



Breast Cancer and Breast Self-examination: Awareness and Practice among Secondary School Girls in Nyarugenge District, Rwanda

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Authors' contributions

This work was carried out in collaboration between all authors. Authors JN and JNK did the study design and wrote the protocol. Authors MFM and JBN did the statistical analysis and literature searches while analyses of study was by authors JN and JNK. All authors read and approved the final manuscript.

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ABSTRACT

Aims: To assess the level of early sensitization and education of adolescent high school girls in Rwanda about Breast Cancer (BC) and Breast Self-Examination (BSE) as one of strategic approaches to reduce the risk of late intervention and thence the BC related deaths.

Methods: 239 girls aged 17-20 years old, randomly selected from Nyarugenge secondary schools during the academic year 2013-2014 participated in this prospective cross-sectional survey using a structured self-administered questionnaire.

Results: Overall 94.6% of surveyed girls had heard about BC, but only few had limited knowledge about BC risk factors, diagnostic methods and BSE. Less than 24% practiced breast palpation and not more than 10% knew the correct frequency and technique of BSE performance. No formal

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education is planned in educational curriculum. The awareness was acquired through mainly media (58.4%) and classmates (17.2%), and lightly from parents (5.4%). The level of parents' education, familial history of cancer and attendance to educational workshops may contribute to high alertness.

Conclusions: Evaluating the actual level of education given to adolescent high school students will help decision-makers drawing appropriate action. There is need to establish coordinated cooperation between parents, educators, and the media in dissemination of adequate information.

Keywords: Breast cancer; breast self-examination; awareness; practice; school girls; Rwanda.

1. INTRODUCTION

The cancer was, some time ago, considered a disease of rich countries with neglected incidence in poor developing countries, but nowadays the cancer has become an ever serious public health concern worldwide. According to GLOBOCAN-2012 estimations, there were 14.1 million new cancer cases, 8.2 million cancer deaths and 32.6 million people living with cancer (within 5 years of diagnosis) worldwide, but 57% (8 million) of new cancer cases, 65% (5.3 million) of the cancer deaths and 48% (15.6 million) of the 5-year prevalent cancer cases occurred in the less developed regions [1]. The burden of cancer in developing countries is growing and threatens to extract a heavy morbidity, mortality, and economic cost in these countries in the next 20 years [2,3]. Cancer burden in developing countries is growing rapidly and the incidence in sub-Saharan Africa is expected to exceed 1 million by 2030 [4-7].

With regard to breast cancer (BC), about 1.3 million women are annually diagnosed with the affection worldwide and over 508 000 women died in 2011 from the disease, making it the top women cancer [8]. Although BC is thought to be a disease of the developed world, almost 50% of breast cancer cases and 58% of deaths occur in less developed countries [9]. The GLOBOCAN2012 reported the incidence of BC in East Africa close to 11.7%, second to cervix cancer with 27.1% estimated 5-year prevalence [1].

This incidental increase of BC in the developing world has somehow been linked to the increasing of life expectancy momentum, urbanization, and adoption of western lifestyles [10,11]. At the current stage, it would make less sense telling people to completely stop urbanization or western lifestyles to reducing cancer prevalence in poor countries. However, every endeavor that can promote reduction of related risk factors might be put on the Table. Thus, having in mind that limited resources with weak health systems

in low-income populations make it difficult to satisfactorily manage cancer treatment, the option to implement early diagnosis programs based on awareness of early signs and symptoms is the best way to prompt good outcomes by minimizing late stage referral to treatment. As BC is a long term illness which affects women above 35 years, it would be good to know it before this age in order to plan how to prevent and control it earlier [9,12,13].

So far the only BC screening method that has proved to be effective is mammography screening which is very costly or cost-effective, feasible only in countries with good health infrastructure that can afford long-term organized population-based screening programs [13-15]. However, even as researchers conflictly discuss about the actual beneficence of Breast Self-Examination (BSE) in preventing the disease, BSE is widely recommended for breast cancer prevention. Following recent controversy over the efficacy of mammography, it may be seen as an alternative [16]. There is a body of literature on the use of BSE as good diagnostic strategy to early detect BC. Studies have been undertaken among various groups of populations in the world, targeting school teachers, young women, health workers, sex workers, pre-menopausal women, university students, and secondary school adolescents [16-19]. The BSE method is a formalized practice that a woman is taught to examine her own breast regularly (usually monthly after 20 years). During the BSE, a woman systematically inspects, and palpates her each breast using her contralateral hand with her ipsilateral arm raised above her head to detect lumps.

In Rwanda, although no reliable statistics exist on the prevalence of BC in the whole Rwandan population, the incidental BC rate is increasing. According to GLOBOCAN data [1], 6600 new cases of cancer occur annually; the five most common are cervical cancer, liver cancer, Kaposi's sarcoma, and cancers of the stomach and breast. About 5300 people die from cancer

each year. The ministry of health in association with Partners made step forwards the early detection as well as the good treatment for those who are affected [20,21]. The government has planned to expand advanced cancer care to hospitals around the country of 11.7 million people, using a new set of treatment guidelines.

No data has been published about BSE. We undertook this study in young adolescents attending secondary schools to reconcile with those who think that developing proper health habits in adolescence can have profound long-term ramifications on their adulthood health. The aim of the study was to trace the existence of BSE education program at high school level and to assess the level of awareness about BC, risk factors, methods of prevention and performance of BSE. We expected that the simple fact of walking up to young girls with such a topic will help raise their attention on cancer issues.

2. METHODS

2.1 Study Sample

This was a prospective cross-sectional survey conducted among secondary school girls between the ages 17-20 years, attending Nyarugenge schools during the academic year 2014. The district has 10 sectors and 15 secondary schools (10 private and 5 public) and is ranked the second with 86.7% literacy rate among the population aged 15 years and above. The net attendance rate in Nyarugenge district secondary school is 40% that is above the national average of about 21%, and the averages for rural areas (18.2%) and urban areas (37.4%) [22].

The study sample was selected proportionally to size allocation to give equal chance to each school located in and then simple random sampling technique was utilized. Sample size was determined using the formula for single population proportion with a 95% confidence interval, a precision of 5%, and an assumed prevalence of BC knowledge of 50% (0.5) to get a maximum sample size as there was no previous study conducted similar to this one.

$$N = \frac{(1.96)^2 \times 0.5(1 - 0.5)}{(0.05)^2} = 384$$

$N' = 384 / (1 + 384/720) = 252$ for adjusting the sample size, due to actual student population. The total sample size selected was 252 females, but 239 respondents had filled the questionnaire

correctly, giving 13 non response or unwilling to enter the study.

2.2 Data Collection and Analysis

Data were collected using a self-administered questionnaire with close and open-ended questions. The girls' awareness or knowledge was based on whether they ever heard about BC, knew methods of diagnosis, risk factors, and sources of information. Knowledge of BC risk factors was assessed with reference to the guidelines of the American Cancer Society (ACS) [10] as adapted to target population as young girls: 1) Family history of breast cancer, 2) Early menarche < 12 years, 3) Aging, 4) Never breastfed a child, 5) Genetics heritage, 6) Recent oral contraceptive use, 7) Environmental pollution, 8) High fat diet, 9) Lack of physical activity, 10) other. Practice of BSE was assessed based on how often they were ready to perform mirror Breast Self-Inspection (BSI) and Breast Self-Palpation (BSP). The impact of parents' education and attendance to eventual training on BSE was examined.

Data were captured using Microsoft Excel 2010 and analyzed with SPSS v 16.0 Windows software to do descriptive statistics. Chi-square analysis was made to determine the effect of independent variables on the extent of BSE practice at $p < 0.05$ significance. Missing cases were not included in the calculation of percentages reported in the results.

3. RESULTS

3.1 Respondents

The average age of the interviewed girls is 18.1 ± 1.2 (17-20) years old. Their parents were educationally grouped as uneducated (8.7%), primary level (23%), secondary level (32.1%), bachelor level (24.3%), master level (9.6%) and doctoral level (2.3%).

3.2 Level of BSE Awareness

Table 1 shows that 94.6% of respondent girls had heard about BC against 5.4% who had no idea about it. Only 39 girls (17%) had a family history of BC. Also, few girls (24.7%) had participated in a training session focused on BC. About knowledge of BC diagnosis methods, they cited mammography (34%), BSE (19%), clinical physical exam (17%), pathological examination (2.6%), and ultrasound (1.7%). About 25% did not know any technique to detect BC. Half of respondent girls could not name any one risk

factor of BC. The other half mentioned gender (14%), growing age (14%), genetics family predisposition (10%), race (9%) and early menarche (3%).

Their sources of information were media i.e. radio, television, newspaper (59%), classmates (17%), class lessons (6.2%), talk with parents (5.4%), and public campaign (4.4%).

3.3 Level of BSE Practice

Globally, about half (48%) of girls never had inspected their breasts in mirror for cancer diagnosis purpose. Out of 52% who agreed practicing self-inspection, 23% said they do it every day, 23% once a month, and 4.3% occasionally. During the observation session, the aspects examined as cited by the respondents are shape, size, redness, color, and symmetry of the breast. Some are checking all these aspects

while others are focusing only on one or two aspects. The reasons given for not doing examination were: "I don't know what to look for" (45.9%), or because "I don't have a breast problem" (21.6%), or "I am not interested in" (25.2%).

Apart from observing a breast, self-palpation also is needed in order to identify any mass inside the breast. However, the majority of girls (76%) said they never do self-palpation. The few girls who practice self-palpation, said doing it either every day (4%), once a month (4%), or just occasionally (15%). Different palpation techniques were cited like radial (5.4%), circular (45%), vertical (31%) and arbitrary palpation (18%). According to their responses, the reasons for not doing breast palpation were either "I did not know the technique" (54%), or "I did not know why to do palpation" (29%), or "I am not interested" (18%).

Table 1. Awareness and practice of breast self-examination among secondary school girls of Nyarugenge district in Rwanda (valid cases and percentages)

Awareness questions	N	%	Practice questions	N	%
Had heard of BC (n=239)			Do breast self-inspection (n=230)		
Yes	226	94.6	Never	111	48.3
No	13	5.4	Everyday	55	23.9
Had family history of BC (230)			Once a month	54	23.5
Yes	39	17.0	Occasionally	10	4.3
No	191	83.0	Focus of the inspection (n=119)		
Attended BSE session (=235)			Shape	80	67.2
Yes	58	24.7	Color	11	9.2
No	177	75.3	Size	67	56.3
Diagnostic methods (n=226)			Redness	36	30.3
Don't know any	58	24.7	Symmetry	20	15.8
Mammography	80	34.0	Other	5	4.2
Self-examination	45	19.1	Reason for not inspecting (n=111)		
Clinical examination	41	17.4	I don't have breast problem	24	21.6
Pathological examination	6	2.6	I don't know what to look for	51	45.9
Ultrasound	4	1.7	I am not interested	28	25.2
Other method	1	0.4	Other reason	8	7.2
Risk factors (n=226)			Do Self-Palpation (n=229)		
Don't know any	107	50.7	Never	174	76.0
Gender	30	14.2	Everyday	9	3.9
Growing age	29	13.7	Once a month	10	4.4
Genetic predisposition	20	9.5	Occasionally	36	15.7
Race	18	8.5	Palpation technique (n=55)		
Early menarche	7	3.3	Vertically	17	30.9
Source of information (n=226)			Circularly	25	45.5
Media	140	58.6	Radial	3	5.5
Classmates	41	17.2	Arbitrary	10	18.2
Parents	13	5.4	Reason for never palpation (n=174)		
Medical practitioners	9	3.8	I don't know the technique	93	53.8
Class lesson	14	5.9	I am not interested	31	17.9
Public campaign	11	4.6	I don't know why to do it	50	28.9

3.4 Factors with Impact on BSE Practice

Fig. 1 shows some factors that can influence the practice of BSE, i.e. parents' education, attendance to training session and having family history of cancer. The difference between groups is significant ($p < 0.001$), as illustrated by ratios of those that practiced over those that did not (Yes/No). When comparing the education level of respondent' mother with palpation practice, we could find a positive relationship from primary level ($R=0.1$) up to master level ($R=3.5$). Surprisingly however, girls from doctorate mother or father are less likely to practice breast self-palpation than university or master levels. Also, a previous training ($R=1.5$ vs 0.1) and family history of BC ($R=0.8$ vs 0.3) could increase the alertness of girls about BC concerns.

4. DISCUSSION

4.1 Awareness and Practice of BSE

Almost 95% of respondents in our study said they had heard about BC, but less than 25% had sufficient knowledge about BC diagnostic methods, BC risk factors and BSE. More than 74% of interviewed girls never had performed BSE for breast cancer purpose, and of those who agreed doing BSE, only 4% knew the real timeframe of doing it, consistent with the studies by other researchers worldwide.

A similar study [23] conducted on female secondary school girls in Nigeria reported that a greater proportion of respondents (56.8%) had poor knowledge of BC while 75.6% had poor knowledge of BSE, only 39.7% knew that being a female was a risk factor for BC and the least known risk factors were obesity and aging; only 10.1% had practiced BSE.

Another study in Jeddah Saudi Arabia [24] indicated that 39.6% reported ever hearing of BSE, but only 14.4% and 7.1% respectively knew the correct frequency and timing. A study among High School and College Students in Mid-Western USA [25] concluded that despite many annual efforts to disseminate breast cancer awareness and the availability of information about the disease, both college and high school students have a poor understanding of BC.

Among female university students, the percentage of adolescents performing BSE is also low all over the world. The findings among female university nursing students in Angola [26] revealed that only 57.8% were knowledgeable about BC and its screening. In Turkey, a study [27] found low knowledge among adolescent females as to time for BSE (13.2%), frequency of BSE (21.8%) and BSE procedure (26.6%). In Europe a study [28] reported that only 14.8% among students aged 17 to 30 years knew how to perform BSE. Close findings also were found in Malaysia [29], Yemen [30] and Kuwaiti [31].

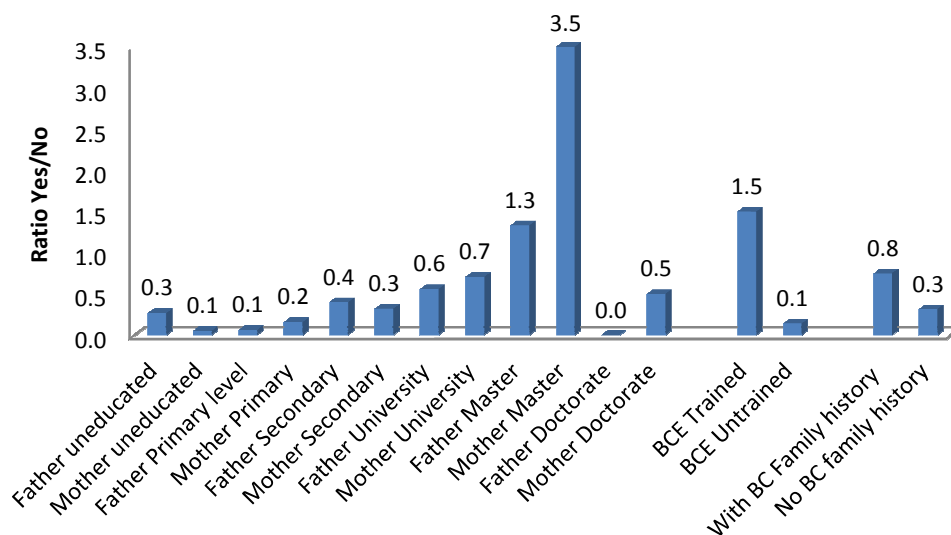


Fig. 1. Proportions of secondary school girls from Nyarugenge district in Rwanda who performed BSE or not in relation to parents' education, previous training and family history of BC

In general and surprisingly, be it in Middle East, Asia, Europe, America and Africa, and independently of the target groups, majority of studies have reported low BC knowledge and low practice of BSE [32-42]. Thus we are far from blaming the awareness level of Rwandan girls.

4.2 Reasons or Factors Influencing Low Awareness and Low Practice of BSE

The average age of the girls in our study is 18.1 ± 1.2 (17-20) years old. The legally fixed mature age for girls is 21 years old in the country, but we thought that a case study targeting secondary school girls under the mature age is relevant for early alert. Considering global world reports, we observe the women age may have significant impact on awareness and knowledge, but has little effect on practices. Many studies expressed that the most important factor for not doing BSE is lack of BC knowledge and lack of knowledge regarding the conduct of BSE. In our study, the most common reasons for not doing BSE were "not knowing how to perform BSE" (53%), "not knowing what to look for" (46%), "not being interested in "(25%), "not having breast problem" (45.6%) or "not having a close relative with BC" (42.9%). The responses of these teenagers sound reflecting immaturity.

In fact, teenagers really might have poor knowledge about women health problems due to their age, unless they are given a structured relevant education on it. Apart from this eventual age impact, the lack of knowledge about how to perform BSE reflects insufficiency or lack of educational programs. Studies have shown that there was a highly significant improvement in all knowledge score of the intervention group from pre to post test after training sessions [43-45]. That indicates education given to the women in general may be effective in covering the lack of knowledge and correcting the incorrect previous knowledge.

The association between socio-demographic variables and BSE practice in the present study was significantly related to family history of BC, parents' education, and previous training on BSE. The impact of family cancer history is consistent with some studies that found relation between family history of BC and BSE performance. For the impact of parents' education, one may speculate that a low education also means low-income and unavailability of mural mirror, depriving poor families of practical tool. Education also may provide parents with good

knowledge that they may share with daughters. But the fact that in this study, girls whose parents had the highest education level (PhD) were less likely to perform BSE than girls from Master or Bachelor parents is surprising. That means not only parent's education per se plays important role, but also availability of parents to devote sufficient talking time to children is capital.

4.3 Perspectives and Opportunities to Improving BSE Knowledge

In this study, we found the media as the main source of information on BC and BSE. No sustained educational program is provided in the study curricula even though some students said they had have information during class session. The media can provide deep comprehensive information about BC or about other salient health issues as it can reach many people at the same time. The impact of media is evident, but there is need to establish coordinated cooperation between parents, public health educators, and the media in dissemination of adequate information. It also is possible to include BC content in the secondary school curriculum. We support those who argued that as the implementation of the revised curricula may take some time, more training and workshops must be given at school which will have an impact on narrowing the gap to make all concerned adolescent girls knowledgeable and expanding their role as client educators to disseminate this information to others (family, relatives and community) [25].

In Rwanda furthermore, individual initiatives such as awareness/fund raising events "Ulinzi Walk" that was organized on Sunday, October 28, 2012, in Kigali followed by discussion about BSE demonstration, and health exercises [46] are welcome and deserve big encouragement.

5. CONCLUSION

The findings of this study provide important baseline information that will help decision-makers draw appropriate action. Majority of the female students studying in Nyarugenge secondary schools are not satisfactory knowledgeable about BC and its prevention methods. The general average knowledge and practice is low. The impact of media is evident, but there is need to establish coordinated cooperation between public health educators, parents and the media in dissemination of adequate information. The education will also

address the importance of mammography at advanced ages since noninvasive tumors or undetectable nodules in young women become invasive as they age.

CONSENT

Informed consent for voluntary participation was obtained from the respondents, clearly stating potential benefits and confidentiality of the study.

ETHICAL CONSIDERATION

Approval was obtained from the directors of Nyarungenge High Schools. Also, approval was obtained from the Directorate of School Education, affiliating with the Ministry of Education.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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