Knowledge and practice concerning swallowing disorders in hemiplegic patients among nurses of Bobo–Dioulasso urban primary health care centers in Burkina Faso

Jeoffray Diendéré [a,d], Appolinaire Sawadogo [b], Athanase Millogo [b], Alassane Ilboudo [b], Christian Napon [c], Nicolas Méda [d], Jean Kaboré [c], Ziemlé-Clément Méda [e], Jean Testa [d], Pierre-Marie Preux [a], Jean-Yves Salle [f], Jean-Claude Desport [g,*]

[a] INSERM, UMR1094 Tropical Neuroepidemiology (NET), School of Medicine, 2 rue du Dr Marcland, 87 025 Limoges Cedex, France
[b] Medicine Department, CHU Souro Sanou, 01 BP 676 Bobo–Dioulasso, Burkina Faso
[c] Neurology Service, CHU Yalgado Ouédraogo, 03 BP 7022 Ouagadougou, Burkina Faso
[d] Centre Muraz, 2054 Avenue Mamadou Konaté, 01 BP 390 Bobo–Dioulasso, Burkina Faso
[e] Institut Supérieur des Sciences de la Santé (INSSA), Université de Bobo–Dioulasso, 01 BP 1091 Bobo–Dioulasso, Burkina Faso
[f] Physical and Readaptation Medicine, Hôpital J. Rebeyrol, Limoges University Hospital, 2 Avenue Martin Luther King, 87042 Limoges cedex, France
[g] Nutrition Unit and Specialized Centre of Obesity Care for the region of Limousin, Dupuytren University Hospital, 2 Avenue Martin Luther King, 87042 Limoges cedex, France

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ABSTRACT

Introduction: The quality of management of swallowing disorders (SD) from admission onwards influences the patients' nutritional status and their prognosis. Neurological diseases are the main causes of SD, affecting one in three patients with hemiplegia (Hp). In Burkina Faso (BF), primary health care center (PHCC) nurses are the first to manage these patients, but there are no data related to their management of SD. The study aimed to assess knowledge and practices regarding SD in Hp among PHCC nurses in Bobo–Dioulasso, a main center for care of Hp in BF.
Methods: This cross-sectional study was performed August 1–September 15 2014. Subjects underwent a standardized survey to determine their knowledge and practices concerning SD in Hp.
Results: Of 125 nurses surveyed (83.3% of the targeted workers), 82.4% had experience of caring for Hp. The role of the central nervous system in cases of Hp and SD was recognized by 56.8% of nurses; 42.3% knew that SD can cause aspiration, and 36.0% were aware of rescue techniques to use when aspiration occurs; 39.2% correctly assessed the impact on nutritional status of SD. Knowledge in this area was better among respondents who recently completed training school. 65.6% and 1.6% respectively knew about the impact of posture and the texture of food on the ability to swallow. Among the 103 nurses with experience of treating Hp, 68.0% considered clinical interview the best way to detect SD, and 30.1% did not give the patient advice in this area. In multivariate analysis, detection of SD was associated with good knowledge of the value of voice disorders (OR = 3.5, 95% CI = 1.4–8.1; p = 0.005).
Conclusion: Few nurses had been warned of the connection between Hp and SD, which are classic issues and potential complications. Practices varied, but most were not in accord with what are recognized as good strategies for SD screening and management. In order to improve care of Hp, neurological and nutritional training should be accompanied by specific training in SD, emphasizing screening and simple management.

1. Introduction

Swallowing disorders (SD) are common among patients with a range of conditions, and dysphagias were identified in 22.6% of adults consulting at primary care centers (PCC) in the United States of America (USA) [1]. In developed countries, fundamental [2] and epidemiologic [3] studies have been conducted and support measures [4] have been proposed. Developed countries are considered as those with human development index higher than or equal to 0.8. They are countries of OECD (Organization for Economic Co-operation and Development) areas, the countries of Eastern Europe, Central Europe, countries of Commonwealth of Independent States. As the result of this geographical distribution, one often speaks of "western countries" [5,6]. Diseases of the central nervous system are strongly associated with SD [7], and a prevalence of approximately one-third is reported during hemiplegia after cerebrovascular accident

* Corresponding author.
  E-mail address: nutrition@unilim.fr (J.-C. Desport).

(CVA) [8–10]. Clinically, stroke patients who receive good-quality care that is initiated early and involves competent caregivers at admission have a better outcome [11,12]. In particular, the role of nurses seems critical [13,14]. With the epidemiological transition [15], diseases of the central nervous system causing SD are increasingly encountered in developing countries [16], but the exploration of these disorders appears insufficient.

In Burkina Faso, a resource-limited country in sub-Saharan Africa, nurses working in PCC (corresponding to Health Centers and Social Promotion, HCSP) comprise the foundation level of the health care system. They are therefore the first to encounter hemiplegic patients, before they progress to higher level care. The second level is the health district, with a medical center and surgical unit. The third and final level is the referral hospital, which may be a regional or university institution. Of the 13 third-level hospitals in Burkina Faso, the Souro Sanou University Hospital in Bobo–Dioulasso in the Hauts–Bassins region accounted for two consecutive years for most admissions of patients with hemiplegia [17,18]. The two urban health districts in this region (Dafra and Do) had a total of 43 HCSP including 28 urban and suburban, of which 15 were in Bobo–Dioulasso. They cover a population of 787,304 inhabitants living in an area of 4287 km².

In low-income countries of Africa, the availability of medical and paramedical care is insufficient. In 2013, in Burkina Faso, statistics from the Ministry of Health indicated the country has one physician for 21,653 inhabitants, one pharmacist for 83,685 inhabitants, one state graduate nurse for 4965 inhabitants, one nurse (state graduate nurse or patented nurses) for 2957 inhabitants. There was also one midwife for 3643 inhabitants [18]. Nurses are about seven times more likely than physicians, and are present in primary health care centers and are theoretically able to recognize clinically hemiplegia. However, the actual theoretical and practical knowledge of these nurses have not yet been evaluated.

The objective of this study was to assess the knowledge, attitudes, and practices of primary care nurses concerning SD and to investigate the nutritional status of hemiplegic patients in both urban health districts in the Hauts–Bassins region of Burkina Faso.

2. Methods

Permission to collect information was obtained from the Regional Directorate of Health of Hauts–Bassins and the urban health districts of Dafra and Do. A cross-sectional survey was conducted in 150 nurses (85 state graduate nurses (SGN) and 65 patented nurses (PN)) from the district concerned, excluding personal attendants. SGN had received training lasting at least 3 years, and PN trained for at least 2 years. They had started working in the level 1 structure either directly or after working in a higher level of care, and had benefited from various ongoing training courses. To collect data, the standardized questionnaire was administered by face-to-face interview, in the places of primary health care centers. The standardized questionnaire (Table 1) was administered orally between 1 August and 15 September 2014 by a medical student. Questionnaire items exploring the knowledge of nurses were grouped into 10 chapters: the chapter "brain" brought together items confirming basic knowledge regarding the role of the brain in the occurrence of hemiplegia and in the mechanisms of swallowing. The chapters "cough" and "voice" concerned the value of those symptoms in the diagnosis of SD. "Beverages" was about the influence of the characteristics of drinks on swallowing, and "posture" covered postural adaptations. The chapters "pneumonia" and "rescue," respectively, related to items on the classic consequence of SD—aspiration pneumonia—and any emergency maneuver that can be used if food goes down the wrong way. "Nutrition" covered the impact of SD on nutritional status (weight, body mass index (BMI), arm circumference, and levels of blood proteins). "Hospitalization" concerned knowledge about possible longer hospital stays and increased costs related to the management of SD. The chapter "mortality" covered the impact of SD on death rates.

Attitudes and practices were explored in seven questions addressed only to nurses who had experience of caring for a hemiplegic patient. The questions concerned their judgment of the need to recognize SD in a hemiplegic patient, how to proceed to achieve a diagnosis, whether they had ever suspected or detected SD, whether they had ever needed to place a nasogastric tube (NGT), whether they talked with the patient about the possibility of SD, the type of advice given, and the transmission of information to the next level of care.

Variables were entered using computer software Epi-Info 3.5.1 (CDC Atlanta/USA) and analyzed with STATA 11.1 (Texas/USA). Quantitative variables were expressed as mean ± standard deviation, and categorical variables as percentages. Student's test was used for comparison of quantitative variables and the chi-squared test and the Fisher exact test for categorical variables. Multivariate step-down analysis was made, intended to explain the ability of nurses to detect SD. The model of multivariate analysis was the logistic regression, using the backward elimination process. First, univariate analysis allowed us to identify each explanatory variable whose odds ratio was a significance level less than 0.25. This threshold makes sure to identify all variables independently related to dependent variable, and particularly those whose significance level is influenced by others in the multivariate model for reasons of effect modification or confusion. Then, they were included in the multivariate model. We gradually removed non-significant variables, and we finally kept only those that are associated with the dependent variable with p < 0.05. In all cases, the significance level was 5%.

3. Results

3.1. Socio-professional characteristics

Meetings could not be arranged with 23 of the 150 nurses, and two unusable questionnaires were excluded from the study. A total of 125 nurses responded, comprising 83.3% of the targeted workers. They were aged 38.2 ± 6.5 years; 93 (74.4%) were men, 75 (60.0%) were SGN, and their average length of service was 11.4 ± 7.4 years. Fifty-five nurses (44.0%) had completed training before 2005 (median year at end of study) and 58 (46.4%) had experience in higher level care. Fifty-eight (46.4%) reported having received training on SD, and 103 (82.4%) had experience of caring for a hemiplegic patient.

3.2. Nurses' knowledge about the items and chapters of items (Tables 1 and 2)

One hundred and eight nurses (86.4%) knew that hemiplegia is linked to neurological damage, 112 (89.6%) knew that the brain is involved in the swallowing mechanism, 105 (84.0%) knew that hemiplegia could be accompanied by SD and 98 (78.4%) knew a medical term for difficulty swallowing. In total, 71 (56.8%) nurses correctly completed chapter "brain"; the figure for "pneumonia" was 54 (42.3%), and that for "rescue" 45 (36.0%); 73 (58.4%) and 70 (56.0%), respectively, saw the value of a cough, or a change in voice quality. Twenty-three (18.4%) 91 (72.8%), 49 (39.2%), and 57 (45.0%) nurses knew that thickening beverages, and changing their consistency, taste and temperature may influence a hemiplegic person's ability to swallow it. The chapter "beverages" was completed correctly by just two (1.6%) nurses. The importance of how the patient is seated was recognized by 105 (84.0%) nurses, and that of the posture of the nurse or caregiver helping the patient eat by 83 (66.0%) nurses. The chapter "posture" was completed correctly by 82 (65.6%) nurses. Regarding the impact of SD on nutritional status, 101 (80.8%) nurses knew that there may be an effect on weight, 81 (64.8%) BMI, 72 (57.6%) arm circumference, and 82 (66.4%) blood protein levels. The chapter "nutrition" was completed correctly by 49 (39.2%) nurses. Furthermore, 114 (91.2%) and 115 (92.0%), respectively, knew that the presence of SD could lengthen hospital stay or increase the cost of care. "Hospitalization" was correctly completed

Table 1
Questionnaire grid.

Questionnaire No: Date:
Socio-professional characteristics of nurses:
Health district: Do/Dafra CSPS: Urban/Suburban
Age: Sex: M/F
Training period (years): from... to... Year-end training: Years of service:
Diploma: PN/SGN
Having already worked at a higher level: Yes/No
Having already cared for a hemiplegic patient: Yes/No
Having received ongoing and repeated training on the theme: Yes/No
1. Chapters exploring the knowledge of all nurses
1.1. Chapter "brain": knowledge of brain, hemiplegia and SD
1- Hemiplegia may be the result of a brain injury Yes: No: DK:
2- The mechanisms of swallowing are controlled by the brain Yes: No: DK:
3- Hemiplegia may be accompanied by SD Yes: No: DK:
Name one of the four medical terms used to describe difficulty swallowing
1.2. Chapter "cough": value of cough in a hemiplegic patient in the context of swallowing
1 - Does cough draw your attention (is it an important sign) Yes: No: DK:
2 - Coughing is potential evidence of SD Yes: No: DK:
1.3. Chapter "voice": value of modification of the voice in a hemiplegic patient in the context of swallowing
1 - Does a change draw your attention (is it an important sign) Yes: No: DK:
2 - A change in the voice is a potential sign of SD Yes: No: DK:
1.4. Chapter "beverages": influence of the characteristics of drinks on the ability to swallow in the hemiplegic subject
1 - Thickened water is easier to swallow than plain water Yes: No: DK:
2 - The texture of drinks/foods may influence the ability to swallow Yes: No: DK:
3 - Water with a taste is easier to swallow than plain water Yes: No: DK:
4 - The temperature of beverages may influence the ability to swallow Yes: No: DK:
1.5. Chapter "posture": influence of posture on swallowing ability
1 - The way a patient is seated plays a role Yes: No: DK:
2 - The posture of the nurse/caregiver who feeds the patient plays a role Yes: No: DK:
1.6. Chapter "pneumonia": occurrence of pneumonia and SD
SD can cause lung infection Yes: No: DK:
1.7. Chapter "rescue": knowledge of rescue maneuvers in case of aspiration
Respondent knows the Heimlich maneuver Yes: No: DK:
1.8. Chapter "nutrition": impact of SD on nutritional parameters
1 - SD may decrease weight Yes: No: DK:
2 - SD may decrease the body mass index Yes: No: DK:
3 - SD may decrease MUAC Yes: No: DK:
4 - SD may decrease the levels of blood proteins Yes: No: DK:
1.9. Chapter "hospital": hospital stay and costs related to SD
1 - SD can lengthen hospital stay Yes: No: DK:
2 - SD may increase the cost of hemiplegia care Yes: No: DK:
1.10. Chapter "mortality": knowledge of the link between mortality and SD
SD can cause death Yes: No: DK:
2. Questions on attitudes and practices of nurses who have cared for a hemiplegic patient in consultation
2.1. Faced with a hemiplegic patient, do you feel you need to inquire about SD?
Yes: No: DK:
2.2. How do you identify difficulty swallowing in a hemiplegic patient?
1 - By questioning the patient
2 - By asking the patient to ingest a drink or some food
3 - By combining the two previous measures
4 - Do not know
5 - Other (details):
2.3. Do you think you have already detected or identified suspected SD in a hemiplegic patient?
Yes: No: DK:
2.4. Have you ever needed to place a nasogastric tube (NGT) in a hemiplegic patient?
Yes: No: DK:
2.5. Do you talk about the possibility of SD with patients or those around them?
1 - No, never
2 - Often
3 - Regularly
4 - Very regularly
5 - Other (details)
2.6. What advice do you give a hemiplegic patient or those around him about SD?
1- Try liquid food
2 - Try semi-liquid food
3 - Try solid food
4 - Do not swallow anything yet
5 - No advice
6 - Other (details)
2.7. Do you inform your superiors of the presence or absence of SD in a hemiplegic patient?
1 - No, never

2 - Often
3 - Regularly
4 - Very regularly
5 - Other (details)

CSPS: health center and social promotion; F: female; M: male; PN: patented nurse; SGN: State Graduate Nurse; SD: swallowing disorders; DK: don't know.

by 109 (87.2%) nurses. Finally, 95 (76.0%) answered "mortality" correctly.

3.2.1. Comparing responses of nurses who have cared for a hemiplegic patient with those who never have

Regarding"brain," nurses who had cared for a hemiplegic patient responded correctly more often than did those with no such experience (Table 2). Other chapters showed no significant differences between the groups.

3.2.2. Comparison of responses according to nurses' professional training (Table 3)

Regarding "nutrition," the proportion of correct answers was higher in respondents who had recently completed training, that is to say, since 2005 (47.1 vs 29.1%; p = 0.04) and the average length of service of those who gave correct answers was lower than that of those who did not (9.4 ± 6.8 versus 12.8 ± 7.4 years, p = 0.006). In the chapter "pneumonia," the proportion of correct answers was higher among those who had received training in connection with the subject (52.2 vs 32.8%; p = 0.01) and the same was true of "rescue"(48.3 vs 25.4%; p = 0.008). For other chapters, there was no difference between subgroups (SGN or not, trained or not, experienced at a higher level or not, and finished training before or after 2005).

3.3. Attitudes and practices regarding SD among nurses who had cared for hemiplegic patients (Table 4)

One hundred and three nurses had cared for a hemiplegic patient. Of these, 84 (81.6%) found it necessary to deal with difficulty swallowing, and 45 (43.7%) reported detecting or suspecting SD in a hemiplegic patient. Regarding detection, 70 (68.0%) nurses felt able to detect SD by questioning the patient or someone close to him, 18 (17.5%) just used a swallowing test with a food or beverage, 12 (11.6%) used both questions and a test, and 3 (2.9%) did not respond. With regard to communication, 31 nurses (30.1%) did not speak to the patient about SD or offer lifestyle and dietary advice, and 21 (20.4%) advocated not eating anything until a higher level professional had been consulted. In addition, 36 (35.0%) nurses regularly passed information about SD to the next level for further care, while 43 (41.7%) did not.

3.4. Relationship between the ability to detect SD, professional training, and knowledge about screening for SD (Table 5)

There was an association between knowledge of material in the chapter "cough" and ability to detect SD (OR = 2.0, 95% CI = 1.1–5.9; p = 0.02) and between good knowledge of "voice" and the same ability (OR = 3.5, 95% CI = 1.5–8.3; p = 0.004), but in multivariate analysis, only knowledge of "voice" remained associated with the ability to detect SD (OR = 3.5, 95% CI = 1.4–8.1, p = 0.005). Variables in professional training (diploma, specific training on SD, length of training, experience of the higher level) and "brain" were not associated with the ability to detect SD.

4. Discussion

The main limitation of the study is that the responses were declarative. However, the general impression of the investigator was that the nurses he met in person tried hard to be as honest as possible. There may have been problems with the comprehension of questions, but

Table 2

Quality of answers concerning global knowledge among all nurses, and between those who have and have not cared for a hemiplegic patient.

Chapter on the comprehensive knowledge of nurses	All nurses N = 125	%	Having already cared for a hemiplegic patient n = 103	%	Never having cared for a hemiplegic patient n = 22	%	P
Chapter "brain"							**0.004**
- Correct responses	71	56.8	65	63.1	6	27.3	
- Incorrect responses	54	43.2	38	36.9	16	72.7	
Chapter "cough"							0.17
- Correct responses	73	58.4	63	61.2	10	45.4	
- Incorrect responses	52	41.6	40	38.8	12	54.6	
Chapter "voice"							0.11
- Correct responses	70	56.0	61	59.2	9	40.9	
- Incorrect responses	55	44.0	42	40.8	13	59.1	
Chapter "beverages"							0.99
- Correct responses	2	1.6	2	1.9	0	0.0	
- Incorrect responses	123	98.4	101	98.1	22	100	
Chapter "posture"							0.47
- Correct responses	82	65.6	69	67.0	13	59.1	
- Incorrect responses	43	34.4	34	33.0	9	40.9	
Chapter "pneumonia"							0.34
- Correct responses	54	43.2	47	45.6	7	31.8	
- Incorrect responses	71	56.8	56	54.4	15	68.2	
Chapter "rescue"							0.46
- Correct responses	45	36.0	39	37.9	6	27.3	
- Incorrect responses	80	64.0	64	62.1	16	72.7	
Chapter "nutrition"							0.23
- Correct responses	49	39.2	43	41.7	6	27.3	
- Incorrect responses	76	60.8	60	58.3	16	72.7	
Chapter "hospitalization"							0.56
- Correct responses	109	87.2	90	87.4	19	86.4	
- Incorrect responses	16	12.8	13	12.6	3	13.6	
Chapter "mortality"							0.27
- Correct responses	95	76.0	76	73.8	19	86.4	
- Incorrect responses	30	24.0	27	26.2	3	13.6	

explanations were given as needed. Finally, multivariate analysis could probably incorporate other factors not considered in the study.

4.1. Socio-professional characteristics and reality of the problem in the work of primary care nurses

The breakdown by professional category of 60% SGN and 40% PN in this study is similar to the profile of nursing students in first year nursing training schools in Burkina Faso in 2013, in that SGN accounted for 567 and 935 were PN [18] (respectively, 60.6 and 39.4%). It was noted that 82.4% of nurses had cared for a hemiplegic patient, 43.7% had already identified suspected SD in a hemiplegic patient, and 7.8% had used a NGT in this context (Table 3). This confirms that, in practice, primary level nurses actually encounter hemiplegic patients who potentially go on to have SD.

4.2. Knowledge of nurses about SD in hemiplegic patients

4.2.1. Fundamental knowledge on the subject

The modest proportion of correct responses to "brain" (56.8%) reflects either a lack of specific training on SD or the absence of fundamental knowledge. This applies to all nurse groups, regardless of their level of education and their career, and is a clear limitation in their opportunities for intervention.

4.2.2. Knowledge of the main challenges for SD

Only 42.3% of nurses knew that SD may be the cause of pneumonia (Table 2) even though this disease is a common and regularly fatal consequence of SD. This is consistent with Durgude and Cocks, which highlighted limited knowledge of London nurses regarding the link between dysphagia, oral hygiene, and pneumonia [19], even though,

Table 3

Comparison of nurses' knowledge based on their diploma course, theoretical acquisitions in initial and continuing education, and experience at a higher level.

Target items or chapters of questions exploring knowledge	Proportions of correct responses within subgroups											
	PN n = 50 %	SNG n = 75 %	P	Not trained n = 67 %	Trained n = 58 %	P	Step 1 n = 67 %	Higher level of experiance n = 58 %	P	<2005 n = 50 %	≥2005 n = 75 %	P
Chapter "brain"	48.0	62.7	0.1	55.2	58.6	0.7	50.8	63.8	0.14	54.6	58.6	0.65
Chapter "cough"	56.0	60.0	0.65	59.7	56.9	0.75	56.7	60.3	0.68	58.2	58.6	0.96
Chapter "voice"	48.0	61.3	0.14	49.3	63.8	0.10	56.7	55.2	0.86	52.7	58.6	0.51
Chapter "beverages"	0.0	2.7	0.2	1.5	1.7	0.9	3.0	0.0	0.19	0.0	2.9	0.20
Chapter "posture"	62.0	68.0	0.48	61.2	70.7	0.27	61.2	70.7	0.26	58.2	71.4	0.12
Chapter "rescue"	26.0	42.7	0.06	25.4	48.3	0.008	40.3	31.0	0.28	38.2	34.3	0.65
Chapter "pneumonia"	38.0	46.7	0.34	32.8	55.2	0.01	44.8	41.4	0.7	38.2	47.1	0.31
Chapter "nutrition"	42.0	37.3	0.6	38.8	39.7	0.9	43.3	34.5	0.31	29.1	47.1	0.04
Chapter "hospitalization"	82.0	90.7	0.15	86.6	87.9	0.8	88.1	86.2	0.75	89.1	85.7	0.57
Chapter "mortality"	82.0	92.0	0.2	70.2	82.7	0.1	82.1	69.0	0.09	72.7	78.6	0.44

SD: swallowing disorders, PN: patented nurse, SGN: State Graduate Nurse, trained: claiming to have received training related to the subject; not trained: not yet having received training in the subject; Experience: having worked at a higher level of care; Step 1: not yet having worked at a higher level; <2005: finished training school before the year 2005; ≥2005: finished training school since 2005.

Table 4
Attitudes and practices regarding swallowing disorders among 103 nurses who had cared for a hemiplegic patient.

Attitudes and practices	N	%
The nurse considers it necessary to inquire about SD		
- Yes	84	81.6
- No	19	18.4
The nurse has identified SD		
- by questioning the patient or carers	70	68.0
- by asking the patient to ingest a drink or food	18	17.5
- by combining the two previous measures	12	11.6
- Do not know	3	2.9
The nurse thought he or she had already detected or suspected SD in a hemiplegic patient		
- Yes	45	43.7
- No	58	56.3
The nurse has needed to place a NGT in a hemiplegic patient		
- Yes	8	7.8
- No	95	92.2
The nurse communicates on the subject with the patient or relatives		
- Never	31	30.1
- Often	49	47.6
- Regularly	23	22.3
The nurse advises the patient or relatives		
- to try liquid food	38	36.9
- to try semi-liquid food	12	11.7
- to try solid food	1	0.9
- not to swallow anything for the moment	21	20.4
- no advice	31	30.1
The nurse informs superiors of the existence or not of SD in a patient to be admitted		
- No	43	41.7
- Often	24	23.3
- Regularly	36	35.0

SD: swallowing disorders, NGT: nasogastric tube.

during stroke, dysphagia increases 3.17-fold the risk of pneumonia [20], and multiplies by 3.62 the risk of death [21].

Only 36.0% of nurses knew a rescue technique to use in case of aspiration (Table 2). Eisenburger asserts that education on this point should reach the entire population [22], to reduce the mortality and morbidity of emergencies [23]. The Heimlich technique is very well known, simple to perform, effective [24], and should be popularized [25]. All nurses should know the technique to be applied in cases of aspiration and teach it to hemiplegic patients' families, particularly vulnerable patients.

4.2.3. Knowledge of the major signs requiring screening for SD

The proportions of nurses correctly completing the chapters "cough" and "voices" were 58.4% and 56.0%, respectively (Table 2). Clinical tools recommended for screening SD, especially among patients with neurological diseases such as stroke, items for cough and voice quality are most relevant [26,27]. They are integrated into screening grids used by non-nurses caring for vulnerable subjects [28]. It seems essential that all nurses take ownership of this knowledge, both to use themselves and to transmit to patients relatives.

4.2.4. Knowledge of ways of managing SD: Characteristics of drinks

Virtually all nurses were unaware of the influence of differences in the viscosity, taste, and temperature of drinks on swallowing capacity, with only 1.6% of respondents achieving good results (Table 2). However, the management of oral feeding among patients likely to have SD, particularly of neurological origin, is very largely based on modulation of such characteristics [29,30]. This ignorance is due to insufficient training developed in the context of Burkina Faso. Moreover, the problems of SD remain neglected, and local food suppliers have not developed special thickeners to use in practical demonstrations of the preparation of drinks with appropriate textures.

4.2.5. Knowledge of ways of managing SD: Postural adaptation strategies

65.6% of nurses correctly completed the chapter "posture" (Table 2). Given the vulnerability of hemiplegic patients and the possibility of food going down the wrong way, often related to poor posture, this proportion appears insufficient. Indeed, in patients with neurological injury, such problems are avoided in 55% of cases with good posture, especially use of cervical flexion at the moment of delivery of food [31].

4.2.6. Knowledge of the nutritional impact of SD

Only 39.2% of nurses were familiar with the information in "nutrition" (Table 2). It seems that most failed to establish the relationship between SD and nutritional status, or underestimated the real impact of disturbance of the swallowing function on nutritional status. Yet SD of neurological origin such as in stroke patients multiply by 2.43 the risk of malnutrition [32], itself correlated with a high risk of mortality [33]. Nurses having most recently completed training responded better, which can be seen as reflecting renewed interest in nutrition, with the recent introduction of new initial training or continuing education

Table 5
Relationship between the ability of nurses to identify a suspected SD and professional background and knowledge of screening for these disorders.

Professional background and knowledge of chapters on screening SD	N	Number of nurses who already suspected a SD	Univariate analysis			Multivariate analysis		
			OR	CI$_{95}$	P	OR	CI$_{95}$	P
Diploma			2.0	0.9–4.6	0.10			0.14
- SGN	64	32				1.9	0.8–4.5	
- PN	39	13						
Trained			2.1	0.9–4.6	0.06	1.8	0.8–4.2	0.17
- Yes	49	26						
- No	54	19						
Higher level experience			0.9	0.4–2.0	0.77			–
- Yes	52	22						
- No	51	23						
Release year			0.6	0.3–1.3	0.16	0.4	0.2–1.1	0.06
- ≥2005	56	21						
- <2005	47	24						
Chapter "brain"			1.6	0.7–3.5	0.28			–
- Yes	65	31						
- No	38	14						
Chapter "cough"			2.6	1.1–5.9	0.02	2.1	0.8–5.6	0.14
- Yes	63	33						
- No	50	12						
Chapter "voice"			3.5	1.5–8.3	0.004	3.5	1.4–8.1	0.005
- Yes	61	34						
- No	42	11						

PN: patented nurse, SGN; State Graduate Nurse; trained: claiming to have already received training related to the subject; higher level experience: having previously worked at a higher level of care; <2005: out of training school before 2005; ≥ 2005: out of training school from 2005; OR: Odds Ratio, CI: confidence interval.

modules by the Ministry of Health or its partner institutions, and underscores the importance of establishing nutrition education programs.

4.3. Attitudes to, and practices of, nursing

4.3.1. Perceptions and attitudes concerning SD in hemiplegic patients

Of 103 nurses who had cared for hemiplegic patients, 81.6% saw a need to be aware of any SD, but only 35.0% regularly passed such information to a higher level for further care (Table 4). Nurses therefore seemed to perceive the problem, but attributed only modest importance to it. Yet we know that educational programs and outreach specifically focusing on dysphagia in nursing settings have a beneficial effect on the perception and management of SD [34,35].

4.3.2. Approaches to detecting SD in hemiplegic patients

The majority of nurses (68.0%) detected SD by questioning the patient or those around him or her (Table 4). Although overall, in 80% of SD, medical history can provide a presumptive diagnosis [36], some patients are not aware of their inability to swallow normally [37], especially in the case of an inaugural phenomenon or elderly and other patients and relatives may have difficulties for expressing themselves. Hence the interest of a special attention paid to the quality of voice in patients with silent aspirations caused by a default of cough reflex. In addition, the recommended screening tools include a clinical test with progressive and careful refeeding [27].The diversity of responses observed in our study (Table 2) probably reflects a lack of standard guidelines concerning detection of SD at the primary care level, while readily applicable tools are available to manage SD in vulnerable subjects [28,38].

4.3.3. Lifestyle and dietary practices against SD

It was observed that 30.1% of nurses did not talk about SD to the patient or those around him, and gave no lifestyle or dietary advice; however, 20.4% advocated swallowing nothing for the time being (Table 4). This confirms a lack of specific guidelines for managing SD. Nurses are often in difficulty over advising or recommending drinks with a particular texture chosen with reference to a clinical test previously performed because of significant risk to the patient.

4.3.4. Influence of knowledge of the ability to screen for SD

The association found between knowledge in the "cough" and "voice" chapters and aptitude for screening for SD is encouraging. Integrated training could improve understanding of brain disorders associated with hemiplegia and disorders in cough and voice and thereby improve management.

5. Conclusions

In Burkina Faso, few nurses in primary health centers know about the relationship between SD and hemiplegia, or classic issues and complications related to SD. They also vary in their practices, which are often not consistent with good screening and management strategies. Education in neurology and in the nutrition of hemiplegic patients should include specific data on SD, particularly concerning screening, and the provision of simple advice on the texture of food and appropriate posture when eating.

Conflict of interest

The authors declare that there are no conflicts of interest.

Acknowledgments

References

[1] T. Wilkins, R.A. Gillies, A.M. Thomas, et al., The prevalence of dysphagia in primary care patients: a HamesNet Research Network study, J. Am. Board Fam. Med. 20 (2007) 144–150.

[2] E. Michou, S. Hamdy, Cortical input in control of swallowing, Curr. Opin. Otolaryngol. Head Neck Surg. 17 (2009) 166–171.

[3] R. Martino, N. Foley, S. Bhogal, et al., Dysphagia after stroke incidence, diagnosis, and pulmonary complications, Stroke 36 (2005) 2756–2763.

[4] A.W. Martin, Dietary management of swallowing disorders, Dysphagia 6 (1991) 129–134.

[5] Wikipédia, Pays développé, 2008 Available on https://fr.wikipedia.org/wiki/Pays_d%C3%A9velopp%C3%A9.

[6] United Nations Statistics Division, Composition of macro geographical (continental) regions, geographical sub-regions, and selected economic and other groupings, 2013 Available on http://unstats.un.org/unsd/methods/m49/m49regin.htm#ftnc.

[7] D.W. Buchholz, Neurogenic dysphagia: what is the cause when the cause is not obvious? Dysphagia 9 (1994) 245–255.

[8] C. Gordon, R.L. Hewer, D.T. Wade, Dysphagia in acute stroke, Br. Med. J. (Clin. Res. Ed.) 295 (1987) 411–414.

[9] S.K. Daniels, K. Brailey, D.H. Priestly, et al., Aspiration in patients with acute stroke, Arch. Phys. Med. Rehabil. 79 (1998) 14–19.

[10] M.G. Cola, S.K. Daniels, D.M. Corey, et al., Relevance of subcortical stroke in dysphagia, Stroke 41 (2010) 482–486.

[11] D.M. Bravata, C.K. Wells, A.C. Lo, et al., Processes of care associated with acute stroke outcomes, Arch. Intern. Med. 170 (2010) 804–810.

[12] M. Heritage, A collaborative approach to the assessment and management of dysphagia, Int. J. Lang. Commun. Disord. 36 (2001) 369–374 (suppl.).

[13] J.M. McHale, M.A. Phipps, K. Horvath, et al., Expert nursing knowledge in the care of patients at risk of impaired swallowing, Image J. Nurs. Sch. 30 (1998) 137–141.

[14] C.A. Pelletier, What do certified nurse assistants actually know about dysphagia and feeding nursing home residents? Am. J. Speech Lang. Pathol. 13 (2004) 99–113.

[15] R. Lozano, M. Naghavi, K. Foreman, et al., Global and regional mortality from 235 causes of death for 20 age groups in 1990 and 2010: a systematic analysis for the Global Burden of Disease Study 2010, Lancet 380 (2012) 2095–2128.

[16] S.C. Johnston, S. Mendis, C.D. Mathers, Global variation in stroke burden and mortality: estimates from monitoring, surveillance, and modelling, Lancet Neurol. 8 (2009) 345–354.

[17] Ministère de la santé du Burkina Faso, Annuaire statistique 2012, 2013 Available on http://www.cns.bf/IMG/pdf/annuaire_ms_2012.pdf (Ouagadougou).

[18] Ministère de la santé du Burkina Faso, Annuaire statistique 2013, 2014 Available on http://www.cns.bf/IMG/pdf/annuaire_sante_2013.pdf (Ouagadougou).

[19] Y. Durgude, N. Cocks, Nurses' knowledge of the provision of oral care for patients with dysphagia, Br. J. Community Nurs. 16 (2011) 604–610.

[20] R. Martino, N. Foley, S. Bhogal, et al., Dysphagia after stroke: incidence, diagnosis, and pulmonary complications, Stroke 36 (2005) 2756–2763.

[21] W.F. Westendorp, P.J. Nederkoorn, J.-D. Vermeij, et al., Post-stroke infection: a systematic review and meta-analysis, BMC Neurol. 11 (2011) 110.

[22] P. Eisenburger, P. Safar, Life supporting first aid training of the public—review and recommendations, Resuscitation 41 (1999) 3–18.

[23] M.A. Delavar, G. Gholami, L. Ahmadi, et al., Knowledge, attitude and practices of relief workers regarding first aid measures, J. Pak. Med. Assoc. 62 (2012) 218–221.

[24] H.J. Heimlich, E.A. Patrick, The Heimlich maneuver. Best technique for saving any choking victim's life, Postgrad. Med. 87 (1990) 38–48 53.

[25] J.R. Hoffman, Treatment of foreign body obstruction of the upper airway, West J. Med. 136 (1982) 11–22.

[26] K. Nishiwaki, T. Tsuji, M. Liu, et al., Identification of a simple screening tool for dysphagia in patients with stroke using factor analysis of multiple dysphagia variables, J. Rehabil. Med. 37 (2005) 247–251.

[27] S.K. Daniels, J.A. Anderson, P.C. Willson, Valid items for screening dysphagia risk in patients with stroke: a systematic review, Stroke 43 (2012) 892–897.

[28] J.C. Desport, P. Fayemendy, P. Jésus, et al., Conduite à tenir devant des troubles de la déglutition, Nutr. Clin. Metab. 28 (2014) 221–224.

[29] J. Murray, M. Miller, S. Doeltgen, et al., Intake of thickened liquids by hospitalized adults with dysphagia after stroke, Int. J. Speech Lang. Pathol. 16 (2014) 486–494.

[30] A.P. Vivanti, K.L. Campbell, M.S. Suter, et al., Contribution of thickened drinks, food and enteral and parenteral fluids to fluid intake in hospitalised patients with dysphagia, J. Hum. Nutr. Diet. 22 (2009) 148–155.

[31] R. Terre, F. Mearin, Effectiveness of chin-down posture to prevent tracheal aspiration in dysphagia secondary to acquired brain injury. A videofluoroscopy study, Neurogastroenterol. Motil. 24 (2012) 414–419.

[32] N. Foley, R. Martin, K. Salter, et al., A review of the relationship between dysphagia and malnutrition following stroke, J. Rehabil. Med. 41 (2009) 707–713.

[33] Food Trial Collaboration, Poor nutritional status on admission predicts poor outcomes after stroke observational data from the FOOD trial, Stroke 34 (2003) 1450–1456.

[34] S. Sandhaus, M.L. Zalon, D. Valenti, et al., Promoting evidence-based dysphagia assessment and management by nurses, J. Gerontol. Nurs. 35 (2009) 20–27.

[35] D. Shaw, H. May, Sharing knowledge with nursing home staff: an objective investigation, Int. J. Lang. Commun. Disord. 36 (2001) 200–205 (suppl.).

[36] R.K. Goyal, Dysphagie, in: Harrison (Ed.), Principes de médecine interne, 16e ed.Flammarion Médecine-Sciences, Paris 2009, pp. 217–219.

[37] C.H. Smith, J.A. Logemann, L.A. Colangelo, et al., Incidence and patient characteristics associated with silent aspiration in the acute care setting, Dysphagia 14 (1999) 1–7.

[38] D. Farneti, P. Consolmagno, The Swallowing Centre: rationale for a multidisciplinary management, Acta Otorhinolaryngol. Ital. 27 (2007) 200–207.