⊙ OPEN ACCESS

A Reflection on Breast Cancer Screening Strategies in Jordan Status

Khaled Abu Rummn MD[1*], Mohammad Ahmad Abu Al'anaz MD[2], Mohammed Hasan Alfugaha MD[3], Fadi Maaita MD[4], Hamzeh Mohammad Qasimeh MD[5], Haneen Qasim Al Shadowh RN[6], Ola Mohammad Al Waqfi MD[7], Hajem 'Mohammad Ali' Abu Dalo MD[8]

[1]Royal medical Services, king alhusain medical city, department of general surgery, breast surgery team
[2]Royal medical Services, king alhusain medical city, department of general surgery, colorectal surgery team
[3]Royal medical Services, king alhusain medical city, department of general surgery, ENT
[4]Royal medical Services, king alhusain medical city, department of general surgery, colorectal surgery team
[5]Royal medical Services, king alhusain medical city, department of general surgery, breast surgery team
[6]Royal medical Services, king alhusain medical city, registered nurse
[7]Royal medical Services, king alhusain medical city, department of lapratory medicine and histology
[8]Royal medical Services, king alhusain medical city, department of radiology

*Corresponding author: Khaled Abu Rummn MD

Abstract | Original Research Article

Background: Breast cancer is a wide spread clinical problem, early detection and diagnosis is the most significant strategies in reducing morbidity, this study aims on identifying the efficacy of Jordanian royal medical services screening program on the prompt diagnosis. **Method:** A retrospective analysis of data in the years 2016/2017, ethical approval obtained, data collected include: names, diagnosis, surgical intervention, tumour size, lymphovascular involvement, and histopathological features. Analysis of data used Microsoft statistical package EXCELL 2010. **Results:** Of data gathered 49% were diagnosed on early stage with no lymphovascular invasion, 71.4% where with invasive tumours, excised tumour size ranged 0.1 to 14 cm with 3.769cm ±2.56cm; mean ± SD, and 17.68% HERE2 positive tumours, and 51% of cases presented with right sided tumours. **Conclusion:** The result indicated a tendency leaning toward early detection, hinting efficacy of screening strategies, yet was suboptimal when compared at international level indicating further emphasis should be placed on screening strategies.
Keywords: Breast cancer in Jordan, cancer screening, breast cancer epidemiology.

INTRODUCTION

Cancer remains one of the leading disease burden list over time; with the mighty competition of stroke, ischemic heart disease, chronic obstructive pulmonary disease and others. Still recognized as a global health concern and one of the leading causes of mortality and morbidity globally, on-going health systems effort are keen on preventing and early diagnosis of cancer strategies (Placeholder1) (Tabish, 2017) (Allebeck & Agardh, 2017) (Key, Verkasalo, & Banks, 2001).

In Jordan the ministry of health department of non-communicable disease ; the national cancer registry operates to keep up with epidemiological disease burden (Ferlay, Colombet, & Soerjomataram, 2018) (Tarawneh, Nimri, Arkoob, & Zaghal, 2009) Breast cancer is in the 3rd most common type of cancer globally and the most common type of cancer among women in Jordan 36.4% are diagnosed with breast cancer among females and 19.7% among population (Ferlay, Colombet, & Soerjomataram, 2018) (Tarawneh, Nimri, Arkoob, & Zaghal, 2009) (Khader, Sharkas, Arkoub, Alfaqih, Nimri, & Khader, 2018) (Fitzmaurice, et al., 2015), considered the leading type of cancer in Jordan and the second in cancer related deaths 11.3% of all cancer deaths (Ferlay, Colombet, & Soerjomataram, 2018) (Cancer, 2018) cancer care direct and indirect costs are conceived as a burden to health care system internationally (Hassard, Teoh, Visockaite, Dewe, & Cox, 2018) (Alefan, Malhees, & Mhaidat, 2017)breast cancer care cost ranges from 60_134 thousand US dollars per person in 2 years period of diagnosis, costs vary according to stage and prognosis of each case (Blumen, Fitch, & Polkus, 2016) 5years life expectancy indicators in Jordan showed a96% survival rate in 5 years duration for a stage I breast cancer and 31.5% in stage IV (Giuliano, Edge, &

Hortobagyi, 2018) (Abdel-Razeq, Mansour, & Jaddan, 2020) which counts as an approximate to world parameters (DeSantis, Bray, Ferlay, Lortet-Tieulent, Anderson, & Jemal, 2015).

Screening program aims on detecting cancer in small sizes prior to causing any symptoms thus a well implemented screening program would result in early detection and diagnosis of tumours thus reducing health care system load , restricting fatality and reducing costs (Welch, Prorok, O'Malley, & Kramer, 2016) (Tabár, et al., 2019)Among approaches in treating breast cancer surgical intervention is wildly used and it is the focus of this study. To best appreciate tumour size and its clinical histological staging; the American joint commotion of cancer classification 7th edition (AJCC 7th) was used for purposes of staging in this study.

METHODS

A cross sectional retrospective study design was carried out in King Al Husain medical Center in 2020. The Royal Jordanian medical services is considered a major health care provider in jordan serving almost half of the entire pubulation under its health insurance umbrella with hospitals and medical care facilities in every region and distirct in jordan king al husain hospital as a part of king al hussain medical city whish is a large referal center with a multidisplenary teams. Institutional review board IRB consent was submitted and initially obtained prior to data collection (Human research Ethics Committee, Royal Medical Services assembly Dec. 2020). All data for patients admitted to the hospital throughout the period of January 2016 till December 2017, a total of 164 cases admitted with a confirmed breast tumor were included in the study. Data include: demographics, size and type of the tumor, the total number of lymph nodes excised from the operation ; involved and clear counts, histological features such as HER2, AJCC 7th ed. Typing and surgical notes, data preview was limited to the research team and for research purposes only. Data collected were analyzed and described using Microsoft Excel 2010. Distribution analysis, dispersion, central tendency and correlations.

RESULTS

A total of 164 patients admitted over the 2 years period of the study ; 92 patients from the year 2016 and 72 over 2017, only 2 males on the 2 years were seen (1.2%)mean age of the sample was 53.89 years old ±12.5 years the mode was 45 years , tumours excised sizes ranged from 0.3cm to 14 cm at the longest axis and had a mean of 3.769cm ±2.56cm with a mode in the category from 2.1-3 cm. see table 1 and the scatter plot. an average of 19.4 lymph nodes were excised along the tumour ±8.23nods, in average 14.2 nodes where healthy and not involved in the malignancy ±8.4nods, In 61 cases all excised nodes where healthy (not involved) making it 73.3%of lymph nodes are nessisated for an oncological resection.

Table-1

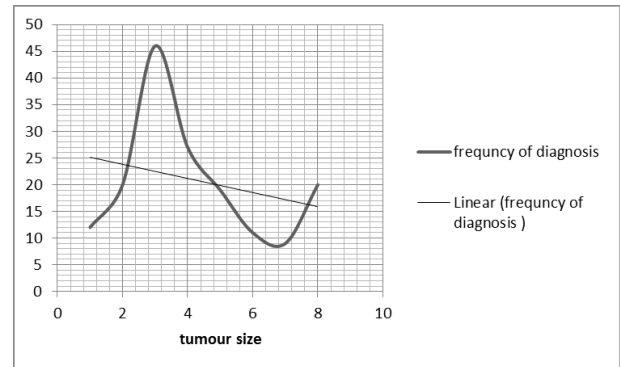| Tumour size category	Frequency of diagnosis
0-1	12
1.1-2	20
2.1-3	46
3.1-4	27
4.1-5	19
5.1-6	11
6.1-7	9
>7cm	20

Fig-1

*The data which presented in the histogram and the table is a classification of this study raw input.

71.4% of this study had an invasive breast cancer The most commonly diagnosed invasive breast tumour was Invasive ductal carcinoma (ICD) which constituted for 108 cases (65.85%) followed by the invasive lobular carcinoma in the fact of 10 cases (6.09%)cases of invasive tumours also included sarcomas mucinous carcinoma, micropilliary, ciripreform and others.

Non-invasive tumours responsible for 28.6 of casualties were also excised and analysed ductal carcinoma insitu (DCIS) had the vast majority of 86.5% of non-invasive tumours while lobular carcinoma insitu (LCIS) presented with 8.23%. A combined presentation of both showed in a 5.2% of the cases.99% of presented cases where unilateral, Laterality of tumour was investigated and showed a 51.16% probability of development in the right side. When tested for Lymphovascular Invasion (LVI) Majority of patients in this study were presented with N0 49.3% and Micrometastases to axillary lymph nodes that was not clinically detected (PN1) was observed in 29.27% of the cases while only 0.6% presented with a grade of M1 or higher.

In 78.04% of the cases mastectomy was performed and in 16.46% of the cases a Wide Local Excision (WLE) was the surgical intervention of choice. Axillary Clearance (AC) was performed in 90.85% of all operations. Estragon receptors(ER) were presented in 75.6% of all tumours while progesterone receptors had a prevalence in 66.46% As for human epidermal

growth factor receptor 2 (HER2) positive out comes in 17.68% of the cases examined.

DISCUSSION

Breast cancer showed a tendency to appear in women who were 50 years of age or older in the united states studies , this result is close to the findings in this study where the mean age of diagnosis was 53.8 ,though the most frequent age of discovery was 45 years of age which is younger than the presented US value and older when compared to 3rd world estimates which shows a peak age of incidence in the ages of 30-49 (DeSantis, Bray, Ferlay, Lortet-Tieulent, Anderson, & Jemal, 2015) (Anyanwu, 2008).

Tumours excised had a mean of 3.769cm ±2.56cm an average tumours excised sizes ranged from 0.3cm to 14 cm, In itself the mean and the frequency of presented tumour size reflected a sub optimal outcome compared to fewer than 2cm size observed in countries with older largely spread programs of screening (Welch, Prorok, O'Malley, & Kramer, 2016) (Tabár, et al., 2019) adding to that the right squid of presentation where reported tumour sizes above 5cm made-up for 20.12% of data available, these finding may sub tell needed enhancements to be placed on the screening programs and there accessibility.

Invasive tumours were reported as the most common form of breast cancers >90% of incidence rates was attributed to invasive malignancies IDC and ILC and around 2% of tumours histologically confirmed to be insitu (Amer, 2014) (Bao, Yu, Jiang, Shao, & Di, 2014)evidently that consists with the findings of the study but a specific look shows that even the grand sum favouring the same trend the close look varies; the gap between a 2% of non-invasive tumour diagnosed cases and 28.6% in this study is rather huge and requires a further investigation.

Unilateral presentation was the most reported presentation in many studies which consisted with the findings ; investigation in the trend of presentation was observed and reflected a higher tendency to develop over the left side , this contradicts the presented value of this study where 51.16% presented with a right sided tumour (Anyanwu, 2008) (Bao, Yu, Jiang, Shao, & Di, 2014) (Senie, Rosen, Lesser, Snyder, Schottenfeld, & Duthie, 1980) (Ekbom, Adami, Trichopoulos, Lambe, Hsieh, & Pontén, 1994).

Majority of patients in this study were presented with N0 49.3% and 29.27% N1 while only 0.6% presented with a grade of M1 or higher , this result reflects a downward deviation from results up road that indicates a later onset of diagnosis in Jordan,as in the USA for example 59% of diagnosed tumours are diagnosed at N0 level of invasion (Amer, 2014) though the approximately 50% of cases presented at a confined to tumour level Most of which T2N0 level indicating

moderate efficiency of the institutional screening programs this result requires further posting to approach word standard (Amer, 2014) (Bao, Yu, Jiang, Shao, & Di, 2014)early diagnosis is the main criterion of screening programs efficacy decrementing (Travier, Vidal, Garcia, Benito, Medina, & Moreno, 2019).

Estrogen receptor or progestron positive tumours made-up for 77% of diagnosed malignancies in the US while HERE II positive tumours made 17.9% these results are close to this study (Amer, 2014) (Filipits, et al., 2011) (Berry, et al., 2006). 5 year survival rate in Jordan hanged up to 97% which is remarkably high when compared to 88% in non-hispanic white women and 91% in Asians in the united states through time period of 2003-2009 (DeSantis, Bray, Ferlay, Lortet-Tieulent, Anderson, & Jemal, 2015) so could that influence be due to early stages of diagnosis , availability of screening and health care access in both countries or could be a racial genetic influence

CONCLUSION

Efforts in Jordan to early diagnose and treat breast cancer might require a further introspection as the demonstrated data shows a slope from medically advanced countries in areas of tumour size and stage upon diagnosis.

RECOMMENDATIONS

Further investigation on screening programs accessibility and compliance as well as community attitudes and beliefs. Enhancing screening program and health care delivery will reflect on the institution positively.

ACKNOWLEDGMENT

Gratitude to the institutional support.

BIBLIOGRAPHY

- Abdel-Razeq, H., Mansour, A., & Jaddan, D. (2020). Breast Cancer Care in Jordan. JCO Global Oncology, 6, 260-268.
- Alefan, Q., Malhees, R., & Mhaidat, N. (2017). Direct medical cost associated with colorectal cancer in north of Jordan. Current problems in cancer, 41(5), 371–381. https://doi.org/10.1016/j.currproblcancer.2017.05.001.
- Allebeck, P., & Agardh, E. (2017). The global burden of disease has both decreased and increased. The update of the global disease burden project is now complete. Lakartidningen, 114.
- Amer, M. H. (2014). Genetic factors and breast cancer laterality. Cancer management and research, 6, 191.
- Anyanwu, S. N. (2008). Temporal trends in breast cancer presentation in the third world. Journal of

Experimental & Clinical Cancer Research, 27(1), 17.

- Bao, J., Yu, K. D., Jiang, Y. Z., Shao, Z. M., & Di, G. H. (2014). The effect of laterality and primary tumor site on cancer-specific mortality in breast cancer: a SEER population-based study. PloS one, 9(4), e94815.

- Berry, D. A., Cirrincione, C., Henderson, I. C., C. M., Budman, D. R., Goldstein, L. J., et al. (2006). Estrogen-receptor status and outcomes of modern chemotherapy for patients with node-positive breast cancer. JAMA, 295(14), 1658-1667.

- Blumen, H., Fitch, K., & Polkus, V. (2016). Comparison of Treatment Costs for Breast Cancer, by Tumor Stage and Type of Service. American health & drug benefits, 9(1), 23–32.

- Cancer, I. A. (2018). Latest global cancer data: Cancer burden rises to 18.1 million new cases and 9.6 million cancer deaths in 2018. Lyon, France: International Agency for Research on Cancer.

- DeSantis, C. E., Bray, F., Ferlay, J., Lortet-Tieulent, J., Anderson, B. O., & Jemal, A. (2015). International variation in female breast cancer incidence and mortality rates. Cancer Epidemiology and Prevention Biomarkers, 24(10), 1495-1506.

- Ekbom, A., Adami, H. O., Trichopoulos, D., Lambe, M., Hsieh, C. C., & Pontén, J. (1994). Epidemiologic correlates of breast cancer laterality (Sweden). Cancer Causes & Control, 5(6), 510-516.

- Ferlay, J., Colombet, M., & Soerjomataram, I. (2018). Global and Regional Estimates of the Incidence and Mortality for 38 Cancers. GLOBOCAN 2018.

- Filipits, M., Rudas, M., Jakesz, R., Dubsky, P., Fitzal, F., Singer, C. F., et al. (2011). A new molecular predictor of distant recurrence in ER-positive, HER2-negative breast cancer adds independent information to conventional clinical risk factors. Clinical Cancer Research, 17(18), 6012-6020.

- Fitzmaurice, C., Dicker, D., Pain, A., Hamavid, H., Moradi-Lakeh, M., MacIntyre, M. F., et al. (2015). The global burden of cancer 2013. JAMA oncology, 1(4), 505-527.

- Giuliano, A. E., Edge, S. B., & Hortobagyi, G. N. (2018). of the AJCC cancer staging manual: breast

- cancer. Annals of surgical oncology, 25(7), 1783-1785.

- Hassard, J., Teoh, K. R., Visockaite, G., Dewe, P., & Cox, T. (2018). The financial burden of psychosocial workplace aggression: A systematic review of cost-of-illness studies. . Work & Stress, 32(1), 6-32.

- Key, T. J., Verkasalo, P. K., & Banks, E. (2001). Epidemiology of breast cancer. The lancet oncology, 2(3), 133-140.

- Khader, Y. S., Sharkas, G. F., Arkoub, K. H., Alfaqih, M. A., Nimri, O. F., & Khader, A. M. (2018). The Epidemiology and Trend of Cancer in Jordan, 2000–2013. Journal of cancer epidemiology, 2018.

- Senie, R. T., Rosen, P. P., Lesser, M. L., Snyder, R. E., Schottenfeld, D., & Duthie, K. (1980). Epidemiology of breast carcinoma II: Factors related to the predominance of left- sided diseaseEpidemiology of breast carcinoma II: Factors related to the predominance of left- sided disease. Cancer, 46(7), 1705-1713.

- Tabár, L., Dean, P. B., Chen, T. H., Yen, A. M., Chen, S. L., Fann, J. C., et al. (2019). The incidence of fatal breast cancer measures the increased effectiveness of therapy in women participating in mammography screening. Cancer, 125(4), 515-523.

- Tabish, S. A. (2017). Lifestyle diseases: consequences, characteristics, causes and control. Journal of Cardiology & Current Research, 9(3), 1-4.

- Tarawneh, M., Nimri, O., Arkoob, K., & Zaghal, M. A. (2009). Cancer incidence in Jordan 2009. amman: Non-Communicable Diseases Directorate,jordan Cancer Registry. Ministry of Health.

- Travier, N., Vidal, C., Garcia, M., Benito, L., Medina, P., & Moreno, V. (2019). Communication Channels Used by Women to Contact a Population-Based Breast Cancer Screening Program in Catalonia, Spain. Journal of Medical Systems , 43(8), 244.

- Welch, H. G., Prorok, P. C., O'Malley, A. J., & Kramer, B. S. (2016). Breast-cancer tumor size, overdiagnosis, and mammography screening effectiveness. New England Journal of Medicine, 375(15), 1438-1447.