer about origins of stroke.

Regarding stroke prevention, 483 (89%) workers had stated that it was important to initiate prevention. Table 3 presents the data related to knowledge about stroke prevention measures. The most mentioned prevention measure was "lead a balanced lifestyle with time for relaxation and rest" (n = 179; 33%).

3.2. Knowledge about Post-Stroke Life of Stroke Victims

Of the 543 workers, 440 (81%) had indicated that the professional reintegration of stroke victims was possible. For 70 (12.9%) workers, professional reintegration of stroke victims was impossible because of the motor disability (n = 46; 8.4%), the fragile state of the stroke victims (n = 15; 2.8%) and the high probability of recurrence (n = 9; 1.7%). Thirty-seven (6.8%) workers did not have an answer about professional reintegration of stroke victims.

About marriage, 467 (86%) workers had indicated that stroke victims could marry. For 41 (7.6%) workers, marriage was impossible because of the motor disability (n = 27; 5%), the burden of the stroke victim (n = 8; 1.5%) and the fear

Table 3. Knowledge about prevention measures of stroke.

	Correct answers	
	n	(%)
Lead a balanced lifestyle with time for relaxation and rest	179	33%
Eating a healthy and balanced diet, low in salt and including regular consumption of fruit and vegetables	165	30.4%
Regular physical activity	151	27.8%
Managing daily stress	89	16.4%
Follow and respect the prescribed treatment in case of heart disease, diabetes mellitus or dyslipidemia	82	15.1%
Limiting alcohol consumption	50	9.2%
Stop smoking if you smoke	48	8.8%
Stop using drugs or stimulants if you are using them	28	5.2%
Losing weight if you are overweight or obese	13	2.4%

that the stroke victim will have a recurrence (n = 6; 1.1%). Thirty-five (6.4%) workers had no answer about marriage.

Concerning sexuality, 403 (74.2%) workers had stated that stroke victims could have post-stroke sexual intercourse with their partners. For 62 (11.4%) workers, post-stroke sexual intercourse could not take place because of the motor disability (n = 24; 4.4%), the risk of recurrence (n = 10; 1.8%) and the fear that the stroke victim will die (n = 32; 5.9%). Seventy-eight (14.4%) workers did not have an answer about stroke victims' post-stroke sexuality.

On reproduction, 391 (72%) workers had indicated that stroke victims were able to procreate. For 44 (8.1%) workers, stroke victims had become infertile. One hundred and eight (19.9%) workers had no answer about post-stroke reproduction of stroke victims.

3.3. Attitudes of Workers towards Stroke Victims

Regarding item "behavior towards a person with stroke warning signs/symptoms", 308 (56.7%) workers reported taking the patient to the hospital immediately versus 163 (30%) workers for alerting the medical assistance service or the civil security (fireman). Seventy-two workers did not have an answer about item.

Concerning item "behavior towards a stroke victim who has returned to work", 163 (30%) workers mentioned having a normal behavior towards him/her versus 290 (53.4%) workers for a protective behavior. Ninety (16.6%) workers had no answer about item. The protective behavior consisted of reducing the tasks to be performed by the stroke victim (n = 244; 84.1%), giving him/her more attention (n = 116; 40%), not frustrating him/her (n = 67; 23.2%) and motivating him/her every day (n = 7; 2.4%).

3.4. Factors Influencing Knowledge about Stroke and Attitudes of Workers

Table 4 shows that knowledge about stroke was influenced by education ($p = 0.039$) and information ($p = 0.040$). Workers with tertiary education level had significantly more knowledge about stroke, followed by those with secondary education level. Workers, who had stroke information, had significantly more knowledge about stroke when compared to those who had no information.

Table 5 shows that workers' normal attitude towards stroke victims was influenced by education ($p = 0.023$) and knowledge about stroke ($p < 0.001$). The normal attitude of workers towards stroke victims was significantly more pronounced among workers with tertiary education level and knowledge about stroke, followed by workers with secondary education level and knowledge about stroke. There was no significant difference in the protective attitude of workers towards stroke victims between workers with tertiary education level and those with secondary education level, and between workers who have knowledge about stroke and those who did not.

Table 4. Factors influencing knowledge about stroke.

		Lack of knowledge n (%)	Existence of knowledge n (%)	p
Education level	Primary education	5 (3.8)	8 (2)	0.039
	Secondary education	55 (42)	132 (32)	
	Tertiary education	71 (54.2)	272 (66)	
Information	No	4 (3)	3 (0.7)	0.040
	Yes	127 (97)	409 (99.3)	

Table 5. Factors influencing workers' attitudes towards stroke victims.

		Protective attitude n (%)	Normal attitude n (%)	p
Education level	Primary education	4 (0.7)	9 (1.7)	0.023
	Secondary education	63 (11.6)	124 (22.8)	
	Tertiary education	78 (14.4)	265 (48.8)	
knowledge	Yes	65 (12)	347 (63.9)	<0.001
	No	80 (14.7)	51 (9.4)	

4. Discussion

This study focuses on knowledge about stroke among workers, workers' attitudes towards stroke victims and factors influencing knowledge about stroke and workers' attitudes.

In our series, knowledge about the age of the stroke population is good (score = 84%). This is also seen in Nepal (score = 74.8%) [33] and Ivory Coast (score = 84.9%) [38].

A good knowledge of the natural origin of stroke was noted in our study (score = 84.5%). Our data is similar to that found in Burkina Faso (score = 85%) [39]. The belief in a supernatural or mystical origin, observed in our series (5.5%) and in studies conducted in Ivory Coast (50.9%) [38] and in Burkina Faso (15%) [39], could be explained by traditional conceptions of disease in African societies, which often attribute a mystical origin to disease [40] [41] [42].

The low knowledge of the types of strokes, noted in the present study (cerebral arterial infarction score: 2%; intracerebral hemorrhage score: 2.2%), is lower than that reported in the India study (cerebral arterial infarction score: 39.3%; intracerebral hemorrhage score: 13.4%) [43].

The good knowledge for at least one warning sign, noted in our series (score = 74%), has been also reported in other series (score = 70% - 98%) [33] [35] [43] [44] [45] [46]. Regarding facial or limb paralysis, which is the most mentioned warning sign in our series, knowledge is moderate (score = 67%). Previous series report good knowledge of facial or limb paralysis (score = 77% - 91%) [38] [47] [48]. Concerning other warning signs, low knowledge is noted (score < 16%)

(**Table 2**). This is also observed in previous series (score < 40%) [28] [39] [43] [49]-[55].

In our study, the knowledge for at least one risk factor is good (score = 77.7%). This is also reported by other investigators (score = 72% - 99%) [35] [43] [45] [47] [56] [57]. About stress, which is the most mentioned risk factor in our study, moderate knowledge is noted (score = 68.5%). This is similar to the data found among teachers in Nigeria (65.8%) [54]. Good knowledge of stress has been also reported by other investigators among workers in various professional sectors (score = 70% - 88%) [29] [34] [58]. Regarding other risk factors, low knowledge is noted (score < 29%) (**Table 2**). This is also found in other studies (score < 45%) [28] [30] [51] [59] [60].

Concerning types of treatments, good knowledge about modern medicine treatment is noted in our study (score = 77.5%). This finding is also encountered in the Nepal study (score = 82.5%) [33]. In our series, this good knowledge could be explained by the high education level of workers, who would have a better understanding of the concept of disease. The other types of treatments, indicated in our study, could be explained by sociocultural and anthropological conceptions [40] [41] [42] [61].

Low knowledge of prevention measures is noted in our series (score < 33%) (**Table 3**). This is also reported in previous series (score < 50%) [38] [39] [62]. The most mentioned prevention measures in our study have been also reported by other authors [38] [48].

Studies in many sub-Saharan African countries report low levels of knowledge about stroke [28] [29] [30] [31] [34] [38] [39] [63] [64]. This is also noted in our study. The lack of regular awareness campaigns could explain these low knowledge levels. Indeed, studies show that regular stroke awareness campaigns improve knowledge about stroke [65].

In our study, knowledge about post-stroke life of stroke victims is overall good (score = 78.3%). However, there are 19.5% of workers with incorrect answers about post-stroke sexuality and reproductive disorders of stroke victims and 17.1% of workers unable to answer both items. This indicates that it is important to increase the knowledge of the population in relation to both items. Indeed, the literature reports that stroke can affect stroke victims' sexuality through physical, behavioral or emotional changes [66] [67] [68] or increase the risk of reproductive disorders if the brain territory affected is the hypothalamus. The latter is involved in the regulation of reproductive processes [68] [69] [70].

Workers' attitudes towards stroke victims are overall good in our series (score = 81.4%). However, the responses in relation to the item "behavior towards a person with stroke warning signs/symptoms" suggest that, during awareness campaigns, it is important to focus on the time of admission to hospital for stroke victims and its impact on brain cell life, treatment seeking, patient recovery and complications leading to sequelae and death [71] [72] [73] [74] [75]. The normal attitude of workers towards stroke victims could be explained by education and prior information about stroke. The protective attitude would be the result of the

good initial working relationship between the stroke victim and his/her colleagues.

In our series, electronic media (television and radio) are in first place among the sources of information. Our data match those reported in other African series [29] [54] [58] [64]. In still other African series, television and radio are ranked second [38] [76]. Studies show that television is an effective information tool for learning about stroke because of the combination of visual and audio aids [73]. All these data suggest that television and radio are important tools to use for stroke awareness campaigns in Africa.

Research shows that the main factors influencing knowledge about stroke are information [16] [77] [78] and education [29] [35] [47] [55] [63] [77] [78]. Our data corroborate those of previous studies.

5. Strengths

This study has some strengths. The sampling method allowed us to obtain a representative sample of enterprises. The sample size provided robust data on knowledge about stroke in the work environment and workers' attitudes towards stroke victims. These data can be used by the management team of the National Programme for Prevention and Control of Non-Communicable Diseases to improve and increase public awareness and education campaigns.

6. Conclusion

Our results show that workers' attitudes towards stroke victims are overall good. However, based on knowledge scores of warning signs, risk factors and prevention measures, the level of knowledge about stroke among workers is low. Taking into account data related to the sources of information and the factors influencing knowledge about stroke, it is important to organize public regular awareness and education campaigns using the media and educational tools in order to improve and increase knowledge about stroke.

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Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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