

Running title: Cancer screening

Uptake and correlates of cervical and breast cancer screening among women in Jordan: national results of the 2017-2018 Population and Family Health Survey

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Abstract

The study aimed to estimate the prevalence and associated factors of cervical and breast cancer screening among women in the general population in Jordan. Nationally representative cross-sectional data were analysed from 14,689 women (34 years median age, range 15-49) that took part in the “2017-18 Jordan Population and Family Health Survey”. Information about cancer screening uptake included Pap smear, clinical breast examination, and mammography. Results indicate that the prevalence of ever Pap smear cancer screening was 15.3%, clinical breast examination in the past 12 months 13.9% and ever mammography 8.7%. In adjusted logistic regression analysis, older age, higher wealth, greater media exposure and tobacco use were positively and being Syrian, and living in the southern region were negatively associated with ever Pap smear, clinical breast examination in the past 12 months, and ever mammography. In addition, high decision-making power was associated with the uptake of Pap smear and higher education was associated with ever mammography. The study showed a low cancer screening

uptake, and several factors were identified that can assist in promoting cancer screening in Jordan.

Keywords: screening, cervical cancer, breast cancer, women, Jordan

Introduction

“Breast cancer is the most frequent cancer among women, impacting 2.1 million women each year, and also causes the greatest number of cancer-related deaths among women.” (WHO, 2020a) “Cervical cancer is the fourth most frequent cancer in women with an estimated 570,000 new cases in 2018 representing 6.6% of all female cancers. Approximately 90% of deaths from cervical cancer occurred in low- and middle-income countries.” (WHO, 2020b) In the Eastern Mediterranean region, “the most common cancers among women are breast (34.7%), colorectal (5.7%) and cervical cancer (4.6%)” (Pourghazian et al., 2019). In Jordan, the most common cancers among women are breast (36.4%), colorectal 10.9%, thyroid 6.4% and corpus uteri 4.3% (WHO, 2018). In Jordan, the age-standardized incidence of breast cancer was 57.4 pro 100000 and corpus uteri 7.9 per 100000 (WHO, 2018). Crucial in the fight against “cervical and breast cancer is the early detection and treatment” (Sankaranarayanan, 2014), yet “organized cancer screening is lacking in most of countries of the *Extended Middle East and North Africa Region*, the majority of cervical cancers are diagnosed late, leading to high mortality, and women face many political, cultural, and financial barriers to gaining access to screening.” (Sancho-Garnier et al., 2013, p.G51).

In a few local surveys in Jordan, low uptake of cancer screening among women has been reported. For example, 31.2% of 500 married Jordanian women (21 to 65 years) in Amman had been screened for cervical cancer (Al-Amro et al., 2020), 87.6% of 507 women (40-69 years) in six governorates in Jordan had never undergone mammography screening (Abu-Helalah et al., 2015) and in a study in 2018 among 612 women (18-63 years), 38% had had a smear test before. (Asali et al., 2020). Moreover, in a national survey among women (20-49 years) in Jordan in 2012, the prevalence of clinical breast examination in the past 12 months was 19.3% and lifetime Pap-smear testing 25.5% (Al Rifai & Nakamura, 2015), and in a national survey (N=1549) in 2011 in Jordan among women (≥ 18 years), 7% had ever undergone mammography (Othman et al., 2015). As part of the national Demographic and Health Surveys in 18 countries (women 15-49 years) the prevalence of the utilization of cervical cancer screening was 29.2%, (Mahumud et al., 2020), including in Egypt (97.4%), and India (27.2%) (Mahumud, et al., 2020), and in

Turkey 22.0% (Sözmen et al., 2016). In women 30 years and older in Turkey 19.0% ever had a mammography (Sözmen et al., 2016) and in South Africa 13.4% ever had mammography (Phaswana & Peltzer, 2018). In Brunei Darussalam, the prevalence of a pap smear test (women 18-69 years) was 56.5%, mammography (women 18-69 years) 11.3%, and clinical breast examination (=CBE)(women 18-69 years) 56.2% (Pg Suhaimi et al., 2020).

In an integrative review of CCS in Middle Eastern and Western Asian Arab countries, Ali, Skirton, Clark, and Donaldson (2017, p.414) found that “few population-based cervical cancer screening programs had been implemented, with low knowledge of, and perceptions about, cervical screening among Arab women, the majority of whom are Muslim.” In a study among women in Jordan, the most commonly reported barriers for women who never underwent mammography were: “fear of results (63.8%); no support from surrounding environment (59.7); cost of the test (53.4%); and religious belief, i.e. Qadaa Wa Qadar (51.1%).” (Abu-Helalah et al., 2015). There seems to be a lack of recent national population-based information on cervical and breast cancer screening and its correlates among women in Jordan, an upper middle-income country in the Middle East.

As reviewed previously (in Pengpid & Peltzer, 2018), factors associated with cervical and/or breast cancer screening may include “higher socioeconomic position, urban living, increased access to health care, having chronic conditions, positive lifestyle behaviours such as physical activity, fruit and vegetable consumption, and not smoking, having mental distress or illness or having depressive symptoms, having obesity and poor self-rated health status.” In addition, having a health insurance (Mahumud et al., 2020; Tiruneh et al., 2017), media exposure (Al Rifai & Nakamura, 2015; Mahumud et al., 2020), sexual autonomy (Tiruneh et al., 2017), tobacco use (Al Rifai & Nakamura, 2015), living in the central and northern region in Jordan (Al Rifai & Nakamura, 2015) were associated with clinical breast examination and/or cervical cancer screening. This study aimed to determine the prevalence and correlates of cervical and breast cancer screening in a national survey in Jordan in 2017-2018.

Method

Sample and procedure

The study is based on a national population-based cross-sectional survey of ever-married women age 15-49 (2017-18 Jordan Population and Family Health Survey= JPFHS) in Jordan. The

dataset is publically available and study procedures and sampling strategy have been described in detail (DOS, 2019). A “stratified multistage cluster sampling design” was used to generate a sample that is nationally representative, “for urban and rural areas, for the country’s three regions (Central, North, and South) and 12 governorates, and for three national groups (Jordanians, Syrians, and individuals of other nationalities” (DOS, 2019). The household and individual response rate was 98% and 99%, respectively (DOS, 2019). The survey protocol was approved by the ICF Institutional Review Board, and written informed consent was obtained from all participants prior to the investigation (DOS, 2019).

Measures

Outcomes variables included, ever had a Pap test, breast cancer examination by a specialist in the past 12 months, and ever had a mammogram. Reasons for never having had a mammogram were asked with a structured question (“no, need, not sick, no symptom, fear of results, no support from family/husband, too far, too expensive, other, don’t know”) (DOS, 2019).

Sociodemographic variables included educational level, age, sex, nationality, region, residence status and wealth quintiles based on a household asset list (DOS, 2019).

Other co-variates included, health insurance cover (Yes, No); Decision making power in relation to woman’s health, large household purchases, and visits to friends or family (high decision making power was defined as alone or jointly with husband, and other responses as low decision making power) (Tiruneh et al., 2017); media exposure included newspaper, radio, TV (each at least once a week), and internet use past year. Responses were summed and classified as 0-1, 2 and 3-4 types of media exposure. Smokes cigarettes (Yes, No), smokes water pipe (Yes, No) (DOS, 2019).

Data analysis

Considering the clustered study design, data analyses were conducted with “STATA software version 15.0 (Stata Corporation, College Station, TX, USA).” Adjusted logistic regression identified predictors of ever Pap smear, past 12-month breast clinical examination, and ever mammography. P values of below 0.05 were accepted as significant and missing values were excluded from the analysis.

Results

Sample and cancer screening characteristics

The sample included 14,689 women (34 years median age, IQE 28-44, range 15-49), 72.4% had secondary or higher education, 8.6% were Syrian, and 89.9% lived in urban areas. More than half of the participants (58.3%) had a health insurance cover, 25.2% had exposure to three or four media types, 90.5% had high decision-making power and 12.0% were tobacco users. The prevalence of ever Pap smear cancer screening was 15.3%, clinical breast examination in the past 12 months 13.9% and ever mammography 8.7% (see Table 1).

Table 1

Associations with cancer screening among women in Jordan

In adjusted logistic regression analysis, older age, higher wealth, greater media exposure and tobacco use were positively and being Syrian, and living in the southern region were negatively associated with ever Pap smear, clinical breast examination in the past 12 months, and ever mammography. In addition, high decision-making power was associated with the uptake of Pap smear and higher education was associated with ever mammography (see Table 2).

Table 2

Reasons for never having had a mammogram included no need (50.1%), not sick (23.5%), no symptom (14.7%), fear of results (4.4%), no support from family or husband (2.2%), too far (1.3%) and too expensive (0.9%).

Discussion

In this 2017-2018 national population-based survey among women (15-49 years) in Jordan, the prevalence of ever CCS (15.3%) was lower than in the 2012 national survey in Jordan (18.8%, women 15-49 years) (Al Rifai & Nakamura, 2015), a local survey in Amman, Jordan (31.2%, 21-65 years) (Al-Amro et al., 2020) and another local survey in Jordan (38%, 18-63 years) (Asali et al., 2020). The CCS prevalence rate in Jordan was also lower than the national

Demographic and Health Surveys in 18 countries (29.2%) (Mahumud et al., 2020), Egypt (97.4%) (Mahumud et al., 2020), Turkey (22.0%, 30 years and older) (Sözmen et al., 2016) and India (27.2%) (Mahumud et al., 2020). The prevalence of past 12-month CBE (13.9%) in this study was lower than in the 2012 Jordan national survey (19.3%) (Al Rifai & Nakamura, 2015) and in Brunei Darussalam STEPS survey (ever 56.2%, 18-69 years) (Pg Suhaimi et al., 2020). The prevalence of ever mammography screening (8.7%) in this study was similar to a 2011 national survey among women (≥ 18 years) in Jordan (7%) (Othman et al., 2015), and lower than in a study in six governorates in Jordan (12.4%, 40-64 years) (Abu-Helalah et al., 2015) and lower than in Turkey (19.0%, ≥ 30 years) (Sözmen et al., 2016) and in South Africa (13.4%, ≥ 30 years) (Phaswana & Peltzer, 2018) and Brunei Darussalam (11.3%, 18-69 years) (Pg Suhaimi et al., 2020). CBE and mammography screening fall short of national recommendations for women at normal risk in Jordan (for CBE ≥ 25 years yearly, and mammogramme ≥ 40 years yearly) (Jordan Breast Cancer Program, 2019), and cervical cancer screening fall short of Jordanian guidelines (annual Pap smear, ≥ 21 years) (DOS, 2019) and the US Preventive Services Task Force (USPSTF) 2012 recommendations (screening for cervical cancer every 3 years with cervical cytology alone in women aged 21 to 65 years) (US Preventive Services Task Force, 2018). Low uptake of cervical cancer screening may be attributed to lack of awareness or understanding, the “low incidence of cervix cervical cancer in Jordan and the fact that it is primarily caused by HPV infection, a sexually transmitted disease believed to be uncommon in a conservative Muslim country.” (Al-amro et al., 2020; Al Nsour et al., 2012). Reasons for the low uptake of CBE and mammography may be related to low knowledge on mammography, many Jordanian women do not believe in the benefits of mammography (Al Nsour et al., 2012). Major barriers to access mammography in this study were no need (50.1%), not sick (23.5%), no symptom (14.7%), fear of results (4.4%), no support from family or husband (2.2%), too far (1.3%) and too expensive (0.9%), while in a previous study in Jordan, major barriers were “fear of results (63.8%); no support from surrounding environment (59.7); cost of the test (53.4%); and religious belief, i.e. Qadaa Wa Qadar (51.1%)” (Abu-Helalah et al., 2015). Health education should include the benefits and misconceptions of cancer screening (Abu-Helalah et al., 2015).

The study showed that the 30-49 year-old age group was more likely to have undergone CCS than the younger age group, which is consistent with the recommendations of the World Health Organization (2013), prioritizing cervical cancer screening of women aged 30 to 49 years.

Mammography and CBE were more likely in the 30-49 year-old age group in this study, which is in line with the Jordanian recommendations on breast cancer screening (Jordan Breast Cancer Program, 2019). Consistent with some previous research (Al Rifai & Nakumara, 2015; Mahumud et al., 2018; Sözmen et al., 2016; Williams-Brennan et al., 2012), this study showed that a higher socioeconomic position (higher wealth status and higher education) and greater media exposure increased the odds for CCS, CBE and/or mammography. It is possible that women who are wealthier, have higher education and greater media exposure have better knowledge of the health risks related to cancer and therefore engage more likely in cancer screening (Al Rifai & Nakumara, 2015; Ampofo et al., 2020). In another study in Jordan that investigated the “public use of different media and channels for seeking health/cancer-related information,” health service providers and TV were found the most trusted sources and may therefore be effective tools for health education (Akhu-Zaheya et al., 2014). Unlike some previous studies, including in Jordan (Al Rifai & Nakamura, 2015; Mahumud et al., 2020; Phaswana-Mafuya & Peltzer, 2018; Tiruneh et al., 2017), this study did not show that having a health insurance and urban residence increased the odds for cancer screening.

As shown in the 2012 Jordan national survey (Al Rifai & Nakamura, 2015), in this study, living in the southern region decreased the odds for cancer screening and tobacco use increased the odds for cancer screening. In an earlier study in 2007 in Jordan, the lower uptake of CBE and Pap smear in the Southern region in Jordan was attributed to inadequate health services coverage, e.g., due to shortage of qualified trained staff (Al Nsour et al., 2012). In the 2012 Jordan national survey (Al Rifai & Nakamura, 2015), tobacco use among women was also associated with CBE but not with CCS, while in national US health interview surveys never smokers were less likely to take up cancer screening than current smokers (Sanford et al., 2019). Some previous research showed that the practice of other positive lifestyle behaviours apart from CCS increased the odds for CCS (Sözmen et al., 2016; Theme Filha et al., 2016), however, this was not confirmed in this study for non-current smokers.

Compared to women with Jordanian nationality, Syrian women had significantly lower odds to uptake cancer screening (CCS, CBE and mammography). Syrian refugees in Jordan may be disproportionately affected by cancer and have decreased access to cancer screening services (Mansour et al., 2010). All the more, Syrian women and women living in the Southern region should be particularly targeted in improving cancer-screening uptake. In line with some previous

research (Tiruneh et al., 2017), this study found that high decision-making power was associated with CCS. Similar results were found about cancer screening among Vietnamese American women (Nguyen et al., 2014). “It is possible that the sense of control these women feel over their lives includes control over their health care practices” (Nguyen et al., 2014).

The study limitations included that this investigation was limited due to the self-report of data and the cross-sectional survey design. An additional limitation was that the JPFHS in Jordan did not assess awareness cancer screening, information sources about cancer screening, risk perception about cancer, family history of cancer, and accessibility of cancer screening, which should be included in future studies.

Conclusion

The study showed a low cancer screening uptake (Pap smear, mammography, and clinical breast examination). Several protective factors were identified for cancer screening such as older age, higher wealth, higher education, greater media exposure, decision-making power, not being Syrian and not residing in the Southern region of the country, that could assist in programmes promoting cervical and breast cancer screening.

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Table 1: Sample and cancer screening characteristics of women, Jordan, 2017/2018

Variable	Sample	Ever Pap smear	Breast exam past 12 months	Ever mammography
	N (%)	N (%)	N (%)	N (%)
All	14689	1783 (15.3)	1642 (13.9)	1080 (8.7)
Age in years				
15-19	427 (2.5)	4 (1.4)	4 (1.3)	0 (0.0)
20-24	1640 (10.5)	63 (5.0)	92 (7.1)	61 (3.8)
25-29	2612 (16.9)	168 (7.9)	186 (8.5)	120 (5.3)
30-34	2748 (18.6)	275 (12.7)	290 (13.3)	162 (6.9)
35-39	2545 (18.0)	356 (17.3)	331 (17.0)	181 (8.7)
40-44	2386 (17.1)	443 (22.5)	340 (17.5)	244 (12.2)
45-49	2331 (16.5)	474 (24.7)	399 (19.4)	312 (15.3)
Education				
None	507 (2.5)	34 (9.4)	41 (10.2)	31 (7.0)
Elementary	1438 (9.1)	110 (12.3)	114 (10.8)	69 (7.2)
Preparatory	2262 (15.9)	275 (15.5)	246 (13.3)	155 (7.0)
Secondary	6113 (41.1)	737 (14.4)	640 (11.2)	398 (6.6)
Higher	3410 (31.3)	528 (18.2)	498 (19.0)	353 (13.0)
Nationality				
Jordanian	12390 (86.9)	1676 (16.5)	1481 (14.8)	988 (10.1)
Syrian	1703 (8.6)	58 (5.8)	71 (5.2)	38 (6.7)
Other nationality	596 (4.5)	49 (10.4)	90 (14.3)	54 (5.3)
Wealth quintile				
Lowest	4312 (20.0)	278 (9.3)	309 (9.4)	198 (4.8)
Low	3668 (20.7)	376 (11.5)	340 (10.6)	204 (6.1)
Middle	3089 (21.0)	445 (16.3)	363 (11.9)	239 (7.7)
High	2261 (20.5)	401 (18.1)	348 (15.5)	244 (10.2)
Highest	1359 (17.9)	283 (22.0)	282 (23.5)	195 (15.7)
Region				
Central	5244 (35.7)	726 (16.4)	680 (15.6)	484 (10.1)
North	5128 (34.9)	719 (15.2)	636 (12.4)	365 (6.7)
South	4317 (29.4)	338 (8.4)	326 (7.6)	231 (5.3)
Residence				
Rural	2944 (10.1)	303 (12.7)	297 (13.1)	187 (7.0)
Urban	11745 (89.9)	1480 (15.6)	1345 (14.0)	893 (8.9)
Health insurance cover				
No	4360 (41.7)	482 (14.8)	477 (13.3)	302 (7.9)
Yes	10329 (58.3)	1301 (15.6)	1165 (14.4)	778 (9.3)
Media exposure				
0-1	5962 (33.7)	551 (11.9)	513 (10.9)	356 (6.7)
2	5948 (41.1)	776 (15.7)	659 (12.3)	416 (7.5)
3-4	2779 (25.2)	456 (19.0)	470 (20.6)	308 (13.5)
Decision making power				
Low	1554 (9.5)	134 (10.1)	124 (9.5)	95 (7.1)
High	12180 (90.5)	1550 (16.0)	1415 (14.4)	911 (8.9)
Smoking water pipe and/or cigarettes				
No	13453 (88.0)	1576 (14.4)	1445 (13.4)	930 (8.1)
Yes	1236 (12.0)	207 (21.6)	197 (18.2)	150 (13.6)

Table 2: Associations with cancer screening among women in Jordan, 2017/2018

Variable	Ever Pap smear	Breast exam past 12 months	Ever mammography
	AOR (95% CI)	AOR (95% CI)	AOR (95% CI)
Age in years			
15-29	1 (Reference)	1 (Reference)	1 (Reference)
30-49	3.22 (2.62, 3.96)***	2.32 (1.86, 2.89)***	2.32 (1.77, 3.03)***
Education			
None/Elementary/Preparatory	1 (Reference)	1 (Reference)	1 (Reference)
Secondary	0.93 (0.77, 1.13)	0.81 (0.66, 1.00)	0.82 (0.63, 1.07)
Higher	0.98 (0.79, 1.22)	1.18 (0.94, 1.48)	1.32 (1.01, 1.73)*
Nationality			
Jordanian	1 (Reference)	1 (Reference)	1 (Reference)
Syrian	0.47 (0.30, 0.74)***	0.46 (0.30, 0.70)***	0.50 (0.30, 0.86)*
Other nationality	0.69 (0.44, 1.09)	1.12 (0.76, 1.65)	0.86 (0.54, 1.38)
Wealth quintile			
Lowest/Low	1 (Reference)	1 (Reference)	1 (Reference)
Middle	1.42 (1.16, 1.74)***	1.04 (0.83, 1.29)	1.17 (0.90, 1.53)
High/Highest	1.62 (1.32, 2.00)***	1.46 (1.17, 1.83)***	1.58 (1.21, 2.08)***
Region			
Central	1 (Reference)	1 (Reference)	1 (Reference)
North	1.16 (0.96, 1.41)	1.03 (0.84, 1.25)	0.82 (0.65, 1.03)
South	0.56 (0.45, 0.69)***	0.53 (0.43, 0.66)***	0.59 (0.47, 0.74)***
Residence			
Rural	1 (Reference)	1 (Reference)	1 (Reference)
Urban	1.03 (0.81, 1.32)	0.79 (0.59, 1.04)	0.91 (0.71, 1.17)
Health insurance cover			
No	1 (Reference)	1 (Reference)	1 (Reference)
Yes	1.04 (0.87, 1.24)	1.05 (0.88, 1.26)	1.25 (0.99, 1.57)
Media exposure			
0-1	1 (Reference)	1 (Reference)	1 (Reference)
2	1.24 (1.02, 1.50)*	1.10 (0.91, 1.33)	1.03 (0.80, 1.34)
3-4	1.34 (1.07, 1.68)*	1.80 (1.46, 2.23)***	1.62 (1.23, 2.14)***
Decision making power			
Low	1 (Reference)	1 (Reference)	1 (Reference)
High	1.32 (1.02, 1.72)*	1.23 (0.93, 1.63)	0.96 (0.70, 1.33)
Tobacco use			
No	1 (Reference)	1 (Reference)	1 (Reference)
Yes	1.43 (1.11, 1.84)**	1.30 (1.02, 1.66)*	1.61 (1.21, 2.14)***

AOR=Adjusted Odds Ratio; CI=Confidence Interval; ***P<0.001; **P<0.01; *P<0.05