

Health Literacy of Cervical Cancer amongst Participants at Tamaki Health and Browns Bay Family Doctors Clinics in Auckland, New Zealand

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ABSTRACT: Objective: The World Health Organization (WHO) estimates Human Papilloma virus (HPV) associated cervical cancer (CxCa) is the 2nd most common cancer in women aged 15-44; consequently, it launched an international campaign aiming for CxCa elimination by 2030[1]. In New Zealand (NZ), screening for CxCa will transition from a 3-yearly sampling protocol for 20 years old or under and over 59 years using the cytologic Pap test, to an exclusively 5-yearly primary HPV DNA screening protocol for aged 25-69 women, with a self-sampling option introduced on 12 Sep 2023[2]. This study aims to conduct awareness-assessment surveys (AAS) inviting all genders relative to these conversions in CxCa screening practice. **Methods:** The anonymized AAS invited participants at two independent medical centres in Auckland City, NZ: (100) participants at Tamaki Health Clinic (March-October 2020), and (202) participants at Browns Bay Family Doctors (October 2020-January 2021). **Results:** The Independent-Samples Mann-Whitney U test revealed statistical significance in the level of health literacy between Genders: 242/301 (80.4%) Women, 59/301 (16.6%) Men. Chi-Square testing revealed statistical significance between health literacy and Age Groups: lower in age-group 15-20 [13/301 (4.3%)] and higher in age-group 20-29 [69/301 (22.8%)]. Therefore, the test rejects the null hypothesis that distribution of health literacy is equivalent across genders. **Implications for Public Health:** With upcoming introduction of primary HPV DNA screening for CxCa, health literacy initiatives ought to target all genders from younger ages (i.e., 15-25) onwards, to optimize CxCa prevention in NZ and in accordance with WHO campaigns.

Keywords: Health Literacy, Gender, Cervical Cancer, HPV, Pap test, World Health Organization

I. INTRODUCTION

The World Health Organization (WHO) estimates Human Papilloma virus (HPV)-associated cervical cancer (CxCa) is the 2nd most common cancer in women aged 15-44; consequently, it launched an international campaign for CxCa elimination defined as <4 cases of CxCa per 100,000 women by 2030[1]. When achieved, this target presumes CxCa would no longer be considered a public health concern and is based on 3 pillars of primary and secondary health care that must be retained: (1) 90% coverage of HPV vaccination for girls by 15 years of age, (2) 70% coverage of systemic screening by the age of 35-45 years; and (3) 90% treatment and management of identified cervical disease[1]. **On February 4, 2023**, the World Cancer Day slogan: 'Close the Care Gap', reflects upon a three-year campaign (i.e., 2022-2024) to unite, inspire change, and assemble global action by addressing barriers and gaps, and by empowering people with health literacy[3].

Theoretically, individuals adequately aware of the new changes in CxCa screening and prevention, and of the transitioning healthcare pathways, may foster diminishing gaps in healthcare knowledge worldwide, leading to improved disease prevention based on targets. In contrast however, lingering gaps in health literacy may effectively undermine disease prevention initiatives, thus prove overall disruptive.

Australasia comprises Australia, New Zealand (NZ), and various neighboring islands in the Pacific Ocean. Australia is the most likely of countries to reach the WHO millstone because the national HPV vaccination program has achieved high vaccination coverage across all genders since 2007; the National Cervical Screening Program reintroduced a five-year HPV test for women aged 25 to 74, with subsequent reflex cytology of specimens that are HPV positive, in 2017[4].

The growing body of research has demonstrated that HPV self-sampling screening tests reduce the barriers to cervical screening [5][6][7][8][9]. Self-sampling may provide a mechanism to overcome obstacles to participation; however, it is essential to ensure all variables among geographic settings and the need for pilot studies before the national roll-out of the HPV self-sampling test[10]. The first validation study of primary HPV screening with self-sampling provided positive proof that self-sampling increases screening among study women who were never-screened or under-screened, and for Māori and non-Māori Pacific women[11][12][13].

In NZ, CxCa prevention practices are based on a 3-yearly screening model using the cytologic Pap test since 1990[14]. In 2008, national HPV immunization was cost-free for girls and young women up to their 20th birthday [15] and for all genders aged 9 to 26, including non-residents under (18) starting in 2017 [16]. Yet, CxCa remains the 12th most frequent malignancy, ranking as the 3rd leading cause of cancer in females, the 4th most common cancer in women aged 15 to 44, with an estimated (190) new cases annually[17][18].

The most current estimates indicate 2.13 million women (15) years and older are at risk of developing cervical lesions, 174 women are diagnosed with CxCa, and 81 will die from the disease by 2023 in NZ[19]. Accordingly, upgrades in the TeWhatu Ora'- Health New Zealand program are justified, as reflected by additional \$7.3 million in funding to provide accessible cervical screening healthcare services for critical groups at risk, and as part of moving forward toward disease elimination by 2030.

The National Cervical Screening Programme (NCSP) renewed its CxCa screening guidelines per the new international initiatives in Sept 2023. The fundamental changes were to transition from a 3-yearly Pap test or liquid-based cytology modality for women aged (20 to 69 and over) towards a 5-yearly HPV DNA test for women aged (25 to 69), with subsequent reflex cytology of specimens that are high-risk HPV positive with a self-sampling option [20].

Little research has examined the public awareness and perspectives of CxCa, especially given the upcoming screening changes in NZ. As such, the study's objective is to explore the dynamic interactions between health literacy and screening modality to make a difference and move closer towards a world without CxCa. The study aims to conduct CxCa and HPV associated awareness-assessment surveys (AAS), with the proposed hypothesis that awareness is distributed equivalently across all participants in the immunized population, despite nationality and gender. As the study takes a societal approach, it is critical to explore levels of awareness of CxCa comparable to the findings arising from a retrospective study conducted in the State of Qatar: a population without national systematic CxCa screening, or HPV immunization[21][22].

II. METHODS & FINDINGS

This study explores the awareness and health literacy of the primary and secondary prevention related to cervical cancer disease using anonymous across-sectional awareness-assessment surveys (AAS). The ASS consisted of sixteen questions, and the research protocol followed the guidelines from the approval of the Griffith University (GU) ethics to the anonymous, cross-sectional research approved by GU reference number 2020/096 in March 2020.

The survey used a copy form to invite participants from two medical centres, and the distribution of the first survey commenced in March 2020 to the end of September 2020 due to the Covid-19-related Alert Level 4 lockdown in March 2020 in NZ. The interest was shared by (100) participants from Tamaki Clinic and (202) participants using the Browns Bay Family Doctors Clinic. Responses from all surveys were transcribed into a dedicated Excel spreadsheet with columns and drop-down menus to coincide with all surveys and organized and registered as per date and sequentially numbered 001 to 302.

The complete data set was examined through three levels of statistical analysis and hypothesis testing. Two independent variables, Socio-Demographic Group (SDG) (Questions 1-6) and Source of Information (SOI) (Questions 9 and 12), were used to evaluate three study categories of awareness (Health Literacy), experience (Health Services), and interest (HPV self-sampling test). See Figure 1: The study Categories, Table 1: Category I: Health Literacy (Questions 7, 8, 10), Table 2: Category II: Healthcare Services (Questions 11, 13 and 14).

Bivariate analyses produced a matrix demonstrating the p-values (0.05) reflecting dependence between variables for the entire data set, and every question was considered a variable and analyzed using the Statistical Package for Social Sciences (SPSS) 16.0 software delivered exclusively to data and comparing the overall categories using either Independent-Samples Mann-Whitney U Test or Kruskal-Wallis Test.

The distribution of ethnicities in this study suggested a representative sampling of frequency of 219 (72.8) NZ nationality participants compared to 82 (27.2) of other nationalities residents in Auckland City- NZ. The findings revealed no significant results or gaps in different categories, and the test retains the null hypothesis that the understanding distribution is the same across all Nationalities.

Yet, the quantitative findings disclose a significance level in the distribution of the participant's awareness across the SDG, excluding nationality, and the test retains the null hypothesis that the distribution of attention is the same across. The Mann-Whitney U test shows gender significance differences the frequency of participants respondents by 242 (80.4) women and 59 (16.6) men and Kruskal-Wallis Test show level of significant between age groups frequency 13 (4.3) of (15-20), 69 (22.9) of (20-29), 68 (22.6) of (30-39), 45 (15.0) of (40-49), 68 (22.6) of (50-59) and 38 (12.6) of 60+ age group. See Table 3: Category I: Health Literacy, SOI, Age and Gender. Table 4: Category II: Healthcare Services, SOI, Age and Gender.

I. FIGURES & TABLES

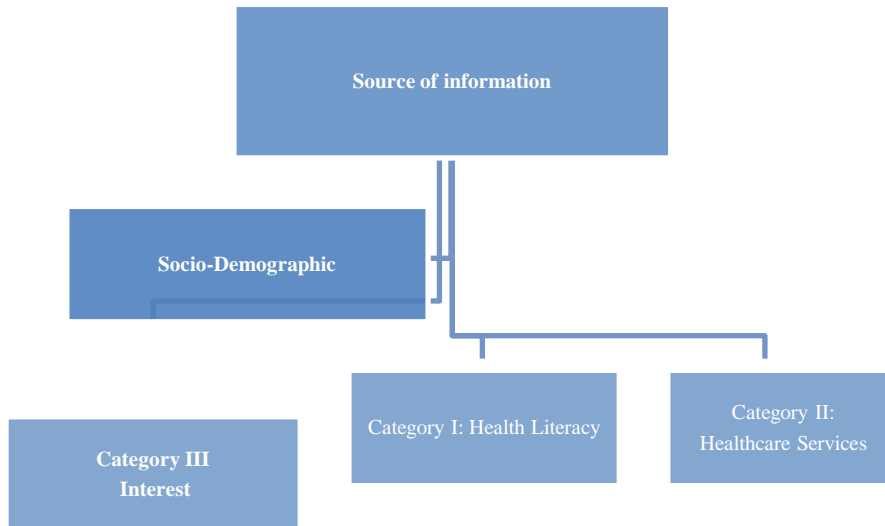


Figure 1: The study Categories

Table 1: Category I- Health Literacy

Q7: Human Papilloma virus and its association with cervical cancer?		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	179	59.3	60.9	60.9
	No	99	32.8	33.7	94.6
	Don't know	16	5.3	5.4	100.0
	Total	294	97.4	100.0	
Missing		8	2.6		
Total		302	100.0		
Q8: Are you familiar with Human Papillomavirus Vaccine and its availability?		Frequency	Percent	Valid Percent	Cumulative Percent
Yes		160	53.0	53.0	53.0
No		114	37.7	37.7	90.7
Don't know		16	5.3	5.3	96.0
Missing		12	4.0	4.0	100.0
Total		302	100.0	100.0	
Q10: Human Papilloma Virus and its association with cervical cancer		Frequency	Percent	Valid Percent	Cumulative Percent
Yes		98	32.5	32.5	32.5
No		169	56.0	56.0	88.4
Don't know		24	7.9	7.9	96.4
Missing		11	3.6	3.6	100.0
Total		302	100.0	100.0	

Table 2: Category II: Healthcare Service

Q11: Do you know what a Pap smear or Pap test is?		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	247	81.8	81.8	95.0
	No	40	13.2	13.2	97.4
	Don't know	7	2.3	2.3	100.0
Missing		8	2.6	2.6	
Total		302	100.0		

Q13 Have you ever had a Pap Smear/test done in NZ?		Frequency	Percent	Valid Percent	Cumulative Percent
Yes		98	32.5	32.5	32.5
No		169	56.0	56.0	88.4
Don't know		24	7.9	7.9	96.4
Missing		11	3.6	3.6	100.0
Total		302	100.0	100.0	

Q14 Are you aware that HPV increase the likelihood of an abnormal results on Pap Smear/test?		Frequency	Percent	Valid Percent	Cumulative Percent
Yes		116	38.4	40.0	40.0
No		142	47.0	49.0	89.0
Don't know		32	10.6	11.0	100.0
Total		202	96.0	100.0	
Missing		12	3.6		
Total		302	100.0		

Table 3: Category I: Health Literacy, SOI, Age and Gender

Category II	Q7	<i>Human Papillomavirus and its association with cervical cancer?</i>							
Category I		Female				Male			
Age Group	Yes	No	Don't Know	Not Answered	Yes	No	Don't Know	Not Answered	
15-20	2	2	3	1	2	2	1		
20-29	31	19	1	1	7	9	1		
30-39	36	11	5	1	5	9	1		
40-49	25	9		1	4	7			
50-59	42	17	1	1	3	4			
60+	21	7	3	2	1	3		1	

Category II	Q8	<i>Are you familiar with Human Papilloma Virus Vaccine and its availability?</i>							
Category I		Female				Male			
Age Group	Yes	No	Don't Know	Not Answered	Yes	No	Don't Know	Not Answered	
15-20	4	3	1	1		3	1		
20-29	30	21		1	5	11	1		
30-39	30	14	6	3	4	10	1		
40-49	22	12		1	3	8			
50-59	38	18	3	2	3	4			

60+	20	6	3	4	1	4			
Category IV	Q9	<i>If your answer is YES, where did you hear about the anti-Human Papilloma Virus vaccine?</i>							
Category I		Female				Male			
Age Group	Health Provider	Social Media	General Info	Not Answered	Health Provider	Social Media	General Info	Not Answered	
15-20	1		1	8				4	
20-29	38	1	8	5	4	1	2	10	
30-39	46		2	5	6	3	3	3	
40-49	29		1	4	2		3	6	
50-59	53	1	2	5	2		1	4	
60+	29		1	3	3		1	1	
Category II	Q10	<i>Did you know that Human Papilloma Virus associated Cervical cancer Is 3rd most common cancers among women of ALL AGES?</i>							
Category I		Female				Male			
Age Group	Yes	No	Don't Know	Not Answered	Yes	No	Don't Know	Not Answered	
15-20	1	6		2		4			
20-29	14	31	6	1	3	14			
30-39	26	18	7	3	2	12	1		
40-49	15	15	2	2		10	1		
50-59	24	32	3	2	2	5			
60+	11	17	3	2		3	1	1	

Table 4: Category II: Healthcare Services, SOI, Age and Gender.

Category III	Q11	<i>Do you know what a Pap smear or Pap test is?</i>							
Category I		Female				Male			
Age Group	Yes	No	Don't Know	Not Answered	Yes	No	Don't Know	Not Answered	
15-20	2	5	1	2		4			
20-29	46	3	1	2	7	7	2	1	
30-39	49	2		2	13	1	1		
40-49	30	3		1	5	4	1	1	
50-59	57	1	1	2	3	4			
60+	30	1		2	4			1	
Category IV	Q12	<i>If your answer is YES, where did you hear about Pap Smear/test</i>							
Category I		Female				Male			
Age Group	Health Provider	Social Media	General Info	Not Answered	Health Provider	Social Media	General Info	Not Answered	
15-20	1		0	8				4	
20-29	35	1	0	5	3	0	0	10	
30-39	46		1	4	6	2	0	3	
40-49	28		0	4	2		0	6	

50-59	51	1	1	5	2		0	4
60+	28		0	3	3		0	1
Category III	Q13	<i>Have you ever had a Pap Smear/test done in NZ?</i>						
Category I	Female				Male			
Age Group	Yes	No	Don't Know	Not Answered	Yes	No	Don't Know	Not Answered
15-20		7		3		3	1	
20-29	23	22	4	3		13	2	2
30-39	43	7	2	1		9		6
40-49	29	4		1	1	7		3
50-59	55	4	1	1		5		2
60+	26	5		2		2		3
Category III	Q14	<i>Are you aware that Human Papilloma Virus increase the likelihood of an abnormal results on Pap Smear/test?</i>						
Category I	Female				Male			
Age Group	Yes	No	Don't Know	Not Answered	Yes	No	Don't Know	Not Answered
15-20		7	1	1		4	1	
20-29	19	26	5	2	2	13	2	
30-39	29	14	8	2	1	11	2	1
40-49	22	9	2	1	2	7	1	1
50-59	27	28	5	1	1	4	2	
60+	13	15	3	2		4		1

III. DISCUSSION

The overall intent of this article is to present the quantitative findings reflecting the health literacy of CxCa and HPV through participants' responses, designed to capture information based on the study's three categories reflecting the views and opinions of demographic participants from Auckland City, NZ.

It was hypothesized that the systematic Pap testing and HPV immunized population's health literacy of CxCa would correspond positively in keeping awareness of the primary disease prevention relative to non-immunized populations and opportunistic CxCa screening [21][22]. However, the data reported in this paper reveal similar significant findings in genders and age groups excluding nationality; therefore, given the considerable health literacy gaps in gender awareness of HPV vaccination, the authors rejected the null hypothesis.

Based on likely similarities in systematic CxCa screening and HPV immunization between the Australian experience for post-primary HPV screening and NZ, it was hypothesized that women may feel more comfortable taking their samples using the self-sampling method to improve CxCa screening rates as in Question 15: *Are you interested in having a Human Papilloma virus self-sample test?*

The study data showed low responses; as, from 302 participants, 189 participants' feedback was either incomplete or inapplicable; and from 113 participants, 68 (22.5) had a valid frequency (60.2) *Yes*, and 45 (14.9) a reasonable frequency (39.8) *No*.

To assess the degree of self-efficacy and support of the perceived value of investment embedded in any test for good health from all respondents in Question 16: *What would discourage you from getting any test done?* The feedback was from 302 participants, 188 participants' feedback was incomplete, and 114 response

rates of 12 (4.0), valid frequency (10.5) *Yes* and 4 (1.0), valid frequency (3.5) *No*, 98 (32.0), and valid frequency (86.0) *Don't know*.

The chi-square test was used to compare Category III Interest and SOI; the findings show significant differences and exclude Nationality, prompting the authors to reject the null hypothesis.

All variables considered, the efficacy of national CxCa screening systems in developed nations remains limited due to inadequate participation [23]. Many pillars are being recommended to increase CxCa awareness. The findings from this study demonstrate that the relationship between the health professional and targeted communication is vital to augmenting primary HPV DNA self-sampling strategies [10]. Cervical cancer is a preventable cancer in women given adequate HPV vaccination, Pap testing, and therapeutic management. Unfortunately, it is also costly due to potentially increasing healthcare disparities, reflecting substantial public health care concerns [24][25]. Furthermore, HPV vaccination may not protect infected women at risk for developing CxCa. Thus, despite the potential for primary prevention of HPV vaccination, studies show that systematic screening practices are prudent to provide outreach and awareness [22].

The renewed NCSP in Australia includes a new clinician-supported self-collection pathway; acceptability among practitioners and participants was highly acceptable to most screening participants and practitioners [26][27]. Applying different factors to the HPV self-sampling could help in the implementation process and appropriate support and information that can assist the population of never or under-screened women to complete the HPV self-collection pathway successfully [28].

The self-sampling test was available to the Australian women overdue for screening during 2018-2019; however, data suggests fewer than 6000 self-collected tests were processed [29]. Our study reflected awareness, which is vital as most of the other research data show unaware of the availability of self-collection similar to other Australian women [30][31][32].

This article relates to the WHO-endorsed strategy and targets set to eliminate CxCa by 2030. The global initiative resolves to eliminate gaps in healthcare by developing worldwide awareness, improving health literacy and collective government action. This study also enabled multi-lever exploration allowing a broad range of values to be analysed. The data set allowed for multivariate analyses between awareness of, and association between, CxCa and HPV.

The study findings are based on the level of awareness, degree of good health choices or practices, and agreement of supporting the perceived value embedded in AAS. The awareness among practitioners is of fundamental importance and plays a critical role in the uptake of new CxCa screening pathways.

IV. CONCLUSIONS

The study's open invitation to all Nationalities and Genders fostered the significance of the results obtained. The study's limitation, however, is that it was assumed that using a hard copy survey method would make it easy for participants to complete the survey questionnaires; as such, the study was limited due to the nature of the cohort completing the questionnaire. However, the Alert Level System during the different levels of the lockdown in Auckland, NZ, due to the COVID-19 pandemic in 2020 and 2021, either reduced or restricted participation, adding additional obstacles.

The study findings indicate that systematic CxCa screening tests or HPV immunization alone may not ensure equitable outcomes, meaning health literacy should target young adults and all genders. Therefore, health literacy initiatives should ideally target younger adults ages (i.e. 15-25) and all genders. In addition, close attention must be paid to all communication approaches to achieve the NCSP goals in a safe and high-quality enhancing program. There is a justified opportunity and need for various methods to be considered and deployed to ensure CxCa health literacy remains adequate to foster disease elimination targets.

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