



## ASSESSMENT OF KNOWLEDGE ON THE USE OF HPV VACCINE AMONG PARENTS WITH FEMALE ADOLESCENTS AGED 9-14 YEARS IN DODOMA REGION, TANZANIA. A CROSS SECTIONAL STUDY

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### Abstract

**Background:** The success of HPV vaccination program requires awareness regarding HPV, cervical cancer and the benefits of HPV vaccination for the general population. The aim of this study was to assess the level of awareness and knowledge of human papilloma virus (HPV) infection, cervical cancer prevention, vaccine, and factors associated with HPV awareness among parents with female adolescent on their children health. Human papilloma virus (HPV) infection is mainly cause of cervical cancer together with other anogenital cancers, where cervical cancer being the leading cause of death worldwide. HPV vaccine as among primary prevention of cervical cancer was established to different countries, whereby awareness or level of knowledge and attitude regarding cervical cancer, cervical cancer, HPV and HPV vaccine among parents and adolescents were regarded as factors affecting the utilization of HPV vaccine. In order to control or reduce high incidence of cervical cancer, elevation of knowledge level about HPV vaccine among parents and care giver is more important since they play major role in their children's health. Healthcare services should take serious measures to educate parents about cervical cancer, HPV, and the potential value of HPV vaccination.

**Methodology:** A cross sectional study design was used to assess at 190 parents with female adolescent aged 9-14 years from Dodoma region, selected through multistage sampling technique. Data collection was done using interview with semi structured questionnaire. The data collected were then analyzed using a Statistical Package for Social Science (SPSS) version 23, where by frequencies were determined, also cross-tabulations and Chi-square were used for bivariate analysis and significance test.

**Results:** Overall, 190 participated in the research in which majority 86.8% were not knowledgeable regarding HPV infection. However, this study shows that majority 65.1% are having high knowledge regarding HPV vaccine with statistical significance ( $p$  value < 0.05) early adult, marital status, occupation and education level.

**Conclusion:** Most of parents were not knowledgeable regarding HPV infection, however parents responded yes as they know benefits of vaccine but most failed to mention them therefore people have low knowledge regarding HPV infection despite, they have heard about the presence of HPV vaccine that prevents cervical cancer infections.

## Introduction

Human papilloma virus (HPV) infection is mainly cause of cervical cancer together with other anogenital cancer such as anus, vulva, vagina and penis, and other infection such as genital warts. There are different types of HPV causing various types of cancer but HPV types 16 and 18 are responsible for about 70% of all cervical cancer. (Bruni et al., 2017). On last 10 years, more than 100 countries had introduced HPV vaccine still there were large number of girls who had not yet receive the vaccine, just 1.1% of girls aged 10-20 years has been vaccinated with one or more dose and more than two third of girls had not receive the vaccine. This has been contributed with different factors such as low income, poor knowledge and attitude on both parents and adolescents on HPV vaccine, HPV safety and efficacy (Egawa-Takata et al., 2016). Due to that, on 2014 most countries under influence of WHO introduce the vaccine as part of their national vaccination schedule, primarily in high and upper middle-income countries so as to have a good coverage of vaccine and hence to reduce the mortality rate of women with cervical cancer. (Gallagher, Lamontagne, & Watson-jones, 2018)

However, in African countries different factors have been identified leading to lower uptake of HPV vaccine, this includes poverty which led to failure of parents to purchase the vaccine. Also, poor perception of community towards the vaccine safety and efficacy has led to poor reaching and follow-up. Another barrier was fear of parents to speak to their children about sexual transmitted disease believing that when you speak to young adolescent is like you have told him or her to go and test. (Ib, So, & Oi, 2016) (Madhivanan et al., 2009)

Different strategies were initiated to overcome the problem one being increasing the availability of the vaccine in lower and lower middle-income countries. With the help of GAVI Alliance, HPV national vaccination program was initiated in different African countries as one of strategy so as to combat the burden of cervical cancer, in which it ensures the availability of vaccine within the country. This was achieved to some extent since different countries are being supplied by GAVI this include Uganda, Rwanda, South Africa, and many others. (Finocchiaro-Kessler et al., 2016) (Rasul, Cheraghi, & Moghdam, 2016)

Other strategies include educational campaign on cervical cancer and HPV vaccine were promoted to increase vaccine uptake, this increased awareness to the community and reduce misconceptions towards vaccine safety efficacy (Ndikom, 2014) (Ib et al., 2016).

Meanwhile Tanzania had not yet introduced the vaccine until early 2018 making it in lag towards combatting the disease burden with highest rates of cervical cancer among countries getting support from the GAVI Alliance. (Abudukadeer et al., 2015) (WHO, 2016b)

This study was conducted in Dodoma region because it is one among regions with high prevalence of HIV (The United Republic of Tanzania, 2017), making it a good candidate for assessing the knowledge of parents towards the vaccine to their daughters.

## **Materials and Methods**

### **Study design**

A cross-sectional study was used to assess knowledge of parents with young girls towards HPV vaccine among female adolescent aged 9-14 years since its quickly, fair and easily, also allow planners and administrator to allocate resource and provide the first important clues about possible determinants of factors influencing HPV uptake hence useful for the formulation of hypothesis

### **Data collection**

Data was collected using quantitative approach, participants being parents with female adolescent aged 9-14 years old in which self-administered questionnaire was used. The semi-structured questionnaires with 30 questions, was provided to the subject. From those who were not able to write and reading, the assistance was given from the research assistant.

### **Data analysis**

Data was organized from previously code questionnaire and entered individually in pre-code computer spread sheet then analyzed by SPSS computer software version 23. Chi-square test was done to see if there was any association between categorical variables.

## **Results**

### **Social demographic characteristics**

A total eligible of parent's participated approached, 190 (100%) elected to participate in the structured interview and completed questionnaire. The participation rate of female parents was higher 108 (56.8%) as compared to male parents 82 (43.2%). Most of parents 124 (65.3%) were early adult while the least group 10 (5.3%) were late adult. Out of which 83 (43.7%) were married and 24 (12.6%) were single. Majority of parents 84 (44.2%) had primary education level and 25(13.2%) were college level of education. In addition to that most were self-employed 87 (45.8%) and minority were jobless 51(26.8%). Detailed demographic characteristics of the participants are presented in Table 1 and figure 1

**Table 1 Demographic characteristics of respondents (N=190)**

| Variable                  | Number (frequency) | Percentage (%) |
|---------------------------|--------------------|----------------|
| <b>Gender</b>             |                    |                |
| Male                      | 82                 | 43.2           |
| Female                    | 108                | 56.8           |
| <b>Age</b>                |                    |                |
| Early adult (20-39)       | 124                | 65.3           |
| Middle adult (40-59)      | 56                 | 29.5           |
| Late adult (60+)          | 10                 | 5.3            |
| <b>Religion</b>           |                    |                |
| Christian                 | 112                | 58.9           |
| Muslim                    | 72                 | 37.9           |
| Tradition believer        | 6                  | 3.2            |
| <b>Marital status</b>     |                    |                |
| Single                    | 24                 | 12.6           |
| Married                   | 83                 | 43.7           |
| Separated                 | 28                 | 14.7           |
| Cohabitated               | 55                 | 28.9           |
| <b>Level of education</b> |                    |                |
| No formal education       | 29                 | 15.3           |
| Primary education         | 84                 | 44.2           |
| Secondary education       | 52                 | 27.4           |
| College education         | 25                 | 13.2           |
| <b>Occupation</b>         |                    |                |
| Employed                  | 52                 | 27.4           |
| Self employed             | 87                 | 45.8           |
| Jobless                   | 51                 | 26.8           |

### **Knowledge on HPV infection**

Knowledge level score was calculated using mode (mode = 11) from a total of fourteen knowledge items which give a cut point 5.5, therefore the one who got above the average had high score and the one who got below had low score. Awareness about HPV was much lower: only 76 (40%) knew that HPV was transmitted by sexual contact and 124 (65.4%) knew that HPV infection cause cervical cancer. Furthermore, only 55 (28.9%)

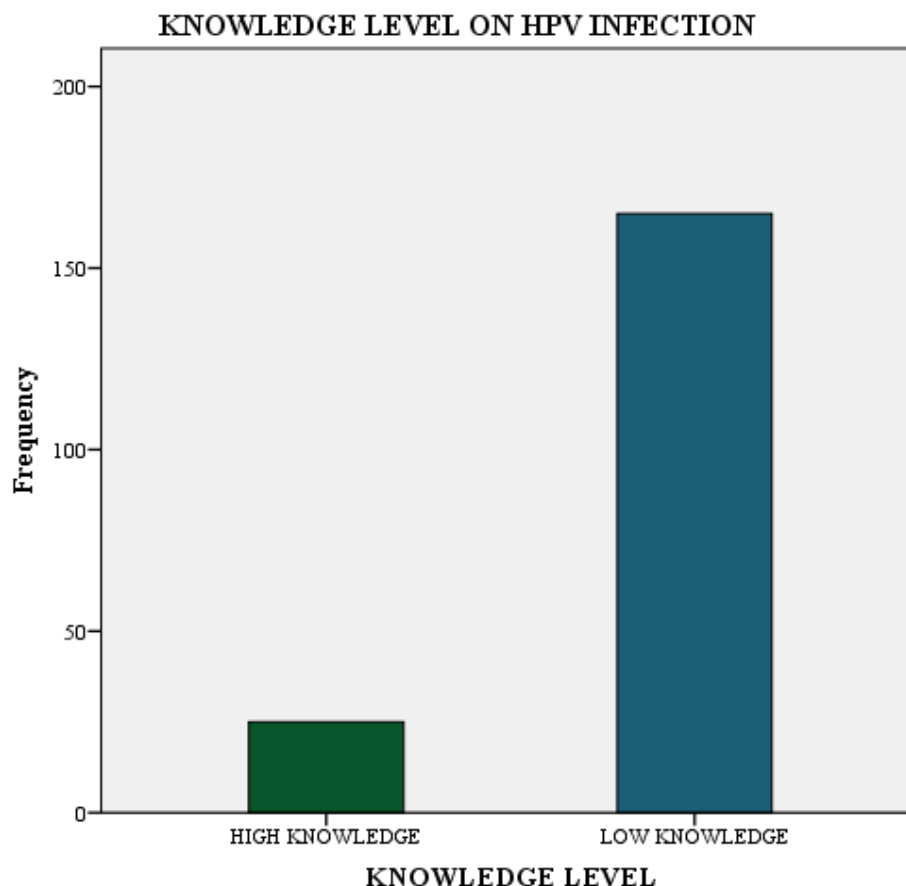
participants knew the link between HPV and HIV infection, whereas 135 (71.1%) participants had no idea about it. Also, majority 146 (76.8%) didn't know if men are affected with HPV infection while 44 (23.2%) knew about it. For more information, refer table 2 and figure 1.

**Table 2 Knowledge on HPV infection (N=190)**

| Variable   | Frequency | Percentage (%) |
|--|-----------|----------------|
| <b>Knowledge level</b>   |           |                |
| High knowledge   | 25        | 13.2           |
| Low knowledge  | 165       | 86.8           |
| <b>HPV infection has no visible sign and symptoms</b>          |           |                |
| Yes  | 51        | 73.2           |
| No   | 139       | 26.8           |
| <b>More sexual partners increase risk of HPV infection</b>     |           |                |
| Yes  | 100       | 47.4           |
| No   | 90        | 52.6           |
| <b>HPV infection has no effect in male</b>                     |           |                |
| Yes  | 64        | 33.7           |
| No   | 126       | 66.3           |
| <b>HPV cause genital warts</b>                                 |           |                |
| Yes  | 41        | 21.6           |
| No   | 149       | 78.4           |
| <b>HPV infection is related to AIDS</b>                        |           |                |
| Yes  | 55        | 28.9           |
| No   | 135       | 71.1           |
| <b>HPV infection is transmitted through sexual intercourse</b> |           |                |
| Yes  | 76        | 40             |
| No   | 114       | 60             |
| <b>HPV infection can be treated with antibacterial</b>         |           |                |
| Yes  | 88        | 46.3           |
| No   | 102       | 53.7           |
| <b>HPV infection cause cervical cancer</b>                     |           |                |

|   |     |      |
|---|-----|------|
| Yes   | 124 | 65.3 |
| No  | 66  | 34.7 |
| <b>HPV infection usually goes without treatment</b>                     |     |      |
| Yes   | 35  | 18.4 |
| No  | 155 | 81.6 |
| <b>Sexually active people will get HPV infection once in their life</b> |     |      |
| Yes   | 70  | 36.8 |
| No  | 120 | 63.2 |
| <b>People knows that they have HPV</b>                                  |     |      |
| Yes   | 31  | 16.3 |
| No  | 159 | 83.7 |
| <b>Person could have HPV infection</b>                                  |     |      |
| Yes   | 53  | 27.9 |
| No  | 137 | 72.1 |
| <b>Men cannot get HPV</b>   |     |      |
| Yes   | 44  | 23.2 |
| No  | 146 | 76.8 |

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**Figure 1 Knowledge level on HPV infection**

### **Relationship between social demographics characteristics and knowledge level on HPV infection**

Among 190 participants, the majority 165 (86.8%) had low knowledge, in which low knowledge being high among married participants 47 (37.9%) with a statistically significant difference ( $P < 0.05$ ). A statistically significance was found among the educational levels of the participants with different levels of knowledge of HPV ( $P < 0.05$ ) whereby low knowledge of HPV was found to be high in primary education 49 (39.5%). Also, a statistically significant difference ( $P < 0.05$ ) was identified in parent's occupation relative to different knowledge levels of HPV. However, low knowledge was found to be higher among self-employed 65 (54.2%). For more information, refer table 3

**Table3 Relationship between social demographic characteristics and knowledge level on HPV infection (N=190)**

| Variable               | Knowledge level on HPV infection |               | Chi-square      |
|------------------------|----------------------------------|---------------|-----------------|
|                        | High knowledge                   | Low knowledge | p-value         |
| <b>Age group</b>       |                                  |               |                 |
| Early adult            | 44 (66.7%)                       | 80 (64.5%)    | $X^2 = 0.146$   |
| Middle adult           | 19 (28.8%)                       | 37 (29.8%)    | p-value = 0.930 |
| Late adult             | 3 (4.5%)                         | 7 (5.6%)      |                 |
| <b>Gender</b>          |                                  |               |                 |
| Male                   | 23 (34.8%)                       | 59 (47.6%)    | $X^2 = 2.846$   |
| female                 | 43 (65.2%)                       | 65 (52.4%)    | p-value = 0.092 |
| <b>Marital status</b>  |                                  |               |                 |
| Single                 | 10 (15.2%)                       | 14 (11.3%)    | $X^2 = 8.591$   |
| Married                | 36 (54.5%)                       | 47 (37.9%)    | p-value = 0.035 |
| Separated              | 9 (13.6%)                        | 19 (15.3%)    |                 |
| Cohabitated            | 11 (16.7%)                       | 44 (35.5%)    |                 |
| <b>Education level</b> |                                  |               |                 |
| No education           | 4 (6.1%)                         | 25 (20.2%)    | $X^2 = 14.551$  |
| Primary education      | 35 (53.0%)                       | 49 (39.5%)    | p-value = 0.002 |
| Secondary education    | 13 (19.7%)                       | 39 (31.5%)    |                 |
| College level          | 14 (21.2%)                       | 11 (8.9%)     |                 |
| <b>Occupation</b>      |                                  |               |                 |
| Employed               | 16 (24.2%)                       | 36 (29.0%)    | $X^2 = 12.936$  |
| Self employed          | 22 (33.3%)                       | 65 (52.4%)    | p-value = 0.002 |
| Jobless                | 28 (42.4%)                       | 23 (18.5%)    |                 |



## Knowledge on HPV vaccine

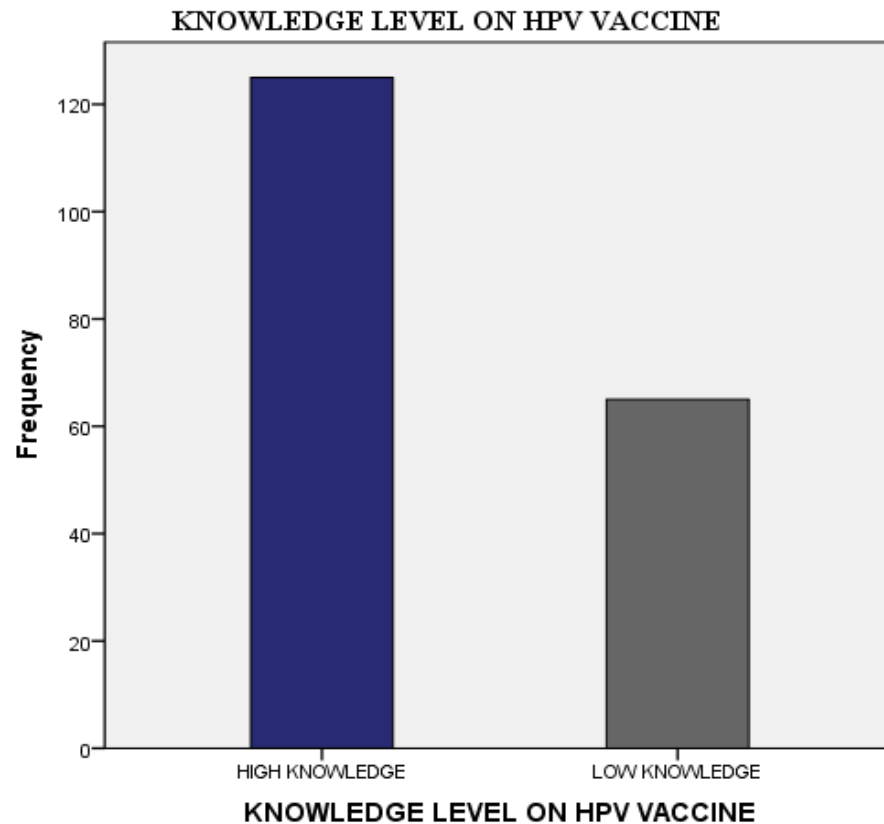
Also, knowledge was calculated using mode and highest score was 9 out of 10 and the cut points was 4.5. Overall, only 121 (63.7%) participants had heard of HPV vaccine, whereas 65 (33.9%) had never heard of HPV vaccine. In which most 64 (33.7%) heard from mass media and 5(2.6%). Awareness about HPV vaccine was much high compared to knowledge on HPV infection; but majority 99 (52.1%) didn't know the age at which a girl can receive the vaccine. Only 26 participants (8.4%) knew that HPV vaccine prevents against cervical cancer. Further details refer table 4 below.

**Table 4 Knowledge on HPV vaccine (N=190)**

| Variable   | Frequency | Percentage (%) |
|--|-----------|----------------|
| <b>Knowledge level on HPV vaccine</b>                          |           |                |
| High knowledge   | 125       | 65.1           |
| Low knowledge  | 65        | 33.9           |
| <b>Ever heard about HPV vaccine</b>                            |           |                |
| Yes  | 121       | 63.7           |
| No   | 69        | 36.3           |
| <b>Place you heard about HPV vaccine</b>                       |           |                |
| 1. Mass media  | 64        | 33.7           |
| 2. Brochures, posters  | 17        | 8.9            |
| 3. Announcements   | 10        | 5.3            |
| 4. Health workers  | 13        | 6.8            |
| 5. Family, friends, neighbours and colleagues                  | 11        | 5.8            |
| 6. Social media  | 5         | 2.6            |
| <b>Age for a girl to receive vaccine</b>                       |           |                |
| 9-14   | 91        | 47.9           |
| I don't know   | 99        | 52.1           |
| <b>HPV vaccine are effective in preventing cervical cancer</b> |           |                |
| Yes  | 178       | 93.7           |
| No   | 12        | 6.3            |
| <b>Benefits of HPV</b>   |           |                |
| Yes  | 92        | 48.4           |

|   |     |      |
|---|-----|------|
| No  | 98  | 51.6 |
| <b>Mention benefits of HPV</b>                                    |     |      |
| It prevents against cervical cancer infection                     | 16  | 8.4  |
| I don't know  | 174 | 91.6 |
| <b>Important for my child</b>                                     |     |      |
| Yes   | 165 | 86.8 |
| No  | 25  | 13.2 |
| <b>I have responsibility have my daughter receive the vaccine</b> |     |      |
| Yes   | 165 | 86.8 |
| No  | 25  | 13.2 |
| <b>Availability of HPV vaccine</b>                                |     |      |
| Yes   | 76  | 40   |
| No  | 114 | 60   |

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**Figure 2 Knowledge level on HPV vaccine**

### Relationship between social demographic data and knowledge on HPV vaccine

Among the study respondent's majority had knowledge about HPV vaccine in which earl adult had high knowledge 99 (65.6%) and its statistical significance ( $P < 0.05$ ). other variables show statistical insignificance ( $p \text{ value} > 0.05$ ) as explained in table 4-5 below

**Table 5 Relationship between social demographic characteristics and knowledge level on HPV vaccine (N=190)**

| Variable     | Knowledge level on HPV vaccine |               | Chi square                                   |
|--------------|--------------------------------|---------------|--|
|              | High knowledge                 | Low knowledge | p-value                                      |
| Age group    |                                |               |  |
| Early adult  | 99 (65.6%)                     | 25 (64.1%)    | X <sup>2</sup> = 6.017<br><br>p-value =0.049 |
| Middle adult | 47 (31.1%)                     | 9 (23.1%)     |  |
| Late adult   | 5 (3.3%)                       | 5 (12.8%)     |  |
| Gender       |                                |               |  |
| Male         | 60 (39.7%)                     | 22 (56.4%)    |  |

|                        |            |            |                                  |
|------------------------|------------|------------|----------------------------------|
| female                 | 91 (60.3%) | 17 (43.6%) | $X^2 = 3.513$<br>p-value = 0.061 |
| <b>Marital status</b>  |            |            |                                  |
| Single                 | 19 (12.6%) | 4 (12.8%)  | $X^2 = 0.708$<br>p-value =0.871  |
| Married                | 68 (45.0%) | 15 (38.5%) |                                  |
| Separated              | 21 (13.9%) | 7 (17.9%)  |                                  |
| Cohabitated            | 43 (28.5%) | 12 (30.8%) |                                  |
| <b>Education level</b> |            |            |                                  |
| No education           | 21 (13.9%) | 8 (20.5%)  | $X^2 = 1.775$<br>p-value =0.620  |
| Primary education      | 66 (43.7%) | 18 (46.2%) |                                  |
| Secondary education    | 44 (29.1%) | 8 (20.5%)  |                                  |
| College level          | 20 (13.2%) | 5 (12.8%)  |                                  |
| <b>Occupation</b>      |            |            |                                  |
| Employed               | 42 (27.8%) | 10 (25.6%) | $X^2 = 6.306$<br>p-value =0.043  |
| Self employed          | 63 (41.7%) | 24 (61.5%) |                                  |
| Jobless                | 46 (30.5%) | 5 (12.8%)  |                                  |

## Discussion

### Knowledge on HPV infection

Our result is consistent with the other studies done in India that showed low level of HPV knowledge among parent. Only 26 participants (8.6%) knew that HPV was transmitted by sexual contact. None of the female subjects were able to correctly describe at least one symptom related to HPV. Only 21 participants (7%) correctly stated that HPV was one of the major causes of Cervical cancer (7 females, 14 males). Like wise to my study only 76 (40%) knew that HPV was transmitted by sexual contact and 124 (65.4%) knew that HPV infection cause cervical cancer. Furthermore, only 55 (28.9%) participants knew the link between HPV and HIV infection, whereas 135 (71.1%) participants had no idea about it (Groot et al., 2017).

Another study from India showed that majority of the participants (375) who had knowledge about cervical cancer, 275 (73%) participants were having knowledge that cervical cancer is caused due to HPV infection. A

significant difference was observed between male: female and rural vs urban participants, as 172 (63%) females and 103 (37%) males were aware that HPV infection causes genital cancer however to my study 149 (78.4%) parents didn't know if HPV infection can cause genital warts (Hussain et al., 2014).

Similar study conducted in Brazil, only one third of them reported that they had ever heard of HPV 58 (19.0%). Among those who had heard of it, less than a quarter knew that HPV can cause cervical cancer 23 (7.6%); about half knew that HPV is a sexually transmitted infection 1 (0.3%), and only 2 (0.7%) knew that it can cause genital warts. Only 7% of all participants answered both that HPV is an STI and that it can cause cervical cancer however to my study none of respondents had heard of HPV and 76 (40%) knew that HPV was transmitted by sexual contact and 124 (65.4%) knew that HPV infection cause cervical cancer (Rama et al., 2010).

Another report done in Italy, Less than one-third (29.8%) reported that they have heard that HPV is one of the most common infections of the genital mucosa and three-quarters of them identified that the infection is primarily transmitted through sexual intercourse. (Giuseppe, Abbate, Liguori, Albano, & Angelillo, 2008)

Also Li et al as cited in (Hussain et al., 2014) reported that (51.1%) urban women knew that HPV is related to cervical cancer in compare to their rural counterpart (41.6%). Even fewer (8.1%) knew that it is associated with genital warts with the similar rate of both geographies same as my study despite was conducted in urban area still there was low knowledge among parents.

My results reflected that the HPV awareness is influenced by marital status, education level and occupation of parents that had statistical significance however other results from other studies reflected that the HPV awareness is influenced by age, education, gender and community (Hussain et al., 2014).

This low knowledge on HPV infection in my study can be associated with new introduction of HPV vaccine. Majority of the population doesn't know what cause the cervical cancer and those how know have no enough detail on the sign and symptoms associated with cervical cancer.

### **Knowledge on HPV vaccine**

Overall, in relation to other study in this study majority 125 (65.1%) had heard of vaccine. Majority had heard from mass media 64 (33.7%) and minority heard from social media 5 (2.6%). However, in Italy relatively few women had heard of vaccine from a healthcare provider (13%), and far fewer had heard of it through their education or schooling (1%). Few women had heard of the HPV vaccine, with significant differences in the proportion between rural and urban strata. Of those that had heard of the vaccine, the majority had awareness

through the radio (70%), television (20%) or healthcare interactions (12%). Despite low awareness, most believed (80%) that their friends or family would support HPV vaccination.

nearly all women (98%) believed that vaccinations were beneficial, and a moderate proportion (65%) were willing to pay for vaccines if they were not offered free. Women were willing to travel to receive vaccinations, with many women agreeing to travel for longer than 2 h (55% rural, 42% urban (Giuseppe et al., 2008).

Study conducted in Nigeria, fifty seven respondents (31.2%) had an overall good knowledge while 65 (35.5%) had poor knowledge of HPV vaccination however in my study results shows that majority have high knowledge about the vaccine 125 (65.1%) and minority were 65 (33.9%) (Onowhakpor, Omuemu, Osagie, & Odili, 2016).

In Italy less than half (42.1%) knows that the vaccine was a preventive measure against cervical cancer, but only 15.3% knows that a vaccine is available in Italy. Overall, only 23.3% have heard that HPV is one of the most common infections of the genital mucosa and about cervical cancer. However in this study shows that there is an increased percentage of people had of HPV vaccine 121 (63.7%)(Giuseppe et al., 2008).

On HPV vaccine respondents shows have high knowledge regarding the vaccine but most respond regarding the overall knowledge of vaccine but not specific to the HPV vaccine since they were asked on the importance of vaccine but most, they failed

## **Conclusion**

The study shows that most of parents have low knowledge regarding HPV infection. However, parents had high knowledge regarding HPV vaccine that it prevents against cervical cancer but some extent is not true it occurs by chance since some failed to mention the advantages of the vaccines despite they said yes. Therefore, regarding the findings people needs more information about HPV infection and HPV vaccine.

On top of that parents need more knowledge since they play major role on their children health therefore much emphasise is needed in order to increase the awareness about HPV infection and cervical cancer together with primary prevention against these infections.

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## References

- Abudukadeer, A., Azam, S., Mutailipu, A. Z., Qun, L., Guilin, G., & Mijiti, S. (2015). Knowledge and attitude of Uyghur women in Xinjiang province of China related to the prevention and early detection of cervical cancer, 1–7. <https://doi.org/10.1186/s12957-015-0531-8>
- Black, E., & Richmond, R. (2018). Prevention of Cervical Cancer in Sub-Saharan Africa : The Advantages and Challenges of HPV Vaccination. <https://doi.org/10.3390/vaccines6030061>
- Bruni, L., Barrionuevo-Rosas, L., Albero, G., Serrano, B., Mena, M., Gómez, D., ... Bosch, F. (2017). *Human Papillomavirus and Related Diseases Report. HPV Information Centre report.*
- Egawa-Takata, T., Ueda, Y., Tanaka, Y., Morimoto, A., Kubota, S., Yagi, A., ... Shimura, K. (2016). Mothers' attitudes in Japan regarding cervical cancer screening correlates with intention to recommend cervical cancer screening for daughters. *International Journal of Clinical Oncology*, 21(5), 962–968. <https://doi.org/10.1007/s10147-016-0970-4>
- Finocchiaro-Kessler, S., Wexler, C., Maloba, M., Mabachi, N., Ndikum-Moffor, F., & Bukusi, E. (2016). Cervical cancer prevention and treatment research in Africa: A systematic review from a public health perspective. *BMC Women's Health*, 16(1). <https://doi.org/10.1186/s12905-016-0306-6>
- Gallagher, K. E., Lamontagne, D. S., & Watson-jones, D. (2018). Status of HPV vaccine introduction and barriers to country uptake. *Vaccine*. <https://doi.org/10.1016/j.vaccine.2018.02.003>
- Giuseppe, G. Di, Abbate, R., Liguori, G., Albano, L., & Angelillo, I. F. (2008). Human papillomavirus and vaccination : knowledge , attitudes , and behavioural intention in adolescents and young women in Italy, 225–229. <https://doi.org/10.1038/sj.bjc.6604454>
- Groot, A. S. De, Tounkara, K., Beseme, S., Yekta, S., Diallo, F. S., Tracy, J. K., ... Koita, O. A. (2017). Knowledge , attitudes , practices and willingness to vaccinate in preparation for the introduction of HPV vaccines in Bamako , Mali, (Cc), 1–13. <https://doi.org/10.1371/journal.pone.0171631>
- Hussain, S., Nasare, V., Kumari, M., Sharma, S., Khan, M. A., Das, B. C., & Bharadwaj, M. (2014). Perception of human papillomavirus infection, cervical cancer and HPV vaccination in North Indian population. *PLoS ONE*. <https://doi.org/10.1371/journal.pone.0112861>
- Ib, U., So, N., & Oi, E. (2016). Mothers ' willingness to pay for HPV vaccines in Anambra state , Nigeria : a cross sectional contingent valuation study . <https://doi.org/10.1186/s12962-016-0057-0>
- Israel, G. (1992). Using Published Tables Using Formulas To Calculate A Sample Size Using A Census For Small Populations.
- Madhivanan, P., Krupp, K., Yashodha, M. N., Marlow, L., Klausner, J. D., & Reingold, A. L. (2009). Attitudes toward HPV vaccination among parents of adolescent girls in Mysore, India. *Vaccine*, 120. <https://doi.org/10.1016/j.vaccine.2009.06.073>
- Masika, M. M., Ogembo, J. G., Chabeda, S. V., Wamai, R. G., & Mugo, N. (2015). Knowledge on HPV Vaccine and Cervical Cancer Facilitates Vaccine Acceptability among School Teachers in Kitui County , Kenya, 10(8), 1–17. <https://doi.org/10.1371/journal.pone.0135563>
- Moshi, F., Vandervoort, E., & Kibusi, S. (2018). International Journal of Chronic Diseases. *International Journal of Chronic Diseases*, 2018, 7–12.

- Ndikom, C. M. (2014). Awareness , perception and factors affecting utilization of cervical cancer screening services among women in Ibadan , Nigeria : a qualitative study. *ResearchGate*, (August 2012). <https://doi.org/10.1186/1742-4755-9-11>
- Onowhakpor, A. O., Omuemu, V. O., Osagie, O. L., & Odili, C. G. (2016). COMMUNITY MEDICINE AND PRIMARY HEALTH CARE Human Papilloma Virus Vaccination : Knowledge , Attitude and Uptake among Female Medical and Dental Students in a Tertiary Institution, 28(2), 101–108.
- Perlman, S., Wamai, R. G., Bain, P. A., Welty, T., Welty, E., & Ogembo, J. G. (2014). Knowledge and awareness of HPV vaccine and acceptability to vaccinate in sub-Saharan Africa: A systematic review. *PLoS ONE*, 9(3). <https://doi.org/10.1371/journal.pone.0090912>
- Rama, C. H., Villa, L. L., Pagliusi, S., Andreoli, M. A., Costa, M. C., & Aoki, A. L. (2010). Awareness and knowledge of HPV , cervical cancer , and vaccines in young women after first delivery in São Paulo , Brazil - a cross-sectional study. *BMC Women's Health*, 10(1), 35. <https://doi.org/10.1186/1472-6874-10-35>
- Rasul, V. H., Cheraghi, M. A., & Moghdam, Z. B. (2016). Barriers to cervical cancer screening among Iraqi Kurdish women: A qualitative study. *Acta Medica Mediterranea*, 32(SpecialIssue4). <https://doi.org/10.1136/jfprhc-2014-101082>
- Tanzania National Bureau of Statistics. (2013). *2012 POPULATION AND HOUSING CENSUS Population Distribution by Administrative Areas*.
- The United Republic of Tanzania. (2014). Global Aids Response Country Progress Report. *MoHSW & TACAIDS*, 9–43.
- Wakimizu, R., Nishigaki, K., Fujioka, H., Maehara, K., Kuroki, H., Saito, T., & Uduki, K. (2014). Factors Affecting Japanese HPV-Vaccination : Findings from the Semi-Structured Interviews with Adolescent Girls and Caregivers. *Open Access*. <https://doi.org/10.4236/health.2014.613193>
- Wheldon, C. W., Daley, E. M., Walsh-buhi, E. R., Baldwin, J. A., Nyitray, A. G., & Giuliano, A. R. (2016). An Integrative Theoretical Framework for HPV Vaccine Promotion Among Male Sexual Minorities, (June). <https://doi.org/10.1177/1557988316652937>
- WHO. (2014). *Comprehensive Cervical Cancer Control. WHO Library Cataloguing-in-Publication Data*. Retrieved from <http://www.who.int/reproductivehealth/publications/cancers/cervical-cancer-guide/en/>
- WHO. (2016a). *GLOBAL HEALTH SECTOR STRATEGY ON HIV 2016–2021*.
- WHO. (2016b). *INTRODUCING HPV VACCINE INTO NATIONAL*.