Review Article

Barriers affecting uptake of cervical cancer screening in low and middle income countries: A systematic review

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Abstract

BACKGROUND: Cervical cancer is the second-most common cancer among women in the developing world and approximately 500,000 cases are diagnosed each year. In developed countries, cervical cancer (CCa) accounts for only 3.6% of newly diagnosed cancers. **OBJECTIVE:** The present study aims to identify the most effective barriers associated with CCa screening uptake in low and middle-income countries (L and MICs) and aid to adopt effective measures to overcome prevailing barriers to the attainment of CCa uptake in the community. **MATERIALS AND METHODS:** Health sciences electronic databases like MEDLINE, PubMed, Cochrane library, and Google Scholar were searched for studies published until August 2017. Keywords used for the search were ("cervical cancer screening"), ("barriers"), AND ("low income countries" OR "Middle income countries"). Articles were reviewed and data were extracted by using Mendeley Desktop Software (V-1.17.10). Income-level classification of countries was done as per the World Bank 2017 report. Statistical software like SPSS-V.23 and Medical-V.14 were used for the statistical application. **RESULTS:** A total of 31 studies met the inclusion criteria with a total of 25,650 participants. The sample size of the included studies ranged from 97 to 5929 participants. Articles majorly reported data on participants from African region (51.6%) and minimally in the Western Pacific region (3.2%). Sampling methods among studies varied from convenience sampling-12 (39.7%) to consecutive sampling-1 (3.2%). Besides, two studies (6.5%) did not discuss their sampling procedures. It was observed that "Lack of information about CCa and its treatment" (Barrier of lack of knowledge and Awareness); "Embracement or shy" (Psychological Barrier); "Lack of time" (structural Barrier); and "Lack of family support" (Sociocultural and religious barrier) were the most commonly reported among all 22 barriers. **CONCLUSION:** There is a need of policies advancement of CCa screening programs by focusing on aspects of accessibility, affordability, CCa education, and the necessity of screening to improve screening uptake to control the CCa morbidity and mortality rate in L and MIC's.

Key Words: Barriers, Cervical cancer, diagnosis, low income countries, middle income countries, screening uptake

Introduction

Cervical cancer (CCa) is a preventable and curable malignant disease with a global annual crude incidence rate of 15.1 per 1,00,000.[1] An estimated 5,29,000 new cases and 2,75,000 deaths occurred in 2008 out of which 79–83% of new cases were diagnosed in developing countries.[2] For developed countries, CCa accounts for only 3.6% of newly diagnosed cancers[3] whereas it is the third most common cancer and fourth most common cause of cancer death in the world.[4]

CCa is the most preventable cancer due to its slow progression, cytologically identifiable precancerous lesions, and effective treatments.[5,6] Evidence suggests that cervical screening awareness and early detection through screening had a major impact on mortality associated with CCa in developed nations like United States, United Kingdom, and Australia.[7-9] In developing countries, cervical screening programs failed to decrease the incidence and mortality of the disease due to the low uptake rate of screening.[10-12] The Papanicolaou (Pap) test, visual inspection with acetic acid (VIA), and Lugol's iodine (VILI) are effective screening methods for the early detection of CCa. The Pap-test can be performed in hospitals and clinics, whereas VIA does not require laboratory procedures and can be done in areas with less resources also. It has been observed that there are several barriers and factors which affect the uptake rate of cervical screening, i.e., accessibility to testing facilities, lack of health education, low socioeconomic status, low perceived risk of disease, fear of CCa diagnosis, fear of pain and embarrassment, lack of female health care providers, busy schedules, and beliefs that such tests are unnecessary.

Cervical screening programs in developing countries were not of priority earlier. To identify factors and barriers associated with cervical screening uptake prior to organizing community-based screening programs is essential. In low resource countries, identifying barriers and factors associated with low cervical screening uptake helps policy makers and health care delivery organizations to improve and take necessary steps to overcome the existing barriers and reach the community to increase the cervical screening uptake, which in turn may decrease the incidence and mortality of the disease. Primary studies have been conducted to identify the factors and barriers for uptake of cervical screening from various countries. Systematic reviews were also conducted on various aspects to increase screening uptake such as through the special event of health promotion.[13] Self-collection of Human papillomavirus (HPV) testing[14,15] and other interventions.[16,17] There was a systematic review done on barriers for CCa screening participation in developed countries like UK, Australia, Sweden, and Korea.[18] There have been integrated reviews of barriers to CCa screening from sub-Saharan Africa and Asia.[19-21] These systematic reviews were not focused toward low and middle-income countries. Since the factors and barriers from low and

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middle-income countries are likely to be very different from developed countries, hence, we conducted a systematic review of studies from low and middle income countries.

Materials and Methods

Search strategy

We conducted a comprehensive search of quantitative literature that was published till August 2017 in the electronic databases MEDLINE, PubMed, Cochrane library, and Google Scholar to retrieve all English language studies that contained information on barriers of CCa screening in low and middle-income countries. Studies were defined into "low income," "lower middle income," and "upper middle income" countries as classified by the World Bank (World Bank, July 2016). Articles were included if they reported quantitative data of women's knowledge or experiences or observations or perceptions of cervical cancer screening in lower and middle income countries. Primary concepts of "cervical cancer screening" "barriers," "low income and middle income countries" were expanded to generate additional medical terms (cervix, cervical, cancer, neoplasm, cervical neoplasms, screening, and primary diagnosis of cancer) for the search. The subject search and text word search were done separately in all databases and then combined with "OR" and "AND" operators. Combined terms were used, for example, ("cervical cancer screening" or 'cervical screening') AND ('barriers' or 'barriers in screening') AND ("low income countries" OR "middle income countries"). Gray literature and additional articles were identified using the bibliography of included articles and some excluded review articles, along with forward citation searches.

Study selection

Only articles that had reported quantitative evidence data of barriers on women's perception or experiences of cervical screening in low and middle-income countries were included. Figure 1 shows the selection process of the articles retrieved. Our systematic review was done according to PRISMA guidelines (http://annals.org/article.aspx?articleid=744664). The initial database search retrieved 935 published English-language studies. The abstracts were read and studies that did not meet the inclusion criteria, of which 115 were duplicates and 720 studies were excluded because they were conducted either among woman with CCa receiving treatments or were conducted in high-income countries. Of the remaining 205 studies, 43 met the inclusion criteria of which 23 studies focused on barriers to CCa screening.[22-52] Included studies were published between 2002 and 2017. Further search was conducted using Google Scholar and additional articles were identified using the reference lists of included articles and excluded review articles, and forward citation searches.

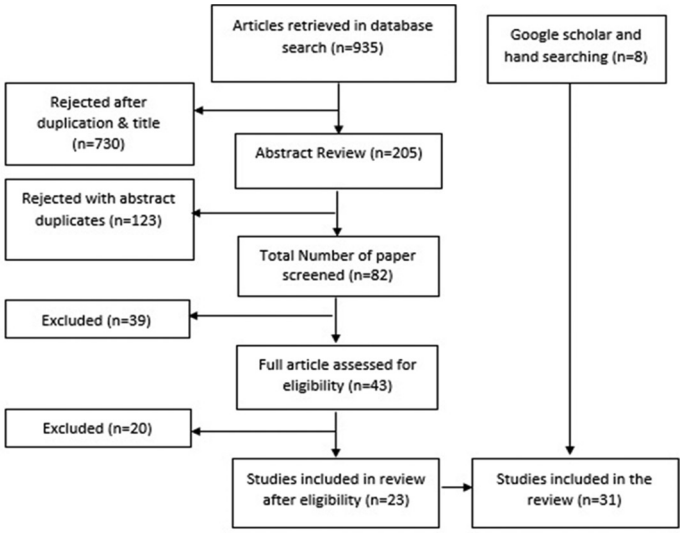

Figure 1: Summary of Literature Search and Review Process

Inclusion criteria

Population-based studies (cross-sectional studies, quasi-experimental, mixed and case–control studies) conducted in diverse settings like hospitals or communites published till August 2017. English language, low and middle-income countries (according to World Bank list of economies-July 2016) based studies of barriers and factors influencing cervical cancer and its screening uptake procedures. Studies with quantitative assessments were included.

Exclusion criteria

Case reports, case series, earlier reviews, and qualitative studies of CCa and its screening uptake. Studies conducted in high-income countries and articles published in languages other than English were excluded.

Data extraction and synthesis

We extracted the following key characteristics of the studies: lead author and country, year published, study design, sampling technique, sample size, age group and mean age, percentage rate of women ever screened and never screened, screening method used, and barriers themes with percentages. Articles were reviewed and data was extracted by using Mendeley Desktop Software (V-1.17.10). After the removal of duplicates, primary outcome data of all articles were indexed in Microsoft Excel. Later, interpretation of textual data was extracted to a Microsoft Word document. Income-level classification of countries was done as per the World Bank 2017 report (https://siteresources.worldbank.org/DATASTATISTICS/Resources/CLASS.XLS). Quantitative data of barriers were mainly categorized into 1. Barriers of lack of knowledge and awareness, 2. psychological barriers, 3. structural barriers, and 4. socio-cultural and religious barriers. Two authors (PD and NN) independently carried out the literature search and identified 935 citations for CCa screening by two investigators (PD and NN) independently. Full-text articles were identified and assessed for eligibility after applying the inclusion and exclusion criteria. Critical appraisal of each study found eligible was done by both investigators. Agreement of the requisite contents of the articles related to quality assessment and data extraction was performed. Any dispute in selection was resolved by author (SA) after deliberation with PD and NN. Statistical software like SPSS-V.23 and Medcal-V.14 was used for statistical application.

Results

As per the selection criteria, approximately 28 of the 31 articles were published before 2010 and only 3 articles were published between 2002 and 2010. They included

a total of 25,650 participants across the 31 independent studies. Included studies had different sampling methods in which most of them were population-based articles reported on recruitment in diverse settings i.e., hospitals or community and most of the respondents were patients or participants. Outcome measures for most of the studies included respondent's willingness to participate or perceived barriers to participation in CCa screening. The majority of the articles reported data on African participants (51.6%); fewer studies focused on Southeast Asians (16%), Americans (16%), Europeans (12.9%), and Western Pacific (3.2). cross-sectional studies (80.6%) following with quasi-experimental (12.9%), mixed,[27] and case–control[39] [Table 1].

The 31 studies were from Nigeria-7, Kenya-5, Turkey-4, India-3, Ethiopia-2, Mexico-3, Tanzania-2, Bangladesh-1, China-1, El Salvador-1, Jamaica-1, and Thailand-1. Among sampling methods 12 (38.7%) studies used convenience sampling, while 7 (22.6%) studies used random sampling followed by multistage sampling-6 (19.4%), systematic sampling-3 (9.7%), and consecutive sampling-1 (3.2%). Sampling procedures were not clearly discussed in two studies (6.5%).

The sample size of the quantitative studies ranged from 97 to 5929 participants.[38,40] The age of the study participants in studies varied from 14 years and above, but 8 studies did not report any upper age limit. In 31 studies, most of them used interviewer-administered questionnaire (35.5%) followed by structured interviews (32.3%), questionnaire survey methodology (29%), and survey forms (3.2%).

Percentage of barriers reported in studies of low and middle-income countries is shown in Table 2 and meta-analysis of

Table 1: Characteristics of studies of low and middle-income countries for CCa screening uptake and their effecting barriers

Author	Year	Country	Sampling Technique	Sample size	Age group	Mean age	Intervention Method	Barriers	Screened for CCa (%)	Never screened for CCa (%)
Low Income Countries										
Bayu H *et al.*	2016	Ethiopia	Systematic	1186	21-50	31.3	Interview	ABC	19.9	80.1
Fasika *et al.*	2016	Ethiopia	Multistage	620	15-49	-	Interviewer administered questionnaire (IAQ)	AB	11.0	89.0
Kahesa C *et al.*	2012	Tanzania	Multistage	1117	25-59	-	IAQ	ABC	-	-
Melissa *et al.*	2015	Tanzania	Multistage	575	18-55	34.0	IAQ	ACD	10.0	90.0
Lower-Middle Income Countries										
Basu *et al.*	2006	India	Random	500	25-65	-	IAQ	ABD	0	100.0
Brita R *et al.*	2008	India	Unclear	299	18-77	34.0	Interview	ABCD	10.4	89.6
Chibuike *et al.*	2015	Nigeria	Random	700	25-86	43.2	Questionnaire	BC	-	-
Elkanah *et al.*	2016	Kenya	Convenience	2505	18-55	-	IAQ	B	-	-
Fatima *et al.*	2017	Nigeria	Convenience	400	30-65	40.8	IAQ	AC	1.2	98.8
Islam *et al.*	2015	Bangladesh	Multistage	1590	30-59	42.3	Interview	ABCD	8.3	91.7
Jain N *et al.*	2016	India	Multistage	306	30-60	-	Interview	ABCD	11.0	89.0
Joelle *et al.*	2015	Kenya	Convenience	106	23-64	-	Questionnaire	ABC	-	-
Joelle *et al.*	2015	Kenya	Random	419	>23	33.4	Interview	AC	-	-
Karla *et al.*	2015	El Salvador	Random	409	30-49	37.6	Interview	ABC	2.7	97.3
Kikelomo *et al.*	2011	Nigeria	Convenience	350	>18	34.1	Questionnaire	AB	5.0	95.0
L. Sudenga *et al.*	2013	Kenya	Random	388	15-49	27.0	Questionnaire	ABC	6.0	94.0
Mbachu *et al.*	2017	Nigeria	Convenience	300	45-54	48.0	Questionnaire	ABC	17.3	82.7
Nwankwo *et al.*	2011	Nigeria	Convenience	815	18-70	38.1	IAQ	ABC	4.2	95.8
Ogwuegbu C *et al.*	2011	Nigeria	Systematic	3712	-	-	Questionnaire	ABCD	10.5	89.5
Olumide *et al.*	2014	Nigeria	Multistage	350	25-64	-	Questionnaire	AC	8.3	91.7
Were E *et al.*	2011	Kenya	Consecutive	219	+/-30	31.3	IAQ	ABC	12.3	87.7
Upper-Middle income Countries										
Basak *et al.*	2013	Turkey	Convenience	256	>21	21.4	Interview	ABC	32.4	67.6
Budkaew *et al.*	2014	Thailand	Systematic	195	30-60	45.6	IAQ	ABCD	89.4	10.6
Gulten *et al.*	2013	Turkey	Random	510	22-65	37.1	Questionnaire	ABC	56.6	43.4
Jia *et al.*	2013	China	Convenience	5929	26-65	-	Questionnaire	ABD	-	-
Laura F *et al.*	2012	Mexico	Convenience	281	14-47	27.0	IAQ	ABC	56.2	43.8
Luisa Marva *et al.*	2013	Mexico	Convenience	384	26-64	41.9	Survey forms	BD	79.0	21.0
Ncube *et al.*	2015	Jamaica	Unclear	403	>19	-	IAQ	ABC	66.0	34.0
Nesrin *et al.*	2012	Turkey	Random	387	>18	34.9	Interview	C	29.5	70.5
Semra *et al.*	2017	Turkey	Convenience	342	>18	44.4	Interview	ABC	33.6	66.4
Watkins *et al.*	2002	Mexico	Convenience	97	16-66	40.0	Interview	ABC	34.0	66.0

A. Barriers of lack of knowledge and awareness, B. Psychological barriers, C. Structural barriers and D. Sociocultural & religious barriers

Table 2: Percentage of barriers reported in studies of low and middle income countries

	Studies	1							2				3								4		
		a	b	c	d	e	f	g	a	B	c	d	a	b	c	d	e	f	g	h	a	b	c
Low	Kahesa C *et al.*		8.5	31.1					12.6		4.8			2		57.1		11.6					
	Fasikaet al.		19								7.3												
	Bayu H *et al.*			67						42.06	55.4		57.15	24									
	Melissa *et al.*		66.5										25.6	49.3		20					11.15		
Lower Middle	Jain N *et al.*	5.9	88.2	11.8	11.8			35.3	17.6	64.7		11.8	23.5	29.4						5.9	17.6		
	Brita R *et al.*				28.7	23.9	13.9			37.7	73.4	66		61	76						9	7	
	Chigbu O *et al.*		51.9	51.6	20.6				37.6				13.2	19.6	51.5	21.1					36.8		8.8
	Islam *et al.*	37.5	2.2	86.1						1.9			1.8	11.5	1.8						1.6		
	Abodium *et al.*		91.1													5.6							
	Kikelomo *et al.*		34.9	50.3		2.5			15														
	Fatima *et al.*		6.2										8.7			49.7			3.6				
	Chibuike *et al.*									86.5			50.6	49.1		20.4				86.4			
	Mbachu *et al.*		41.2	36.7					14.1		3.2			8.5	28.6	16.2							
	Joelle *et al.*		19								16.5		54.8						33.3				
	Karla *et al.*		61.4		65.7					64.3	61.4									71.4			
	Nwankwo *et al.*		49.8	32	3.4			3				2.4		5.5			3.9						
	Staci *et al.*		14									16		10									
	Elkanah *et al.*										18												
	Were E *et al.*		4.1		35				22.1			5.5		11.4									
	Joelle *et al.*			66.4									27.9										
	Basu *et al.*		7.8	46.1	17.9					15.1	61.9	36.2									40		18.5
Upper Middle	Gulten *et al.*		16.7	13.2	10.4					8.9	20.8		22.9										
	Nesrin *et al.*								17.6	19.6		10.1											
	Laura *et al.*	24.1	10.8					20.5		8.4		4.8	12										
	Ncube *et al.*		38.8						34.6	7.5		36.8	13.8	11.7	11.9	5.2	5.7		36.8				
	Semra *et al.*			31.7					4.4	2.6	1.3		33.9										
	Watkins *et al.*		18									50						14					
	Budkaew *et al.*			22.7			7.5					3.8	5.3									7.5	
	Jia *et al.*	13.4	11.1	34.1	12.4				47.6		11.4										2.2		
	Marva L M *et al.*								17.1	36.9	24.1	31.4									10.9		
	Basak *et al.*	44.67	41.5	35.93	35.45		34.14			41.2			38.89										
Median		24.1	19	35.93	19.25	13.2	13.9	20.5	17.6	28.25	18	13.9	23.5	11.7	28.6	20.2	4.8	12.8	33.3	71.4	11.03	7.25	13.6
Range		39	88.9	74.3	62	21	27	32	43.2	85	72.1	64	55	59	74	51.9	2	2.4	33	81	38	1	9.7

1. Barriers of lack of knowledge and awareness; a. Need of screening; b. Information of Cca and treatment; c. Asymptomatic; d. Disbelieves; e. Belief of virginity loss; f. Only women who had babies need test; g. No attention to personal problems; **2. Psychological barriers;** a. Fear of diagnosed with CCa; b. Embarrassment/shy; c. Pain; d. Fear/anxiety; **3. Structural barriers;** a. Lack of time/procedure is time taking; b. Test is expensive; c. Unaware of screening area and privacy; d. Far to travel; e. Lack of transportation; f. Lack of medical advice; g. Need more time with health provider; h. Poor facilities; **4. Sociocultural & religious barriers;** a. Lack of family support; b. Unmarried; c. Trust in God

proportions of reported barriers and their heterogeneity outcomes are shown in Table 3.

Barriers reported

Barriers of lack of knowledge and awareness

Among the 31 studies, 27 reported the association between barriers of lack of knowledge and awareness and reduced participation in trials (87.09). In addition, one of those studies reported lack of knowledge about the backgrounds of cancer and its treatment as a barrier to enrolment, followed by the 18 (58.06%) studies that reported barriers to awareness. The belief that only symptomatic women need to undergo CCa screening was the next frequently reported barrier (48.38%). Belief of virginity loss (6.45) was the least reported barrier among them [Figure 2].

Psychological barriers

A total of 28 articles have reported that psychological barriers were one of the reasons that effect in CCa screening uptake. Most of those articles reported embarrassment or shyness (45.16%) as a barrier during CCa screening procedures. Other frequently reported barriers in participating in CCa screening were painful procedures (41.93%), fear of getting diagnosed with CCa (35.48%), and anxiety or fear (38.7%) in CCa screening procedure [Figure 3].

Structural barriers

Lack of time for procedure and/or belief that the procedure (48.3%) was time consuming was the most frequently reported barrier in the eligible studies. Expensive CCa screening procedure was the next most reported barrier (41.93%). Lack of transportation to the CCa screening procedure center and insufficient medical advice from health care providers were the least reported barrier among structural barriers. Moreover, 25.8% of studies have reported that CCa screening centers were far to reach from their residences [Figure 4].

Sociocultural and religious barriers

Only 14 articles reported about sociocultural and religious barriers, in which lack of family support (husband's disapproval or condemnation of patients planning to undergo CCa screening procedure) was the most frequently reported barrier. About 6.45% of women believe that CCa screening is an unnecessary thing for an unmarried women [Figure 5].

Distribution of barriers among low and middle income countries

Low-income countries

The four studies that reported barriers for CCa screening in low-income countries were all from the African region namely Ethiopia (6.5%), Tanzania (6.5%). Lack of knowledge and awareness was the most commonly reported barrier than other barriers in LICs. In Ethiopia most (67%) felt that only symptomatic women should undergo screening.[42] In a study by Melissa *et al*., 90% Tanzanian women had never got screened for CCa. Two studies conducted in Ethiopia shows that percentages of women never had got screened for CCa screening were[42] - 80.1% and Fasika *et al* (89%) [Table 1].

Low-middle income countries (LMICs)

A total of 17 studies in low-middle income countries explored barriers for CCa screening, in which 7 studies were from Nigeria. Besides, 13 studies reported lack of information about CCa and its screening procedures as a common barrier to screening uptake. A study was undertaken in Nigeria also identified religious barrier- trust in God (8.8%). Lack of time, time taking procedure, distance to the screening center and expenses were some of the barriers that are majorly reported in these countries.[53,54] A study conducted in India shows that 100% (n = 299) participants in the study had never got screened for CCa.

Upper-middle income countries (UMICs)

A total of 11 studies in upper-middle income countries were from Turkey-4, Mexico-3, China-1, Thailand-1, and Jamica-1 that had reported barriers for CCa screening. Structural barriers including cost associated with screening and treatment, distance to the service centres, access, and availability to screening were the most common barriers identified in these countries. This was followed by lack of awareness of, and knowledge about, CCa and CCa screening in eight studies and social and religious factors including marital status and lack of family support in another three studies.[37,39,40]

Discussion

Our systematic review assessed the numerous barriers that affect the participation of women in low and middle income countries in CCa screening. Included studies of different countries framed barriers in different ways relying on factors like perceptions, cultures, education, and accessibility of screening services. However, poor understanding of the role of CCa and lack of knowledge about screening procedures were the major reported barriers among women in most studies from low and middle-income countries.

Most of the studies have reported that lack of knowledge is an important barrier perceived for CCa screening. The next majorly reported barriers are "Absence of any CCa symptoms" and "Lack of time for Screening" in which, eight studies of LMICs have reported "Absence of any CCa symptoms" as a barrier, followed by UMICs-5 and LICs-2. Whereas seven studies of LMICs have reported "Lack of time for screening", followed by UMICs-6 and LICs-2. Long delays in the screening process may possibly effect in follow-up of treatment or for future screenings.It was known that most of the screening methods test the presence of precancerous cells in cervix. Low cost screening has a greater impact when it is targeted to women of ages between 30 and 40 in a low resource setting.[22] Besides, promoting self sampling in low resourced areas of developed countries had helped in improving access to cervical screening. It was also proved as a better way to attract non-attendees and recall their invitation for cytology and screening programs.[23] About 9.7% women reported poor facilitates, false negative results and untrained clinical professionals as the barriers. In earlier studies, it was estimated that 29.3% of failures to prevent invasive cervical cancer can be attributed to

Table 3: Meta-analysis of proportions of reported barriers and their heterogeneity outcomes

Barriers	Median	Range	95% CI (random effects)	Q	DF	I^2 (inconsistency)	95% CI for I^2	Proportion % (random effects)	Significance level
Lack of knowledgeand awareness									
Need of screening	24.1	39	1.32 to 12.49	148.91	4	97.31%	95.64 to 98.35	5.56	*P*<0.0001
Information of Cca and treatment	19	88.9	4.64 to 11.36	1472.02	21	98.57%	98.30 to 98.80	7.66	*P*<0.0001
Asymptomatic	35.93	74.3	5.10 to 11.73	762.09	14	98.16%	97.68 to 98.54	8.11	*P*<0.0001
Disbelieves	19.25	62	2.58 to 7.91	351.31	9	97.44%	96.47 to 98.14	4.90	*P*<0.0001
Belief of virginity loss	13.2	21	0.07 to 19.50	33.07	1	96.98%	92.09 to 98.84	4.55	*P*<0.0001
Only women who had babies need test	13.9	27	0.32 to 6.31	33.59	2	94.05%	86.00 to 97.47	2.40	*P*<0.0001
No attention to personal problems	20.5	32	0.33 to 31.54	109.47	2	98.17%	96.67 to 99.00	10.32	*P*<0.0001
[Barrier 1]	19-35	21-88.9	0.07 to 31.54	33-1472	1-21	94.05-98.57	86.00-99.00	2.40-10.32	
Psychological factors									
Fear of diagnosed with CCa	17.6	43.2	3.50 to 9.44	185.83	10	94.62%	92.10 to 96.33	6.13	*P*<0.0001
Embracement/shy	28.25	85	4.14 to 12.49	885.47	13	98.53%	98.16 to 98.83	7.80	*P*<0.0001
Pain/	18	72.1	2.65 to 7.95	388.81	12	96.91%	95.85 to 97.70	4.96	*P*<0.0001
Fear/anxiety	13.9	64	2.47 to 8.89	439.31	11	97.50%	96.66 to 98.12	5.21	*P*<0.0001
[Barrier 2]	13.9-28.2	43-85	2.47 to 12.49	185.8-885	10-13	94.6-98.5	92.1-98.8	4.96-7.80	
Structural barriers									
Lack of time/procedure is time taking	23.5	55	3.37 to 8.40	481.05	14	97.09%	96.19 to 97.77	5.62	*P*<0.0001
Test is expensive	11.7	59	2.73 to 8.31	360.15	12	96.67%	95.49 to 97.54	5.16	*P*<0.0001
Unaware of screening area and privacy	28.6	74	2.38 to 22.68	180.67	4	97.79%	96.51 to 98.60	10.24	*P*<0.0001
Far to travel	20.2	51.9	2.60 to 8.56	118.21	7	94.08%	90.52 to 96.30	5.17	*P*<0.0001
Lack of transportation	4.8	2	0.41 to 2.90	2.18	1	54.20%	0.00 to 88.76	1.38	*P*=0.1395
Lack of medical advice	12.8	2.4	1.42 to 4.63	2.29	1	56.42%	0.00 to 89.52	2.80	*P*=0.1298
Need more time with health provider	33.3	33	1.15 to 15.62	47.90	2	95.82%	90.96 to 98.07	6.45	*P*<0.0001
Poor facilities	71.4	81	7.96 to 23.58	20.36	2	90.18%	73.88 to 96.31	14.91	*P*<0.0001
[Barrier 3]	4.8-71.4	2-81	0.41-23.5	2.1-481	1-14	54.2-97.7	0-98.6	1.37-14.91	
Sociocultural and religious									
Lack of family support	11.03	38	1.46 to 5.73	126.70	7	94.48%	91.24 to 96.52	3.25	*P*<0.0001
Unmarried	7.25	1	1.41 to 3.90	0.97	1	0.00%	0.00 to 0.00	2.51	*P*=0.3244
Trust in God	13.6	9.7	0.03 to 4.92	12.32	1	91.88%	71.90 to 97.66	1.45	*P*=0.0004
[Barrier 4]	7.2-11	1-38	0.03-4.90	0.9-123.7	1-7	0-94.4	0-97.6	1.45-3.25	
Total barriers	4.8-71.4	1-88.9	0.03-31.5	0.9-1472	1-21	0-98.5	0-99	1.37-14.91	

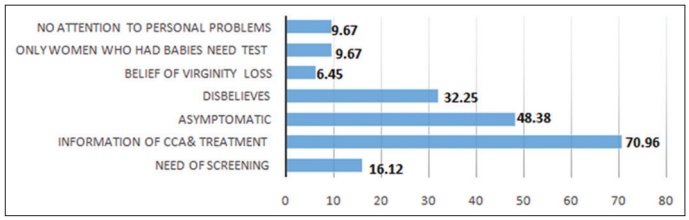

Figure 2: Barriers of Lack of knowledge and Awareness

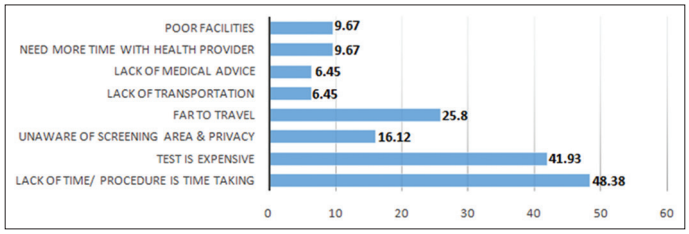

Figure 4: Structural Barriers

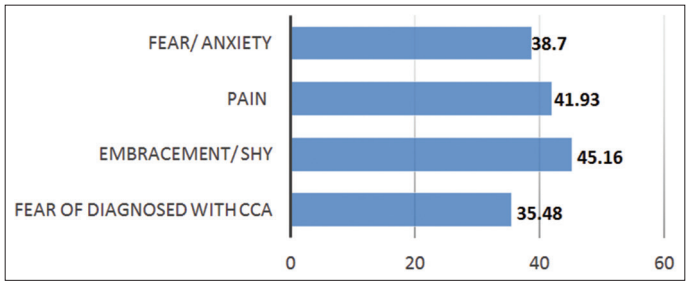

Figure 3: Psychological Barriers

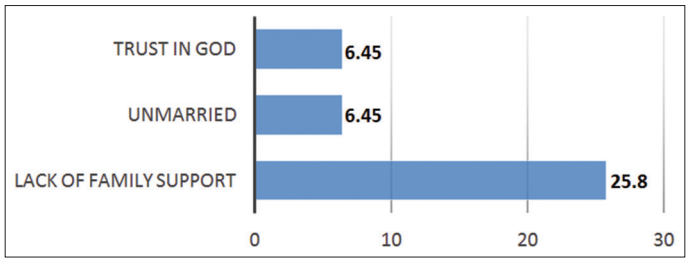

Figure 5: Socio-Cultural and Religious Barriers

false-negative Pap smears and 11.9% to poor follow-up of abnormal results.[24]

In many studies[33-35,38,41-44,49,55-59] embarrassment or shyness was reported as a barrier due to the unfriendly or male work staff. Women in some studies also reported facing objection from their husbands or family members to take the screening test. In an earlier review, Asian immigrants held a variety of misconceptions concerning one's susceptibility to cancer and social stigmatization by community and physicians, whereas African–Americans identified administrative processes in establishing health care as barriers to screening.[25] Some studies have reported that women are discouraged by the cost of services or traveling far for procedure. Analyses of a previous review showed that liquid based cytology was more cost-effective than conventional Pap smear testing over the same screening interval.[26]

A study revealed that cervical cancer screening ranges from 1% in Bangladesh to 73% in Brazil. Particularly, poor and older women are less likely to be screened in developed(63%) and developing countries(19%) and have highest risk of getting cervical cancer.[27] There are several issues requiring further evaluation like appropriate screening interval, age to start and stop screening, the role of self-sampling for HPV testing and the choice of primary test (cytology and/or HPV).[28]

Limitations of the studies that might have influenced the results are lack of studies of particular defined data and studies from different geographical area and heterogeneity of diversified population data collected and pooled from various studies. Variations such as age range, sampling techniques, study designs, data collected methods were also not uniform. Merging such data may lead to high heterogeneity which is a potential source of bias. Nonadjustment of potential confounders in some primary studies can also be an issue.

Settings at the screening center also influence the screening uptake rate, such as infrastructure, cleanliness, lack of trained staff, malfunctioned equipment, etc. The lack of similarity between reported barriers of studies may be due to diversity in modes of recruitment, sample size, study designs, sampling procedures, and study quality. Even-though included studies have bias between them it is may be because of the unclear sampling procedures and different study domains. CCa screening is given less priority in low and middle income countries, resulting to either improper screening programs or being totally unavailable. Barriers do influence recruitment outcomes through their effects on opportunity to participate and the choice to refuse or accept participation. Greater levels of guiding knowledge is needed for development of CCa screening uptake. Advance research into the tools by which screening uptake will be increased is needed for future, so that they help to update policies in L and MICs.

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Conflicts of interest

There are no conflicts of interest.

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