RESEARCH ARTICLE

Effectiveness of an Educational Intervention among Public Health Midwives on Breast Cancer Early Detection in the District of Gampaha, Sri Lanka

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Abstract

Background: Breast cancer is the commonest cancer among Sri Lankan females, accounting for 26% of the cancer incidence in women. Early detection of breast cancer is conducted by public health midwives (PHMs) in the Well Woman Clinics. The aim of the present study was to determine the effectiveness of an educational intervention on improving knowledge, attitudes and practices (KAP) on breast cancer screening among PHMs in the district of Gampaha. Materials and Methods: Two Medical Officer of Health (MOH) areas in Gampaha district were selected using random sampling as intervention (IG) and control (CG) groups. All the PHMs in the two MOH areas participated in the study, with totals of 38 in IG and 47 in CG. They were exposed to an educational intervention with the objective of using them to subsequently conduct the same among 35-59 year women in the community. Following the intervention, post-intervention assessments were conducted at one month and six months to assess the effectiveness of the intervention. Results: The overall median scores for KAP among PHMs respectively were as follows. Pre-intervention: IG:58%(IQR: 53- 69%), 90%(IQR: 70-100%) and 62%(IQR: 57-70%). CG: 64%(IQR: 56-69%), 90%(IQR: 70-90%) and 62%(IQR: 50-77%). Post-intervention: one month, IG:96%(IQR: 93-96%), 100%(IQR: 100-100%), and 85%(IQR: 81-89%). CG:67%(IQR: 60- 73%), 90%(IQR: 80-100%) and 65%(IQR: 50-73%). Post-intervention: six months, IG: 93% (IQR: 91-93%), 100%(IQR: 90-100%), and 81%(IQR: 77-89%). CG: 67%(IQR: 58- 71%), 90%(IQR: 90-100%), and 62%(IQR: 58-73%). All the above post-intervention scores of PHMs in the IG were significantly higher in comparison to CG (p<0.001). Conclusions: This planned educational intervention had a significant impact on improving KAP of PHMs for early detection of breast cancer in the Gampaha district.

Keywords: Breast cancer screening- educational intervention - public health midwives - Sri Lanka

Asian Pac J Cancer Prev, **16 (1)**, 227-232

Introduction

Worldwide, breast cancer is the most common cancer diagnosed among women and is the leading cause of cancer deaths (Parkin et al., 2005; Benson and Jatoi, 2012; Bray et al., 2013). In the Sri Lankan context, neoplasms are the second leading cause of hospital deaths (Ministry of Health, 2013) and breast cancer is the commonest cancer accounting for 26% of newly diagnosed female cancers in 2007 (National Cancer Control Programme, 2012).

Cancer screening/early detection tests with advances in treatment have been shown to play a pivotal role in reducing breast cancer mortality and improving survival (Ries et al., 2003; Anderson et al., 2008; Lan et al., 2013). Breast self-examination (BSE), clinical breast examination (CBE) and mammography, are the methods used for early detection of breast cancer. However, mammographic facilities are costly and available only at limited places.

Practices of breast cancer early detection were found to be substandard in the Asia Pacific region (Yurdakos et al., 2013; Shiryazdi et al., 2014). A cross-sectional study conducted in 2012, on 500 health personnel, and 50 general administration services workers from seven government hospitals and the Cancer Early Diagnosis, Screening, and Education Centre within the province of Samsun, Thailand showed that only 25.6% and 5.0% of them were performing BSE regularly every month (Yurdakos et al., 2013). Another cross-sectional study performed among 441 female health care workers in three different health centers in Yazd, Iran highlighted that only 41.9% of the workers had performed BSE in the past, of which only 14.9% of them did it regularly.

The opportunistic early detection of breast cancer was introduced in Sri Lanka in 1996 through the Well

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Woman Clinics (WWC). These clinics screen women over 35 years of age for hypertension, diabetes mellitus, breast malignancies and cervical cancer. Breast cancer early detection is conducted using CBE by Public Health Midwives (PHMs) and through promoting BSE by educating women. In case of detecting abnormalities, the woman is examined by the Medical Officer of Health (MOH) who will refer those confirmed of clinical abnormality to specialist clinics. The PHM of the area is expected to,, follow up these women in the field.

There were 54 functioning WWCs in the Gampaha district by the end of 2008. The percentage of women aged 35-59 years who underwent screening in WWCs was 2.2% in 2007. The entire district was assessed to be substandard in CBE and BSE in the same study (Vithana et al., 2013a).

Sensitivity and specificity of CBE and BSE depend on how correctly it is practiced (Wilke et al., 2009). A qualitative assessment conducted among PHMs, revealed, inadequacy of training and lack of skills as some of the factors that contributed to poor outcome of this service. Major strategies suggested were training of PHMs using evidence-based learning and teaching technics, provision of modern health education materials and strengthening of monitoring and supervision of the program (Vithana et al., 2013b).

A cross-sectional survey conducted among 219 female health care workers (of which 68.9% were PHMs) selected from six districts in Sri Lanka revealed that although 98% knew about BSE, only 47.9% practiced it on a monthly basis. CBE and mammography were known by 94.1% and 64.3% respectively. Only 19.2% had undergone a CBE within one year and 3.6% had ever undergone a mammography (Nilaweera et al., 2012).

Educational interventions on CBE and BSE for health care providers as well as women in the community in Asia Pacific Region has been reported to be effective (Khokhar, 2012; Wang et al., 2013). An educational intervention conducted in 2009 among 259 nursing officers of a missionary hospital in Delhi showed a significant improvement ($p<0.05$) in providing correct answers for all the questions regarding high risk factors for breast cancer, from 7.2% at pre-intervention to 100% at post-intervention. Knowledge on BSE had shown a significant ($p<0.05$) increase from 65.2% at pre-intervention to 99.3% at post-intervention. Correct knowledge on all three early detection methods had increased significantly from 56.8% to 98.7% (Khokhar, 2012).

The aim of the present study was to describe the assessment of effectiveness of an intervention on improving the knowledge, attitudes and practices (KAP) of PHMs on breast cancer early detection services provided through WWCs in the Gampaha district.

Materials and Methods

This paper reports the first phase of a community-based intervention done in 2009 in the above district which consist of 14 MOH areas with 54 functioning WWCs at the field level. It is the second most populous district in the country, (Department of Census and Statistics, 2013) .

Permission of health authorities were obtained prior to the commencement of the study. The intervention was conducted in two similar non-bordering MOH areas belonging to the rural sector, selected using stratified sampling. The intervention (Divulapitiya) and control (Attanagalle) areas was selected randomly. The intervention (IG) and control (CG) groups consisted of all the PHMs in the two areas.

Pre-intervention

The instrument used was a pre-tested self-administrated questionnaire (SAQ). The subject areas included were 1) socio demographic data 2) knowledge 3) attitudes and 4) practices regarding breast cancer early detection and 5) PHM's role in breast cancer prevention and detection.

Intervention

The intervention consisted of developing a Trainers' Guide for conducting training for PHMs ,handbook for the use of PHMs, checklist with a colour code of four colours to assess breast cancer screening status of individual clients, and training PHMs of IG. After the baseline survey (pre-intervention), a two-day training programme was conducted for primary healthcare staff of the intervention area.. Didactic lectures, discussions, practical sessions and role-plays were employed in it as planned in the Trainers' Guide.

Post-intervention KAP survey among PHMs – One month

The post-tests among IG and CG were conducted one month after commencing the intervention while invention was going on, using the same KAP questionnaire used for base-line assessment to assess the adequacy of the training.

Post-intervention KAP survey among PHMs – Six months

The second post-intervention KAP survey was carried out six months after implementation of the intervention in both IG and CG using the same SAQ.

Data analysis

Each questionnaire was inspected for inconsistencies and incompleteness immediately after it was filled. Data entry and entire data processing was done using Epi Data V 2.2 and SPSS Version 16. Comparative analyses were carried out at four levels: *i*) Pre-intervention comparison between IG and CG, *ii*) Post-intervention comparison between IG and CG *iii*) Pre and post-intervention comparison within IG and *iv*) Pre and post-intervention comparison with in CG

Scoring system was developed to assess KAP with expert participation. Attitude was marked using a 4-point Likert scale: very favorable (+2), favourable (+1), un-favourable (-1) and very unfavourable (-2). Percentage scores for individual components of knowledge, attitudes and practices were calculated. Since the scores on assessment of KAP did not conform to a normal distribution the results are presented as median values with respective inter quartile ranges (IQR). Comparison of scores in two groups at pre and post interventions were carried out using Mann Whitney U test and pre and post paired comparisons with in IG and CG using Wilcoxon

Signed Ranks test . Chi-Square test and Fisher's exact test were used for determining associations.

Ethical clearance was obtained from the Ethics Review Committee of the Faculty of Medicine, University of Kelaniya. Results were made available for stakeholders to facilitate improving of breast cancer early detection services.

Results

All 38 PHMs in IG and 47 in CG, participated giving a response rate of 100%.

Selected Socio-demographic and service related characteristics of IG and CG

Median age of IG and CG were 42.5 (IQR=38.0-51.0) and 43.0 (IQR=38.0-51.0) years respectively. All PHMS were Sinhala Buddhists. A majority in IG (89.5%; n=34) and CG (87.2%; n=41) were married. Proportion with an educational level of GCE A/L was higher among CG (48.9%; n=23) than in IG (28.9%; n= 11). None from the IG had undergone training on breast cancer screening where as 10.6% (n=5) from CG had. None of the differences observed on above variables were statistically significant.

Table 1. Comparison of Knowledge on Risk Factors for Breast Cancer among Public Health Midwives in the Intervention (IA) and Control (CA) Groups at Pre-intervention, Post-intervention at 1 Month and Post-intervention at 6 Months

Variable	Pre-intervention (Pre)			Post-intervention one month (PI-1)			Post-intervention six months (PI-2)		
	IG (N=38)	CG (N=47)	Significance	IG (N=38)	CG (N=47)	Significance	IG (N=38)	CG (N=47)	Significance
Risk Factors									
Obesity									
Yes	35 (92.1)	37 (78.7)	Fisher's test	38(100)	7(14.9)	Fisher's test	35(92.1)	7(14.9)	χ^2=50.11
No/Don't know	3 (7.9)	10 (21.3)	p=0.130	0(0)	40(85.1)	p<0.001	3(7.9)	40(85.1)	df=1
									p<0.001
Prolonged use of oral contraceptives/ hormone replacement therapy									
Yes	26 (68.4)	29 (61.7)	χ^2=0.415	33(86.8)	30(63.8)	χ^2=0.415	36(94.7)	31(66)	χ^2=10.43
No/Don't know	12 (31.6)	18 (38.3)	df=1	5(13.2)	17(36.2)	df=1	2(5.3)	16(34)	df=1
			p=0.519			p=0.024			p=0.001
Early menarche									
Yes	10 (26.3)	14 (29.8)	χ^2=0.125	38(100)	13(27.7)	Fisher's test	38(100)	13(27.7)	χ^2=45.82
No/Don't know	28 (73.7)	33 (70.2)	df=1	0(0)	34(72.3)	p<0.001	0(0)	34(72.3)	df=1
			p=0.724						p<0.001
Late menopause									
Yes	1 (2.6)	16 (34.0)	Fisher's test	37(97.4)	15(31.9)	Fisher's test	34(89.5)	12(25.5)	χ^2=34.598 df=1
No/Don't know	37 (97.4)	31 (66.0)	p<0.001	1(2.6)	32(68.1)	p<0.001	4(10.5)	35(74.5)	p<0.001
Nulliparous women									
Yes	26 (68.4)	35 (74.5)	χ^2=0.379	38(100)	40(85.1)	Fisher's test	38(100)	40(85.1)	Fisher's test
No/Don't know	12 (31.6)	12 (25.5)	df=1	0(0)	7(14.9)	p=0.015	0(0)	7(14.9)	p=0.015
			p=0.538						
Hereditary									
Yes	26 (68.4)	30 (63.8)	χ^2=0.197	38(100)	37(78.7)	Fisher's test	38(100)	38(80.9)	Fisher's test
No/Don't know	12 (31.6)	17 (36.2)	df=1	0(0)	10(21.3)	p=0.002	0(0)	9(19.1)	p=0.004
			p=0.657						
First pregnancy after 30 years of age									
Yes	5 (13.2)	24 (51.1)	χ^2=13.432	37(97.4)	21(44.7)	χ^2=13.43	37(97.4)	16(34)	χ^2=35.89
No/Don't know	33 (86.8)	23 (48.9)	df=1	1(2.6)	26(55.3)	df=1	1(2.6)	31(66)	df=1
			p<0.001			p=0.001			p<0.001
Family history of ovarian cancer									
Yes	4 (10.5)	7 (14.9)	Fisher's	23(60.5)	13(27.7)	χ^2=0.002	20(52.6)	13(27.7)	χ^2=5.517
						df=1			df=1
No/Don't know	34 (89.5)	40 (85.1)	p=0.747	15(39.5)	34(72.3)	p=0.002	18(47.4)	34(72.3)	p=0.019
Past history of breast cancer									
Yes	4 (10.5)	18 (38.3)	Fisher's	37(97.4)	15(31.9)		32(84.2)	13(27.7)	χ^2=26.97
No/Don't know	34 (89.5)	29 (61.7)	p=0.004	1(2.6)	32(68.1)		6(15.8)	34(72.3)	df=1
									p<0.001
Protective Factors									
Prolonged breast feeding									
No	33(86.8)	43(91.5)	Fisher test	37(97.4)	45(95.7)	Fisher's test	38(100)	43(91.5)	Fisher's
Yes/Don't know	5(13.2)	4(8.5)	p=0.505	1(2.6)	2(4.3)	p=1.000	0(0)	4(8.5)	test
									p=0.125
Having more children									
No	24(63.2)	38(80.9)	χ^2=3.33	37(97.4)	39(83.)	Fisher's test	36(94.7)	36(76.6)	χ^2=5.338
Yes/Don't know	14(36.8)	9(19.1)	df=1	1(2.6)	8(17)	p=0.038	2(5.3)	11(23.4)	df=1
			p=0.068						p=0.021

Knowledge on breast cancer and screening among PHMs in IG and CG

Knowledge on breast cancer being commonest cancer: In pre-intervention assessment, the proportion with correct responses to the question on breast cancer being commonest cancer, was higher in CG (n=11:23.4%) than in IG (n=7:18.4%), but this difference was not statistically significant (P=0.58). The number of PHMs who provided correct answers to the question on breast cancer being commonest cancer at one month post-intervention was 36 (94.7%) in IG and 10 (21.3%) in CG, which changed to 35 (92.1%) in IG and 17 (36.2%) in CG at six months post-intervention . This improvement of knowledge observed among IG in comparison to CG, both at one month (p<0.001) and six months (p<0.001) post-intervention were statistically significant.

Knowledge on "risk factors for breast cancer" (Table 1): At pre-intervention, the proportions of correct responses for above were higher among CG for Question Nos. 3, 4, 5, 7, 8, 9, 10 and 11. Of them, question Nos. 4, 7 and 9 demonstrated a statistically significant difference. During post-intervention assessments at one and six months, the proportions of correct responses to all the questions were higher among IG and the differences between IG and CG were statistically significant for all questions except question No.10. However, The knowledge in CG remained basically same as at pre-intervention.

Overall knowledge on breast cancer and early detection:

Knowledge on breast cancer and early detection in IG and CG (Table 2): At pre-intervention assessment, overall median score on knowledge was higher in CG compared to IG (P = 0.067). During assessments at one and six months post intervention, median scores were significantly higher in IG compared to CG (p<0.001).

Pre and post comparison of knowledge scores within IG and CG (Table 3): Overall knowledge in IG improved from 57.8% (IQR: 53.3-69.4%) at pre intervention to 95.6% (IQR: 93.3-96.1%) and 93.3% (IQR: 90.6-93.3%) respectively at one (p<0.001) and six (p<0.001) months post-intervention. The respective figures for the CG were 64.4% (IQR: 55.6 -68.9%), 66.7% (IQR: 60.0-73.3%) and

Table 2. Comparison of Median Scores on Overall Knowledge, Attitude and Practices on Breast Cancer and Early Detection among Public Health Midwives between the Intervention (IG) and Control (CG) Groups at Pre Intervention and Post Intervention at One and Six Months

Component	Percentage Scores								
	Pre Intervention			Post Intervention - 1Month			Post Intervention - 6 Months		
	IG Median IQR	CG Median IQR	Significance	IG Median IQR	CG Median IQR	Significance	IG Median IQR	CG Median IQR	Significance
Overall Knowledge	57.8 53.3-69.4	64.4 55.6-68.9	p=0.067 93.3-96.1	95.6 60.0-73.3	66.7	p<0.001 90.6-93.3	93.3 57.8-71.1	66.7	p<0.001
Overall Attitude	90 70.0-100.0	90 70.0-90.0	P=0.746 100.0-100.0	100 80.0-100.0	90	p<0.001 90.0-100.0	100 90.0-100.0	90	p<0.001
Overall Practices	61.5 56.7-70.2	61.5 50.0-76.9	p=0.965 80.8-88.5	84.6 50.0-73.1	65.4 76.9-88.5	p<0.001 57.7-73.1	80.8	61.5	p<0.001

*Statistical test: Mann Whitney U Test (between IG and CG at pre intervention, post intervention one month and post intervention six months levels separately)

Table 3. Comparison of Median Scores on Knowledge, Attitude and Practice on Breast Cancer and Early Detection among Public Health Midwives within Intervention and Control Areas between Pre-Intervention and Post-Intervention at One Month and Pre-Intervention and Post-Intervention at Six Months

Component	Area	Percentage Scores				
		Pre-intervention 1 Month Median IQR	Post-intervention 6 Months Median IQR	Post-intervention Pre Median IQR	Significance Pre & Post 1 Month	Significance & Post 6 Months
Overall knowledge	Intervention	57.8 53.3-69.4	95.6 93.3-96.1	93.3 90.6-93.3	p<0.001	p<0.001
	Control	64.4 55.6-68.9	66.7 60.0-73.3	66.7 57.8-71.1	p=0.016	p=0.034
Overall attitude	Intervention	90 70.0-100.0	100 100.0-100.0	100 90.0-100.0	p<0.001	p<0.001
	Control	90 70.0-90.0	90 80.0-100.0	90 90.0-100.0	p=0.112	p=0.098
Overall practices	Intervention	61.5 56.7-70.2	84.6 80.8-88.5	80.8 76.9-88.5	p<0.001	p<0.001
	Control	61.5 50.0-76.9	65.4 50.0-73.1	61.5 57.7-73.1	p<0.12	p=0.464

*Statistical test: Wilcoxon signed rank test (within IG and CG: pre-intervention with post-intervention one month and pre-intervention with post-intervention six months separately)

66.7% (IQR: 57.8-71.1%) with significant improvements also at one (P=0.02) and six months (P=0.03).

Overall attitudes on breast cancer and early detection

Attitudes on breast cancer and early detection in IG and CG (Table 2): With regard to attitudes on breast cancer early detection at pre-intervention, all the median scores in CG were either higher or same as that of IG except for attitude that PHM has a major role to play in provision of breast cancer early detection in the community for which IG had a higher score, but none of the differences were statistically significant. However, at one and six months post-intervention assessments, the overall median scores were significantly higher in IG than CG ($p<0.001$)

Pre and post comparison of attitude scores within IG and CG (Table 3): Scores of overall attitudes and all individual items of IG had increased significantly from pre to post intervention at one and six months. In the CG, median scores in relation to overall attitudes and all individual items, except on attitudes on for attitude that PHM has a major role to play in provision of breast cancer early detection in the community remained almost the same at pre and one and six months post-intervention. .

Overall practices on breast cancer and early detection

Comparison of practices to promote early detection of breast cancer in the community in IG and CG (Table 2): PHM's practices on educating the public on breast cancer screening and follow up of women with abnormalities and their own practices on BSE were assessed. At pre-intervention, there was no significant difference between IG and CG. However, at one and six months post-intervention IG demonstrated significantly($p<0.001$). higher scores than CG

Pre and post comparison of practices within IG and CG (Table 3): A significant improvement was shown only in IG ($p<0.001$) with regard to comparison of practice scores at pre, and one and six months post intervention.

Discussion

The findings of this study indicate that the educational intervention applied was effective in improving KAP on early detection of breast cancer among PHMs. At baseline, none of the socio demographic and service related characteristics differed significantly among the PHMs of the two arms and this confirmed the comparability of the two groups, which minimizes the effect of confounding.

The CG fared significantly better than IG on knowledge on risk factors and symptoms at pre-intervention, which may probably be attributed to the training received by CG. Despite above all the components of knowledge was found to be significantly higher among IG at one and six months post-intervention in comparison to pre -intervention. This was true for CG (Tables 2 and 3) as well and this observation may be attributed to maturation, Hawthorne and testing effects, phenomena which are common to both arms. Maturation refers to natural change over time, Hawthorne effect the tendency to perform better due to the attention received when they are participants of an intervention study and the testing effect due to improved post test performance attributed to the participation in pre test. All these are annulled by having the CG. Thus the significant increase in knowledge above that of CG among IG points towards the effectiveness of the intervention

IQRs were much narrower with respect to all the median percentage scores in the IG, which also reflects the impact of the intervention. The wider IQRs in CG imply that the improvement was seen only among a small number in CG who were not exposed to additional inputs. Slight decline in the median scores from one month to six months post-intervention in IG reflects the sustainability of the improvements observed and thus the need for in-service training on a regular basis.

The objective of the post-intervention assessment at one month was to assess the adequacy and effectiveness of the training.and post-intervention at six months to determine the sustainability of the improvements gained from the intervention. As the former demonstrated a significant improvement, further training was confined only to a refresher session conducted after three months to sustain improved KAP among PHMs in the IG, which was needed for the phase II of the study where the PHMs were involved in the intervention targeted towards the public.

The overall attitude score of both groups was high (90%) which was quite encouraging. The application of the intervention led to a further significant improvement in the IG in comparison to CG at both post-intervention assessments. The pre and post intervention score with in IG too had shown a significant difference when the score with in CG remained the same. Slight decline in IQRs of attitude scores over time from post-intervention one month to six months (100-100% to 90-100%) reflects strongly the need for in service training on a regular basis.

Similar to knowledge and attitudes, the practices too had demonstrated a statistically significant ($p<0.001$) improvement in IG in comparison to CG, at both post intervention assessments, despite same overall practice scores (61.5%) among IG and CG at pre-intervention. This reflects further the extent of the impact of the educational intervention.. However, slight decline in practice scores from one month to six months post-intervention emphasizes consistently, the need for regular in service training.

The results of this study indicates that lack of knowledge had a major influence on the level of practices as both groups demonstrated high attitude scores even at pre intervention. This further proves the need for regular upgrading of knowledge. Similar results have been reported by Khokhar (2012) and Wang et al. (2013) on educational interventions on strengthening BSE and CBE for health care personnel as well as women in the community in the Asia-Pacific region .

In the present study, initial stratification according to sectors ensured the required comparability as the socio-demographic characteristics. The study pair was selected randomly and the intervention was assigned on a random basis within the selected pair. Randomization between the two settings minimized the selection bias. This is demonstrated clearly by the fact that although differences in relation to knowledge on certain risk factors such as late menopause, first childbirth after 30 years of age and

history of breast cancer were apparent, they were not statistically significant

Contamination was minimized by identifying the non-bordering areas in the sampling frame when selecting the intervention/control pairs by each stratum. Threats to internal validity such as maturation, Hawthorne and testing effects have been addressed above which were negated by having the control group.

A colour code as shown was developed to indicate the screening status, which was measured, based on the compliance to BSE and WWC visits. This type of colour code which was administered in Cancer Screening Office Systems (Cancer SOS), an intervention designed to increase cancer screening in primary care settings serving disadvantaged populations in Hills-borough County had been found to be effective (Roetzheim et al., 2004).

Well acceptance of PHM in the community helped to enhance a two way communication, which is recognized to be more suitable for behavior changed communication (Redding et al., 2003).

Monitoring was also conducted through existing system of area supervisory staff in both groups,, which helped to reduce introducing a bias due to the Hawthorne effect. All measures were taken to meet with the increased demands for service provision, which was essential to win the confidence of the clients, and thus sustained participation in the screening programme.

Anonymity of SAQs ensured validity and reliability of the responses. Participation was 100% in both arms of the intervention during all stages, which ensured representativeness of the sample and thus generalizability of results to the two parent MOH areas. Since the two arms were selected randomly, the results can further be generalized to the entire district and this implies satisfactory external validity of the study.

The overall scores computed were observed to have a highly skewed distribution and hence it was decided to present the summary measures as median and their respective IQRs. It may be observed that of the variables that demonstrated significant differences, the values of the median percentage scores were the same in most instances, but what differed were the values of IQRs. Thus, the significant differences are actually reflected through the variations in the lower or upper bounds of the IQRs. The Mann-Whiteny U and Wilcoxon signed-ranks test were used to compare unpaired and paired data respectively. These tests are non-parametric tests that are best suited for, distribution free variables.

Shorter follow up period of six months, may be considered as a limitation. A longer follow up period was not feasible due to logistical reasons. . Further research is recommended to overcome the above measures.

In conclusion, the study demonstrated that educational intervention was effective on improving knowledge, attitudes and practices among Public Health Midwives on breast cancer screening in the Gampaha district. Recommend incorporation of regular educational interventions in to the existing system to sustain higher levels of knowledge, attitudes and practices among Public Health Midwives for betterment of the quality of breast cancer screening services.

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