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## 8 **Knowledge and Attitude Regarding Cervical Cancer and Human Papilloma** 9 **Virus in Oman**

10 **\*Marwa Al Raisi,<sup>1</sup> Tagharid Al Yahyai,<sup>1</sup> Rahma Al Kindi<sup>2</sup>**

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12 <sup>1</sup>*Family Medicine Residency Program, Oman Medical Specialty Board, Muscat, Oman;*

13 <sup>2</sup>*Department of Family Medicine & Public Health, Sultan Qaboos University Hospital, Muscat,*  
14 *Oman*

15 *\*Corresponding Author's e-mail: [marwa.alraisi@gmail.com](mailto:marwa.alraisi@gmail.com)*

16  
17 **Objective:** This study aimed to assess the knowledge and attitude regarding cervical cancer and  
18 Human papilloma virus (HPV) among Omani women aged 18 years and older. **Methods:** This  
19 cross-sectional survey was conducted between September 2019 and February 2020 in primary  
20 health care facilities throughout Oman. A self-administered questionnaire was distributed to  
21 assess the knowledge and attitude regarding cervical cancer and HPV. **Results:** A total of 805  
22 women participated in the study (response rate: 89%). Two thirds of the participants had heard  
23 about cervical cancer (67%) while fewer were aware of HPV (15.8%). Around one third of the  
24 women identified HPV as a risk factor for developing cervical cancer (38.9%). Very few  
25 participants had knowledge of HPV vaccines (10.1%). Major source of information regarding  
26 both cervical cancer and HPV was social media (33.0%), as compared to 16.9% who got the  
27 information from healthcare providers. Despite the poor knowledge, almost half of the  
28 participants were open to vaccinating schoolgirls (41.2%) and even their daughters (47.0%)  
29 **Conclusion:** Most of the participants had poor knowledge regarding cervical cancer and HPV;  
30 even those with a personal or family history of cervical cancer. Main source of knowledge was  
31 social media. Majority were open to the idea of offering the HPV vaccine to middle school-aged

32 girls and even their daughters. Proper incorporation into school curricula and improving access  
33 to trusted medical knowledge to the public in the social media may help in enriching the public's  
34 knowledge, and possibly, correct misinformation and myths regarding cervical cancer and HPV.

35 **Keywords:** Papillomavirus Vaccines; Cervical Cancer, Surveys and Questionnaires; Risk  
36 Factors; Community-Institutional Relations; knowledge; attitude; practice; Oman

37

### 38 **Advances in Knowledge**

- 39 • To the best of the authors' knowledge, this is the first study to be conducted in all the  
40 governorates of Oman to assess the knowledge and attitude regarding cervical cancer and  
41 human papilloma virus (HPV) among Omani women.
- 42 • This study showed that most participants had poor knowledge regarding cervical cancer  
43 and HPV. Despite that, the majority showed acceptance of the HPV vaccine. Therefore,  
44 health care providers and decision makers should be vigilant and prepare a nationwide  
45 awareness program to enrich the public's knowledge regarding cervical cancer, HPV and  
46 its implications.

47

### 48 **Application to Patient Care**

- 49 • The findings of this study provide useful information which could form the basis for  
50 educational campaigns and initiatives focusing on cervical cancer and the importance of  
51 HPV vaccination. This would result in increased utilization of the screening program,  
52 better health outcomes, and significantly reduce the incidence of cervical cancer.
- 53 • This survey demonstrates public acceptance of the vaccine. This urges policy makers to  
54 seriously plan to integrate the vaccine to the national immunization schedule.

55

### 56 **Introduction**

57 Human papilloma virus (HPV) has been identified as a precursor to cervical cancer. There are  
58 many HPV carcinogenic genotypes but types 16 and 18 are the most commonly identified in  
59 cervical cancer.<sup>1,2</sup> In a recent study from Oman, the prevalence of HPV was 17.8% and there  
60 were 22 different types identified, some of which were found to be high risk and carcinogenic.  
61 The highest prevalence was for the low-risk type 52 (12.3%) followed by the high-risk type 82  
62 (10.2%).<sup>3</sup>

63

64 According to the Global Cancer Observatory (GLOBOCAN) estimates of 2020, the incidence of  
65 cervical cancer worldwide was 604,127 (3.1%), ranking it as the seventh most common cancer  
66 overall, and fourth in females.<sup>4</sup> The corresponding mortality worldwide mounts up to 341,831  
67 (7.7%), ranking fourth in cancer-related mortality in females of all ages.<sup>4</sup> In Oman, cervical  
68 cancer is also the fourth most common cancer in women of all ages and is the third most  
69 common in women aged 15 to 44 years.<sup>5,6</sup> About 77 new cervical cancer cases are diagnosed  
70 annually in Oman with a total of 41 deaths as per 2019 HPV information centre estimates.<sup>6</sup>  
71 The HPV vaccine was introduced with different combinations of HPV genotypes. In many  
72 countries, the vaccine was approved as a preventative measure against cervical cancer. For the  
73 vaccine to provide adequate immunity, it should be administered years before exposure to the  
74 virus. This necessitates its use early before the individual becomes sexually active, preferably in  
75 the prepubertal age.<sup>7</sup> Many developed countries have integrated the HPV vaccine into their  
76 national immunization programs.<sup>8</sup> Among the Arab countries, the area that extends from the  
77 Middle East to the North African region (also referred to by the acronym MENA) only one  
78 country, the United Arab Emirates, offers the HPV vaccine as a part of their immunisation  
79 schedule.<sup>9</sup> In Oman, the HPV vaccine is not yet included in the Expanded National  
80 Immunization Program and is not systematically provided by the institutes of the Ministry of  
81 Health.<sup>10</sup>

82

83 The incidence of cervical cancer has dropped significantly after the introduction of cervical  
84 cancer screening. In the UK, the incidence rates have declined by 24% and in the USA, cervical  
85 cancer moved from being in the top ten to the fourteenth place since screening was introduced.<sup>11-</sup>  
86 <sup>14</sup> A study conducted in Sweden on more than one million females who were followed for more  
87 than 10 years showed a substantial reduction in the incidence of cervical cancer, especially  
88 among those vaccinated before the age of 17.<sup>15</sup>

89

90 Based on a study conducted in 2019, the estimated worldwide incidence of cervical cancer is  
91 predicted to be 44.4 million by the year 2069.<sup>16</sup> Unfortunately, two thirds of the new cases are  
92 thought to be from low to middle income countries. As per the same study, even if those

93 countries implement HPV vaccine coverage to middle school-aged girls, lowering the new cases  
94 of cervical cancer will only take effect after three to four decades.<sup>16</sup>

95  
96 In Oman, a previous study in a tertiary hospital reported that women had insufficient knowledge  
97 regarding cervical cancer, its risk factors, and methods of screening.<sup>17</sup> Therefore, this study  
98 aimed to assess knowledge about cervical cancer as well as knowledge and attitude regarding  
99 HPV and its vaccine among Omani women throughout the sultanate, and to establish a  
100 correlation between their knowledge/attitude and sociodemographic factors. Assessing the  
101 knowledge and the attitude regarding HPV infection and its consequences would help in  
102 assessing the acceptability of introducing a well-structured cervical cancer screening program.  
103 Furthermore, assessing the knowledge of the available vaccine in addition to the participant's  
104 acceptability towards it will aid the decision makers in charge of the of the national  
105 immunization schedule in their decision on whether to add the vaccine.

## 106 107 **Methods**

108 A multi-centric cross-sectional study was carried out in primary health centres across Oman from  
109 September 2019 to February 2020. In Oman, there are eleven governorates, and the number of  
110 health centres varies from one governorate to another. Each of these health centres serve the  
111 general population and the aim is to have a health centre per 10,000 population. Health centres  
112 provide a single location for primary care teams to work from and deliver primary health care  
113 needs. These clinics are well developed in terms of the availability of trained and qualified  
114 family physicians, appointment systems, and a wide range of investigations and medications.  
115 Eighteen health centres were randomly selected from each governorate. This was done by  
116 categorising the governorates as either large or small based on population size. The enrolled  
117 health centres were arranged based on the population of the catchment area and number of  
118 outpatient visits obtained from the Oman Health Records 2019. We ended up with seven large  
119 governorates and four small ones. Two health centres were randomly selected from the larger  
120 governorates and one health centre from the less populated governorates using a simple random  
121 sampling method. The number of participants from each centre was then calculated based on the  
122 proportion of outpatient visits in that health centre compared to the total number of outpatient  
123 visits. We selected the participants randomly by using a systematic random sampling method in

124 which we chose every second adult female visiting the health centre for any reason (medical or  
125 non-medical) during the study period. The target population was Omani women aged 18 years  
126 and older who were attending the health centre for any service. Women who could not read,  
127 those who did not speak Arabic or English, those with learning difficulties or dementia, acutely  
128 sick women who required immediate care, or those in a hurry were excluded from the study.  
129 The sample size was determined based on the anticipated level of knowledge regarding cervical  
130 cancer and screening for cervical cancer as 50% with a 5% margin of error, 95% confidence  
131 level, and 5% 2 tailed alpha error. The calculated sample size was 768. In addition, we  
132 anticipated a 4% non-response rate to the survey. Therefore, the total sample size became 800.  
133 The calculation was done using OpenEpi software.

134  
135 A well-structured questionnaire was used for data collection, and this had been tested in a  
136 previous study in Oman.<sup>17</sup> The participation was voluntary and a written consent with a  
137 statement of confidentiality was taken from all participants. The purpose and objectives of the  
138 research were explained to all participants. Privacy, confidentiality, and the right to withdraw at  
139 any given time was assured. The average time taken to fill the questionnaire ranged between 10  
140 and 15 minutes and this was done by face-to-face interview. The study was anonymous, and the  
141 participants were assigned a unique code which was later used for data analysis.

142  
143 The survey consisted of three main parts. The first part was regarding the sociodemographic  
144 characteristics including age, marital status, age at first marriage, number of marriages, total  
145 number of children, number of daughters, theirs and their spouses' level of education,  
146 employment status, and if their degree was related to health care, the total monthly income, and  
147 if their income affected their regular gynaecological reviews.

148  
149 The second part assessed the participants' cervical cancer risk factors including history of  
150 smoking, exercise, use of oral contraceptive methods, history of abortion, history of sexually  
151 transmitted infection (STI), history of HPV infection, and a personal and a family history of  
152 cervical cancer. Moreover, we inquired about their immunity status, such as having a history of  
153 human immunodeficiency virus (HIV) infection, self or spouse, or using immunosuppressant  
154 medications.

155

156 The third part assessed knowledge and awareness regarding cervical cancer and HPV. Questions  
157 included whether the participants had heard of cervical cancer, their source of information, and if  
158 they thought it was among the common cancers leading to death worldwide. They were  
159 questioned about their knowledge regarding the warning signs of cervical cancer, for example,  
160 intermenstrual bleeding, persistent low back pain, persistent foul-smelling vaginal discharge,  
161 dyspareunia, menorrhagia, persistent diarrhoea, postmenopausal bleeding, persistent pelvic pain,  
162 postcoital bleeding, blood in urine or stool, and unexplained weight loss. Furthermore, the  
163 knowledge regarding factors that affect the chances of developing cervical cancer including  
164 history of infection with HPV, smoking, weakened immunity of self or spouse, long term use of  
165 contraceptive pills, early marriage before the age of 16 years, having many children ( $\geq 3$ ), family  
166 history of cervical cancer, and finally, failure to get screened for cervical cancer.

167

168 The last few questions in this part were regarding HPV and its vaccine, if they had ever heard of  
169 this vaccine and whether they generally accepted the provision of the HPV vaccine to middle  
170 school-aged girls and to their own daughters, specifically. Finally, they were asked if their  
171 knowledge, awareness, and practice regarding cervical cancer and its screening was influenced  
172 by the conservative nature of the Omani society.

173

174 To assess knowledge, all knowledge-related questions were compiled, and a scoring system was  
175 created. Each correct answer was given one point and the total possible score was 22. The scores  
176 were then divided into two categories: not knowledgeable (scores of  $<12$ ) and knowledgeable  
177 (scores of 12-22).

178

179 The data analysis was done using Statistical Package for Social Science (SPSS) version 23  
180 (SPSS Inc., Chicago, IL, USA). For sample characteristics, descriptive analyses were done.  
181 Continuous variables were presented as means and standard deviations. Categorical variables  
182 were reported as frequencies and percentages. Pearson's chi-square ( $\chi^2$ ) test was used when  
183 appropriate to determine significance and Fisher's exact tests were used for low cell frequencies.  
184 A P value of 0.05 or less was considered significant.

185

186 Ethical approval for the study was obtained from the Research and Ethics committee of the  
187 Department of Planning and Studies sections, Ministry of Health, Oman.

188

## 189 **Results**

190 A total of 805 women participated and completed the study (response rate: 89%). Most of the  
191 participants were in the age group of 21 to 30 years (38.9%) and 31 to 40 years (40.6%). More  
192 than half of the participants were in college (52.2%). Out of the remaining, most had high school  
193 diplomas (38.5%). The participants were almost equally divided between being employed  
194 (45.7%) or searching for a job (42.5%). Around one fifth of the participants had jobs related to  
195 health care (20.6%). Only a fifth of the women surveyed were never married (16.9%), while  
196 majority had been married (83.7%) and this includes currently married, divorced, or widowed.  
197 More than half were married when they were between the ages of 18 and 25 years (55.9%). Only  
198 a small number were married when they were younger than 18 years old (8.0%). The number of  
199 children of each participant varied greatly from 1 to 13 with an average of  $2.52 \pm 2.44$ . The  
200 number of daughters was also variable with an average of  $1.25 \pm 1.49$  where the majority did not  
201 have any (42%), followed by a quarter who had one daughter (24.3%). Almost half of the  
202 husbands had secondary school diplomas (40.9%), followed by undergraduate degrees (26.8%).  
203 In terms of income, this varied greatly, 20.2% reported having low income of less than 500 OMR  
204 a month and 20.4% stated having an income of 1000-2500 OMR a month. The majority of the  
205 participants (78.3%) indicated that their financial status did not affect their visits to the  
206 gynaecologist.

207

208 Almost all of the participants were non-smokers (99.5%). Around one third did not exercise  
209 (31.9%), while only 69 (8.6%) exercised regularly around four to five times a week. Most of the  
210 women (78.9%) were not using any contraceptive methods. Around one third (30.1%) had a  
211 history of abortion, with a small proportion that had more than two abortions (6.6%). Few (1.1%)  
212 had a history of STI, and less (0.5%) had previously been infected with HPV. Of all participants,  
213 only 6 (0.7%) had a history of cervical cancer and 27 (3.4%) had a family history of cervical  
214 cancer to their knowledge. Few (0.6%) reported having low immunity and only one (0.1%)  
215 reported having a husband with low immunity.

216

217 When questioned regarding knowledge about cervical cancer, more than two thirds of the  
218 participants (67.5%) had heard of cervical cancer. Most of them gained this knowledge from  
219 social media (33.0%) followed by their health care provider (16.9%), television programs or  
220 advertisements (16.5%), schools or universities (12.9%), family and friends (8.2%), and written  
221 media such as magazines and newspapers (8.1%). The majority (60%) did not know that cervical  
222 cancer is a leading cause of death, and only a quarter (26.3%) thought it was. Spotting between  
223 periods (47.3%), vaginal discharge (41.9%), persistent pelvic pain (41.6%), and post-menopausal  
224 bleeding (39.0%) were frequently identified warning signs of cervical cancer. In addition, just  
225 under half of the participants identified persistent low back pain (47.3%), menorrhagia (38.9%),  
226 postcoital bleeding (35.5%), dyspareunia (34.7%), and weight loss (31.1%) to be warnings signs.  
227 However, blood in the stool and urine (26.2%) and diarrhea (12.3%) were infrequently identified  
228 as warning signs.

229

230 When questioned regarding factors that increase the chances of developing cervical cancer, most  
231 of the participants agreed that the following are risk factors for cervical cancer:  
232 immunosuppression (56.9%), having a family history of cervical cancer (53.3%), never being  
233 screened for cervical cancer before (49.7%), smoking (48.1%), long term use of oral  
234 contraceptive pills (36.6%), and having a husband with a weakened immune system (34.4%). On  
235 the other hand, very few respondents thought that early marriage (17%) and having many  
236 children (9.3%) played a role in developing cervical cancer. Almost half of the respondents  
237 (49.7%) did not know that HPV infection was a risk factor and some (11.4%) thought it was not  
238 a risk factor. On the other hand, more than half (53.3%) identified family history of cervical  
239 cancer as a risk factor for cervical cancer.

240

241 Regarding the knowledge score, 60.0% of the participants had poor knowledge with a score of  
242 less than 12 and 40.0% of the participants were knowledgeable with a score of 12 or more. The  
243 knowledge score was significantly associated with the participants' qualifications ( $P = 0.000$ )  
244 and if their degree was related to health care ( $P = 0.000$ ). Most women who were knowledgeable  
245 had a college degree or higher (65.5%). Regarding the field of study and whether it was related  
246 to health care and knowledge score, more than half of the participants had poor knowledge  
247 (59.9%), with a few of these who were in health care-related fields (7.7%). The knowledge score



248 was also significantly associated with employment status ( $P = 0.000$ ), income ( $P = 0.000$ ), and  
249 family history of cervical cancer ( $P = 0.000$ ). The knowledge score was not significantly  
250 associated with the other sociodemographic characteristics nor with the previous history of STI,  
251 history of HPV infection, or history of cervical cancer. Table 1.

252

253 Two thirds of the participants (67%) had never heard of HPV. Even though only 81 women  
254 (10.1%) had heard of the HPV vaccine, 332 (41.2%) agreed with offering the vaccine to middle  
255 school-aged girls and almost half (47.0%) agreed that vaccinating their daughters was a good  
256 decision. Furthermore, 48.3% of the participants admitted that the conservative nature of Omani  
257 society did affect their knowledge regarding cervical cancer. Regarding the acceptance of the  
258 provision of the HPV vaccine to their own daughters, there was no association with any of the  
259 factors. However, there was a significant association between agreement to giving the vaccine to  
260 school children and the level of education ( $P = 0.000$ ) and whether their field of study was  
261 related to health care ( $P = 0.036$ ). On the contrary, there was no association between agreement  
262 to give the vaccine and whether the participants had daughters. Table 2.

263

## 264 **Discussion**

265 Even though cervical cancer is the third most common cancer among Omani women aged 15–44  
266 years, there is no well-structured national screening program.<sup>5</sup> The unavailability of cervical  
267 cancer screening and Pap smear testing at the primary healthcare level has led to a lack of  
268 knowledge regarding cervical cancer. In the current study, most of participants (67.5%) had  
269 heard of cervical cancer which is low compared to a previous similar study in Oman where the  
270 majority of participants (80%) had heard of cervical cancer.<sup>17</sup> The main source of information for  
271 the participants in our study was social media (33%) followed by only 16.9% from healthcare  
272 providers. Our study was not the only one which demonstrated that social media, rather than  
273 health care professionals, was the major source of knowledge. The same was demonstrated in  
274 other Arabic countries such as Qatar, Hispanic communities in the US, and some Asian countries  
275 including India.<sup>18-20</sup> These findings are contrary to a study done in Italy among young adult  
276 woman which found healthcare providers to be the primary and most trusted source of  
277 information.<sup>21</sup> This leads us to think that national education and/or awareness programs are  
278 deficient in Oman or are not well within reach of the public. Social media has become an

279 important platform that can be utilised in educating the public about cervical cancer and the HPV  
280 vaccine, especially that currently social media is one of the fastest and easiest ways to deliver  
281 information. Hence, it could be wisely used by health care providers if it is well prepared and  
282 structured.

283

284 In comparison to a study done previously in Oman, the majority of college degree holders,  
285 whether patients, staff, or current students, had inadequate knowledge regarding cervical cancer,  
286 100%, 59.5%, and 92.4%, respectively.<sup>17</sup> In both studies, participants demonstrated poor  
287 knowledge despite educational level or employment status which leads us to think that the  
288 public's overall exposure to cervical cancer awareness, whether through advertisement, their  
289 health care providers, or their schools, is lacking. This indicates the increased need to utilize  
290 different resources to increase awareness of cervical cancer and to focus more on health care  
291 professionals to deliver the required information as they would be the most reliable in spread the  
292 information, respond to any inquires, and guide them appropriately.

293

294 In terms of knowledge regarding cervical cancer, our study demonstrated similar results to  
295 studies done in Qatar and Kuwait.<sup>18, 22</sup> People who had better knowledge were mostly college  
296 degree holders or higher or aged 31 years or older. In addition, people with inadequate  
297 knowledge were women under 30 years of age, recently married, or uneducated. Although most  
298 of the respondents in our study were educated, only 40% were considered knowledgeable.  
299 Contrary to what was found in previous studies, even the highly educated people in our study  
300 were unaware of cervical cancer. That could be because the population size in the previous study  
301 was smaller and most of the participants were hospital staff and nursing students who would  
302 have previously been exposed to information regarding if not patients with cervical cancer and/or  
303 HPV.

304

305 Regarding knowledge of HPV and its vaccine, of our study participants, only 15% had heard of  
306 HPV as compared to 34.5% in a study done in Saudi Arabia. In the same study, 29.9% of  
307 participating Saudi women were aware of the HPV vaccine compared to only 10.1% in this  
308 study.<sup>23</sup> Both of which are very low when compared to 79.1% of all participants who knew of the

309 HPV vaccine in a study done in the UK, US, and Australia.<sup>24</sup> This calls for a nationwide  
310 awareness program to educate the Omani public regarding HPV and its implications.  
311 Despite the poor knowledge regarding HPV and the vaccine for it, our studied population  
312 reported to be accepting of vaccinating middle school-aged girls including their own daughters.  
313 This could indicate the public's trust in health authority in the country. The acceptability rate was  
314 47.1%, which is considered low when compared to 83.7% in Thailand, 81.8% in Bahrain, and  
315 64.3% in Saudi Arabia.<sup>23,25-27</sup> Though the acceptance for HPV vaccine is comparably low, it is  
316 essential that initiative be taken and the vaccine be provided to eligible candidates.

### 317 **Strengths and limitations**

318 The strength of this study lies in the diversity of the respondents. It is the first national study  
319 from Oman to assess knowledge, awareness, and attitude regarding cervical cancer and HPV.  
320 The results of our study can therefore be generalisable to the entire population. Moreover, the  
321 response rate was high, likely due to the chosen data collection method (face-to-face interviews)  
322 which may have helped to build a stronger rapport with the respondents and allowed for more  
323 accurate and complete responses. Among the limitations of our study is the length of the  
324 questionnaire and that the interviews were placed in waiting areas of primary health care  
325 facilities which can often be crowded. Finally, the inclusion of questions referring to the  
326 participants' past experiences and the face-to-face interview setup itself could have inadvertently  
327 led to recall or response bias.

328

### 329 **Conclusion**

330 Most of the participants had poor knowledge regarding cervical cancer and HPV. Even those  
331 with a personal or family history of cervical cancer were not aware of HPV and its role. Despite  
332 that, the majority were open and accepting of the idea of offering the HPV vaccine to middle  
333 school-aged girls and even their daughters. Community outreach programs may help in enriching  
334 public knowledge, and possibly, correct misinformation and myths regarding cervical cancer and  
335 HPV.

336

### 337 **Authors Contribution**

338 MR, TK and RK conceived the presented research idea and went through literature review. MR  
339 and TK, under the supervision of RK, designed the research methodology. MR and TK were

340 involved in the data collection and data entry. MR, TK and RK analyzed and interpreted the results.  
341 MR was a major contributor in writing the manuscript in consultation with TK and RK. RK was  
342 the research supervisor who guided MR and TK throughout the project. All authors read and  
343 approved the final manuscript.

344

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349 national level.

350

### 351 **Conflict of Interest**

352 The authors declare no conflicts of interest.

353

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356

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447

448 **Table 1:** Knowledge of Cervical Cancer among Omani Women<sup>†</sup>

	<b>n (%)</b>	<b>n (%)</b>	<b>n (%)</b>	<b>n (%)</b>
<b>Cervical Cancer Knowledge</b>	<b>Poor Knowledge</b>	<b>Knowledgeable</b>	<b>P value<sup>^</sup></b>	<b>Total</b>
	<b>N = 483 (60.0)</b>	<b>N = 322 (40.0)</b>		
<b>Age group</b>				
≤ 30	224 (28.1)	143 (17.9)	0.546	798 (99.1)
> 30 years	254 (31.8)	177 (22.2)		
<b>Qualification</b>				
Illiterate	28 (3.5)	17 (2.1)	<b>0.000*</b>	802 (99.6)
Secondary	217 (27.1)	93 (11.6)		
Undergrad or higher	236 (29.4)	211 (26.3)		
<b>Related to healthcare</b>				
No	420 (52.2)	218 (27.1)	<b>0.000*</b>	804 (99.9)
Yes	62 (7.7)	104 (12.9)		
<b>Marital status</b>				
Never married	90 (11.2)	46 (5.7)	0.105	802 (99.6)
Married\ Divorced\ Widowed	391 (48.8)	275 (34.3)		
<b>Employment</b>				
No	284 (35.9)	139 (17.3)	<b>0.000*</b>	790 (98.1)
Yes	187 (23.7)	180 (22.8)		
<b>Income</b>				

≤ 1000 OMR	289 (45.7)	144 (22.8)	<b>0.000*</b>	632 (78.5)
> 1000 OMR	89 (14.1)	110 (17.4)		
<b>Husband's qualification</b>				
Illiterate	52 (7.9)	31 (4.7)	0.410	662 (82.2)
Secondary	186 (28.1)	143 (21.6)		
Undergrad or higher	153 (23.1)	97 (14.7)		
<b>History of STD</b>				
No	477 (59.3)	319 (39.6)	0.681	800 (99.4)
Yes	6 (0.7)	3 (0.4)		
<b>History of HPV</b>				
No	481 (59.8)	320 (39.8)	0.682	805 (100)
Yes	2 (0.2)	2 (0.2)		
<b>History of cervical cancer</b>				
No	480 (59.6)	319 (39.6)	0.616	805 (100)
Yes	3 (0.4)	3 (0.4)		
<b>Family history of cervical cancer</b>				
No	474 (58.9)	304 (37.8)	<b>0.004*</b>	805 (100)
Yes	9 (1.1)	18 (2.2)		

449 ^Chi square test p value

450 \*Statistically significant at  $p \leq 0.05$

451 †Missing data were not included in the statistical analysis

452

453 **Table 2:** Acceptability of administering HPV Vaccine among Omani Women

Acceptability of administering HPV vaccine	†To daughters N= n (%)		P value*	†To middle school-aged girls N= n (%)		P value *
	No N = 100 (12.4)	Yes N = 378 (47)		No N = 115 (14.3)	Yes N = 332 (41.2)	
<b>Age group</b>						
≤ 30	43 (5.4)	172 (21.6)	0.817	50 (6.3)	157 (19.7)	0.760
>30	55 (6.9)	206 (25.8)		64 (8.0)	174 (21.8)	
<b>Qualification</b>						
Illiterate	10 (1.2)	18 (2.2)	0.052	12 (1.5)	15 (1.9)	<b>0.000**</b>
Secondary	47 (5.9)	133 (16.6)		62 (7.7)	105 (13.1)	
Undergrad or higher	43 (5.4)	226 (28.2)		41 (5.1)	212 (26.4)	



<b>Related to healthcare</b>						
No	79 (9.8)	287 (35.7)	0.070	98 (12.2)	249 (31.0)	<b>0.036**</b>
Yes	21 (2.6)	90 (11.2)		17 (2.1)	82 (10.2)	
<b>Marital status</b>						
Never married	19 (2.4)	62 (7.7)	0.809	22 (2.7)	52 (6.5)	0.682
Married [currently or before]	80 (10)	315 (39.3)		93 (11.6)	276 (34.7)	
<b>Employment</b>						
No	53 (6.7)	189 (23.9)	0.194	69 (8.7)	157 (19.9)	0.014
Yes	44 (5.6)	187 (23.7)		43 (5.4)	172 (21.8)	
<b>Income</b>						
1000 OMR or less	56 (8.9)	197 (31.2)	0.333	60 (9.5)	172 (27.2)	0.270
More than 1000 OMR	24 (3.8)	103 (16.3)		29 (4.6)	91 (14.4)	
<b>Husband's qualification</b>						
Illiterate	15 (2.3)	33 (5.0)	0.262	18 (2.7)	28 (4.2)	0.284
Secondary	38 (5.7)	165 (24.9)		42 (6.3)	140 (21.1)	
Undergrad or higher	27 (4.1)	116 (17.5)		35 (5.3)	105 (15.9)	
<b>History of STD</b>						
No	100 (12.4)	371 (46.1)	0.155	115 (14.3)	328 (40.7)	0.455
Yes	0 (0.0)	7 (0.9)		0 (0.0)	4 (0.5)	
<b>History of HPV</b>						
No	100 (12.4)	376 (46.7)	0.743	115 (14.3)	330 (41.0)	0.713
Yes	0 (0.0)	2 (0.2)		0 (0.0)	2 (0.2)	
<b>History of cervical cancer</b>						

No	99 (12.3)	376 (4.7)	0.796	115 (14.3)	327 (40.6)	0.105
Yes	1 (0.1)	2 (0.2)		0 (0.0)	5 (0.6)	
<b>Family history of cervical cancer</b>						
No	99 (12.3)	364 (45.2)	0.377	114 (14.2)	317 (39.4)	0.160
Yes	1 (0.1)	14 (1.7)		1 (0.1)	15 (1.9)	
<b>Do you have daughters?</b>						
No	37 (4.6)	170 (21.1)	0.234	44 (5.5)	148 (18.4)	0.410
Yes	63 (7.8)	208 (25.8)		71 (8.8)	184 (22.9)	

454 \*Chi square test p value

455 \*\*Statistically significant at  $p \leq 0.05$

456 †I don't know\ Not sure responses were not included in the statistical analysis

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