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BMJ Open

Assessing knowledge, attitudes and belief toward HPV vaccination of parents with children aged 9-14 years in rural communities of North West Cameroon: a qualitative study

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Keywords:	INFECTIOUS DISEASES, Public health < INFECTIOUS DISEASES, PUBLIC HEALTH

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3 Title: Assessing knowledge, attitudes and belief toward HPV vaccination of parents with children aged 9-
4 14 years in rural communities of North West Cameroon: a qualitative study
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ABSTRACT

Introduction: Despite HPV vaccine being incorporated in the National Immunization Program in Cameroon in 2019, HPV vaccine uptake among eligible girls has been poor (5%). The barriers to HPV vaccination in this high-burden setting have not been previously studied, especially in rural areas. We propose to evaluate the knowledge, attitudes and beliefs of parents of girls aged 9 to 14 years regarding HPV vaccine.

Methods and Analysis:

Study design: A qualitative descriptive study will be conducted using one-on-one semi structured interviews with parents of girls aged 9-14-year-old from 3 health districts in Cameroon (Mbingo, Njinikom and Fundong) who can converse in English or Pidgeon English. Enrolment will occur until thematic saturation – like 40 participants.

Analysis: Quantitative methods will be used to describe the interviewees. All interviews will be audio recorded, transcribed and loaded into ATLAS.ti. Transcripts will be coded and thematic analysis will be conducted. Analysis will occur concurrent with interviews.

Ethics and Dissemination:

Ethics: Institutional review board approval will be obtained from the Cameroon Baptist Convention Health Board (CBCHB), Cameroon and McMaster University, Hamilton, Canada.

Dissemination: Study findings will be presented via a report and webinar to the Ministry of Health, the funders, the CBCHB and in person to healthcare providers and interested members of the general population in the study region. Plans are to share findings internationally through peer reviewed publication(s) and presentation(s).

Key words: HPV vaccine, Knowledge, Attitudes and Beliefs

Limitations

-During the conduct of the study, NW Cameroon is in the midst of civil conflict. This limits the methods available for recruitment and potential willingness of parents to attend the interviews

Strengths

-Rigorously developed protocol will be implemented by a research team that has experience with qualitative methods and analysis.

-5 of the 6 researchers reside in Cameroon with 4 of them residing between Mbingo and Bamenda. Mbingo is the site for the interviews. This is important as it facilitates understanding of the anthropologic nuances of the Kom people in this region.

- The conflict has been ongoing in this region since 2018. This study will reflect the impact of long lasting civil unrest on access to knowledge about and access to preventative strategies against cancer.

INTRODUCTION

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3 Infection with the Human Papilloma Virus (HPV) is an important public health problem given that HPV is
4 the major cause of preinvasive disease and/or cancer of the lower genital tract and/or oral cavity [1,2].
5 The introduction of HPV vaccines prior to exposure to the virus has been shown to play a major role in
6 lowering disease burden associated with the oncologic types of this virus. The problem is that HPV
7 vaccination uptake is still low in several countries [3,4]. At least 179 countries have implemented various
8 HPV National Immunization Programs (NIP). Currently HPV vaccination coverage stands at 30% in low
9 and low middle-income countries, 55% in upper middle-income countries and 80% in high income
10 countries [4,5]. In Cameroon, a West African Country, reports from the Ministry of Health indicate a
11 lower HPV vaccination rate, with only 5% of eligible girls having received the vaccine in 2020 [6]. Several
12 factors may contribute to this low uptake: lack of knowledge or awareness of health care providers and
13 the general population [7] and low acceptance of this vaccine among parents, guardians and
14 adolescents themselves [8].
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18 In Africa, cervical cancer is the second leading cause of cancer mortality in women [7]. According to
19 GLOBOCAN, 2020, the age standardized incidence and mortality rate of cervical cancer in Western
20 African countries including Cameroon is 33.7 per 100,000 and 16.6 per 100,000 respectively [5,9]. The
21 World Health Organization (WHO) has proposed a 90-70-90 cervical cancer reduction goal by 2030. This
22 envisions achieving a 90% world vaccination rate for all girls by age 15 years, screening 70% of women at
23 age 35 and again at 45-year-old by a high-performance test, and delivering appropriate treatment to
24 90% of those with disease [10]. The global goal is a cervical cancer incidence rate of <4 per 100,000.
25 Unfortunately, there is a paucity of population-based cancer statistics in much of the world, including
26 Cameroon. Currently Cameroon reports cervical cancer as the second most common of all cancers
27 (representing 13.8% of all cancer diagnoses) [11]. Cervical screening uptake is very low with just 4% of
28 women having access to screening services [12,13].
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32 There have been two previous pay for HPV vaccination projects in Cameroon. In 2009, the National
33 Committee for the Fight Against Cancer approved the use of Gardasil in Cameroon for the vaccination of
34 girls aged 9 to 26 years (though emphasis was made on girls aged 9 to 13 years) [14,15]. As a result, the
35 Cameroon Baptist Convention Health Services (CBCHS), a large faith-based private health services
36 organization in Cameroon, vaccinated 6,851 girls from 2010-2012 [15]. There was a fee to cover
37 administration of the doses (\$8USD/dose). Uptake was highest in the north and south west regions but
38 poor in Yaoundé. Eighty-five percent of girls received all three doses. In 2017, the Cervarix vaccine (a
39 bivalent vaccine produced by GlaxoSmithKline (GSK) against HPV 16,18) was approved for use in
40 Cameroon by the Ministry of Health [14]. This pay for vaccine was used for Cameroonian women aged 9
41 through 55. Results of this opportunity in terms of number of Cervarix doses administered or number of
42 cycles completed are not available.
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46 In 2019, Gardasil 4 was incorporated into the national (EPI) vaccine program for Cameroon but there has
47 been poor communication concerning availability of doses both to health care providers and the
48 community [9,16]. In North West Cameroon, while there is supply of free Gardasil 4 for girls aged 9-14-
49 year-old, the 2021 supply expired before use. Despite CBCHS campaigns to promote vaccination against
50 HPV related diseases, the uptake of the HPV vaccination has been low in Cameroon. There exists no
51 evidence-based explanation for this low uptake for the Cameroonian context.
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54 Our hypothesis is that the uptake of the HPV vaccine depends on the public's comprehension of
55 implications of an HPV infection and their understanding of the benefits of the HPV vaccine in
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3 preventing lower genital tract and oral cancer [17]. The aim of this study is to assess knowledge, beliefs
4 and attitudes of parents of young girls aged 9 to 14 years about HPV vaccines within some rural
5 communities in the North West Region of Cameroon served by three well attended hospitals. These are
6 Mbingo Baptist Hospital, St Martin de Porres Catholic Hospital Njinikom and Fundong District Hospital.
7 We wish to understand from a public perspective the reasons for this low uptake. While there are many
8 stakeholders involved in the process of HPV vaccination (like Ministry of Health, Ministry of Education,
9 Hospitals, Pharmaceutical companies, Schools, community leaders (like Fons, Chiefs, quarter heads,
10 pastors, public, girls aged 9-14yo), understanding the perspectives of parents with girls aged 9-14yo who
11 may or may not provide consent for vaccination is essential to improve HPV vaccine uptake. The above
12 listed hospitals have been conducting activities related to primary prevention (vaccination) since as early
13 as 2016 and secondary prevention (screening) for cervical cancer since 2007. We also know that
14 communities served by these hospitals are in the region in which CBCHS organizes HPV vaccine
15 promotion campaigns. While these sites are in a zone of conflict, the area has been more stable in the
16 recent 2 years as compared to 2018. We recognize the presence of COVID in the region since March
17 2020 with COVID vaccinations for health workers and the public being available as of April 2021.
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22 The aim of this study is to assess knowledge, beliefs and attitudes of parents to young girls aged 9 to 14
23 years about HPV vaccines within some rural communities in the North West Region of Cameroon served
24 by three hospitals in that area. The specific objectives of this evaluation are: To evaluate the knowledge,
25 beliefs and attitudes of parents of young girls aged 9 to 14 years regarding the vaccine. To obtain
26 learning on possible intervention to improve acceptance of HPV vaccine by parents of young girls aged 9
27 to 14 years in the area of study.
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32 **METHODS**

33 This is a qualitative descriptive study as described by Sandelowski [1],8 which is a suitable method for
34 advancing understanding of questions related to health care seeking. The Theoretical framework of
35 acceptability (TFA) will serve as a guide for this study [19]. The TFA provides a reflection of how much
36 healthcare interventions are considered appropriate by providers and receivers based on real or
37 perceived understanding and emotional implications of the intervention. The TFA assesses acceptability
38 of interventions by looking at seven domains which include perceived effectiveness, burden, affective
39 attitude, intervention coherence, self-efficacy, ethicality and opportunity cost.
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43 This study involves the collection and analysis of approximately 40 one-on-one semi-structured
44 interviews with parent(s) of one or more female children (ages 9-14 years) living in rural communities in
45 North West Cameroon. More specifically they live within Fundong, Njinikom or Mbingo health areas.
46 Interviews are being conducted between January and November 2022.
47

48 Sampling will involve a quota sampling method for parent(s) consent to participate in the interviews.
49 Given a study objective is to clarify motivations driving HPV vaccination or its avoidance in this district,
50 sampling will include purposively seeking a balance between parents who have at the time of interview
51 opted in or out of HPV vaccination for their girl(s) with maximum variation (e.g., level of parental
52 education, occupation). We will include up to 10 parents of girls who received HPV vaccine and 30 parents
53 of girls who did not receive the HPV vaccine. Potential parent participants will be identified from HPV
54 vaccination registry at the Mbingo Baptist Hospital women's health program office (for girls who received
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3 the vaccine). Regarding families who did not receive the vaccine, potential parent participants will be
4 those who respond to word-of-mouth advertisements by health area community mobilizers
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6 To be invited for an interview, the individual must be a parent of a daughter aged 9 to 14 years living in
7 Mbingo, Njinikom and Fundong health areas. Individuals will be excluded if they are a health workers or
8 working in any health institution. It is our assumption that the knowledge, attitudes and beliefs of health
9 care worker differ from those of the general public. This study is focused on advancing understanding of
10 these from a public perspective as they pertain to HPV vaccination. Other exclusion criteria include
11 unwillingness to provide consent to participate, inability to converse in the language of the interviewer
12 (English or Pidgin English). Pidgin English otherwise known as Cameroonian Creole or Kamtok is spoken in
13 the North and South West regions of Cameroon that are primarily English speaking. Enrolment will be
14 continued until we reach thematic saturation (i.e, the point when new data does not add new thematic
15 information to what has been learned from completed interviews).
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19 All parents who agree to participate in the study will be invited to Mbingo Baptist Hospital at a date and
20 time convenient to them for the interview with the research interviewer. Interviews will be conducted
21 by a medical anthropologist with post-graduate training in qualitative research. Parents will be
22 reimbursed for the transportation and feeding costs. They will also receive a small stipend of soap.
23

24 An interview guide has been created addressing knowledge, attitudes and behaviors toward vaccination
25 in general, sexually transmitted diseases, cervical cancer, and HPV vaccination. The guide contains open
26 ended questions with probes. The guide will be pilot tested with 5 parents for comprehension and flow.
27 All interviews will be done in either English, or pidgin English. The interviews will last between 45 to 60
28 minutes and will be audio recorded. The interviewer will use an electronic tablet with recording
29 application. All the interviews will be transcribed into English. All recorded audio files will be saved on
30 password-protected computers and backed up on to Mbingo Baptist Hospital servers. Only study
31 investigators and the interviewer will have access to the saved files.
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35 *Patient and Public Involvement:* This study is designed to foreground the voices of parents approached
36 for consent to have their daughters' vaccinated within Cameroon's National Vaccination Program.
37 Cameroonian healthcare professionals familiar with the study region, and ultimately responsible for
38 vaccination in the region supported the design and recruitment strategies. Member checking will be
39 conducted using a focus group within the community to discuss themes identified in the individual
40 interviews.
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44 **ANALYSIS**

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46 Data will be analyzed concurrently with the interviews. A four step thematic content analysis will be
47 conducted including data familiarization, theme identification, data coding and organization of codes
48 and themes using the framework method. Through an iterative process, transcripts will be coded and
49 analyzed for description and interpretive themes. All transcribed interviews will be inputted into ATLAS
50 Ti. Two study personnel (CN, GMA) will code each of the first 2 interviews, with the goal of identifying
51 key beliefs and attitudes that could clarify a participant's or wider society hesitancy to seek out HPV
52 vaccination. Codes will be compared and discrepancies resolved in dialogue with the study co-leads (LE,
53 JFD, EN). Sequential groups of 2 interviews will be double coded until agreement is achieved. Thereafter,
54 an interview will only need to be coded by one member of the study team. An individual external to the
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3 team (EH) will conduct an audit coding of all the coded content once all the interviews have been coded,
4 towards verifying the accuracy and coherence of the coding process. The research team will meet to
5 discuss and reach consensus on the themes identified and their implications in relation to the study
6 question.
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10 **ETHICS**

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12 Institutional Ethics approval has been obtained both in Canada at McMaster University and through the
13 Cameroon Baptist Convention Health Board. Participant information and informed consent documents
14 will be read and explained to potential participants prior to participating in the interviews. The consent
15 describes in detail the study intervention, study procedures, benefits, risks, compensation, voluntary
16 participation, confidentiality, right as a participant and ability to withdraw from the study. Those who
17 opt into the study will be asked to sign the consent form. A copy of the signed informed consent
18 document will be stored in the participant's research record and another signed copy retained by the
19 consenting participant. Consent forms will be kept separate from the data collected and no identifying
20 information will be included in the transcription of the interview.
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24 Any information that is obtained during this study will be kept confidential. All participant information
25 will have a research code number (and no personal identifying information). These documents will be
26 stored in encrypted and password-protected computer files. Only the PI and other investigators will
27 have access. These files will be backed up at Mbingo Baptist Hospital secure servers. The identifiers and
28 other data will be destroyed 7 years after study completion.
29

30 Direct benefits to study participants are unlikely; however, information garnered from this study will be
31 used to determine the knowledge, beliefs and attitudes of parents of young girls aged 9 to 14 years
32 regarding the HPV vaccine and identify possible interventions to improve acceptance of HPV vaccine by
33 parents of young girls aged 9 to 14 years in the area of study.
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36 We anticipate minimal risks for participants in this study. A few risks will involve traveling up to about
37 30Km to Mbingo Baptist Hospital for the interviews. There has been a waxing and waning civil conflict in
38 this region since 2018. If in the opinion of local hospital administration and/or Cameroon Baptist
39 Convention Health Services (CBCHS) that people should not travel to the hospital on a given day, the
40 interviews will be cancelled that day and/or the study will be put on hold. Other risks include the
41 possible discomfort in expressing personal perceptions in response to some interview questions. To
42 mitigate these, interviews will be arranged for dates and times that are suitable for the participants and
43 participants shall be informed prior to the start of interviews not to provide names or personal
44 identifiers on recordings.
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48 Participants will be free to withdraw from the study at any time upon request. If they choose to leave the
49 study after data has been collected, they will be able to request a withdrawal of collected information.
50 If the study is prematurely terminated or suspended, the PI will promptly inform the Research Ethics
51 Committee at McMaster University and the Cameroon Baptist Convention Health Board and the study
52 sponsors and funders (Merck), providing the reason(s) for the termination or suspension. Any
53 amendment to the protocol will be submitted to various ethics committees before the changes are
54 implemented to the study.
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3 The PI and study team will conduct the study in compliance with the approved protocol. The PI and
4 study team will not implement any deviation from or changes to the protocol without prior review and
5 documented approval from the Ethics Committee. Any unintentional deviations from the protocol will
6 be reported to the Ethics Committee.
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10 **EXPECTED OUTCOMES AND DISSEMINATION**

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12 At the end of this study we hope to better understand the perspective of parents and their knowledge,
13 attitudes and beliefs about HPV vaccinations for their young daughters. This is the first study of its kind
14 in rural communities in the North West Region, Cameroon. This information will help us understand if
15 there are knowledge gaps that could be addressed through education, or negative attitudes that could
16 be challenged through peer communication. We anticipate this project could serve as a stepping stone
17 to similar projects in other regions of Cameroon or intervention projects based on the findings of this
18 study. Results will be disseminated to the funders, to CBCHB, Cameroon Ministry of Health and
19 interested parties like the EPI vaccine program. Presentation locally at the internal medicine and surgery
20 residents of the Baptist Institute of Health Sciences is anticipated. A peer review publication and
21 presentation at peer reviewed meeting(s) are planned.
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27 **AUTHORS' CONTRIBUTIONS**

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29 Elit- the research team leader and writing of the protocol

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31 Ngalla-provided feasibility and cultural input into recruitment and design of the interview guide

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33 Afungchwi – provided feasibility and cultural insight into recruitment, design of the interview guide and
34 analysis

35
36 Tum-provided cultural input into recruitment and design and reiterations of the interview guide

37
38 Folkom-Domgue- provided input into the background, rationale and cultural insight into recruitment
39 and design of the interview guide

40
41 Nouvet – provided input into the background and rationale, methods and analysis
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43

44 **COMPETING INTERESTS STATEMENT**

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46 This is an investigator initiated research project which has been funded by Merck. Merck does not have
47 access to any of the original material but will be provided with any manuscripts that result from this
48 work for review prior to publication.
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51 **FUNDING STATEMENT**

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Study protocol for assessing knowledge, attitudes and belief toward HPV vaccination of parents with children aged 9-14 years in rural communities of North West Cameroon: a qualitative study

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Primary Subject Heading:	Qualitative research
Secondary Subject Heading:	Public health
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23 ABSTRACT

24 **Introduction:** Despite HPV vaccine being incorporated in the National Immunization Program in
25 Cameroon in 2019, HPV vaccine uptake among eligible girls has been poor (5%). The barriers to HPV
26 vaccination in this high-burden setting have not been previously studied, especially in rural areas. We
27 propose to evaluate the knowledge, attitudes and beliefs of parents of girls aged 9 to 14 years regarding
28 HPV vaccine.

29 **Methods and Analysis:**

30 *Study design:* A qualitative descriptive study will be conducted using one-on-one semi structured
31 interviews with parents of girls aged 9-14-year-old from 3 health districts in Cameroon (Mbingo,
32 Njinikom and Fundong) who can converse in English or Pidgeon English. Enrolment will occur until
33 thematic saturation – approximately 40 participants.

34 *Analysis:* Quantitative methods will be used to describe the interviewees. All interviews will be audio
35 recorded, transcribed, and loaded into a tool to facilitate analysis (ATLAS.ti). Transcripts will be coded
36 and thematic analysis will be conducted. Analysis will occur concurrent with interviews.

37 **Ethics and Dissemination:**

38 *Ethics:* Institutional review board approval will be obtained from the Cameroon Baptist Convention
39 Health Board (CBCHB), Cameroon and McMaster University, Hamilton, Canada.

40 *Dissemination:* Study findings will be presented via a report and webinar to the Ministry of Health, the
41 funders, the CBCHB and in person to healthcare providers and interested members of the general
42 population in the study region. Plans are to share findings internationally through peer reviewed
43 publication(s) and presentation(s).

44 Key words: HPV vaccine, Knowledge, Attitudes and Beliefs

45 **Strengths**

46 -The interview guide was developed and will be implemented by a predominantly Cameroon research
47 team that has experience with medical anthropology, qualitative methods and analysis.

48 -Analysis will be conducted by a predominantly Cameroon research team who has understanding of the
49 anthropologic nuances of the Kom people residing in this region.

50 **Limitations**

51 -Cameroon is a unique country setting and the region where the study was conducted is in a conflict
52 zone; this may limit generalizability of findings.

53 -This study is limited to the perceptions of one group of key decision-makers in vaccination in the region:
54 those of parents.

55

56 **INTRODUCTION**

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2
3 57 Infection with the Human Papilloma Virus (HPV) is an important public health problem given that HPV is
4 58 the major cause of preinvasive disease and/or cancer of the lower genital tract and/or oral cavity [1,2].
5 59 The introduction of HPV vaccines prior to exposure to the virus has been shown to play a major role in
6 60 lowering disease burden associated with the oncologic types of this virus. The problem is that HPV
7 61 vaccination uptake is still low in several countries [3,4]. At least 179 countries have implemented various
8 62 HPV National Immunization Programs (NIP). Currently HPV vaccination coverage stands at 30% in low
9 63 and low middle-income countries, 55% in upper middle-income countries and 80% in high income
10 64 countries [4,5]. In Cameroon, a West African Country, reports from the Ministry of Health indicate a
11 65 lower HPV vaccination rate, with only 5% of eligible girls having received the vaccine in 2020 [6]. This is
12 66 lower than reports for other childhood vaccinations like measles (8%) [7] and in Fouban (neighboring
13 67 province), 28.6% for BCG, 22.8% for DPT-Hi+Hb3 and 14.3% for measles/rubella [8]. Several factors may
14 68 contribute to this low uptake: lack of knowledge or awareness of health care providers and the general
15 69 population [9] and low acceptance of this vaccine among parents, guardians and adolescents themselves
16 70 [10].

20
21 71 In Africa, cervical cancer is the second leading cause of cancer mortality in women [9]. According to
22 72 GLOBOCAN, 2020, the age standardized incidence and mortality rate of cervical cancer in Western
23 73 African countries including Cameroon is 33.7 per 100,000 and 16.6 per 100,000 respectively [5,11].
24 74 While other HPV related cancers include oro-pharyngeal (ASI/ASM per 100,000 is 2.21/1.55 (men),
25 75 0.38/0.14 (women)), anal (0.62/0.46 (men), 0.70/0.49 (women)), and other male or female lower genital
26 76 tract sites (0.67/0.44 (vulva), 0.63/0.38 (vaginal), 0.14/0.06 (penile)), disease specific incidence and
27 77 mortality rates appear low in part due to a lack of systematic cancer reporting in Cameroon [6]. The
28 78 World Health Organization (WHO) has proposed a 90-70-90 cervical cancer reduction goal by 2030. This
29 79 envisions achieving a 90% world vaccination rate for all girls by age 15 years, screening 70% of women at
30 80 age 35 and again at 45-year-old by a high-performance test and delivering appropriate treatment to 90%
31 81 of those with disease [12]. The global goal is a cervical cancer incidence rate of <4 per 100,000.
32 82 Unfortunately, there is a paucity of population-based cancer statistics in much of the world, including
33 83 Cameroon. Currently Cameroon reports cervical cancer as the second most common of all cancers
34 84 (representing 13.8% of all cancer diagnoses) [13]. Cervical screening uptake is very low with just 4% of
35 85 women having access to screening services [14,15].

39
40 86 There have been two previous pay for HPV vaccination projects in Cameroon. In 2009, the National
41 87 Committee for the Fight Against Cancer approved the use of Gardasil in Cameroon for the vaccination of
42 88 girls aged 9 to 26 years (though emphasis was made on girls aged 9 to 13 years) [16,17]. As a result, the
43 89 Cameroon Baptist Convention Health Services (CBCHS), a large faith-based private health services
44 90 organization in Cameroon, vaccinated 6,851 girls from 2010-2012 [17]. There was a fee to cover
45 91 administration of the doses (\$8USD/dose). Uptake was highest in the north and south west regions but
46 92 poor in Yaoundé. Eighty-five percent of girls received all three doses. In 2017, the Cervarix vaccine (a
47 93 bivalent vaccine produced by GlaxoSmithKline (GSK) against HPV 16,18 was approved for use in
48 94 Cameroon by the Ministry of Health [16]. This pay for vaccine was used for Cameroonian women aged 9
49 95 through 55. Results of this opportunity in terms of number of Cervarix doses administered or number of
50 96 cycles completed are not available.

53
54 97 In 2019, Gardasil 4 was incorporated into the national (EPI) vaccine program for Cameroon for girls age 9
55 98 years old. There has been poor communication concerning availability of doses both to health care
56 99 providers and the community [11,18]. In North West Cameroon, the CBCHS has made a supply of free

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2
3 100 Gardasil 4 for girls aged 9-14-year-old, the 2021 supply expired before use. Despite CBCHS campaigns to
4 101 promote vaccination against HPV related diseases, the uptake of the HPV vaccination has been low.
5 102 There exists no evidence-based explanation for this low uptake for the Cameroonian context.

7 103 Parents conventionally play a key role in non-adults' healthcare decision-making in this part of
8 104 Cameroon, thus our hypothesis is that the uptake of the HPV vaccine depends in part on the public's
9 105 comprehension of implications of an HPV infection and their understanding of the benefits of the HPV
10 106 vaccine in preventing lower genital tract and oral cancer [19]. The aim of this study is to assess
11 107 knowledge, beliefs and attitudes of parents of young girls aged 9 to 14 years about HPV vaccines within
12 108 some rural communities in the North West Region of Cameroon served by three well attended hospitals.
13 109 These are Mbingo Baptist Hospital, St Martin de Porres Catholic Hospital Njinikom and Fundong District
14 110 Hospital. We wish to understand from a public perspective the reasons for this low uptake. While there
15 111 are many stakeholders involved in the process of HPV vaccination (like Ministry of Health, Ministry of
16 112 Education, Hospitals, Pharmaceutical companies, Schools, community leaders (like Fons, Chiefs, quarter
17 113 heads, pastors, public, girls aged 9-14yo), understanding the perspectives of parents with girls aged 9-
18 114 14yo (who may or may not provide consent for vaccination) is essential to improve HPV vaccine uptake.
19 115 The above listed hospitals have been conducting activities related to primary prevention (vaccination)
20 116 since as early as 2016 and secondary prevention (screening) for cervical cancer since 2007. We also
21 117 know that communities served by these hospitals are in the region in which CBCHS organizes HPV
22 118 vaccine promotion campaigns. While these sites are in a zone of conflict, the area has been more stable
23 119 in the recent 2 years as compared to 2018. We recognize the presence of COVID in the region since
24 120 March 2020 with COVID vaccinations for health workers and the public being available as of April 2021.

25 121 The aim of this study is to assess knowledge, beliefs and attitudes of parents to young girls aged 9 to 14
26 122 years about HPV vaccines within some rural communities in the North West Region of Cameroon served
27 123 by three hospitals in that area. The specific objectives of this evaluation are: To evaluate the knowledge,
28 124 beliefs and attitudes of parents of young girls aged 9 to 14 years regarding the vaccine. To obtain
29 125 learning on possible intervention to improve acceptance of HPV vaccine by parents of young girls aged 9
30 126 to 14 years in the area of study.

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39 128 **METHODS**

40 129 This is a qualitative descriptive study as described by Sandelowski [20] which is a suitable method for
41 130 advancing understanding of questions related to health care seeking. The Theoretical framework of
42 131 acceptability (TFA) will serve as a guide for this study [21]. The TFA provides a reflection of how much
43 132 healthcare interventions are considered appropriate by providers and receivers based on real or
44 133 perceived understanding and emotional implications of the intervention. The TFA assesses acceptability
45 134 of interventions by looking at seven domains which include perceived effectiveness, burden, affective
46 135 attitude, intervention coherence, self-efficacy, ethicality and opportunity cost.

47 136 This study involves the collection and analysis of approximately 40 one-on-one semi-structured
48 137 interviews with parent(s) of one or more female children (ages 9-14 years) living in rural communities in
49 138 North West Cameroon. More specifically they live within Fundong, Njinikom or Mbingo health areas.
50 139 Interviews are being conducted between January and November 2022.

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3 140 Sampling will involve a quota sampling method for parent(s) consent to participate in the interviews.
4 141 Given a study objective is to clarify motivations driving HPV vaccination or its avoidance in this district,
5 142 sampling will include purposively seeking a balance between parents who have at the time of interview
6 143 opted in or out of HPV vaccination for their girl(s) with maximum variation (e.g., level of parental
7 144 education, occupation). We will include up to 10 parents of girls who received HPV vaccine and 30 parents
8 145 of girls who did not receive the HPV vaccine. Potential parent participants will be identified from HPV
9 146 vaccination registry at the Mbingo Baptist Hospital women's health program office (for girls who received
10 147 the vaccine). Regarding families who did not receive the vaccine, potential parent participants will be
11 148 those who respond to word-of-mouth advertisements by health area community mobilizers
12 149

13 150 To be invited for an interview, the individual must be a parent of a daughter aged 9 to 14 years living in
14 151 Mbingo, Njinikom and Fundong health areas. Individuals will be excluded if they are a health worker or
15 152 working in any health institution. It is our assumption that the knowledge, attitudes, and beliefs of health
16 153 care worker differ from those of the general public. This study is focused on advancing understanding of
17 154 these from a public perspective as they pertain to HPV vaccination. Other exclusion criteria include
18 155 unwillingness to provide consent to participate, inability to converse in the language of the interviewer
19 156 (English or Pidgin English). Pidgin English otherwise known as Cameroonian Creole or Kamtok is the main
20 157 language spoken in the North and South West regions of Cameroon. There is a small percent of the
21 158 population who only communicate in Fula. Also, an older segment of the population (beyond the age of
22 159 the parents on whom we focus here) who have not been exposed to formal education may only speak
23 160 their tribal language. We do not anticipate exclusion of these linguistic minorities impacting on our ability
24 161 to recruit sufficient participants. Enrolment will be continued until we reach thematic saturation (i.e, the
25 162 point when new data does not add new thematic information to what has been learned from completed
26 163 interviews).
27 164

28 165 All parents who agree to participate in the study will be invited to Mbingo Baptist Hospital at a date and
29 166 time convenient to them for the interview with the interviewer. We understand that this may limit
30 167 participation of some individuals but by allowing participants to dictate their preferred timing for the
31 168 interview, by reimbursing transportation and meal costs and by offering a small token for their time (in
32 169 the form of soap), we have tried to optimize participation. Interviews will be conducted by a medical
33 170 anthropologist with post-graduate training in qualitative research.
34

35 171 An interview guide has been created addressing knowledge, attitudes, and behaviors toward vaccination
36 172 in general, sexually transmitted diseases, cervical cancer, and HPV vaccination (Supplementary Table).
37 173 The guide contains open ended questions with probes. The guide will be pilot tested with 5 parents for
38 174 comprehension and flow. The interviews will last between 45 to 60 minutes and will be audio recorded.
39 175 The interviewer will use an electronic tablet with recording application. All the interviews will be
40 176 verbatim transcribed into English. All recorded audio files will be saved on password-protected
41 177 computers and backed up on to Mbingo Baptist Hospital servers. Only study investigators and the
42 178 interviewer will have access to the saved files.

43 179 *Patient and Public Involvement:* This study is designed to foreground the voices of parents approached
44 180 for consent to have their daughters' vaccinated within Cameroon's National Vaccination Program.
45 181 Cameroonian healthcare professionals familiar with the study region, and ultimately responsible for
46 182 vaccination in the region supported the design and recruitment strategies. Member checking will be
47 183 conducted using a focus group within the community to discuss themes identified in the individual
48 184 interviews.

185

186 ANALYSIS

187 Data will be analyzed concurrently with the interviews. A four step thematic content analysis will be
188 conducted including data familiarization, theme identification, data coding and organization of codes
189 and themes using the framework method. Through an iterative process, transcripts will be coded and
190 analyzed for description and interpretive themes. All transcribed interviews will be inputted into ATLAS
191 ti9, a program widely used by social scientists to facilitate organization and analysis of qualitative data.
192 Two study personnel (CN, GMA) will code each of the first 2 interviews, with the goal of identifying key
193 beliefs and attitudes that could clarify a participant's or wider society hesitancy to seek out HPV
194 vaccination. Codes will be compared and discrepancies resolved in dialogue with the study co-leads (LE,
195 JFD, EN). Sequential groups of 2 interviews will be double coded until agreement is achieved. Thereafter,
196 an interview will only need to be coded by one member of the study team. An individual external to the
197 team (EH) will conduct an audit coding of all the coded content once all the interviews have been coded,
198 towards verifying the accuracy and coherence of the coding process. The research team will meet
199 regularly to discuss and reach consensus on the themes identified and their implications in relation to
200 the study question.

201

202 ETHICS AND DISEMINATION

203 Institutional Ethics approval has been obtained both in Canada at McMaster University and through the
204 Cameroon Baptist Convention Health Board. Participant information and informed consent documents
205 will be read and explained to potential participants prior to participating in the interviews. The consent
206 describes in detail the study intervention, study procedures, benefits, risks, compensation, voluntary
207 participation, confidentiality, right as a participant and ability to withdraw from the study. Those who
208 opt into the study will be asked to sign the consent form. A copy of the signed informed consent
209 document will be stored in the participant's research record and another signed copy retained by the
210 consenting participant. Consent forms will be kept separate from the data collected and no identifying
211 information will be included in the transcription of the interview.

212 Any information that is obtained during this study will be kept confidential. All participant information
213 will have a research code number (and no personal identifying information). These documents will be
214 stored in encrypted and password-protected computer files. Only the PI and other investigators will
215 have access. These files will be backed up at Mbingo Baptist Hospital secure servers. The identifiers and
216 other data will be destroyed 7 years after study completion.

217 Direct benefits to study participants are unlikely; however, information garnered from this study will be
218 used to determine the knowledge, beliefs and attitudes of parents of young girls aged 9 to 14 years
219 regarding the HPV vaccine and identify possible interventions to improve acceptance of HPV vaccine by
220 parents of young girls aged 9 to 14 years in the area of study.

221

222 We anticipate minimal risks for participants in this study. A few risks will involve traveling up to about
223 30Km to Mbingo Baptist Hospital for the interviews. There has been a waxing and waning civil conflict in
224 this region since 2018. If in the opinion of local hospital administration and/or Cameroon Baptist
225 Convention Health Services (CBCHS) that people should not travel to the hospital on a given day, the

226 interviews will be cancelled that day and/or the study will be put on hold. Other risks include the
227 possible discomfort in expressing personal perceptions in response to some interview questions. To
228 mitigate these, interviews will be arranged for dates and times that are suitable for the participants and
229 participants shall be informed prior to the start of interviews not to provide names or personal
230 identifiers on recordings.

231 Participants will be free to withdraw from the study at any time upon request. If they choose to leave the
232 study after data has been collected, they will be able to request a withdrawal of collected information.
233 If the study is prematurely terminated or suspended, the PI will promptly inform the Research Ethics
234 Committee at McMaster University and the Cameroon Baptist Convention Health Board and the study
235 sponsors and funders (Merck), providing the reason(s) for the termination or suspension. Any
236 amendment to the protocol will be submitted to various ethics committees before the changes are
237 implemented to the study.

238 The PI and study team will conduct the study in compliance with the approved protocol. The PI and
239 study team will not implement any deviation from or changes to the protocol without prior review and
240 documented approval from the Ethics Committee. Any unintentional deviations from the protocol will
241 be reported to the Ethics Committee.

242 Results will be disseminated to the funders, to CBCHB, Cameroon Ministry of Health and interested
243 parties like the EPI vaccine program. Presentation locally at the internal medicine and surgery residents
244 of the Baptist Institute of Health Sciences is anticipated. A peer review publication and presentation at
245 peer reviewed meeting(s) are planned.

246

247 **EXPECTED OUTCOMES**

248 At the end of this study we hope to better understand the perspective of parents and their knowledge,
249 attitudes and beliefs about HPV vaccinations for their young daughters. This is the first study of its kind
250 in rural communities in the North West Region, Cameroon. This information will help us understand if
251 there are knowledge gaps that could be addressed through education, or negative attitudes that could
252 be challenged through peer communication. We anticipate this project could serve as a stepping stone
253 to similar projects in other regions of Cameroon or intervention projects based on the findings of this
254 study.

255

256 **AUTHORS' CONTRIBUTIONS**

257 Elit- the research team leader and writing of the protocol

258 Ngalla-provided feasibility and cultural input into recruitment and design of the interview guide

259 Afungchwi – provided feasibility and cultural insight into recruitment, design of the interview guide and
260 analysis

261 Tum-provided cultural input into recruitment and design and reiterations of the interview guide

262 Folkom-Domgue- provided input into the background, rationale and cultural insight into recruitment
263 and design of the interview guide

264 Nouvet – provided input into the background and rationale, methods and analysis

265

266 COMPETING INTERESTS STATEMENT

267 This is an investigator initiated research project which has been funded by Merck. Merck does not have
268 access to any of the original material but will be provided with any manuscripts that result from this
269 work for review prior to publication.

270

271 FUNDING STATEMENT

272 This work was supported by Merck grant number 100035 (Elit 13Oct2021). Merck had no role in the
273 study design, implementation, data collection. Interpretation and dissemination of the findings of this
274 study.

275

276 ETHICS APPROVAL

277 Ethics approval was obtained from Hamilton Institutional Research Ethics Board (14022) and Cameroon
278 Baptist Convention Health Board Institutional Review Board (IRB2021-075).

279

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Supplemental Table. Interview guide questions

Domain	Question
Demographic	What is your age
	Are you a parent?
	List the age and gender of your children
	Have you ever had a vaccine (examples include, measles, mumps, rubella, covid)?
	If yes, which one?
	Have any of your children had vaccination
	If yes, do you know which disease(s) the vaccine prevented?
	Have you ever had cancer?
	If yes, which type of cancer?
	What is your occupation?
	What is your tribe?
	Which languages are you comfortable speaking?
	What village is closest to where you live?
Knowledge	Have you ever heard of a vaccine that prevents cancer?
	If yes, can you tell us what you remember about this vaccine
	Have you ever heard about the HPV vaccine?
	How did you hear about this vaccine?
	If yes, can you tell us anything about the vaccine?
Attitudes	Would you be willing to be vaccinated against a virus that causes cancer?
	If yes, Why?
	If no, Why not?
	Would you be willing to have your children vaccinated against a virus that causes cancer?
	If yes, Why?
	If no, Why not?
	What do you think would be the benefit if your child was vaccinated against HPV?
What do you think could go wrong with your child if she received the HPV vaccine?	
	Would you advise someone else to be vaccinated against the HPV?
	If yes, Why?
	If no, Why not?
Beliefs	Do you believe vaccines can prevent disease?
	If no, can you tell us more
	If yes, can you tell us more
	If you had questions about a vaccine, who would you go to to get more information?
	Those whose daughters have not been vaccinated Are there reasons why you have chosen not to vaccinate your daughter
	Those who are pro vaccine What things do you think could be done to encourage people to have their daughters' vaccinated
	Those who have not had their daughter's vaccinated Is there anything that would make you want to get your daughter's vaccinated?

Standards for Reporting Qualitative Research

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S16	Results Synthesis and interpretation	Will be available when the study is completed	
S17	Links to Empirical data		
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