RESEARCH ARTICLE

Assessment of Breast Cancer Knowledge among Health Workers in Bangui, Central African Republic: a Cross-sectional study

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Abstract

Background: Breast cancer is the leading cause of cancer deaths among women worldwide. High breast cancer mortality has been attributed to lack of public awareness of the disease. Little is known about the level of knowledge of breast cancer in Central African Republic. This study aimed to investigate the knowledge of health professionals on breast cancer. Materials and Methods: This cross-sectional study was conducted among 158 health professionals (27 medical; 131 paramedical) in 17 hospitals in Bangui using a self-administered questionnaire. Descriptive statistical analysis, Person's χ^2 test and ANOVA were applied to examine associations between variables with $p < 0.05$ being considered significant. Results: Data analyzed using SPSS version 20 indicates that average knowledge about breast cancer perception of the entire population was 47.6%, diagnosis method 45.5%, treatment 34.3% and risk factors 23.8%. Most respondents (65.8%) agreed that breast cancer is important in Central African Republic and that family history is a risk factor (44.3%). Clinical assessments and mammography were considered most suitable diagnostic methods, and surgery as the best treatment. The knowledge level was significantly higher among medical than paramedical staff with regard to risk factors, diagnosis and treatment. However the trainee group had very high significant differences of knowledge compared with all other groups. Conclusions: There is a very urgent need to update the various training programs for these professionals, with recommendations of retraining. Health authorities must create suitable structures for the overall management of cancer observed as a serious public health problem.

Keywords: Breast cancer - knowledge - health workers - Central African Republic

Introduction

Breast cancer is the most common cancer among women, and leading cause of cancer deaths in Central African Republic (CAR) and many other countries of the world (WHO, 2013). With about 1.7 million new cases diagnosed and 521.900 deaths in 2012 (Naderimagham et al., 2014; Torre et al., 2015), breast cancer becomes a real public health problem (Zare et al., 2015).

It was found that due to the advanced stage of the disease, breast cancer diagnosis often produces worse outcomes among African-American women compared to white women (American Cancer Society, 2009).

Knowledge about breast cancer varies among communities and population groups worldwide. While studies conducted to assess breast cancer knowledge among health workers showed satisfactory level in some countries (Grunfeld et al., 2002; McMenamin et al., 2005), other reports, especially from developing countries revealed inadequate knowledge about the disease (Okobia et al., 2006).

According to literature, early detection and treatment of breast cancer is associated with better chance of long-term survival (Akhigbe et al., 2009; Alteri et al., 2013). In CAR, about two-third of patients with this disease present with advanced stages for diagnosis. Some reports from Western Europe and North America revealed reduction in mortality from breast cancer due to adoption of screening methods for detection of early diseases (Olsen et al., 2005).

Breast self-examination (BSE), clinical breast

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examination (CBE) and Mammography are recognized screening methods for breast cancer. However, uptake of these methods by women depends on several factors including attitude and motivation of their physicians to breast cancer screening (Zakpa et al., 1990). Healthcare professionals have greater influence on women's positive perception of breast cancer and motivation to practice screening methods for early detection of the disease (Lurie et al., 1997). In addition, levels of knowledge of healthcare workers providers towards breast cancer are important determinants of their influence on adoption of screening method by women in their localities (Ohene et al., 2013; Liu et al., 2014; Parker et al., 2015). Various studies on breast cancer in Africa have shown very low levels of knowledge about breast cancer among healthcare workers (Okobia et al., 2006; Amoran et al., 2015; Lopes et al., 2015). Improving their knowledge and screening practices through targeted interventions have positively influenced adoption of early detection methods by women in their communities.

In CAR, studies on assessment of breast cancer knowledge have not yet been conducted among healthcare workers. In view of the proportion of patients with breast cancer in CAR presenting with advanced stages of the disease, there is need for more awareness of measures for early detection. Adequate knowledge and positive attitude towards breast cancer screening are essential for healthcare professionals if they are to play their expected role in breast cancer awareness campaign in CAR.

This assessment would help in determining the need for continuing medical and health education programs that could improve knowledge of the disease and adoption of early detection measures among this group of healthcare providers. This will not only enhance their positive influence on women but also improve their individual level of breast cancer knowledge.

This study was designed to assess knowledge on perception, risk factors, diagnostic methods and treatment of breast cancer among health workers of public or private hospital in Bangui, capital of CAR.

Materials and Methods

This cross-sectional and descriptive study was conducted among health workers, working in public and private hospitals in Bangui. It was carried out between July and August 2015. This study has been approved by the ethical committee of the Faculty of Health Sciences of the University of Bangui in the CAR (N° 2068/ UB/ FACSS/ CSCVPER/2015) and the School of Public Health, Tongji Medical College of Huazhong University of Science and Technology of China (IRB Approval File No. [2014] 09). Hospitals were chosen in relation to the availability of gynecological services, while all workers in each service were selected by simple random sampling method. The categories of health workers included physicians, superior health technicians, midwives, nurses, nursing assistants and assistant midwives. They were divided into two groups: medical for the physicians and superior health technicians and paramedical for the midwives, nurses, nursing assistants and assistant

midwives. All respondents were informed about this study and participation was free and liberal. A self-administered questionnaire prepared by the author was employed. The questionnaire used was the modified version of the breast cancer knowledge and awareness among university students in Angola already used by Sambanje et al., 2012. The questionnaire contained five items. The first item was to elicit socio-demographic data on age, sex, profession, duration in service, qualification and marital status of each survey respondent. The second proposed perceptions and knowledge about breast cancer, among others: incidence of breast cancer in CAR, clinical diagnosis and training recycling. The third treated breast cancer risk factors knowledge (knowledge regarding family history of breast cancer, hormone replacement therapy, consumption of fatty food, stressful life, physical activities practice, obesity, use of contraceptives, alcohol and tobacco consumption, exposure to radiation, depression and breastfeeding). The fourth and fifth items are respectively based on the enumeration of three diagnostic methods for breast cancer and four treatments. The other questions were answered with the options Yes (agree), No (disagree) and don't know (no idea). The questionnaire used total of 36 questions, of which 14 assessed perceptions and knowledge about breast cancer, 15 assessed knowledge on breast cancer risk factors, 3 assessed diagnostic methods and 4 assessed treatments.

Principle score

Knowledge about breast cancer perception and risk factors were assessed by calculating the mean score of each worker and comparing using one-way ANOVA. Hence, each correct answer scored one (1) point, each wrong answer scored zero (0) and don't know answer also scored zero (0). The total score ranged from 0-14 for breast cancer perception and 0-15 for the risk factors. Respondents with 0-4 scores were considered to have poor knowledge; those with 5-9 points had moderate knowledge while those with 10 points or over had good knowledge for perception or risk factors.

In addition, knowledge of methods of diagnosis and treatment of breast cancer were evaluated by calculating the total correct answers, the mean and then compare them using one-way ANOVA. Each correct answer was noted with two (2) points, and the wrong response was noted with zero (0) point. The total score ranged from 0-6 for diagnostic and 0-8 for treatment. Respondents with scores of 0-2 were considered to have poor knowledge; those with 3-4 points have moderate knowledge while those with 5 points or over had good knowledge.

The questionnaire was pre-tested by conducting a pilot study on 10 health workers, working in public hospital in Bangui randomly selected. The data were recorded using Epi info 7.1.3.0 (Epi Info™,CDC) and analyzed using Statistical Package for the Social Sciences (SPPS version 20). Frequency distributions were employed to describe the data. For the categorical data, the Person's χ^2 test was used to examine the association between variables and one-way of variance (ANOVA) to find the group means, Standard Deviation and the significance of the overall F ratio. P-value of < 0.05 was considered significant.

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Results

Socio demographic characteristics of respondents

Out of 180 questionnaires that were distributed in 17 hospitals, including 11 publics and 6 privates, one hundred sixty six (166) questionnaires were returned, with mean response rate 92.2%. There was a total of 158/180 (87.8%) health workers (16 males and 142 females) volunteered and successfully completed the data. The mean age of the sample was 42.72 ± 8.8. Sixty (38.0%) of the respondents were in the age group of 35-44 years followed by 36.7% in 45-54 years. In the present sample 131 (82.7%) were paramedical workers group followed by group medical workers 27 (17.1%). Most of respondents 128 (81%) spent more than one year in service. However, 116 (73.4%) were functionary, 24 (15.2%) contractual, 12 (7.6%) trainee and 6 (3.8%) voluntary. Eighty six (54.4%) of the respondents were single, followed by 54 (34.2%) married, 12 (7.6%) widowed and 6 (3.8%) divorced (Table 1).

Knowledge about breast cancer perception

The total rate of correct responses regarding knowledge of breast cancer perception is exposed in table 2. In this study, 100 (63.2%) of the respondents knew someone who had suffered from breast cancer. Most of the respondents 104 (65.8%) confirmed that breast cancer was one of the most common cancers among women in C.A.R. Nevertheless, 98 (62%) accepted that women under 30 years old may suffer from breast cancer. In the present sample, 112 (70.8%) of the participants agreed on the lump in the breast cancer are usually painful. The majority of the total population 124(78.4%) knew that the best way to find breast cancer early is the breast self examination every month followed by a change in color or shape of the nipple of a woman could be a sign of breast cancer 116 (73.5%).

It is very important to note that only few 24 (15.2%) of the respondents who had received training or retraining on breast cancer in their occupation. Also 28(17.7%) had accepted that breast cancer is more common in women with large breasts, with a significant difference between the groups of respondents (χ^2 = 8.89, p = 0.01).

In the current study, the overall mean knowledge score was 1.19± 0.55 out of a maximum score of 14 points (95% CI=1.88-2.06). The medical group had a significantly higher mean knowledge score 2.19 ± 0.55 than paramedical group, F= 5.04, p= 0.02 (Table 2).

However, the knowledge level about breast cancer perception is shown in Table 3.One hundred and nine (69%) of the respondents had moderate knowledge, followed by 22 (13.9%) had good knowledge and 27 (17.1%) had a poor knowledge about knowledge of breast cancer perception.

No statistically significance were observed between medical group and paramedical group about knowledge level on breast cancer perception (χ^2 = 5.18, p=0.07)

Knowledge about breast cancer risk factors

The table 2 showed that 92 (58.2%) of the respondents knew exposure to ionizing radiation is a risk factor for the development of breast cancer followed by a positive family history of breast cancer 70(44.3%). Minority of the participants 58 (36.7%) were also aware that the breast implant is a risk factor for breast cancer. However, there is significantly high difference knowledge between two groups regarding breastfeeding (p=0.03), wearing tight brassiere (p=0.001), stressful life (p=0.05), hormone replacement therapy (p=0.009) and being overweight or obese (p=0.001). On the other hand, most of the participants have a lack of knowledge about the risk factors associated with breast cancer (Table2). Overall assessment of their level of knowledge about risk factors (Table 3) revealed that 95 (60.1%) of the total population had poor knowledge, while 61(38.6%) and 2 (1.3%) respectively, had moderate and good knowledge of risk factors about breast cancer. This result shows a highly significant difference level of knowledge about breast cancer risk factors between groups of respondents (χ^2=13.95, p=0.002). However, the table 2 shows that the average mean knowledge score was 1.41 ± 0.51 out of maximum score of 15 points, (95% IC=1.33-1.49). The medical workers had a significantly more knowledge about breast cancer risk factors than the paramedical workers F=10.99, p= 0.001.

Knowledge about diagnosis methods of breast cancer

An outline of knowledge about breast cancer diagnosis methods revealed, 144 (72.2%) of study participants had listed some diagnosis methods for breast cancer (no specified on the table). Knowledge of some breast cancer diagnostic methods such as clinical examination, biological analysis (cytological or histological) and mammography is higher significantly among medical personnel compared to paramedics (p< 0.001) according to the Table 2. Overall mean knowledge score was 1.70

Table 1. Demographic Characteristics of Study Participants

Characteristics	Frequency	Percent
Age group		
< 25	10	6.3
25-34	16	10.1
35-44	60	38
45-54	58	36.7
≥ 55	14	8.9
Gender		
Male	16	10.1
Female	142	89.9
Duration in service		
< 1year	30	19
≥ 1 year	128	81
Profession		
Medical	27	17.1
Paramedical	131	82.7
Administrative position		
Functionary	116	73.4
Contractual	24	15.2
Trainee	12	7.6
Voluntary	6	3.8
Marital status		
Married	54	34.2
Unmarried (single)	86	54.4
Divorced	6	3.8
Widow	12	7.6

± 0.85 out of maximum score of 6 points, (95% IC=1.54-1.84).The medical group workers had very highly significant knowledge about diagnosis methods than paramedical group workers F=39.71, p< 0.001 (Table 2).

Despite the significant difference of knowledge of breast cancer diagnosis methods between the two categories of surveyed workers (χ^2 = 32.12, p<0.001), assessment of their level of knowledge revealed that 84 (53.1%) of the total population had poor knowledge (Table 3).

Knowledge about treatment of breast cancer

The knowledge level about breast cancer treatment (Table 3) revealed that few part of the respondents 16 (10.1%) had good knowledge followed by 50 (31.6%) and 92 (58.2%) respectively, had moderate and poor knowledge. Overall mean knowledge score was 1.52 0.67 out of maximum score of 8 points, (95% IC=1.41-1.62).The medical group workers had higher significant knowledge about treatment than paramedical group workers (F=29.67, p< 0.001). In this study, surgery is the treatment most listed by the respondents (51.2%).

Table 2. Participants Correct Knowledge about Perception, Risk Factors, Diagnosis and Treatment Methods of Breast Cancer

Parameters	Medical (27) Freq (%)	Paramedical (131) Freq (%)	Total (158) Freq (%)	χ^2	P-value
Perception and knowledge about breast cancer					
Do you know someone suffering from breast cancer	20 (74.0)	80 (61.0)	100 (63.2)	1.63	0.20
Breast cancer is it one of the most common cancers among women in Central African Republic	21 (77.8)	83 (63.3)	104 (65.8)	2.72	0.26
Breast cancer can affect men	14 (51.9)	50 (38.1)	64 (40.5)	2.48	0.29
Women younger than 30 years do not get breast cancer	19 (70.3)	79 (60.3)	98 (62.0)	1.40	0.50
Breast cancer is more common in women with big breasts	10 (37.0)	18 (13.7)	28 (17.7)	8.90	0.01
Lump in the breast that are cancer are usually painful	20 (74.0)	92 (70.2)	112 (70.8)	0.38	0.83
Being hit on the breast can cause cancer	8 (29.6)	38 (29.0)	46 (29.2)	0.24	0.89
A woman who lets a man put "love bites" on her breast is more likely to get breast cancer	5 (18.5)	11 (8.4)	16 (10.1)	2.69	0.26
One of the best way to find breast cancer early is by checking the breast every months (breast self-examination)	25 (92.5)	99 (75.5)	124 (78.4)	4.10	0.13
The best time to check for nodules in the breasts is just after the end of the cycle period	18 (66.7)	64 (48.8)	82 (51.8)	5.17	0.08
A change in color or shape of the nipple of a woman could be a sign of breast cancer.	20 (74.0)	96 (73.2)	116 (73.5)	0.01	1.00
A woman's chance of surviving breast cancer is very low , even if it is found early	13 (48.1)	65 (49.6)	78 (49.4)	2.96	0.23
Black African women are more likely to develop breast cancer than white women	8 (29.6)	54 (41.2)	62 (39.2)	2.32	0.31
Have you received training or retraining of breast cancer for your function	6 (22.2)	18 (13.7)	24 (15.2)	1.25	0.26
Mean score(± SD)	2.19±0.55	1.92±0.54	1.19±0.55		
95% CI	1.96-2.41	1.83-2.02	1.88-2.06		
ANOVA				F=5.04	0.03
Knowledge about risk factors of breast cancer					
A family history of breast cancer	13 (48.1)	57 (43.5)	70 (44.3)	1.10	0.58
Hormone replacement therapy (HRT)	13 (48.1)	37 (28.2)	50 (31.6)	9.53	0.01
Eating fatty foods, with the vegetables	6 (22.2)	18 (13.7)	24 (15.2)	2.88	0.24
Stressful live	7 (26.0)	19 (14.5)	26 (16.4)	5.84	0.05
Lack of regular physical activity practice	6 (22.2)	20 (15.2)	27 (17.0)	1.47	0.48
Having children after age 30 years in women	6 (22.2)	21 (16.0)	28 (17.7)	1.25	0.54
Wearing tight bras	12 (44.4)	18 (13.7)	30 (18.9)	13.72	0.001
Being overweight or obese	11 (40.7)	17 (12.9)	28 (17.7)	14.98	0.001
Using oral contraception	7 (26.0)	25 (19.4)	32 (20.3)	1.08	0.58
Alcohol consumption	1 (3.7)	21 (16.0)	22 (14.0)	2.88	0.24
Tobacco consumption	10 (37.0)	46 (35.1)	56 (35.5)	0.68	0.71
Exposure to ionizing radiation	18 (66.7)	74 (56.4)	92 (58.2)	0.97	0.62
Depression	1 (3.7)	7 (5.3)	8 (5.0)	1.03	0.60
Breastfeeding	7 (26.0)	11 (8.7)	18 (11.3)	6.95	0.03
Brest implant	15 (55.6)	43 (32.9)	58 (36.7)	5.04	0.08
Mean score(± SD)	1.70±0.46	1.35±0.51	1.41±0.51		
95% CI	1.52-1.89	1.26-1.89	1.33-1.49		
ANOVA				F=10.99	0.001

Table 2 (continued). Participants Correct Knowledge about Perception, Risk Factors, Diagnosis and Treatment Methods of Breast Cancer

Knowledge about diagnosis method of breast cancer					
Clinical examination (BSE, CBE)	26 (96.2)	72 (54.9)	98 (62.0)	16.24	0.000
Biological examination (Cytology, histology)	19 (70.3)	39 (29.7)	58 (36.7)	15.88	0.000
Mammography (MMG)	22(81.4)	38 (29.0)	58 (36.7)	26.17	0.000
Mean score(± SD)	2.48±0.64	1.52±0.73	1.68±0.80		
95% CI	2.23-2.74	1.39-1.65	1.56-1.81		
ANOVA				F=39.71	0.000
Knowledge about treatment of breast cancer					
Chemotherapy	26 (96.2)	39 (29.7)	65 (41.1)	40.91	0.000
Radiotherapy	15(55.6)	30 (22.9)	45 (28.4)	11.35	0.001
Hormone therapy	10 (37.0)	16 (12.2)	26 (16.4)	10.03	0.004
Surgery	23 (85.1)	58 (44.2)	81 (51.2)	15.00	0.000
Mean score(± SD)	2.11±0.50	1.40±0.64	1.52±0.67		
95% CI	1.91-2.31	1.29-1.51	1.41-1.62		
ANOVA				F=29.67	0.000

Freq, Frequency; %, percent; BSE, Breast Self Examination; Clinical Breast Examination; X2,Chi square; CI, Coefficient Interval; SD, Standard Deviation, P-value was calculated by Pearsn's chi square test. The data were calculated using one-way of variance (ANOVA) to find the group means, Standard Deviation and the significance of the overall F ratio

Table 3. Knowledge Level about Perception, Risk Factors Diagnosis Methods and Treatment of Breast Cancer According to Categories of Respondents

Knowledge level	Medical (27) Freq (%)	Paramedical (131) Freq (%)	Total (158) Freq (%)	χ^2	P-value
Perception and knowledge of breast cancer					
Poor knowledge	2 (7.4)	25 (19.1)	27 (17.1)	5.18	0.07
Moderate knowledge	18 (66.7)	91 (69.5)	109 (69.0)		
Good knowledge	7 (25.9)	15 (11.5)	22 (13.9)		
Risk factors of breast cancer					
Poor knowledge	8 (29.6)	87 (66.4)	95 (60.1)	13.95	0.002
Moderate knowledge	19 (70.4)	42 (32.1)	61 (38.6)		
Good knowledge	0 (0.0)	2 (1.5)	2 (1.3)		
Diagnosis method					
Poor knowledge	2 (7.4)	82 (62.5)	84 (53.1)	32.12	0.000
Moderate knowledge	10 (37.0)	30 (22.9)	40 (25.3)		
Good knowledge	15 (55.5)	19 (14.5)	34 (21.5)		
Treatment					
Poor knowledge	2 (7.4)	90 (68.7)	92 (58.2)	35.25	0.000
Moderate knowledge	20 (74.0)	30 (22.0)	50 (31.6)		
Good knowledge	5 (18.5)	11 (8.3)	16 (10.1)		

Freq, Frequency;%, percent. P value was calculated by Pearson chi square test. Data were calculated by frequency-Cross tabulation analyze

Table 4. Comparison of Specific Pairs of Groups for the Knowledge Level about Perception, Risk Factors Diagnosis Methods and Treatment of Breast Cancer According to Administrative Position of Respondents

Dependent variable						95% CI		
Post Hoc Test	(i) Group	(j) Group	Mean difference	Std.Error	Sig	LB	UB	ES
Knowledge level about perception								
Tukey HSD	Trainee group	Functionary group	2.45	0.77	0.008	0.50	4.49	1
		Contractual group	3.67*	0.89	0.001	1.35	5.99	1.45
Knowledge level about breast cancer risk factors								
Tukey HSD	Functionary group	Contractual group	1.71	0.54	0.01	0.31	3.1	0.71
	Trainee group	Functionary group	3.25*	0.73	0.000	1.36	5.14	1.35
		Contractual group	4.95*	0.85	0.000	2.76	7.16	2.01
	Volunteer group	Contractual group	4.20*	1.09	0.002	1.37	7.05	1.76
Knowledge level about diagnosis methods of breast cancer								
Tukey HSD	Trainee group	Functionary group	1.07	0.34	0.009	0.20	1.94	1.22
		Contractual group	1.37	0.39	0.003	0.36	2.39	1.25
Knowledge level about treatment of breast cancer								
Tukey HSD	Trainee group	Contractual group	1.375	0.484	0.026	0.12	2.63	1.01
		Volunteer group	2.083	0.685	0.014	0.31	3.86	1.53

Std, Standard Deviation Error; ES, Effect Size; CI, Confidence Interval; LB, Lower Bound; UB, Upper Bound; Sig, Significant. (*)This is a lower bound of the true significance. The data were calculated using one-way analysis of variance (ANOVA) to find the group means, Standard Deviation and the significance of the overall F ratio. Then, using Post Hoc test we seek the significant differences (i-j) between each group mean and the effect size. The effect size (ES) was calculated manually using the formula: $ES=(Xi-Xj)/(\sqrt{MSw})$ with (Xi-Xj) is the mean difference of the two groups (pairs) under consideration; MSw is the within Group's Mean Square Value

Knowledge according to administrative qualification

Table 4 shows the comparison of specific pairs groups for the knowledge level about all items of the study according to the Post Hoc Test. The results of Tukey HSD shows that the knowledge level about breast cancer perception was significantly higher in the trainee group (M = 9.17) compared to the contractual group (M = 5.50), with a mean difference of 3.67 and p-value <0.001. In the other hand, the trainee group (M = 6.75) had a higher significant knowledge level of breast cancer risk factors than the functionary groups (M = 3.50) and contractual group (M = 1.79), with mean differences 3.25 and 4.95 respectively and p-value < 0.001. The volunteer group (M = 6) had more significant knowledge about risk factors for breast cancer than the contractual group (M = 1.79), with a mean difference of 4.20 and p-value = 0.002.

In addition, no significant difference was found among the categories of healthcare personnels regarding the knowledge of breast cancer diagnosis methods and treatment.

Discussion

Nowadays, breast cancer is the leading cause of cancer death among women in developing countries. Health personnel are an important link in the chain of struggle against this disease. It is obvious that the incidence rate of breast cancer may improve in a society unless the healthcare professional is actively involved in the diagnosis and health education. From this point of view; health personnel is supposed to know at least the minimum knowledge on breast cancer in general including; risk factors; diagnosis and treatment.

Our study showed that the level of knowledge of respondents on breast cancer perception was moderate (69.2%). According to the categories of health professionals, there is no significant difference between the level of knowledge about breast cancer perception (p=0.07). Most of participants (63.2%) confirmed to have known a person having suffered from breast cancer. This result was consistent to studies conducted by Mafuvadze et al. (2012) who reported 72% of declaring students know a person suffered breast cancer in the US population. In contrast to results obtained by Sambanje et al. (2012) among Angolan students where only less than 20% reported having experienced person suffer from breast cancer. Additionally most of survey participants had acknowledged the incidence of breast cancer in CAR. The finding of this study is similar with Globocan 2012 report which found that the incidence of breast cancer was 66% of all cancers diagnosed in the 2010s in CAR, making breast cancer a real public health problem in the last decade (Ferlay et al., 2013). This majority acknowledged of the incidence of breast cancer would be linked to the daily activities of health personnel, including reception, consultation and referral of suspected cases of breast cancer disease.

A significant number of respondents 112 (70.8%) in this study shared the same opinion on the presence of painful nodules in the breast, which is comparable to the study by Sambanje et al. (2012) which reported that 80% of respondents said the cancerous nodules in the breasts are painful, unlike Seah et al. (2007) who found only 20% confirming the painful nodules in the breasts. This statement would be linked to a common misconception that most people confuse the pain associated with the occurrence of cancer as confirmed by some studies in different countries (Powe et al., 2005; Ukwenya et al., 2008; Naanyu et al., 2015).

Thus, it is important to stress that without knowledge, those affected still lose so much time to consult medical experts, even if there are changes in their breasts. Our study showed that most 78 % of respondents knew one of the best ways of early detection of breast cancer would be to check their breasts each month (breast self examination). Others recognized that changes in the color or shape of the nipple are warning signs of breast cancer. These results are consistent with a study conducted by Radi et al. (2013) in Saudi Arabia which stipulate that discharge from the nipple, dimpling of the breast skin, changes in breast size or nipple are harbingers most experienced in breast cancer.

Numerous studies have reported the benefits of BSE as a simple, effective and less expensive method for early detection of breast cancer especially in developing countries otherwise diagnostic structures are not sufficient in countries like CAR (Akpinar et al., 2011; Seckinli, 2011; Yurdakos et al., 2013; Yasli et al., 2015). One current study in Cameroon conducted by Peter et al. (2015) reported a low level of knowledge (37.3%) on the monthly practice of BSE. The best time of the practice of BSE after completion of the menstrual period was confirmed in 51.8% of our study compared to Radi et al.(2013) in Saudi Arabia.

In this study, we found a general lack of knowledge of some common risk factors associated with breast cancer. Only 23.8% of the study participants have perfect knowledge about risk factors for breast cancer. However the level of knowledge about breast cancer risk factors was poor with a significant difference between the two categories of participants. The medical staff has more knowledge level about breast cancer risk factors than paramedical staff. This could be related to the training program for each category of staff investigated. Similar studies conducted in different countries have all agreed to the same conclusion (Cockburn et al., 1989; Bekker et al., 1999; Haji et al., 2002; Akhigbe et al., 2009; Kumar et al., 2009; Ghanem et al., 2011).

In addition, detailed knowledge about breast cancer risk factors shows that the majority of participants were more aware of positive family history of breast cancer (63.2%), hormone replacement therapy (65.8%), stress (62%), first living birth beyond 30 years for women (70.8%), oral contraceptive use (78.4%) and tobacco consumption (73.5%); less known are: lack of physical activities practice (17.7%), overweight or obese (10.1%) and breastfeeding (15.2%). Similar results were obtained in studies of health professionals in different countries (Karayurt et al., 2008; Yaren et al., 2008; Akhigbe et al., 2009; Al-Sharbatti et al., 2014).

According to this study, although some risk factors for breast cancer are well known by the health personnel,

the overall level of knowledge remains low compared to other less known risk factors that need to be improved.

Participants in this study had an acceptable perception on the methods of diagnosis but low level of knowledge on strategies for breast cancer treatment. The medical staffs have a significantly higher level of knowledge of methods of diagnosis and breast cancer treatment compared with paramedics (p<0.001). This low level of knowledge could be related to the unavailability of appropriate structures for the management of breast cancer cases in the country and also the unwillingness of political and health authorities in the fight against cancer. Unlike some countries of Sub-Saharan Africa such as Nigeria and Benin or a few private initiatives were taken to support the case of cancer.

Given the status of the country, most of respondents were convinced that the only simple way of diagnosis is clinical examination (BSE and CBE). Similar results were obtained in studies from different countries, performed upon health personnel and conducted by Sea et al. (2007), Lemlem et al. (2013) and Vikas et al. (2013). Participants also believe that the early stages of the disease are curable by surgery. These results may support the report of the study conducted among nurses in Lagos, Nigeria by Odusanya et al. (2001).

Several studies have shown that early detection with mammography saves lives and increases treatment options (American Cancer Society, 2015). This aspect was observed and suggested by all health organizations (Puliti et al., 2012; Smith et al., 2013). However, knowledge of mammography had fewer rises in our study sample; only few (37.9%) respondents had a good understanding of the importance of mammography as a way of early detection of breast cancer. Similar results were found in studies conducted by Akhigbe et al. (2009), Yasli et al. (2014) and Al-Sharbatti et al. (2015). While the studies conducted by Chong et al. (2002), Sea et al. (2007) and Goel et al.(2015) showed public health nurses have a very high knowledge of mammography. This trend is generally observed in all developed countries.

Our study has some limitations that must be considered. The first is the absence of an international evaluation guide of knowledge about breast cancer for comparing our results with those of other studies. The second limitation is the low sampling. However, this study is the first to assess the level of knowledge about breast cancer among CAR health personnel and the results can be considered as such as a larger study base.

In conclusion, the finding shows that knowledge about breast cancer perception, methods of diagnosis and treatment was satisfactory among medical personnel, but insufficient in paramedics. There is a very urgent need to update the various training programs for these categories of health workers by introducing practical courses on screening methods and treatment of cases of cancers. Training and retraining are also recommended. The political-health authorities in the CAR and their partners need to develop a national program against cancer and create adequate structures for the overall management of cases of cancer seen in recent decades as a serious public health problem.

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