

# *A Conceptual Model for Building Breast Cancer E-Portals with Arabic Content*

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**Abstract**—this paper presents a new conceptual model for building e-portals with Arabic content; as a solution for the resulting problems due to the shortage in Arabic e-content and e-portals about breast cancer. This shortage has led to lack of breast-cancer awareness, prevention, early detection, and treatment. Furthermore, the research has been built on solid review and conclusion to the literature about breast cancer. Therefore, the paper explored breast cancer status in the Arab countries, in addition to highlighting statistics regarding the existence percentage of breast cancer among Arab women; distributed over age, country, and cancer type.

**Keywords**—Breast cancer; Arabic e-content; Arabic e-portal model; Arab women; Portal specifications

## I. INTRODUCTION

Cancer is a group of factors that cause body cells to change and spread out of control. Most types of cancer cells form a mass called a tumour [1]. As one of the most popular cancer types; breast cancer is detected either during a screening examination, before symptoms have developed, or after a woman notices a mass [2]. In addition, the prognosis of invasive breast cancer is strongly influenced by the stage of the disease [2-4]. Early detection of breast cancer varies depending on a woman's level of awareness [5]. It is important for Arab women to know this and other information for breast-cancer prevention, early detection, and treatment.

## II. PROBLEM STATEMENT

Arab societies suffer from the spread of breast cancer, lack of prevention and delayed detection. The main reasons for this are the lack of knowledge of Arab women and their lack of awareness of these points, as well as the dispersion and lack of sources of information in this regard and the difficulty of accessing accurate information. International organizations active in the health sector also spend millions of dollars on printed publications distributed in clinics and hospitals in the Arab countries to convey some simple information about breast cancer awareness. These publications do not include everything women need and there is no interaction between women, doctors and other disabilities. Therefore, there is a real gap represented by the lack of such Arabic electronic platform, this gap has caused the following problems:

- The delay of Arab women in the detection of infection
- Lack of know-how in prevention methods
- Fear of examination and treatment
- The futility of treatment for delayed detection
- Community illusions that prevent examination
- Difficulty in obtaining breast cancer information

- The high cost of printed publications distributed in the Arab world
- Publications are inefficient means in the age of technology

Specifically, women in the Arab world do not have enough knowledge and awareness about breast cancer, its reasons or how could it be early detected [2, 5, 6]. One of the main reasons for this lack of knowledge is the absence of the related Arabic content over the internet, while this content is available as an unstructured scattered data in many sources, hospital systems' data and other related systems' data [7-9]. In addition, due to the lack of awareness, there is a severe drop in the number of women who go for a breast cancer test, despite this being the most common cancer among women in the Arab countries [2]. Sometimes, Arab women tend to ignore the test because some still believe it is a death sentence, and others think that they would rather die of cancer than lose their breast. They become worried about their husbands' reaction and think all cases end in mastectomy (total removal of breast), while some of them prefer not to know or discover the disease in an attempt to protect their daughters, as they think cancer is hereditary and people might not propose to their daughters, although hereditary forms of breast cancer constitute only 5 to 10 percent of overall breast cancer cases [2, 6, 10].

### III.OBJECTIVES

The research aims to:

- identify the breast-cancer "lack of awareness" gap and its reasons*
- identify the problems available in the Arab countries due to such gap*
- define and design a model as a base for building electronic portals with Arabic content that address these problems*
- evaluate the model using interviews with experts*

### IV.STATISTICS ABOUT BREAST CANCER AWARENESS IN THE ARAB WORLD

Within the Arab world that is composed of 22 countries; incidence numbers of statistics about breast cancer disease have increased gradually in the period from 1990 to 2016 as shown in Figure 1. The increase rate is nearly similar to the global statistics; without any intervention in the Arab world. It is expected that the incidence will continue to increase over the next decade, both globally and in the Arab world as shown in Figure 1. The incidence of breast cancer in 2016 among women in the Arab countries (28/100k), which is lower than the global average (46/100k). However, compared with those in Western Europe (148/100k), the incidence rates were lower. The overall burden of suffering in terms of DALYs was also lower in Arab countries [11].

DALYs are defined by the WHO (World Health Organization) as: One DALY represents the loss of the equivalent of one year of full health. DALYs for a disease or health condition are the sum of the years of life lost to due to premature mortality (YLLs) and the years lived with a disability (YLDs) due to prevalent cases of the disease or health condition in a population [12].

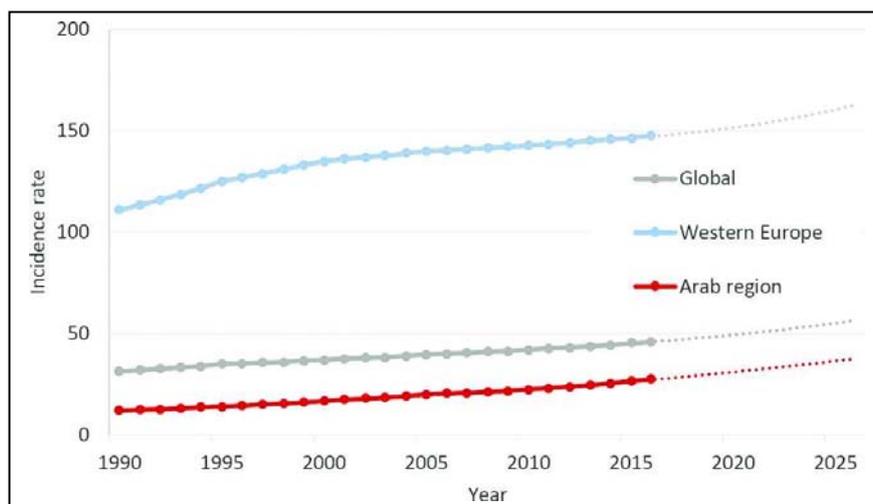


Fig. 1. Breast cancer numbers in the Arab countries from 1990 to 2016 and expectations up to 2025 are in dotted lines [11].

Arab countries with more development and higher income have a higher suffering from breast cancer; Lebanon had the highest incidence rate among Arab nations, followed by Bahrain and Morocco. Generally, the death has similar rates as well, with more deaths per 100k in the more developed Arab countries. Countries such as Egypt, Morocco, and Iraq, which have large populations, had the highest total number of deaths. However, the true burden of suffering is reflected by the rate of DALYs, as shown in Figure 2.

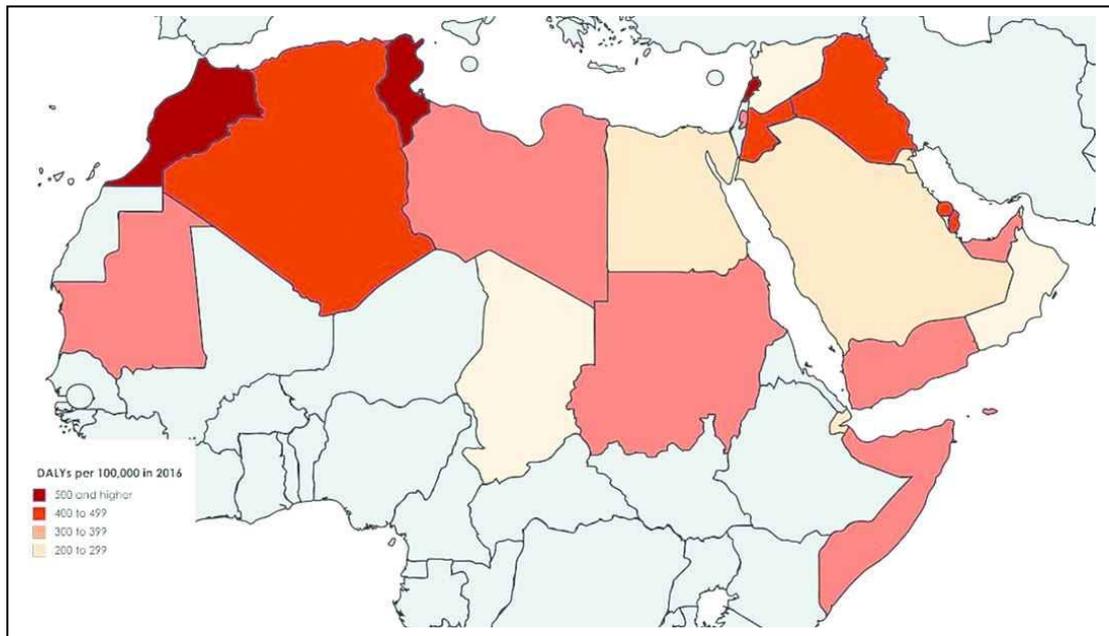


Fig. 2. Geographical distribution of breast cancer burden in the Arab countries, 2016. DALY rates per 100,000 persons in 2016 [11]

Analysis of breast-cancer occurrence by age shows that the rates among younger women (30–59 in age) are not so much different from their global equivalents; as explored in Figure 3. By contrast, regarding older Arab women (60+ years old) were lower.

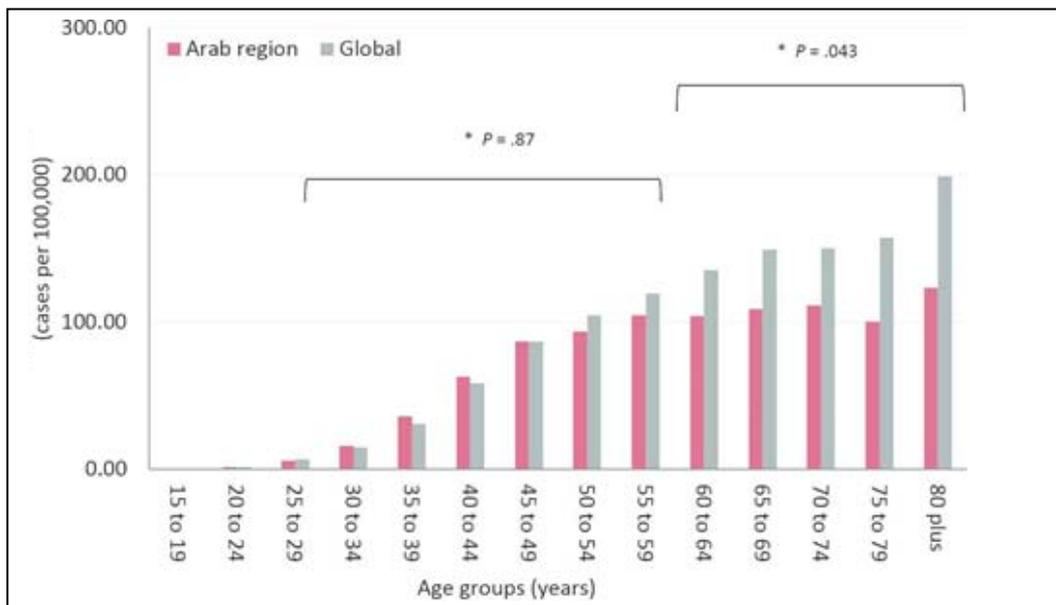


Fig. 3. Age distribution of breast cancer incidence in the Arab world, 2016 [11]

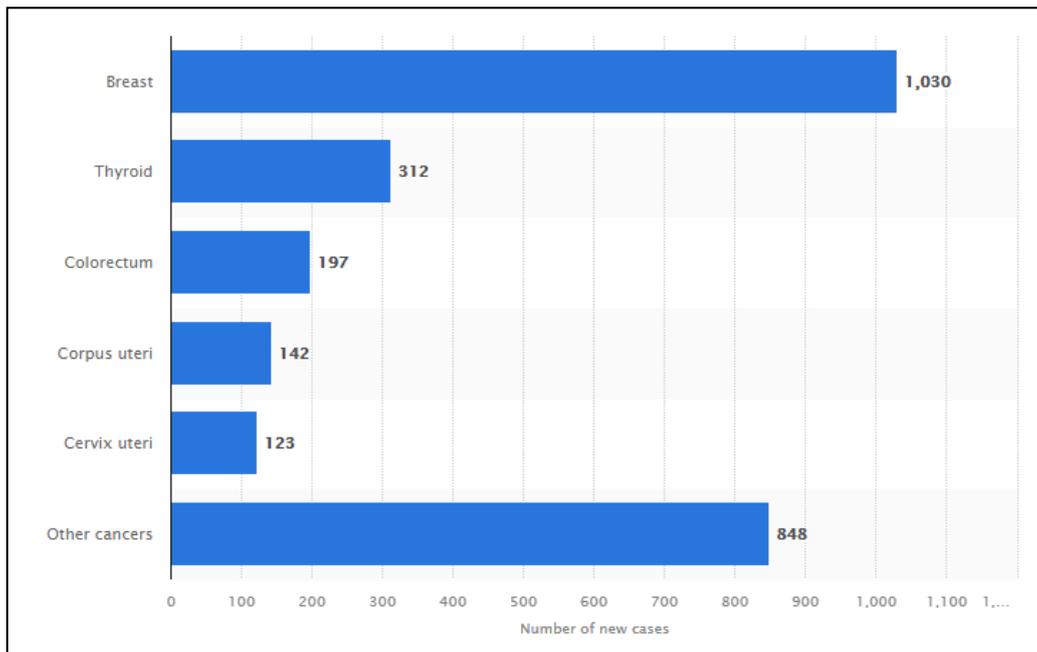


Fig. 4. Cancer number of cases in UAE classified by cancer type [13]

Furthermore, as a sample of the increasing number of new cancer cases among the female population in a sample Arab country, which is the United Arab Emirates (UAE), a research published by Statista Research Department, Oct 13, 2021; shows that In 2020, the number of new breast cancer cases amongst women in the United Arab Emirates totaled 1,030. In that year, the total number of new cancer cases of the general population was at over 4.8 thousand, and there were 1,896 cancer deaths, as shown in figure 4. In addition, the figure shows that breast cancer occupies the highest percentage among other cancer types [13].

### V. CONTRIBUTION

In addition to the above summarized statistics, an original novelty “as a result to this research work” has been made. This novelty is a conceptual model that includes specifications, architecture, phases and required activities; as a base for those who intend to build electronic portals with Arabic content for breast-cancer prevention, early detection, and treatment. The Arabic content of such portals is supposed to be generated from different sources including: users, related big data over the internet, hospital computerized systems, research centers, and other related institutions. Those portals should provide patient education, an overview of appointments, access to the electronic medical records (EMR), patient-reported outcomes plus feedback and physical activity support. In addition, it is supposed to provide statistical reports that are generated based on different heterogeneous data sources of different breast-cancer medical institutions and big data in the related field over the internet [1, 8]. The data of these sources could be extracted, transformed and loaded to a data warehouse repository using a data warehouse tool or a web service. After that, certain statistical reports could be generated based on the clean loaded data. These generated reports are supposed to be plugged to the portal as loosely coupled portlets.

### VI. THE CONCEPTUAL MODEL

The conceptual model is shown in Figure 5 as an output of this research, the model consists of four phases; that can lead to achieving an e-portal for breast cancer with Arabic content; conditioned that these phases are followed. Figure 5 illustrates these phases. The first phase shows the problems’ sources. These problems constitute the base reasons for developing a breast cancer e-portal with Arabic content, and these problems make it clear about the modules to be included in the portal. Upon the completion of this phase, a complete awareness of the problems will be achieved, which leads to expecting the modules the portal should include. Within the second phase, an intensive literature review should be done, specifically for any portals with similarities or any Arabic web content, as well as researches in the domain. This will result in an initial definition of the portal’s specifications such as architecture and modules. The third phase refines these specifications before realizing it by a portal

prototype. Eventually, the 4th phase focuses on testing and validating the portal prototype to announce it as an e-portal with Arabic content about breast cancer.

Specific methods should be used to define, test and verify the portal that should be realized by developing a prototype for testing and validation purposes. Analysis, design, development, and deployment tools are supposed to be used for the implementation of that prototype, and the prototype could also be evaluated using a case study. The completion of this phase will lead to achieving the goal of the desired portal.

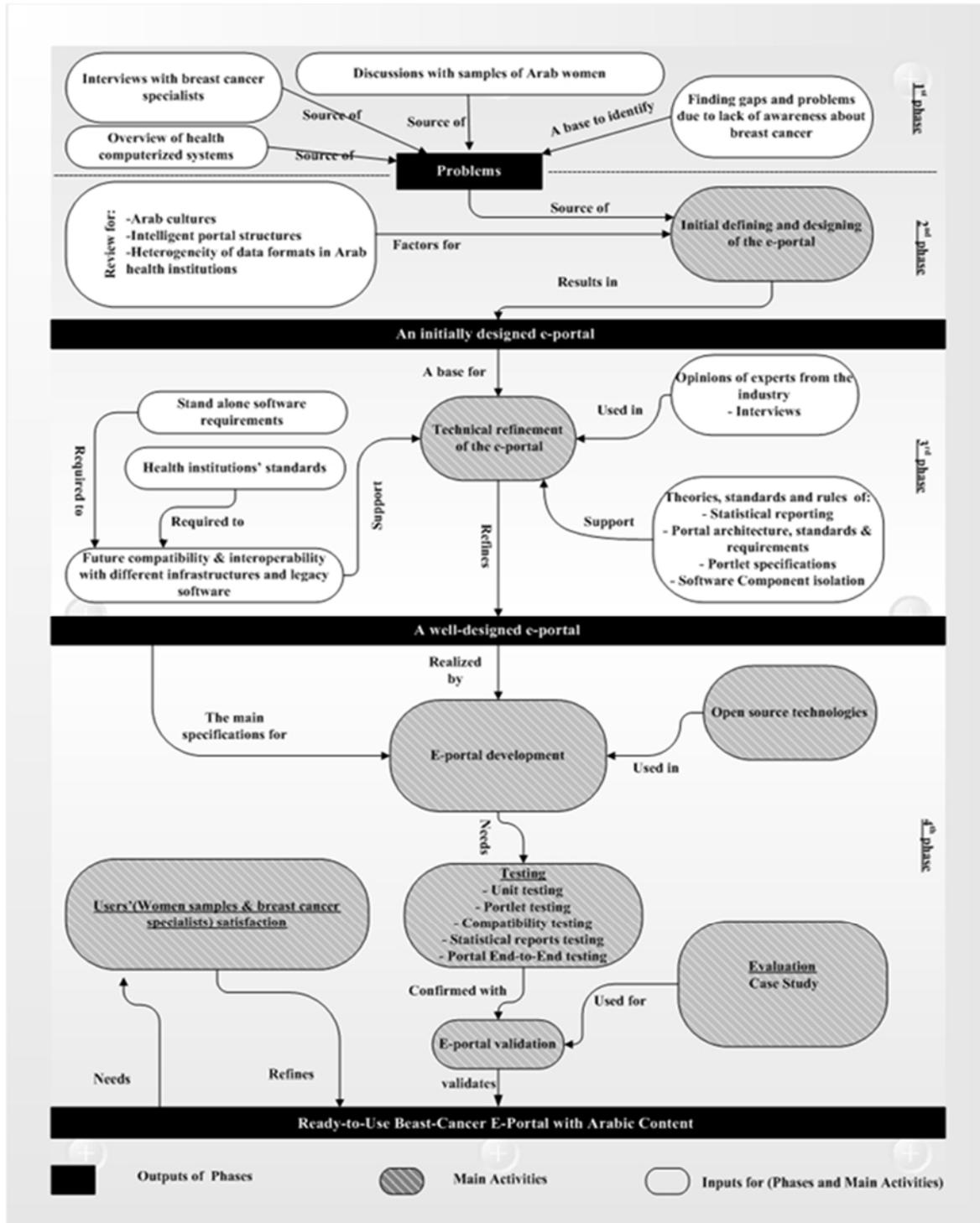


Fig. 5. Conceptual Model for Building Breast-Cancer E-Portals with Arabic Content

VII. EVALUATION

Eight interviews with 8 person were conducted to evaluate the conceptual model, 5 of them were selected from the IT field, they are professionals in e-portals’ analysis, design, development, testing and evaluation, the 6th person is from the medical field, while the 7th and the 8th are two knowledgeable Arab women. In Table I, the responses of respondents on the interview questions show an excellent level of satisfaction. The evaluation process evaluates the percentage of satisfaction level of the respondents. Table I shows the average level of satisfaction among the 8 respondents.

TABLE I. EVALUATING THE LEVEL OF SATISFACTION OF THE MODEL

No.	Parameter	Description	0%	25%	50%	75%	100%
1	The real need for the model	Is the model needed for the IT companies to implement Arabic breast-cancer portals?					✓
2	Model Structure and specifications	Do the model’s structure and specifications enough as a base to build portals.					✓
3	Applicability of the model	Is it easy to build breast-cancer e-portal with Arabic content based on the presented model?				✓	
4	Expected effect of realizing the model	Will building such portals increase the level of awareness, prevention, early detection, and treatment of breast cancer?					✓

The overall evaluation process showed that the level of satisfaction of the interviewees was excellent by the respondents with an average satisfaction percentage of 93.75%.

VIII. CONCLUSIONS

This concept paper has concluded the status of breast cancer in the Arab countries. In addition, it has highlighted the negative effects and problems as results of the shortage in Arabic e-content and e-portals about breast cancer. As a solution to the resulted problems, this research has contributed to the knowledge by inventing and exploring a conceptual model for building breast-cancer e-portals with Arabic content. The model was evaluated by specialists , and the result of evaluation has given an excellent satisfaction level.

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- Best Award in Malaysia Technology Expo 2011 (MTE 2011).
- Gold medal in Malaysia Technology Expo 2011 (MTE 2011).
- Silver Medal in Seoul International Invention Fair 2011 (SIIF 2011), South Korea.
- Gold medal in Malaysia Technology Expo 2012 (MTE 2012).