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Research Article

Valorization of Great Apes Wild Materials in Traditional Medicine; Threats to Apes Conservation in the Menchum Landscape Areas, NW Cameroon -

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ABSTRACT

Great apes are declining in a frightening rate around the Menchum Landscape due to over hunting, principally driven by traditional practitioners due to their high demand for great ape wild materials, for the uncontrollable production of traditional medicines. As such, this study conducted in the Menchum Landscape; Case study of the Kimbi-Fungom National Park and Kom-Wum Forest Reserve in the Northwest Region of Cameroon, was aimed to investigate the values of great apes wild materials in traditional medicine in order to contribute vital information for their effective conservation in the study areas. The survey designed chosen for the study, was a face-to-face interview administered questionnaire conducted at a home of randomly selected traditional practitioners. Results showed that, out of a total of 480 attempted interviews carried out in 49 villages, up to 412 respondents gave valid, complete responses with a return rate of 85.83%. Up to 90.29% and 88.35% respondents have used at least once and knew the concoction of GAWMITMs respectively. Traditional practitioner reported to earn an approximate average sum of 15000-25000 franc cfa/patient for a complete treatment including benefit in kind such as fowls, goats and palm wine. Only 9.95% of the respondents agreed to substitute farmed materials in traditional medicines. A high desire for preferences uses of GAWMITMs glum conservation mind-set. As such, research strategies that can continuously valorize traditional medicine production and train traditional practitioners on how to transform sustainable farmed or alternative materials into traditional medicine with high efficacy at cheaper rate to treat similar conditions should be undertaken to save the remaining great apes.

Keywords: Conservation, Great Apes Wild Material, Traditional Medicine, Traditional Practitioners, Menchum Landccape

ABBREVIATIONS

GAWMITMs: Great apes wild materials in traditional medicines

K-FNP: Kimbi-Fungom National Park

K-WFR: Kom-Wum Forest Reserve

INTRODUCTION

Great apes hunting for body parts transformation into traditional medicine made up the primary form of medicinal treatment used by traditional practitioners, especially in rural areas with a pronounced history of great apes existence [1,2]. The illegal trade and uses of these medicinal products, has been in existence for ages [3], in the treatment of illnesses/conditions ranging from cancer, mental illness, and various injuries [4]. However, valorizing the efficacy of great apes products for traditional medicine, remains complicated. This is because, these products vary widely in their actual usage and are often combined with other medicinal products after being turned into various drinks, pills, and powders [5]. That is, the multidimensionality of traditional medicine concoctions which simultaneously uses other products such as wildlife product, herbal product and wild substances makes it more difficult to value its usage [6]. Also, some of the ingredients used in combination with great apes in traditional medicine are endangered and threatened wildlife species classified under the IUCN illegally obtained, making it harder to valorize their usage [7]. Despite the fact that in recent time, the continuous illegal hunting of great apes and their illegal sells of body parts and its wild material contributes substantially to the welfare and livelihoods of rural communities [8], yet, because there is often no formal commercial market for their commodity, its monetary value and its contributions to ecosystem services are often unnoticed [9]. The traditional medicinal value of great apes products is less known and scientifically questionable. Their values are mostly known by traditional practitioner and users who are always sceptical on revealing the reality of the products due to the illegal nature in which its wild material is acquired [1].

Great apes are declining at a frightening rate around the Menchum Landscape due to overhunting, habitat loss resulting from habitats fragmentation and degradation [2,10]. This is further provoked due to the continuous deterioration of the country economy and escalating hardship and lack of sufficient means to alleviate poverty [7]. This leaves some of the villagers around the study areas with no other option than to engage in different kinds

of activities one of which is traditional medicine practices which rationalize resources especially great apes to improve their standard of living [11]. Despite the fact that administrators have realized that the wellbeing of the local community also lies on traditional medicine practices [12], the uncontrollable profitable production of some of these traditional medicine end product, uses species (gorillas, chimpanzees, drills, leopards, pangolins) that are endemic, endangered and highly protected, posing serious threats to the remaining species and their disappearance in some of their suitable habitats leading to an unhealthy ecosystem [13]. As such, hunting of Great Apes for traditional medicinal purposes should be subject to the greatest scientific concern [11]. In many cases around the study areas, the uses of great apes products are for maladies that can sometime easily be treated with readily available modern medicines [4]. While cultural differences should be respected, but not if such differences mean the extinction of endangered great apes [14]. Beyond beliefs claims require extraordinary evidence, and supporters of traditional medicines derive from great apes wild materials are yet to deliver such evidence to the scientific communities [6]. Great apes medicinal wild materials cannot be purchased publicly and are not found at markets squares; thus their clandestine acquisition are worsening and facilitating the already endangered apes into extinction [15,16]. Despite the number of measures taken to try to reduce the impact that traditional medicine derived from apes body parts may have on great apes species, the strength of such conservation mechanisms remains ambiguous [4]. Therefore, while it has been argued that participating approach of all stakeholders with the involvement of all ethnic groups of local communities in conservation education and sensitization campaign can serve as powerful tools that can change the preferences and behaviours of hunters, traditional practitioners and consumers to reduce the driving force for illegal great apes hunting [11], remains questionable, because the changes in attitudes do not directly trigger behavioural variations and there is still a gap between protection attitude and actual consumption behaviour [17].

Despite the growing emphasis that has been placed in areas such as environmental education or community-based conservation initiatives, there is still very little literature on the values of great apes body parts in traditional medicine and biodiversity conservation [11] and this is an important gap. For example, existing research suggests that people may prefer traditional medicine products derived from great apes because they believe that humanlike ape's materials are more effective and unit in their usage [1,18]. As such, traditional

practitioners continuous their illegal usage as consumers are in fact willing to pay even higher prices for treatments involving great apes products rather than their substitutes products [4]. Thus if current conservation mechanisms including substitution programs are to be successful, appropriate conservation research efforts be designed and targeted [18,19], to have a more in depth understanding of the value of great apes body parts in traditional medicine, their profitability to traditional practitioners and levels of consumer preferences. This will be an important step toward preventing illegal great apes hunting and their continuous increasing demand.

1. Therefore this research was conducted to investigate user's awareness and values of great apes wild materials in traditional medicine, in particular, to examine whether substitution of great apes products may be feasible and finally to assess the conservation effect of great apes wild materials usage in traditional medicine. Thus, data were examined with a view to answering the following research questions: What are user's awareness on great apes wild materials in traditional medicine?
2. What are the values of great apes wild materials in traditional medicine?
3. Does great apes wild materials users prefer wild/farmed materials as substitute in traditional medicinal?
4. What is the conservational influence of great apes wild materials in traditional medicines?

MATERIAL AND METHOD

Description of case study areas

Case study area of Kimbi Fungom National Park: The Kimbi-Fungom National Park (K-FNP), created on February 3rd, 2015 by a Prime Ministerial decree number 2015/0024/PM is located in the North West Region of Cameroon approximately at latitude 6.5-6.9° N and longitude 9.8-10.5° E with a total surface area of 953.8 km² [20]. The K-FNP cuts through 3 divisions: Boyo, Menchum, and Donga-Mantung, covering 4 Sub-divisions: Fonfuka, Fungom, Furu-Awa, and Misaje [21]. In the north, it is bordered by Tumbo and Tosso in Nigeria, Baji, Nser, Kpep, Furubana, Supong, Akum, Edjong and river Katsina Ala in Furu Awa sub-division. In the east by Labo, Batari, and the Dumbo cattle ranch in the Misaje sub-division. In the South by river Kimbi, Kimbi village and Su-Bum in the Fonfuka sub division. In the center by Zhoa-Nkang, Esu, Kundzong and Iwo in the Fungom sub-division, and in the West by Munkep and Gayama also in the Fungom sub-division. These two compartments are linked by a corridor that stretches between Nkang and Nkannye on the Fungom end to the north west of Kimbi and South West of Dumbo cattle ranch with river Kimbi being a natural boundary between the ranch and the National Park. The park has four main entry points: Kimbi to the south, Zhoa-Nkang in the center, Esu - Gayama to the west, and Furuawa to the North. [20].

Case Study Area of Kom-Wum Forest Reserve: The Kom-Wum Forest Reserve (K-WFR) is located between Latitude (6°16'12.53"N) and Longitude (10° 7'57.85"E) in Boyo and Menchum Divisions in the North West Region of Cameroon. The Reserve covers a surface area of approximately 80 km² and is located 25 kilometres away from the main city of Bamenda. The sub-montane forest spreads on an undulating landscape with an altitude of 700-1500 meters above sea level (Sunderland & Mannaseh. 2003). The forest is bordered by the

villages Mughom and Bueni in the south and extends northwards towards Bu, Mbengkas, Baiso Mbongkissu. The Menchum River flows through the western section of the reserve creating a riparian forest [22]. The area has a sub-equatorial climate with a rainy season which lasts from March until November and a dry season between December and February. The overall annual rainfall varies between 2512.5mm and 2829.6mm. The reserve falls within a biodiversity hotspot of global significance. These areas are home of two endangered bird species, Bannerman's turaco (*Tauraco bannermani*) and the banded wattle-eye (*Platysteira laticincta*) [23], which are restricted to montane forests in the Bamenda highlands (IUCN red list). These sites have been recognized as some of Africa's priority primate conservation sites [7], with the presence of the seven diurnal and six nocturnal primate species in Kom-Wum Forest reserve [10,23,24].

Data collection

This study was conducted in the Menchum Landscape; Case study of the Kimbi-Fungom National Park and Kom-Wum Forest Reserve in the Northwest Region of Cameroon in September 2016- October 2017. The survey designed chosen for the study, was based on random selection of villages closer to the park, reserve and areas with a history of traditional practitioners using great apes wild material for traditional medicine. Information were obtained about the villages from state authorities, NGOs and traditional authorities before a random sampling was conducted in order to avoid repeated interviews during the survey. Once the villages to be sample were identified, a face-to-face interview administered questionnaire was conducted at a home of randomly selected traditional practitioner, and persons (hunter or patient) deem necessary with vital information if encountered. Only those who have lived in the village and been in practice for at least one year were interviewed. Respondents were appreciated for their participation after the 20 to 30 minute interview. A field assistant was recruited and trained on the subject matter to assist the senior investigator in conducting the research. Equally in each of the village to be sample, a guard was recruited on the recommendation of the chief/village council to guide the investigators along with the village and also to interpret from local dialect to English where difficulties arises.

Before the survey proper, the initial design of the interviewed administered questionnaire was modified based on the results of a pilot study on 12 postgraduate students at the Faculty of Agronomy and Agricultural Sciences University of Dschang and also on a total of 28 elites who were randomly chosen within the sample areas. The nature of the questionnaire was comprised of different parts; cover letter, completion instructions, questions, answers, and coding. An objective and neutral manner were used to describe and present the questions to avoid prejudicing the respondent's answers. The cover letter introduced the researcher, the primary purpose of the field work, and the main contents of the investigation. Before each interview, emphasized were laid on the fact that, there was no right or wrong answer to each question and that all information collected through the questionnaire would remain anonymous and confidential. Questions were arranged in order of correspondence to the underlying research objectives. Field notes were made, and feedback from respondents was obtained.

The questionnaire conceived and designed for this study begins with questions designed to gathered information on respondent's demographic variables such as gender, age, occupation, monthly income, educational level, native place, and urban/rural origin. It by

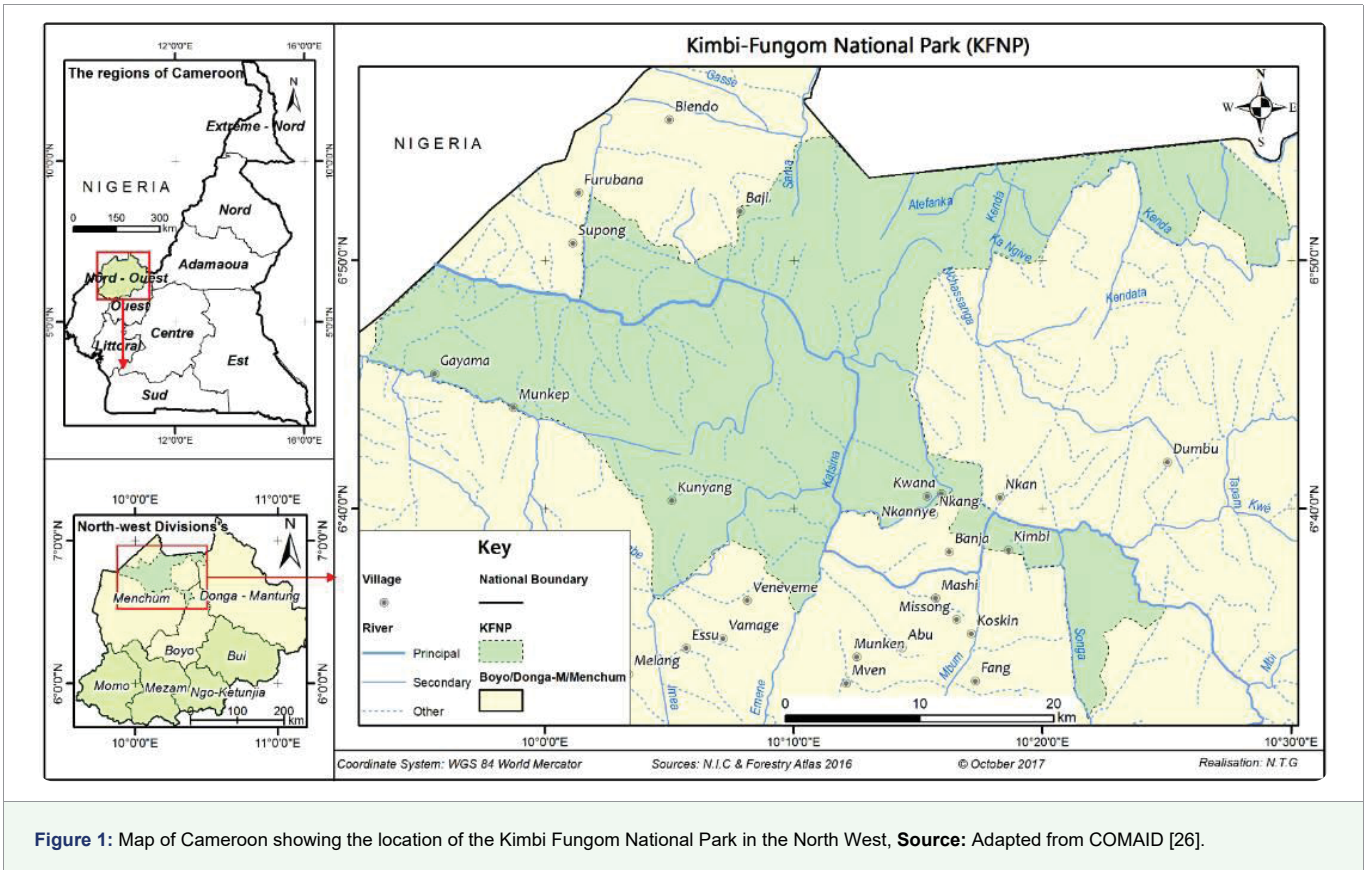


Figure 1: Map of Cameroon showing the location of the Kimbi Fungom National Park in the North West, Source: Adapted from COMAID [26].

questions to investigate respondent’s knowledge and perceptions on great apes body part in traditional medicine. Questions were then asked to inquire whether respondents had heard of, used great apes wild material traditional medicine and knew their concoction. This part of the investigation helped respondents better understand and describe their own knowledge of traditional medicine in preparation for answering the subsequent specified preference questions. In order to obtain information on the value of GAWMITMs, question was designed to obtain respondents favourite used of ape’s wild material products, if it was for the treatment of diseases, rituals or festivals. Find out the trust level, healing value and willingness to use, ways they purchase great apes wild materials and the benefit they obtained from their client. That is, get to know how much attention they paid to the following aspects of traditional medicine products; healing effects, functions and indications, composition, price, reputation, and/or side effects.

In order to assess preferences and substitutability, a question was designed to find out if respondents prefer great apes, wild animals or wild substances in traditional medicines. More so, to find out if domesticated/farmed materials could substitute great apes/animal wild materials. Reasons for choosing wild materials was based on less side effects, more trustworthy, natural, more traditionally inclined and cheap. The while reasons for choosing domesticated/farmed materials was more available, more hygienic, not threaten and for protecting endangered animals.

In order to analyze the conservation consciousness of respondents resulting from their used of great apes wild material in producing traditional medicine, a question was designed to know if respondents were aware of great apes continuous decline or have they relocated in the black bush areas. And if their declined were due

to overhunting, poor agricultural practices, deforestation/habitat or traditional practices. If they were aware that great apes are highly protected and forbidden to be hunted or hunting was a cultural gain for their community. Finally if it was necessity to conserve the remaining great apes or they think nature takes care of the rebirth. The questionnaire was checked after each interview in the field. Audio or visual recording was not used to collect the data because data collection were based on confidential as most of the respondents fears being implicated. Data coded were using a coding manual to guide data entry. The data were further checked in the database for manual typing errors. During the investigation process, data were prepared and analyzed in several rounds in advance to determine whether data saturation was achieved.

DATA ANALYSIS

Data analysis started by decoding all the information reported during the field survey and analyzed in line with the objective. Data from all forty nine villages were pooled during the analysis and were entered into Microsoft excels computer software version 2007 and analyse manually. Finally, field data results were presented in the form frequencies, and percentages.

RESULTS

Demographic Information

Demographic information of respondents linked to the used of great apes wild materials in traditional medicine, shown that out of a total of 480 attempted interview administered questionnaires carried out in 49 villages; Dumbo (5), Sabon-Gida (12), Gida-Jukum (4), Kimbi (11), Su-Bum (14), Buabua (7), Cha (12) Fungom (12), Koshing (6), Mekaf (7), Kung (5), Abah (5), Mashi (5), Mundabili

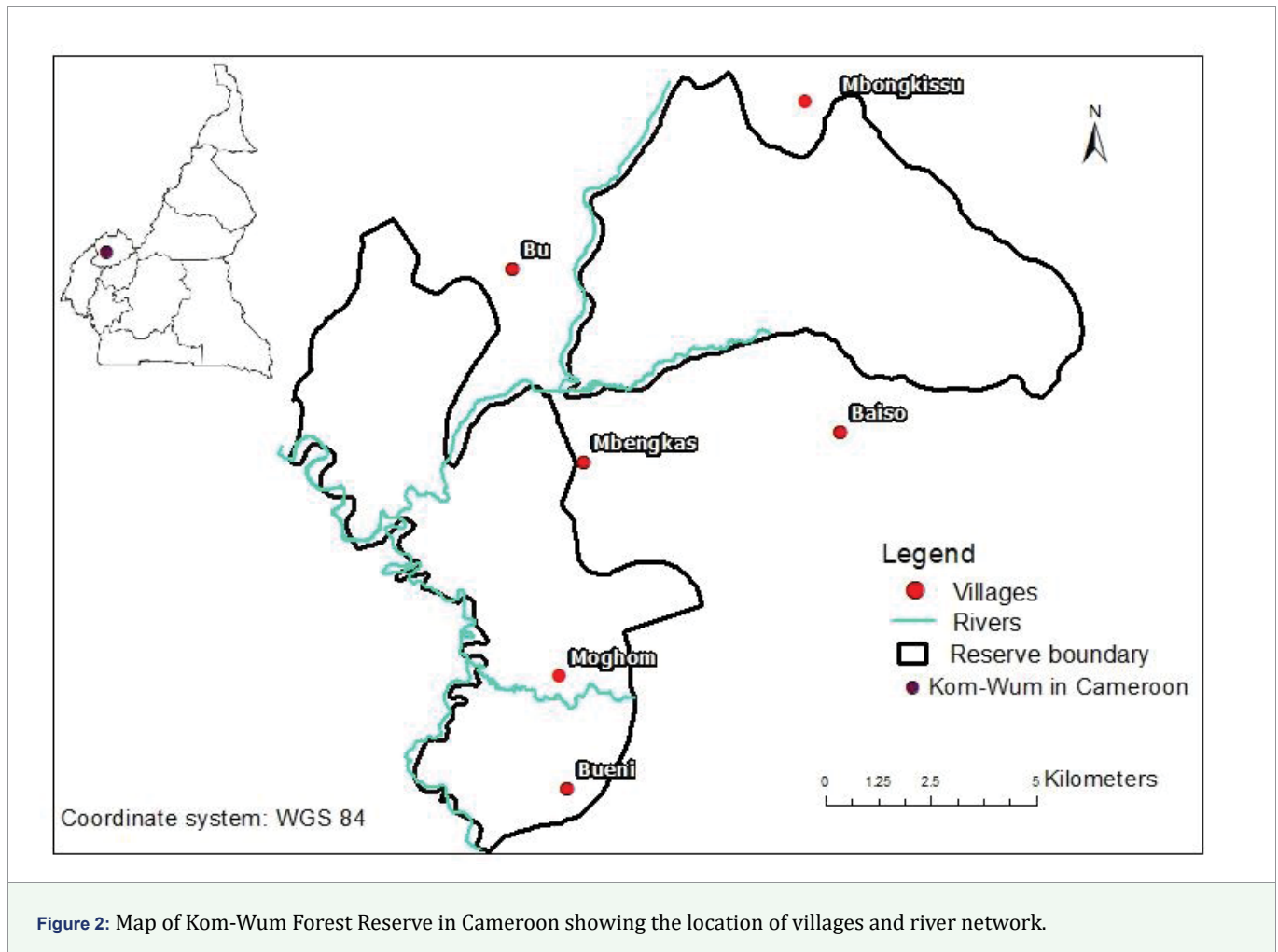


Figure 2: Map of Kom-Wum Forest Reserve in Cameroon showing the location of villages and river network.

(6), Munkep (12), Nkang (10), Akum (8), Nser (12), Badji (10), Turuwa (7), Sambali (8), Lutu (14), Kwept (11), Gayama (5), Esu (28), Weh (14), Kuk (12), Bafmeng (18), Kunfudu (8), Zhoa (12), Fang (8), Funfuka (14), Maholm (7), Mbengkas (8), Biaso (5), Mentang (8), Mbongkesu (8) Bu (13). Aghem-Wum (32), Menteng (6), Agulli (7), Bangwe (4), Atwe (9), Itiaku (4), Echuan (4) Ikakie (4), Modele (13), Benakuma (12), Ishimbi (14). Up to 412 respondents gave valid complete responses with a return rate of 85.83% obtained. While 68 (14.17%) respondents only participated without orderly following the interview administered questionnaires. This was due to fear of being implicated as many of the respondents cast doubt to the objective of the research. The gender ratio was greatly biased toward women as 382 (92.72%) of respondents were male compared to 30 (7.28%) of females respondents. This research found out that most of the traditional practitioners around the study areas were male as most woman were less involved in traditional medicine practices. The age group limit showed that most respondents were of ages ≥ 45 , 168 (40.78%), followed by 30-44, 165 (40.05%) and lastly by 15-29, 79 (19.17%) age groups. The low percentage of younger people could be due to mass rural exodus, lack of interest or modern religion inclinations. For what concern occupation of respondents, of the 412 interviewed during the field survey, all (100%) were traditional practitioners with only 47 (41%) purely engaged and a majority 365 (88.59) undertaking alternative sources of livelihoods such as hunting, farming, grazing, fishing, animal rearing, bike riders, furniture, traders and wide-collar jobs. The choice of interviewing mostly traditional practitioners was

based on the fact that they directly partake in the composition of traditional medicine using wild materials. There existed great disparity between the educational levels of the respondents. For instance, elementary education 202 (49.03%), secondary 114 (27.67%), tertiary 12 (2.91%) and less privilege 84 (20.39%). The monthly incomes of respondents were equally sample and grouped into five categories. For instance, 172 (41.75%) 10000-49000, 128 (31.07%) 50000-99000, 55 (13.35%) 10000-149000, 42 (10.19%) 150000-199000 and 15 (3.64%) ≥ 200000 in francs CFA. These monthly income do not really reflect what respondents gets from traditional medicine derive from great apes wild materials but it equally include gifts in kinds and money gotten from other sources of livelihoods. Respondents equally acted on their religious affiliation and results show that 201(48.79%) were Christians, 193 (46.84%) Animist and 18 (4.37%) Muslims. These demographic variables exhibited significant influence on the use of great apes wild materials in traditional medicines. For instance, age significantly influences the use of great apes wild materials in traditional medicines. That is, older people were significantly more likely to use great apes wild materials in traditional medicines than young people. This is because they have more experience in dealing with wild material than young people.

Respondent Awareness of Great Apes Wild Material in Traditional Medicines

Results showed that all respondents (100%) have heard of GAWMITMs. Up to 372 (90.29%) respondents have used at least

once GAWMITMs compared to the 40 (9.71%) who haven't. A good number of respondents 364 (88.35%) knew the concoction of GAWMITMs and 11.65% (48) were unaware of the concoction GAWMITMs. Taking the respondents as a sample ($n = 412$), there were significant differences among the numbers of GAWMITMs that respondents had heard of and knew the concoction of GAWMITMs. The numbers of GAWMITMs that respondents had heard of, used, and knew the concoction of obeyed different function models. This means most respondents had heard of, used and knew the concoction GAWMITMs. There was a low number between GAWMITMs products for which respondents knew the concoction of and had heard of. Talking on the GAWMITMs products, the rate of respondents who knew the concoctions of GAWMITMs was moderate with the rate of those who had heard of or used them. These results indicated that the frequency with which respondents had heard of or used GAWMITMs showed little effect on knowledge of concoction.

Values of great apes wild materials in traditional medicine

Understanding respondent's usage knowledge of great apes wild material products showed that these products were useful in three ways; 382 (92%) respondents said they used these wild material products in the treatment of diseases, 120 (29.13%) for rituals and 88 (21.36%) festivals. Analyzing respondents responds on GAWMITMs; 93.20% (384) said it got a high trust level, 91.50% (377) high healing value, and 74.76% (308) shown willingness to use GAWMITMs. There were also significant differences in trust level, healing value and willingness to use among the respondents, and the mean of intention to use was the highest, indicating that respondents were willing to use GAWMITMs due to the added value to the products.

Following series of field interviews, respondents displayed ingeniously different ways of purchasing and valuing great apes wild materials in traditional medicines; in which 90.05% (371) of respondents said they purchase them from hunters, and 9.95% (41) of respondents said on most rare cases through exchange ("trade by barter") or self-hunted. Purchasing great apes body parts around the study areas, remains one of the most secret and smartest businesses making it difficult to get its actual buying prices. However, respondents reported prices that range from 500-5000, 5000-10000, 10000-50000, 50000-100000, 100000-200000 and 200000-500000+ in franc cfa, starting from the sizes of a piece of meat, bone, skin, limb/hind, skull, full dead ape, live apes and other body parts of interest. After their combination in traditional medicines, their value in monetary terms depended on the kind of illnesses/diseases or condition to be performed as well as the personality of the client. This makes it even more complex to value GAWMITMs. However, respondents gave clues of benefit they obtained from their client depending on the kind of condition solicited, which ranges in cash as from; 5000, ≥ 10000 , ≥ 20000 , ≥ 30000 , ≥ 40000 and ≥ 50000 franc cfa/patient for a complete treatment. That is a traditional practitioner can end an approximate average sum of 15000-25000 franc cfa/patient for a complete treatment including other benefit in kind such as fowls, pigs, goats, sheep, cola nuts, palm wine, strong wine, foodstuffs, shoes, cloths, blanket, palm oil and more, whose value can only be determined by the client offering them. These are items require to begin or to show appreciation after the treatment. As such this makes it difficult to downplay GAWMITMs preferences or substitute for other materials.

Preferences and Substitutability to GAWMITMs

Questions were designed to investigate respondent's preferences and substitutability over GAWMITMs considering that great apes

numbers are declining significantly; 24.03% (99) prefers great apes wild materials over 22.09% (91) who prefer wild animal's material and 53.88% (222) who said they prefer both materials. Responding to the question of complete absence of great apes wild material, which will be the substitute, most of the respondents 90.05% (371) said they would substitute wild animal's materials over great apes wild materials than domesticated/farmed materials in traditional medicines as supported by 9.95% (41) of the respondents. There were significant differences among the selection frequencies of respondent's preferences. More respondents chose wild materials than domesticated/farmed materials. The ratio of respondents that chose farmed materials was the smallest. These results demonstrated that most respondents prefer traditional medicines made from wild materials than other sources.

Responding to questions relating to reasons of preference and substitution with respect to the selection frequencies of "wild materials" and "domesticated/farmed materials", 90.5%, and 9.95%, respectively. The reasons for choosing "wild materials" were based on the fact that less side effects (7.36%), more trustworthy (16.53%), natural (18.86%), more traditionally inclined (29.7%) and cheap (22%). The reasons for choosing domesticated/farmed materials were more available (2.53%), more hygienic (2.80%), not threaten (3.27%) and protecting endangered animals (3.04%).

Conservation Perception on the Remaining Great Apes Population

Responding to the questions relating to if respondents were aware of great apes continuous decline around their areas of origin; 77.91% (321) of respondents accepted their continuous decline while 22.09% (91) said they are still in numbers but have relocated in the black bush areas. The reasons given for their decline or relocation were overhunting 100% (412), poor agricultural practices 98.06% (404), deforestation/habitat loss 93.93% (387) and only 12.62% (52) of the respondent accepting that traditional practices do contribute to great apes decline. Concerning their conservation status, 86.89% (358) were aware that great apes are highly protected and forbidden to be hunted and 13.11% (54) feel that hunting is a cultural gain for their community, while 81.07% (334) of respondents see the necessity to conserve the remaining great apes, 18.93% (78) think nature takes care of the rebirth. Observing the response of respondents preferences and substitution, conservation consciousness of GAWMITMs was different with the frequency of choosing preferences and was equally different with the frequency of choosing substitute. There was also different opinions between the frequencies of choosing wild materials and farmed/domesticated materials. The frequencies of choosing wild material with conservation consciousness and "substitute were in accordance with the fact that conservation consciousness didn't influenced respondent preference.

DISCUSSION

In this study, respondents demonstrated high understanding of the used of great apes wild materials in traditional medicine with a majority of them knowing the concoction and function. Respondents prove that GAWMITMs have high trust value, high healing and were ideal substances vital in traditional medicines as its products are best recommended in the treatment of diseases/conditions, for rituals and in traditional celebrations. This is consistent with existing research indicating that great apes bones were used to increase calcium level in children deficiency in calcium, to facilitate walking ability in children, for the joining of human fractures [12-14]. Equally, researcher reported some villages for instance, Mbenkas in the North West

region of Cameroon where rituals are performed by sacrificing great apes caught alive on pagans altars to awake their village gods and at times great apes carcasses are used for festivals like child circumcision and in the installation of certain traditional fons [1,4,8]. Diseases/condition such as cancer, epilepsy, infertility, impotent in men, just to name a few have been reported by certain traditional practitioners in some research works to be easily handled through great apes wild materials products [5]. This has made the hunting, purchase and value of GAWMITMs elevated as traditional practitioners scramble for apes body parts when one is hunted down. This suggests that respondents are open up to great benefits both in monetary value and in kind. For instance, a traditional practitioner can end an approximate average sum of 15000-25000 franc cfa/patient for a complete treatment including items in kind such as fowls, pigs, goats, sheep, cola nuts, palm wine, strong wine, foodstuffs, shoes, cloths, blanket, palm oil and much more. More to these benefits, the usage of a piece of bone/skull for instance, can last for decades/century depending on its effective use as reported by a majority of respondents, making the commodity more profitable. These benefits may be the result of increased in the numbers of traditional practitioners due to poverty increment, high preference levels and low willingness to substitute wild ape materials in traditional medicines. This implies augmentation in illegal prices resulting to increase illegal hunting and high desire preferences use of GAWMITMs to any substitute, thus glum conservation programs put in place.

Looking at the results for respondent's preferences and substitutability demonstrated that preference amongst respondents for GAWMITMs and wild animal's materials were high. This high preference was most commonly attributed to a belief that traditional medicine derived from wild animals are more effective and more potent than materials from other sources. This based on the fact that wild materials have less side effects, more trustworthy, natural, more traditionally inclined and cheap. Contrary, only a few respondents appeared to be interested to choose substitutes such as domesticated/farmed materials in traditional medicines holding to the fact that they are more available, more hygienic, not threaten and assist in the conservation of endangered wild animals.

Respondent's awareness of great apes continuous decline around their areas was in a majority, reported to be due to over hunting, poor agricultural practices, habitat loss and with only 12.62% of the respondent accepted that traditional practices do contribute to great apes decline. Therefore, as illegally hunting intensify, great apes population continue to decline seriously, their body parts becomes scarce as prices escalate and their value in traditional medicine becomes paramount while conservation attitude among natives becomes a misplaced priority. Despite the fact that majority of the respondents were aware that great apes are highly protected and forbidden to be hunted, 13.11% still felt that hunting great apes are sacred values for cultural gain of their community, supporting their view that the conservation of great apes should be allowed for nature to take care of the rebirth. If majority of GAWMITMs users are sincere in their views, then effective public sensitization campaign, accompany with training on modern traditional medicine will considerably give room for a transition to farmed animal, plant or alternative material. Contrary, if users express preference for GAWMITMs are on the basis of a traditional belief, then much attention will be needed since it is important to recognize that the relationship between community education efforts and behaviour change is complex and may require numerous engagement strategies to conserve the remaining ape's population [25-32].

CONCLUSION

This present study exposed the features that are drastically contributing to the continuous decline of great apes population in the Menchum Landscape. The result showed that great apes were continuously losing their habitats in a disturbing proportion through habitat fragmentation and degradation. Worst of all, through the deteriorating illegal hunting of great apes, most of which was encouraged by traditional practitioners for their body part in traditional medicines, used in the treatment of diseases, for rituals and festivals. This has for years built high trust level, high healing value, and strong willingness to use GAWMITMs. Moreover, the benefit obtained by traditional practitioners in cash and kind makes it difficult for respondents to accept alternative materials as a substitute in traditional medicines. Seriously threatening the remaining endangered great ape's population.

As such, emphasizing conservation concerns could have great potential to completely eradicate the use of GAWMITMs. It has previously been said that conservation awareness has an important influence on user behavior [11], in the framework of using great apes body parts in traditional medicine, community education can be a powerful tool for raising conservation consciousness and changing great apes user activities. Data showing the fruitlessness of accepting substitution, could base on the context that little or no depth study regarding traditional practitioners knowledge on farmed or alternative substances, have been undertaken to reveal the significant of substitution. As such, this study suggests that, research strategies that can continuously valorize traditional medicine production should be carry out to provide techniques that can train traditional practitioners on how to transform sustainable farmed animals, plants and/or alternative materials into modern traditional medicine that have high efficacy, offer at cheaper prices for the treatments of similar illnesses that are being treated with great apes wild materials. This will help reduce over dependent on endangered wildlife species, especially great apes.

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Authors' contributions

MDC, TEA, TAI, and FC were involved in the design, interpretation and analysis of data. MDC, performed the field work and drafted the present article; TEA and TAI, supervised and gave directives on how to conduct the research work. FC assisted on data analysis and help drew maps for the research works. All authors read and approved the final manuscript.

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