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Barriers Impeding Early Detection of Breast Cancer in Iraq: A Critical Analysis

Mina Maallah[1*], Justin J. Needle[2], Nada Alwan[3]

London North West University Healthcare NHS Trust, Watford Road, Harrow, HA1 3UJ, United Kingdom[1]
Centre for Health Services Research, School of Health and Psychological Sciences, City, University of London, London EC1V 0HB, United Kingdom[2]
College of Medicine, University of Baghdad, Baghdad, Iraq[3]

Corresponding author: 1*

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ABSTRACT

Breast cancer (BC) patients in Iraq tend to be diagnosed at advanced stages and among younger age groups compared to their counterparts in high-income countries, which has led to a higher BC related mortality rate in Iraq. The aim of this paper is to identify the barriers impeding early detection of BC among Iraqi women. The Social-Ecological Model and the knowledge, attitudes and practices framework were used for the analysis. Gaps in awareness of BC-related facts are still present among Iraqi women which are negatively affecting their attitudes and practices towards the early detection of the disease. Women highlighted their concerns regarding losing family support if they were diagnosed with BC. Those living in rural areas and internally displaced populations face difficulties in reaching specialised health centres. There are deficiencies in the required human resources and infrastructure available to the breast cancer early detection programme as it lacks direct budget allocation from the government. Other obstacles include poor implementation of the national protocol guidelines and weak monitoring and evaluation systems. There is an urgent need to adopt comprehensive national protocol guidelines for early detection of BC in Iraq, in line with recommendations of the Breast Health Global Initiative for LMICs.

1. Introduction

Breast cancer (BC) is the most common type of malignancy globally and is the most prevalent cancer among women in both developed and developing countries [43]. Higher survival rates are observed among patients living in high-income compared to low- and middle-income countries (LMICs), where BC is the most common cause of cancer-related mortality among the female population [44] (Figure 1). The higher mortality rate in LMICs is mainly attributable to the advanced stages of the disease at the time of presentation [36], [15].

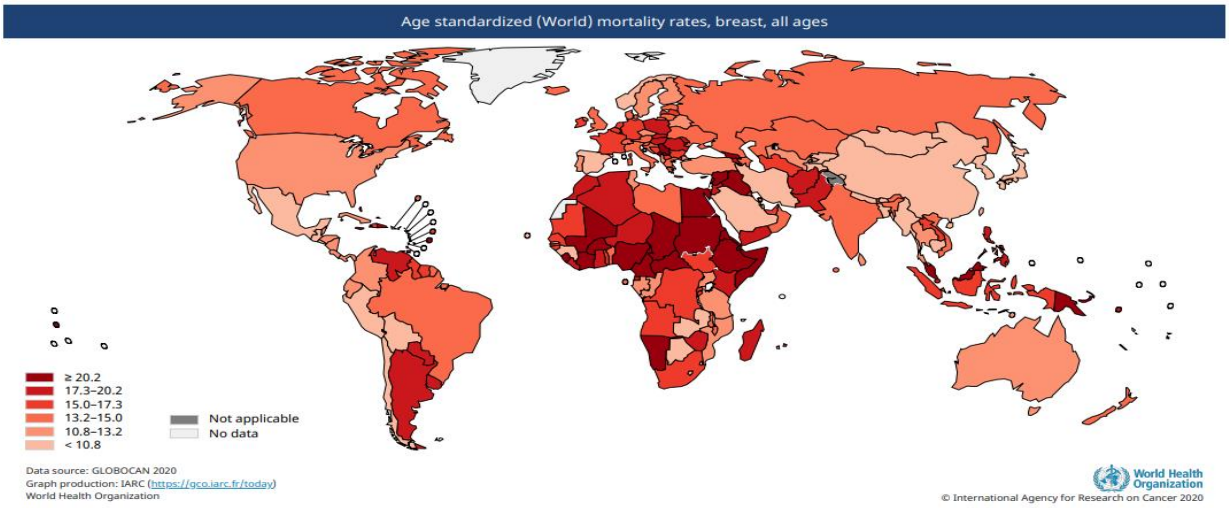

Figure 1. Estimated age-standardized mortality rates (World) in 2020, breast, females, all ages [44]

Although the incidence of BC in the Eastern Mediterranean Region (EMR) is lower than that recorded in more developed regions, mortality rates continue to rise. Regional data indicate that a large proportion of diagnosed cancer cases are detected at advanced stages, leading to poor prognosis even with the provision of adequate treatment [53], [5].

With the objective of controlling cancer in resource-limited settings, the World Health Organization (WHO) introduced a cancer control strategy based on promoting prevention, early detection, treatment, and palliative care [51]. It has been recommended that, in the absence of the required infrastructure and qualified workforce in LMICs, there is an urgent need to increase awareness among the female population of the signs, symptoms, and risk factors of BC [29].

In Iraq, a middle-income country within EMR, BC is the most common registered malignancy among the general population and the second highest cause of cancer-related mortality. The incidence rate of BC has risen from 9.5/100,000 in 2009 to 18.2/100,000 in 2019 [57]. Numerous studies have illustrated that the rising incidence of the disease among Iraqi females is accompanied by a tendency to present at more advanced stages and at younger ages at the time of diagnosis compared to their western counterparts [15], [10].

The Iraqi health system has been experiencing challenging circumstances since the 1980s, as a result of continuous wars, conflicts and population displacement that led to the deterioration of health indicators and capacities within the country [73], [61]. Nevertheless, initiatives have been put in place to strengthen the system, which have led to improvements in some health indicators [15].

The breast cancer early detection (BCED) programme has been established since 2000 by the Iraqi Ministry of Health and Environment (MoH) to promote early detection of BC in an attempt to downstage it at presentation and decrease related mortalities. These efforts were supported by the establishment of the Iraqi National Cancer Research Centre (INCRC) by the Ministry of Higher Education and Scientific Research (MoHESR) in 2012 [9], [69].

In 2012, a regional comparative BC research project was developed in EMR through a collaboration of the WHO Regional Office for the Eastern Mediterranean (WHO EMRO), INCRC, IARC, Susan G. Komen Breast Cancer Foundation and the International Atomic Energy Agency [8]. The IARC and the Iraqi cancer

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Volume 62, Issue 07, September, 2022

Board established a Memorandum of Understanding "to conduct high-quality, evidence-based research in cancer prevention and control" [10].

The cancer control and prevention, diagnostic and treatment services provided within the public sector in Iraq are provided free of charge. Additionally, the MoH has recently involved the private sector in helping to address the needs of cancer management services within the public sector [8], [10].

A retrospective study investigating the clinical and pathological characteristics of 360 BC patients presenting at the BCED referral centre at Medical City Teaching Hospital and at the INCRC in Baghdad reported positive outcomes of the BCED programme. This was reflected in a reduction in the proportion of patients diagnosed at stage IV at the time of presentation to 9.1%, compared to the 15.7% reported by a study conducted at the same referral centre nine years earlier [17]. However, the findings of this study still show a high proportion of patients diagnosed at advanced stages (III and IV) at the time of presentation.

Nevertheless, according to data published by [44], the reported BC-related mortality rate in Iraq is still among the highest worldwide, suggesting the presence of significant obstacles limiting the participation of Iraqi women in the BCED programme [8], [10]. The aim of this study is to address the barriers to early detection of BC among Iraqi women that lead to late stage at presentation and ultimately poor prognosis.

2 Materials and Methods

2.1 Literature search

A search for academic primary studies, systematic reviews, reports and policy documents was conducted. The following databases were searched:

- Academic Search Complete (EBSCOhost)
- CINAHL Plus with Full Text (EBSCOhost)
- Health Policy Reference Center (EBSCOhost)
- SocINDEX with Full Text (EBSCOhost)
- Medline (Ovid Online)
- Global Health (Ovid Online)
- Google Scholar and the Google UK search engine

In addition, the following organisational websites were searched:

- WHO
- World Bank
- UNICEF
- Iraqi official websites (MoH and MoHESR)

2.2 Theoretical frameworks

Barriers to participation in the BCED programme impeding early detection of BC among Iraqi women were analysed using the Social-Ecological Model (SEM), which comprises five interactive levels (individual, interpersonal, organizational, community and policy) at which barriers may arise [25] (Figure 2).

The Knowledge, Attitudes and Practices (KAP) framework, which is frequently employed in health-seeking behaviour research, was also used to investigate barriers at the individual level [67].

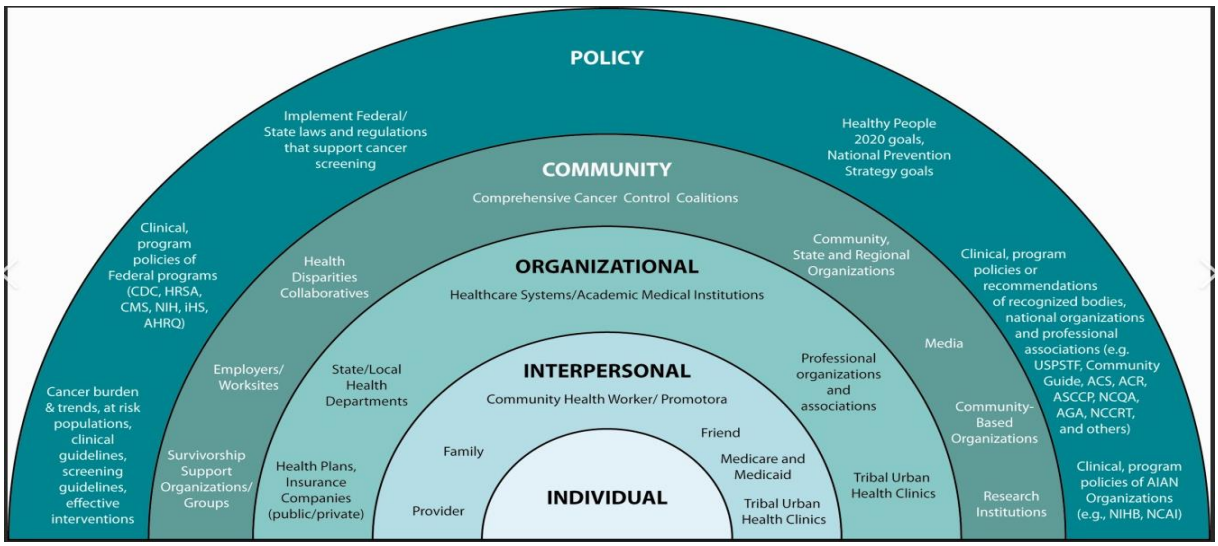

Figure 2. The Social-Ecological Model [25]

3. Results and Discussion

3.1 Individual level

Several studies have been published exploring the knowledge, attitudes and practices of Iraqi women relating to early detection of BC and BC screening programmes. Most of those studies have addressed "knowledge" as the awareness of the study population of BC-related facts, whereas "attitudes" concerned individuals' beliefs and perspectives towards the early detection of BC, including their cultural and religious acceptance of and compliance with the BCED programme. "Practices", on the other hand, mainly focused on practicing breast self-examination (BSE) and the reasons for not performing it.

3.1.1 Knowledge of BC-related information

A study conducted in 2010 among a population of 387 (85 males and 302 females) students, teaching and administrative staff affiliated to two Iraqi Universities revealed that over 70% did not have previous knowledge about the prevalence of BC in Iraq [13]. Although approximately 74% were aware that early detection is the most important measure for controlling BC, less than 50% were able to identify the specific measures that should be used. A wide range in the frequency of correct answers (17%-72%) was observed regarding the different risk factors for BC. However, it is interesting to note that almost 72% were able to recognize the possible methods for BC prevention. The researchers concluded that overall knowledge was relatively low, as almost half of the study sample scored less than 50%. The findings of the study were cited by IARC/WHO, who emphasized the necessity of strengthening national efforts to promote public awareness about BC in developing countries [71].

However, it should be noted that [13] study focused on a sample of educated Iraqi women. According to the [78], [79] in 2012, literacy rates among the Iraqi general population and the female population between the ages of 15-24 years were around 77% and 69%, respectively. This means that around 30% of the female population were illiterate and were not represented in that study's sample. Additionally, it is clear that most of the seminars and educational campaigns that have been conducted, specifically those led by the INCRC, focused on educated rather than illiterate women [10].

Another KAP study targeted a population of 508 females recruited by four NGOs for women's and children's well-being in Baghdad City, the capital of Iraq. Although it was carried out three years later, it

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demonstrated a lower overall knowledge score of BC-related facts as over 60% of that population answered less than half of the questions correctly [40]. Another study, published in 2017, among women visiting the Oncology Teaching Hospital and the INCRC, comprised two groups: 100 females diagnosed with BC compared with a control group of 100 women who were considered healthy [11]. Among the BC patients and the control groups, 54% and 40% respectively, answered more than 90 percent of the questions correctly. The notably higher knowledge scores in this study evidently demonstrated the beneficial role of the educational campaigns promoted by INCRC in raising the level of awareness among the Iraqi population.

In the Kurdistan Region of Northern Iraq, 400 Kurdish women visiting the primary healthcare centres (PHCs) and the maternity teaching hospital in Erbil governorate were enrolled in a study employing the convenience sampling technique. The overall results of the study demonstrated an acceptable level of knowledge: around 95% and 56% of the study sample were familiar with the concept of BC and with screening mammography, respectively. Although about one-third of the sample mistakenly thought that BC is preventable, 88.3% were aware that delaying treatment can lead to a fatal prognosis. The authors reported that higher levels of BC-related knowledge were significantly associated with higher socioeconomic status and recommended targeting groups with lower socioeconomic status in future awareness campaigns, emphasizing the importance of cultural barriers [42].

A 2016 study investigated the factors affecting the participation rate of screening mammography among a sample of 100 women who visited the Oncology Hospital and the INCRC in Baghdad. Almost 85% of respondents agreed that mammography is a useful tool, however, 18%, 21% and 21%, respectively, thought that mammography examination is used to treat BC rather than to diagnose it, that it can cause cancer, and that it is a painful procedure. Over 10% thought that BC is contagious, while 87% and 80%, respectively, were aware that BC has better prognosis if diagnosed early and that it is curable [4].

Several of the published KAP studies involved mainly working Iraqi women. According to the [80], the labour force participation rate of Iraqi females in 2015 was only 15% of the total Iraqi female population aged over 15 years. That percentage dropped to 12% in 2019. This can produce another source of selection bias, potentially affecting the generalizability of their results.

Apart from focusing on the educated and working Iraqi female population, other factors may limit the generalizability of the result of the aforementioned studies. For example, the first three studies discussed above mainly recruited individuals attending Baghdad Medical City, who are not representative of the wider Iraqi population. Furthermore, questionnaires were usually distributed during symposiums and educational sessions and completed in groups, which might have caused contamination bias. Nevertheless, delivering the questionnaire through face-to-face contact in a closed event might have played a role in increasing the response rate [60], [32]. The majority of the studies did not address including random sampling or carry out power calculations to identify appropriate sample sizes [21], [49]. No assessments of the validity of the utilized questionnaire were reported and many questions were closed-ended, which usually limits the amount and quality of the yielded information [26].

3.1.2 Attitudes and beliefs towards early detection of BC

A retrospective study published in 2010 investigated the demographic and clinicopathological characteristics of the 721 patients diagnosed with BC from a total of 5,054 females who presented with palpable breast lumps at the main referral centre for early detection of BC in Baghdad during the period February 2004 to April 2008 [7]. It reported that around 72% of the 721 patients diagnosed with BC were

living in urban areas. Out of the 90.6% who detected the lump by themselves, only 32% sought medical advice within the first month, whereas 16.2% of them did so after one year. As a result, 47% of the BC cases were diagnosed at advanced stages at the time of presentation. The study reflected the ignorance among the Iraqi female population of the significance of detecting BC at an early stage.

On the other hand, a study published in 2017 showed a fairly positive attitudes of the study participants towards seeking diagnostic medical advice, attending Clinical Breast Examination (CBE), and undergoing diagnostic mammography and biopsy tests when needed [11]. However, they still preferred to be examined by a female doctor. That study also reported a positive response with regards to having the courage to be confronted with a diagnosis of BC. This differs from the findings of a study conducted among Iraqi Kurdish women [42], which reported that 49.8% of participants did not attend screening mammography tests for the fear of being diagnosed with BC.

Another study conducted among Iraqi women which focused on screening mammography, reported that 77% confirmed their approval to participate in screening mammography, although almost one-quarter did not consider BC screening a priority [4]. Over 90% were in favour of seeking medical advice in the event of experiencing a breast complaint, but only 76% expressed a willingness to undergo diagnostic beast workup. This could be attributed to the fact that almost one-fifth of the study population believed that the radiation from the mammography examination could cause cancer and 12% were afraid that it might be painful. Nevertheless, over 90% of the participants expressed their interest in improving their knowledge regarding BC risk factors and in helping to advocate for the INCRC awareness program. The authors reported that 86% and 91%, respectively, did believe that screening mammography is neither against their religious beliefs nor their cultural traditions. This was in accordance with the findings of a similar study among the Iraqi females [11]. The previously discussed limitations within the Knowledge section above also apply here, which can limit the generalizability of the results.

3.1.3 Practicing breast self-examination

BSE has been considered a mean of promoting awareness for early detection of BC rather than a BC screening tool [70]. The Cancer Research Foundation in the United Kingdom has emphasized the importance of women being familiar with the regular shape and texture of their breasts so that they are able to detect abnormal changes and seek medical advice as early as possible [24]. Likewise, in the United States, the [59] recommends that females should perform BSE once every month. In that country, about 40% of BC cases are detected by women themselves prior to seeking medical advice.

In Iraq, in the previously mentioned study, almost 90% of the 721 BC patients reported detecting the breast lump by themselves [7]. However, 47% of the sample were diagnosed at an advanced stage. Likewise, a retrospective study conducted among 60 females visiting Al-Kindy Hospital Breast Clinic in Baghdad complaining of finding a breast mass reported that 88.3% detected the mass by themselves through BSE [3].

[13] reported that, despite the fact that almost 90% of their study sample was aware of BSE, only 48% practiced it. The main reasons for not performing BSE were not having sufficient knowledge of the correct technique (48.3%), lack of confidence in their examination (33.1%) and lack of belief regarding its benefits (7.4%). Only 12.8% chose being afraid of detecting a breast lump as a reason. Another KAP study, conducted among an educated sample of 256 females and 48 males affiliated to the University of Kirkuk, illustrated that practicing BSE was significantly associated with older age groups and higher levels of knowledge of BC preventive and screening measures [14]. In both studies, about 84% and 90% of the samples, respectively, expressed their readiness to cooperate with the INCRC in instructing other females in

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Volume 62, Issue 07, September, 2022

the correct technique for BSE, suggesting a constructive attitude towards promoting education for early detection of BC. However, it is unclear whether these views were put into practice.

A significant association between older age groups and practicing of BSE was also reported by [40]. In a later study, the same authors reported a significant association between working women and more positive attitudes towards the BCED programme [39].

In addition to the previously mentioned limitation within the knowledge and attitude sections, questions regarding performing BSE in the addressed studies above could have produced confirmation bias which might have affected the validity of their results [6].

3.2 Interpersonal level

3.2.1 The role of family and friends

In one survey [4], over 80% of participants reported that they had been advised to undergo mammography examination by their family or friends. Nevertheless, almost half of the study sample expressed concerns about being divorced by their husbands if they were diagnosed with BC and 26% believed that a diagnosis of BC could bring shame on the family.

In another study [11], participants diagnosed with BC confirmed the importance of targeting the entire family in the educational campaigns, rather than focusing exclusively on women, and both groups (the BC patients and the controls) reported a positive attitude towards raising awareness of Iraqi men for early detection of BC due to their influential role in encouraging women to engage in the BCED programme. However, most participants in that study believed that being diagnosed with BC did not bring disgrace to the family, nor lead to divorce. The same pattern was also reported in another study conducted among paramedical staff in Iraq [12], which revealed that 87% of participants strongly supported educating men regarding breast cancer. However, the authors reported that about three quarters of participants believed that they might be rejected by their husbands if they got diagnosed with BC, 61% felt it could bring disgrace to the family, and 68% believed that women lacked the required family support. These findings highlight the importance of targeting the community in general, rather than focusing only on women, when advocating for the BCED programme.

3.3 Organizational level

3.3.1 Shortage of healthcare professionals

Since the US-led invasion in 2003, physicians working in Iraq have been living under the continuous threat of kidnap, murder and blackmail on account of their being drawn from the educated upper echelons of society [35], [50]. An estimation of 320 doctors have been killed in Iraq since that war and almost 20,000 doctors had left Iraq since the 1990s, when the UN sanctions were imposed against the country. This situation has driven many elite Iraqi doctors to emigrate, leaving behind a corrupted and collapsed healthcare system responsible for a population of 38 million people [2]. Indeed, practicing medicine in Iraq had become more dangerous after several reported cases of physicians being attacked by their patients' families following the disclosure of bad news. A report published in the Lancet Oncology on cancer control in war-torn Iraq clearly illustrated how such an atmosphere negatively affected cancer management in the country [15].

Apart from the threats of assassinations and abductions, Iraqi health professionals faced several obstacles that impeded their daily routine performance, including continuous political disputes and instability, poor health system infrastructure and training programs, inadequate equipment, shortage of medical

professionals and administrative employees, a lack of incentives, and insufficient salaries [62]. Despite a rise in the numbers of doctors, nurses and midwives working in Iraq since 2017, the country still faces a shortage of doctors compared to other countries within the EMR [72].

In order to address the shortages of doctors, the MoH and MoHESR focused their efforts on establishing more medical colleges in Iraq. As a result, the number rose from seven in 2003 to 23 in 2012 [48].

3.3.2 The role of healthcare providers

The important role of healthcare providers in educating women regarding BC and BSE has been well established [34], [52], [12]. Additionally, the importance of nurses in promoting BC awareness in rural areas has also been emphasized [38].

Previous studies among the Iraqi population have demonstrated a weakness in the participation of healthcare providers in promoting BC awareness [13], [12], [42]. In those studies, it was also noted that most participants obtained information regarding BC from sources other than healthcare professionals.

Another study conducted among students from the final two years of a nursing high school in one of the Iraqi governorates reported that more than half of the study sample gave accurate answers to less than 50% of the questions addressing BC risk factors [30]. Only 26% reported that healthcare providers and nursing schools were their main sources of information about BC, reflecting poor cooperation between the MoH and the BCED programme in terms of including the relevant content within the curriculum of nursing high schools.

The above considerations highlight the gaps in the KAP of Iraqi healthcare personnel regarding BC, which constitute significant barriers to promoting early detection.

3.3.3 Lack of adequate diagnosis and treatment resources

The annual report of the Iraqi MoH demonstrated that in 2020 there were only 3.09 and 0.20 laboratory staff and oncologists per 10,000 population, respectively. It was also reported that there were 1.2 community medicine and public health specialists, 0.1 pathologists, 1.6 specialists in diagnostic radiology and 2.8 general surgery specialists per 100,000 population (MoH, 2021). A total of 70 items of BC screening equipment in Iraq were recorded. Although the type of equipment was not specified, the report was probably referring to mammography devices, as the numbers of ultrasound, MRI and CT scanners were separately reported. Data regarding the precise numbers of PHCs and specialized centres involved in the BCED programme are not available.

The same report stated that in 2020, more than 50% of outpatient visits to primary and tertiary healthcare centres within the public sector, including specialist consultation clinics, were made by the female population. This reflects the adequate accessibility of Iraqi women to healthcare facilities (MoH, 2021).

However, that report lacked data from some Iraqi governorates, which casts doubt on its reliability and generalizability. Nevertheless, it does illustrate clear weaknesses in the BCED programme with regards to the adequacy and availability of both human resources and healthcare infrastructure.

Regarding the satisfaction of the female population with the programme, whereas 21% of a sample of Iraqi women expressed a preference for attending mammography examination outside the country [4], reflecting a lack of confidence in the reliability of the available BC diagnostic services within Iraq, another survey

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Volume 62, Issue 07, September, 2022

reported that a majority of women had a positive attitude towards attending BC examination work up inside the country. Nevertheless, participants in the same study had negative attitudes towards attending screening mammography examinations if they did not have a breast complaint [11].

3.4 Community level

3.4.1 Role of the media

Several studies investigating BC-related KAP conducted in Iraq and other countries within the EMR have shed light on the role of different types of media, including television, radio and the internet, in raising awareness about BC [13], [40]. One of these studies reported that 55.9% and 4.8% of the study participants gained their information about BC and BSE from the television and radio, respectively [13]. Similar results were reported by a study involving a sample of educated Iraqis in Kirkuk, in which the majority stated the television was the main source of their information regarding BC and BSE [14]. This highlights the important role played by the media in raising awareness.

A study conducted in 2014, investigated media usage among adults living across all 18 Iraqi governorates covering a population of over 20 million people [23]. It showed that around 97% of Iraqi households have satellite television, one of the highest rates in the Arab region, compared to access to radios of around 53%. Furthermore, according to the [81], 93% of Iraqis had a mobile phone subscription in 2020. It would therefore appear that mobile phone-based awareness campaigns could have the potential to be a powerful tool for educating the Iraqi population about BC.

However, over recent years, a large proportion of Iraqis have been displaced from their homes as a result of political conflict [63]. In 2021, the number of internally displaced people in Iraq was 1,187,000 [46]. Regrettably, this population is likely to have restricted access to some forms of media, limiting the potential role of the media in educational campaigns.

3.4.2 Geography-related barriers

Iraqis living in rural areas face a number of geographical barriers to access BC care. According to the [82], around 71% of the Iraqi population was living in urban areas in 2021. The remaining 29% (11,893,008 people in 2021) inhabit rural areas, which creates difficulties in reaching tertiary healthcare centres. Around 30% of the rural population was living below the poverty line in 2012 [45]. As a consequence of the continuous political instability and terrorist attacks witnessed in rural areas over previous decades, the health services provided within those areas struggled to cover the needs of the population, especially displaced families [41].

A study conducted in 2016 among women visiting the oncology centre in Baghdad reported that 48% and 35% of the participants, respectively, had concerns regarding road safety and faced problems while traveling to the nearest BC screening centre [4].

Although the BCED programme has progressed to involve PHCs, there are no published data regarding the distribution of PHCs within rural areas that are involved in the programme.

3.5 Policy level

3.5.1 National protocol guidelines for early detection of BC

Although guidelines for the implementation of the BCED programme have been established, they have not yet been fully implemented at a national level, specifically in relation to the management of diagnosed cases [9]. No robust systems have been put in place to evaluate the implementation or the outcomes of the

programme and the surveillance system is still suboptimal [15].

A study assessing the quality of health services of the BCED programme provided within PHCs in Baghdad reported that the programme had the capacity to achieve less than two-thirds of its strategic targets [1]. Although the study, which enrolled 220 females who had participated in the BCED programme, reported high levels of satisfaction with the provided health services, it highlighted several weak points within the system. These included deficiencies in the nursing staff and poor quality registration and documentation procedures relating to the results of the diagnostic tests. Despite the fact that the progress in achieving the programme's targets was impeded by upheaval in some governorates as a consequence of continuous wars and conflicts, where many trained personnel left and a considerable volume of equipment was either destroyed, looted or stopped working due to lack of maintenance, the programme is nevertheless still working towards achieving its objectives [15] and most women participate through self-referral [64].

3.5.2 Financial barriers

Despite the fact that the Iraqi health system offers free services to its population, there is still a significant shortage of cancer care services, including well trained staff, diagnostic imaging and laboratory equipment, cytotoxic drugs, and radiotherapy machines [50], [47], [33]. As stated by a former Iraqi Minister of Health, healthcare is not a priority within the Iraqi government's policy agenda [2]. Until now there is no specific fund allocated to support the cancer control programme in Iraq [10].

4. Recommendations

According to the breast health global initiatives (BHGI) guidelines for LMICs and following a comprehensive review of the BCED programme in Iraq, excluding the presence of opportunistic screening mammography initiatives, the programme can be placed within the 'Limited' resources category [20] (Table 1).

Table 1. Resource allocation for the healthcare system and public policy according to the BHGI Guidelines [20]

Level of resources	Detection method(s)	Evaluation goal
Basic	Breast health awareness (education ± self-examination) Clinical breast examination (clinician education)	Baseline assessment and repeated survey
Limited	Targeted outreach/education encouraging CBE for at-risk groups Diagnostic ultrasound ± diagnostic mammography	Downstaging of symptomatic disease
Enhanced	Diagnostic mammography Opportunistic mammographic screening	Opportunistic screening of asymptomatic patients
Maximal	Population-based mammographic screening Other imaging technologies as appropriate: high-risk groups, unique imaging challenges	Population-based screening of asymptomatic patients

The justification for this is that the BCED programme in Iraq still lacks the appropriate nationwide database, rehabilitation and follow-up services and monitoring and surveillance systems which are available to countries within the 'Enhanced' resources category [9], MoH, 2021). As those guidelines recommend that the capacity building process should be systematic, active steps should be taken to upgrade the current limited-resource facilities to the next ('Enhanced') level.

In light of the BHGI guidelines discussed above and the barriers to early detection of BC identified in Section 3, efforts should be focused on achieving the following:

ISSN: 0005-2523
Volume 62, Issue 07, September, 2022

4.1 Actively integrate the BCED Programme into the agenda of the MoH and support the funding of the programme

The Council of Ministries should collaborate with the MoH to ensure allocating a specific budget for implementing cancer control activities. Official committees should be established to address the barriers facing early detection of BC on a regular basis and appropriate solutions should be put in place through designing strategic action plans. Representatives of cancer patients and survivors should be involved to share their experiences [22], [29]. Intensifying efforts to educate healthcare providers as the basic pillar of awareness campaigns is essential. That should include nurses and junior doctors working at the PHCs [76]. Organizing routine periodic educational sessions within the PHCs is essential and should include testimonies from BC patients and their families regarding the beneficial outcomes of diagnosing BC at an early stage [18].

4.2 Tackle societal barriers and improve awareness campaigns

Evidence regarding the benefits of awareness campaigns and their impact on downstaging BC and ultimately reducing the mortality rate, especially when accompanied by effective treatment, has been documented in those regions of the world where BC is currently diagnosed at earlier stages [68], [65].

Educational campaigns should target lay women from different socio-economic and educational levels, including those of lower social status and illiterate women living in remote and rural areas. Women should be instructed on the correct techniques for and timing of performing BSE [76]. For example, a study investigating the effect of awareness campaigns led by doctors and nurses targeting illiterate women living in a rural area of Ghana reported a significant positive impact on BC-related knowledge and the practice of BSE among those women [54].

Collaborations between politicians, religious bodies, community leaders and NGOs can play an important role in promoting breast health awareness campaigns and reaching remote populations [77]. Sessions should be facilitated by both female and male health professionals and all family members should be involved, as the presence of male relatives may increase the participation of women in the programme, improve levels of support, and help reduce the feelings of shame and disgrace often faced by women following a BC diagnosis, an important cultural barrier [19], [55].

Efforts should also be made to involve the media (specifically television and radio) in promoting awareness about breast health, the BCED programme and the risks of BC [22].

4.3 Adopt clinical breast examination and breast self-examination as tools for early detection

The WHO recommends that organized screening mammography programs should not be implemented unless there are enough resources to cover 70% of the target group [75], [72]. Initiating this programme in Iraq requires allocation of sufficient resources and infrastructure that are difficult to provide in the current political and economic circumstances. Accordingly, [76] emphasized the importance of training doctors and nurses to perform CBE as an early detection tool combined with diagnostic mammography in resource-limited countries. Studies suggested that this approach could play a role in downstaging BC at the time of presentation in LMICs [27], [16]. Although controversies still exist regarding the efficacy of BSE in reducing BC mortality, it has been proposed that adopting CBE as a screening tool, along with educating women about BSE techniques, could likely result in decreased mortality from BC in LMICs [56].

4.4 Tackle geographical barriers

The MoH should strengthen the referral system of the BCED programme through including a breast unit

within each PHC and locating PHCs within each district according to population need in order to reach women living in rural areas and those from internally displaced groups [20], [76], [37]. Arranging routine visits of health professionals to the inhabitants of these areas could also offer a practical solution to reducing loss to follow-up [28].

Mobile health clinics for screening mammography (MHCSMs) have been established worldwide in high- and middle-income countries, such as the USA, United Arab Emirates and India [58], [83], [66]. In Iraq, MHCSMs have been implemented sporadically. A pilot programme undertaken by the MoH suggested that MHCSMs can play a beneficial role in BC screening in Iraq through offering CBE for women living in remote areas, combined with diagnostic ultrasound/mammography upon detecting a lump. Within the same setting, information about BC and instruction in BSE techniques can be provided. Women with suspected cases of BC should then be referred to the specialized tertiary health centre.

4.5 Strengthen research capacity

In addition to emphasizing the role of research as one of the basic pillars of any national cancer control strategy, evidence-based approaches are essential for evaluating the activities of the BCED programme through documenting improvements in downstaging and the decrease in BC-related mortality. International health organizations, NGOs and the private sector can contribute to fund ongoing research focusing on the evaluation of the barriers that impede early detection of BC [31].

4.6 Monitor the programme through situation and outcome analysis

Active comprehensive registration of the resources available to the BCED programme should be included within the annual report of the MoH to allow a situation analysis of the current activities and the extent of the coverage and quality of the services provided [20], [19], [55]. Efforts should be directed towards integrating all data relevant to BC patients and the results of early detection techniques (clinical, laboratory and imaging procedures) within a BC registry. The overall outcomes of the programme should be continuously monitored via a quality assessment programme [55].

5. Conclusion

BC among women living in LMICs, including Iraq, is mainly diagnosed at advanced stages and among younger age groups compared to their counterparts in high-income countries.

Since 1980, Iraq has endured wars, sanctions, terrorist attacks and political instability which have resulted in reduced healthcare resources within the country. The BCED programme and INCRC have been established within the past two decades, with a focus on opportunistic mammography screening, however significant barriers to achieving the programme's strategic objectives have been identified at the individual, interpersonal, organizational, community and policy levels.

Despite recent improvement in BC awareness among Iraqi women, knowledge gaps and misconceptions continue to persist. KAP studies have revealed that Iraqi women believe that men have a significant impact on their participation in the BCED programme. Deficiencies in human resources, infrastructure and services have been highlighted. Substantial geographical barriers exist within the country, especially for women living in rural areas. There is no direct budget allocation for the BCED programme and no mechanisms have been established for its ongoing monitoring and evaluation. Nevertheless, due to the hard work and commitment of the programme's workforce, it is continuing to make progress despite these barriers [15].

The government, private sector, NGOs and community leaders should collaborate actively with BC patients

ISSN: 0005-2523
Volume 62, Issue 07, September, 2022

and public advocates to reduce these barriers. Awareness campaigns should target all family members, including men, due to their essential role in overcoming cultural barriers. All socioeconomic groups within the Iraqi population should be targeted in order to achieve the goals of the programme. Iraq has an extensive media ecosystem which should be utilized to promote awareness. CBE and instruction on BSE techniques should be regularly offered to women within PHCs, followed by prompt referral of suspected cases to tertiary centres. The use of mobile screening clinics should be expanded to promote awareness and reach women living in rural areas. The MoH and MoHESR should support capacity building of staff working within the BCED programme and establish effective monitoring and surveillance systems in order to control the disease more effectively.

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