Online ISSN : 2249-4618
Print ISSN : 0975-5888
DOI : 10.17406/GJMRA

Global Journal

of Medical Research: K

Interdisciplinary



Discovering Thoughts, Inventing Future

VOLUME 20 ISSUE 1 VERSION 1.0

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Volume 20 Issue 5 was originally issued as K1

Global Journal of Medical Research: K
Interdisciplinary

Volume 20 Issue 5
Originally issued as K1

Global Journal of Medical Research: K Interdisciplinary

Volume 20 Issue 1 (Ver. 1.0)

Open Association of Research Society

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Offset Typesetting

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Global Journal of Medical Research: K
Interdisciplinary
Volume 20 Issue 1 Version 1.0 Year 2020
Type: Double Blind Peer Reviewed International Research Journal
Publisher: Global Journals
Online ISSN: 2249-4618 & Print ISSN: 0975-5888

Family Planning Practices among Teenage Mothers in Rural Uganda: An Exploratory Study in Bugoye Sub-County

By David Santson Ayebare, Palka Patel, Geren Stone, Moses Ntaro, Dan Guiles, Jessica Kenny, Grace Nyangoma, Enid Muhindo, Andrew Christopher Wesuta, Fred Bagenda, Michael Matte, Moses Wetyanga, Peter Chris Kawungezi, Raphael Mbusa, Rabbison Muhindo, Sarah Masika, Shem Bwambale, Stephen Baguma & Edgar Mugema Mulogo

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Abstract- *Background:* Utilization of family planning services among teenagers in resource constrained settings is faced with challenges in regard to proximity to the health facility which is prevalent in rural Uganda. Evidence on the contextual challenges and bottom-top interventions with regard to teenage mothers is limited. This study identified major health related challenges teenage mothers face in a dire need to access family planning services and proposed areas of interventions in rural underserved context of south western Uganda.

Keywords: *teenage mothers, rural underserved, family planning, bugoye sub-county, uganda.*

GJMR-K Classification: *NLMC Code: WA 550*



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Family Planning Practices among Teenage Mothers in Rural Uganda: An Exploratory Study in Bugoye Sub-County

David Santson Ayebare [α], Palka Patel [σ], Geren Stone [ρ], Moses Ntaro [ω], Dan Guiles[¥], Jessica Kenny [§], Grace Nyangoma [χ], Enid Muhindo [ν], Andrew Christopher Wesuta [θ], Fred Bagenda [ζ], Michael Matte [£], Moses Wetyanga [€], Peter Chris Kawungezi [₣], Raphael Mbusa [₴], Rabbison Muhindo [₲], Sarah Masika [₳], Shem Bwambale [₫], Stephen Baguma [₥] & Edgar Mugema Mulogo [₢]

Abstract- Background: Utilization of family planning services among teenagers in resource constrained settings is faced with challenges in regard to proximity to the health facility which is prevalent in rural Uganda. Evidence on the contextual challenges and bottom-top interventions with regard to teenage mothers is limited. This study identified major health related challenges teenage mothers face in a dire need to access family planning services and proposed areas of interventions in rural underserved context of south western Uganda.

Methods: Data was obtained from a cross-sectional study involving an exploratory qualitative approach using a combination of in depth interviews, Key informant interviews and a Focus Group Discussion. Data was collected from September to December 2017. Framework analysis sequentially combining content and thematic analyses was used to synthesis emerging themes.

Findings: Inadequate knowledge, fear of negative effects and reliance on traditional herbs as alternatives to modern family planning limited utilization of family planning services among teenage mothers. Participants presumed that upon sensitization of teenage mothers and engaging their male partners were major interventions to improve utilization of family planning services in Bugoye Sub-county.

Conclusions: Mainly individual level factors influence the practices of teenage mothers towards accessing FP services. Interventions should be tailored to address these factors that limit access to FP services by adolescents.

Keywords: teenage mothers, rural underserved, family planning, bugoye sub-county, uganda.

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Abbreviations: FP: Family Planning, ANC: Antenatal care, FGD: Focus group Discussion, TBA: Traditional birth attendants, UNFPA: United Nations Family Planning Association, WHO: World health organization.

I. Introduction

Globally, an estimated 21 million pregnancies occur among teenagers of ages 15–19 years in developing countries with almost half of which (49%) are unintended[1] and this is less than the required 100% access to family planning services by 2030 [2]. Teenagers in sub-Saharan Africa have one of the highest birth rates compared to teenagers in the other regions of the world, this accounts for a significant proportion of the total fertility among the countries in the region [3]. However, although family planning services offer chances for a teenager to avoid unplanned pregnancies through counseling, education, access to contraception and access to safe abortion, its utilization remains a major challenge because it is prevalent and its impact on health and education outcomes among teenagers is perplexing[4]. In African countries, socio-cultural and other challenges in persuading teenagers to engage with health services have been reported [5].

In Uganda teenage pregnancy is high and yet pregnancy and childbirth are the leading causes of death among teenagers aged 15–19 in low and middle-income countries [6].Universal access to sexual and reproductive health services and rights by 2030, including family planning, is a priority in the global Agenda for Sustainable Development, as is laid out in Goals 3 that focuses on ensuring good health and promote wellbeing at all ages and 5 to achieve gender equality and empower all women and girls [7]. Among the significant indicators to the footpath to Sustainable Development Goal 3 are the proportion of women in reproductive age who have their need for family planning satisfied with modern methods and the adolescent birth rate[2]. Also, there was a total fertility rate of 5.4 children, the highest in the world with the highest rates of pregnancy among teenagers with high unmet need for family planning utilization at 30.4%[8].

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The high teenage birth rates reflect the vulnerabilities they experience and the lack of opportunities available for them such as end to education [9]. This is linked to the dominant laws and policies to prevent contraception in relation to age or marital status [10]. Besides, health workers in Uganda are unable to provide contraceptives to teenagers due to their own personal beliefs and biases or misinformation about laws and policies. Further, teenagers may often be unaware of where or when contraceptives are available, unable to afford them, or unable to easily access a contraceptive service-delivery point. Existing barriers in Uganda inaccessible service locations, particularly in rural settings [11].

In resource-poor contextual settings, family planning services are characterized by either lack of or existing policies coupled by lack of financial autonomy to provide basic needs in addition to transport to the health facilities[12]. Even when teenagers are able to access contraceptives, they are reluctant to admit that they are sexually active or are embarrassed to ask for contraceptives especially in rural settings where education levels are low and stigma is high [13]. The existing scholars show that the available interventions to address teenage pregnancy are disproportionate in various contextual settings in terms of magnitude and its allied factors. This study therefore aims at identifying the challenges faced by teenage mothers in accessing family planning and related interventions tin Bugoye Sub-county in South western Uganda.

II. Methods

This was a cross-sectional design using qualitative approach to data collection. Interviews were conducted with teen mothers and male partners, midwives, the focal person and the health faciltyin charge in Bugoye Sub-county, Kasese district, southwestern Uganda. Nyangonge and Muramba 1 are villages at differing distances from Bugoye Health Centre III (BHC III) with Muramba 1 nearer than Nyangonge. It was presumed that access to BHC III was affected by distance, means of transport and associated costs Teenage mothers in the two villages of Nyangonge and Muramba I were selected through purposive sampling of one woman aged 14-17 per village who had given birth were eligible for inclusion in the study and were interviewed. Male partner selected using chain referral sampling and interviewed. Traditional Birth Attendants (TBA) was selected using chain referral sampling to speak with one TBA in each study village. The study was conducted among midwives; individual interviews with all midwives at the health center were also conducted before the larger focus group discussion. Individual key Informant Interview with BHC III In-Charge and Focal person were also conducted. Approval was obtained from the Research Ethics Committee of Mbarara University of Science and Technology.

III. Data Collection

Following common recommendations for sample size in qualitative investigations advise of between five and twenty-five[14]or, elsewhere, greater than 6 interview participants in order to ensure elucidation of key themes during data collection[15]. In this study, a total of 8 interviews and one FGD were conducted. Two teenage mothers, two male partners, two TBAs, one health facility in-charge and one Focal person participated in the study.

Subsequently, upon consent face–to-face interviews were conducted with teenage mothers, male partners and two TBAs in the two villages of Nyangonge and Muramba I. Interviews were conducted with In-Charge and Focal person of Bugoye HC III. Also, a Focus Group Discussion (FGD) with midwives at Bugoye HC III was conducted. Discussion guides were used to provoke data from all the respondents. Interviews with health workers were strictly in English while the TBAs, teenage mothers and male partners were done in the local language of Lhukonzo. Translated discussion guides were used. Responses were digitally voice recorded and transcribed verbatim.

IV. Analysis

Transcripts were reviewed and reread. Framework analysis methods were used to develop the initial codes, final codes and themes, while thematic approach was sequentially used to group themes into the broad outcomes of interest in the study. Consequently all the emerging themes were synthesized into three broad maternal child health attributes.

V. Results

a) *Major health-related Challenges of Teenage Mothers to access Family Planning*

Most participants described inadequate knowledge of family planning services, fear of the negative side effects linked to family planning and use of traditional alternatives were the main challenges affecting family planning utilization among teenage mothers in Bugoye Sub-county.

b) *Inadequate knowledge of where to access family planning services*

Participants reported that teenage mothers lacked adequate knowledge for the whereabouts of venues for the availability of family planning services. Being young, they have very little knowledge of the whereabouts of family planning and find it difficult to avoid unwanted pregnancy. One participant said:

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…few women [teen mothers] use family planning, even if they [teenage mothers] wish to avoid pregnancy… the first reason why it is few people (women utilizing family planning) is that they have not got adequate knowledge about whereto get the service (Partner, Village 2)

c) *Fear of the negative side effects linked to family planning*

Almost all the participants showed concern that immediate and future side effects hindered appointments for family planning utilization. Participants reported side effects such as being barren, cancer and nausea.

"No, I can't use it. I have a complication, so I fear that family planning may make me barren… one needs to agree with the husband then she can go for family planning…usually their husbands refuse. They don't want to get barren"

(Teenage mother, Village 1)

This communication corresponded with the views of the male partner:

"I heard that sometimes they (health workers) can administer an implant to you (the woman) and it may prevent you from conceiving again, or it could cause you some sickness, but I did not understand the kind of sickness that is caused by using the implant. Yes. And on the other hand, they would say that the implant is good, so I would get confused and by then, I was still very young. And I did not know what to follow" (Partner, Village 1).

d) *Use of Traditional Alternatives in Family Planning*

Participants also thought that use of traditional medicine hindered use of available modern family planning methods. Women resorted to the use of local herbs as substitutes. As such, one participant explained:

"… She [referring to his wife] then told me that she fears injections and pills but then had got someone to give her herbs. Ummm, so that is the method (herbs) we (referring to his wife) eventually used"

(Partner, Village 2)

However, some respondents strongly disputed the effectiveness of traditional herbs.

"It (herbs) is a lie. Some people just speak because they want to extort money. They say they have local herbs that would delay pregnancy. Those are lies. There is no method apart from pills, injections and others found in the health facilities that can prevent a woman from becoming pregnant"

(Teenage Mother, Village1).

e) *Suggested interventions*

Some of the suggested interventions to the challenges teenage mothers faced were not particular for adolescents but also other women in the area.

f) *Increase sensitization programmes*

In order to improve awareness among the population, sensitization programmes were suggested.

"Its lack of awareness in the community because we need to talk to those male partners like when there is gathering such as funerals or weddings, we are supposed to tell the community that when the mother is pregnant, you (the man) are supposed to escort her to the health facility"

In addition, there was a challenge of lack of equitable equipment such as stretchers in the community associated with rough terrains.

…we don't have stretchers, so if you start experiencing labour pains like if you're almost delivering and you were not aware that your pregnancy id due, they make a local stretcher from logs, they tie the logs together and they add a cloth, then they put you on that locally made stretcher

(Teenage mother, Village 2).

Participants suggested provision of a cost shared vehicle ambulance with access to the 24 hour call center for improving the referral system, provision of an incubator. One participant confirmed:

… We make sure there is transport means, if you refer they are able to go. But even an ambulance is necessary. Because what about at night, if you refer in the night? Of course, you can't go to the village and start looking for cars and motorcycle, so you get an ambulance, put the patient and take to the health *center IV for assistance. More to that, even protection of the midwife. She must protect herself by putting on sterile gloves, aprons, gumboots, goggles, to prevent/protect her … to prevent her from infections*

(Midwives, FGD, Bugoye Health Centre III).

g) *Motivate and engage male partners*

Participants suggested that household programs that include but not limited to counseling for teenage pregnancy, spousal support, modern family planning methods and early signs of pregnancy. The team also received views that linked health package for male spouses and a transport voucher system for the couple will improve male partner involvement and engagement. Also, bringing Maternal Child Health (MCH) services closer through monthly integrated outreaches and consider family planning methods through VHTs and incorporating VHTs in MCH wards.

… male involvement; it is still a problem because if there is a problem with the mother, and you try to health educate for instance if you health educate the mother alone, when she reaches home and tells the partner, he (the partner) just keeps quiet and does not care. So male involvement is still a challenge (Health worker1)

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Similarly, one study participant affirmed:

> *…we just give a health education talk; we talk about the benefits of family planning to the mother, to the baby, to the community, to the father and to the nation. So, in that health education talk, we tell them the types of family planning that we offer here [Bugoye Health Centre) and that are available,*
>
> (Health worker 1).

Implications in the study shows appreciation of continued priority to mothers who come with spouses during ANC and providing health workers with incentives e.g. providing tea at night with an escort.

VI. Discussion

In a study of teenage mothers from a rural resource constrained community of differing distances from health facilities of access to health services in Bugoye Sub-county, the major health related challenges were inadequate knowledge about FP services, fear of consequential side effects and access to TBAs. The findings in our study are consistent with preliminary reports of previous authors in similar resource constrained settings. A recent literature review study about the factors associated with adolescent pregnancy in low-income and lower middle-income countries revealed that in a total of 12 articles, inadequate education, low socioeconomic coupled with insufficient access to and non-use of contraception were consistently found to be risks for pregnancy among adolescents[16]. There was certain indication that early marriage, residing in a rural area, initiation of sexual activity at an early age, belonging to an ethnic and religious minority group also increased the risk of adolescent pregnancy. However, adequate education, access to income-generating work and family support were found to protect against adolescent pregnancy. Similar to the findings of this study, there is an implication that in resource-constrained countries, as in well-resourced countries and the general rural setting, low socioeconomic status appears to increase the danger of pregnancy among adolescents. In addition, this study found that access to TBAs was a risk linked to low FP utilization similar the finding in the review [16] in that specific contexts such as cultural traditions including early marriage and inaccurate beliefs about contraception were eminent.

Similar to our study, [17] reported that diverse terrains affected access to health services by adolescents especially those residing in rural and remote areas. Additionally, in regard to fear of negative effects associated with FP, [18]reported myths and misconceptions among adolescents regarding family planning, preferably at early ages. Also, [19]in agreement to the findings in this study found that in Kenya increased risks of unintended repeat pregnancies among postpartum adolescents and family planning (FP) providers at two maternal and child health clinics in Kenya were lack of FP knowledge, community misinformation, and insufficient counseling and time with health care providers all contributed to adolescent anxieties about FP. However, it was reported that as adolescents transition to motherhood, they felt more encouraged to use FP implying a need for increased awareness of FP benefits. Similar to our findings and other scholars, [19]while examining the role of socio-cultural inhibitions in the use of modern contraceptives in rural Uganda conducted in 2012 among populations in the districts of Mpigi and Bugiri in rural Uganda persistence of socio-cultural beliefs, continued reliance on traditional family planning practices and misconceptions and fears about modern contraception greatly affected FP use. Socio cultural expectations and values remain impediments to using family planning methods suggesting a dire need to eradicate the cultural beliefs and practices that obstruct clients from using contraceptives, as well as a need to scale-up family planning services and sensitization at the grassroots.

In an array of the diverse challenges faced by teen mothers especially given the long distance coupled with diverse terrains in Bugoye Sub-county, increased awareness through community sensitization outreaches in addition to participation of male partners were the suggested interventions that can enhance access and utilization of FP. This finding is in line with those of [20] who reported inefficiencies among health workers in Uganda suggesting the need for training and equipping health care workers with the aim if improving the provision of reproductive health services to adolescents. Similarly, [21]concurred when it showed that adolescents in Uganda, both unmarried and married, face many sexual and reproductive health risks stemming from early, unprotected, and unwanted sexual activity despite inadequate access to sexuality education, and to accessible, affordable, and appropriate contraception. Besides, 25% pregnancies in Uganda among adolescents[22]. In line with this study, access to contraceptive information and services by sexually active adolescents is one of the interventions that require urgency to implement in order meet the contraception needs of adolescents while dismantling barriers that hinder adolescents from accessing family planning services. Additionally, increasing access to family planning services through community-based distribution of contraceptives and scaling up youth-friendly family planning information and services that are accessible, non-discriminatory, confidential and non-judgmental is vital.

In this study, fear of consequential side effects in addition to low male participation of family planning was reported similar to [23]who identified that low participation by males was crucial to the success of family planning programs in addition to women

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empowerment. It was shown that male involvement leads to contraceptive acceptance and continuation, and safer sexual behaviors. Though inadequate choice and access to methods, attitudes of husbands towards family planning, perceived fear of negative effects, poor quality of available services, cultural or religious disagreements and gender-based obstacles are certain of the reasons for low utilization of family planning. The intentions of low uptake of FP were revealed to be the desire to have more children, wife or partner refusal, fear of consequential side effects, religious prohibition, lack of awareness about contraceptives and the thinking that it is the only issue for women. Views about uptake of family planning services including approval by husbands and current use of family planning methods were associated with male involvement in the services utilization.

In line with [23]similar to our study realized that many men express fear safety and inconvenience of modern family planning methods such as general sickness, menstrual disturbance, weight gain or weight loss, nausea, weakness, infertility, and malformation of newborns. Also, lack of couple communication, trust and couple counseling are major obstacles for the involvement of men in family planning. In addition, lack of communication between couples influences perception towards contraceptive use. In support, adolescents often lack basic reproductive health information, knowledge, and access to affordable confidential health reproduction for reproductive health[24].

It was noted by [25]that health providers have failed to achieve successful male involvement in pregnancy care especially in rural and remote areas where majority of the underserved populations live. Besides, the paradoxical influence of TBAs and use of herbs was identified. TBAs trained and equipped to ensure better care and quick referral identified was back in 1997showed a controversial finding. Turinawe, Rwemisisi [25]showed that TBAs were beneficial to both men and women in that TBAs sensitized men using both cultural and biomedical health knowledge, and become allies with women in persuading men to make available resources needed for maternity care. Also, [25]found that men trust and have confidence in TBAs and suggested that closer collaboration with TBAs provides a suitable platform through which communities can be informed and men actively carried on board in supporting maternal health services for women in rural communities.

In regard to this study, [26]from a health worker perspective indicated that in Kabwe district, Zambia health systems barriers include long distances to healthcare facilities, stock-outs of favorite methods, lack of policies enabling contraceptive access in schools, and undesirable provider attitudes. Also, community level barriers comprised experience with contraceptive side effects, myths, rumours and misconceptions, societal stigma and negative traditional and religious beliefs. Besides, health systems enablers consisted of political will from government to expand contraceptive services access, integration of contraceptive services, [27]in a study at Four hundred and twenty four females of reproductive ages were selected from both Inpatient and Outpatient Departments of Atiak Health Centre IV indicated that long distance to health facility, unavailability of preferred contraceptive methods, absenteeism of family planning providers, high cost of managing negative effects, wish for large family size, children dying less than five years old, men forbidding women from using family planning and lack of community leaders' involvement in family planning programme.

In addition, fear of consequential side effects and myths were reported by [28]who even realized that in developing countries, largely male dominated culture is eminent and the side effects of FP methods and the treatment of side effects and male involvement in which men showed little interest in participating in family planning issues were the major barriers to family planning services. According to [29]in relation to this study reported that adolescents in Kenya experience a higher risk of mistimed and unwanted pregnancy compared to older women, fear of consequential side effects and adverse reactions were a most important barriers to practice. Many fears were based on myths and misconceptions. Besides, most adolescents indicated that they learnt about both true consequential side effects and myths from their social links.

This study has demonstrated that various limitations to this work should be considered. This study being a cross-sectional study, limited our ability to actual health challenges that cause low utilization of FP and predictive interventions to curb the challenges identified. Second, the tools were self-constructed and pretested in Lukonjo and English and administered in communities of varying geographical scopes which could be affected by the diverse regional differences. The study was conducted within one Sub-county of Kasese District and the findings may not be directly transferable to other rural settings or districts of Uganda. Public transport in the study area is worse than in more remote areas.We expect our findings cannot provide the magnitude of the challenges and the corresponding interventions.

VII. Conclusion

Teen mothers in rural poor constrained settings of rural western Uganda mainly face individual level factors that influence the practices of teenage mothers towards accessing FP services. The adolescent friendly interventions should be tailored to address these factors that limit access to FP services by adolescents.

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Availability of data

The data used to support the findings of this study are available from the corresponding author upon request.

Competing interests

The authors declare no conflicts of interest regarding the publication of this paper.

Authors' contributions

DSA was involved in the design, implementation, data analysis, interpretation of findings and write up of the paper. EMM, FB, MN, BB and PL were involved in the conception of idea, design, and implementation, interpretation of findings and review of the paper. PCK, ACW, RN, SM, RM, MM, GN, EM, MW and SB were involved in design, implementation, analysis and write up of the paper. GS, DB, LC, PP, JK, RR, SMM and DG were involved in conception of the idea, design, review and write up of the paper.

Acknowledgements

The authors convey appreciation to the participants for giving priceless responses in this study and the partners for the funding.

Ethical approval and consent of participants

This study was approved by Research Ethics committee of Mbarara University of science and Technology. The team obtained written informed consent from study participants.

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Global Journal of Medical Research: K
Interdisciplinary
Volume 20 Issue 1 Version 1.0 Year 2020
Type: Double Blind Peer Reviewed International Research Journal
Publisher: Global Journals
Online ISSN: 2249-4618 & Print ISSN: 0975-5888

Becoming *Asustado* (Scared): An Ethnographic Contribution to a Transdisciplinary Approach to Children's Health and Development

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Abstract- We characterized and analyzed women's narrative around the idea of becoming asustado (scared) as a cultural way of understanding why children get sick repeatedly or develop illnesses that become increasingly severe, as part of a study carried out in rural communities from the Molinos District, in the North-West of Argentina. We analyze and discuss the implications of becoming asustado for everyday child-rearing and children's health, sociability, and performance in different community endeavors from ethnographic data. We intentionally selected 15 cases elaborated based on 55 semi-structured interviews with 15 women, between 25 and 55 years old, all caregivers of children under 6 years old. Our results show that susto (fright) serves as an explanation for those people who do not fit with cultural expectations about their phenotype and social performance. Also, it is a culturally acceptable way of dealing with both physical and mental stress.

Keywords: susto, childhood, children's development, mother-child health, therapeutic itineraries, medical care, Andean communities, ethnography, transdiscipline.

GJMR-K Classification: NLMC Code: WA 525



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Becoming *Asustado* (Scared): An Ethnographic Contribution to a Transdisciplinary Approach to Children's Health and Development

Carolina Remorini [α] & María Laura Palermo [σ]

Abstract- We characterized and analyzed women's narrative around the idea of becoming *asustado* (scared) as a cultural way of understanding why children get sick repeatedly or develop illnesses that become increasingly severe, as part of a study carried out in rural communities from the Molinos District, in the North-West of Argentina. We analyze and discuss the implications of becoming *asustado* for everyday child-rearing and children's health, sociability, and performance in different community endeavors from ethnographic data. We intentionally selected 15 cases elaborated based on 55 semi-structured interviews with 15 women, between 25 and 55 years old, all caregivers of children under 6 years old. Our results show that *susto* (fright) serves as an explanation for those people who do not fit with cultural expectations about their phenotype and social performance. Also, it is a culturally acceptable way of dealing with both physical and mental stress. A transdisciplinary approach to these issues is necessary for discussing categories and models of children's growth, development and vulnerability in specific cultural contexts. This approach should integrate socio-cultural, emotional and organic factors resulting in a comprehensive understanding of children's pathways, and contributing to the review of interventions from health and education institutions based on monocausal or dichotomic explanations.

Keywords: susto, childhood, children's development, mother-child health, therapeutic itineraries, medical care, Andean communities, ethnography, transdiscipline.

I. Introduction

It is broadly accepted in contemporary research about children's health and development that medical knowledge should sustain a dialogue with several disciplines that approach children's lives from different questions and perspectives. The idea of disease primarily as a natural, organic, or psychobiological entity has been contested since the pioneering studies in Medical Anthropology. Allan Young (1976, 1979) was perhaps one of the first anthropologists to assert that all knowledge and experiences about the human disease are socially and culturally determined. In this regard, the distinction between disease/illness/sickness was an essential contribution to early studies of human health from a socio-cultural perspective and methodology.

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Culture, from an anthropological perspective, cannot be reduced to habits or practices analyzed as "risk factors." Such an idea is widespread in classic medical and epidemiological studies. Instead, ethnography poses the question about the living conditions and cultural practices that may explain the disease occurrence, distribution, and prevalence in specific individuals from a certain society. Indeed, for understanding the process of "becoming ill", we need to move beyond a reductionist and monocausal idea of a set of risk factors, to comprehensive and situated knowledge about the specific environments in which children grow and develop as part of cultural routines and social relationships.

However, the idea according to which biomedical and psychological knowledge about children's diseases or developmental problems should lead to research and interventions remains. In fact, "childhood development" is seen as a matter of pediatricians and mental health professionals. Confronting hegemonic visions of this subject, in the last decades, there has been substantial progress in the cultural study of children's health and development from an interdisciplinary point of view. Several authors acknowledge the contribution of anthropology to the debate about human development, in dialogue with psychology, neuroscience, epidemiology, demography, education, and medicine (Weisner, 1996; Remorini, 2012).

Anthropology emphasizes the notion that the development of children's emotional, cognitive, and social abilities, is driven by the interactions that children have in their immediate surroundings. In this sense, the importance given to the environment in the development from an ecological perspective (Bronfebrenner, 1987; Hertzmann, 2010) recognizes the heuristic value of Ethnography.

Building on these ideas, an ethnographic approach to cultural knowledge, practices, and routines regarding children's health care and rearing, as presented in this article, seeks for a critical understanding of the process through which children may be labeled as *asustados* (scared). We analyze and discuss the implications of becoming *asustado* for everyday child-rearing and children's health, sociability, and performance in different community endeavors from

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ethnographic data. We describe *susto*(fright) and its variants (*aikado, quedao)* as health problems that affect children's development pathways based on the narrative about therapeutic itineraries of women/caregivers of children under six years old. We focused on the sequence of events around the emergency of these illnesses and how women link them to diverse issues that have several consequences in children's later health and development, as well as in their social and school performance. In those illnesses episodes, organic, emotional, and social factors interact and combine both in etiology and therapeutics. We analyze the caregivers' criteria and decisions regarding therapeutic alternatives based on their evaluation, combination and/or confrontation of different knowledge, resources, and practices coming from the local culture as well as from biomedical and educational institutions.

Our study is carried out in rural communities from the Molinos District, in the North-West of Argentina, located in an extensive region that includes the Southern Andes of South America. According to the last official census (2010), there are 5565 people living in Molinos. The area is not only geographically defined, but also by prevalent historical, political, economic and cultural process, being involved in the creolization of various indigenous cultures with Spanish colonialism -the *diaguita* or *calchaquí* and some groups speaking *Quechua* language, coming from the Inca expansion. This mixture resulted in certain homogeneity in cultural patterns and practices common to the entire Andean region and, even today, such fusion produces social and cultural barriers in regards to health care. The present economy is based on extensive farming, cattle breeding, and domestic farming for self-consumption. Although some people still perform those activities, young people are mainly engaged in other tasks such as commerce, wage labor jobs – both inside and outside of Molinos, or even state-administrative jobs.

As regards health services, Molinos District has one hospital located inside the town and six sanitary posts in the nearby rural farms, located several kilometers apart from one another. Molinos' hospital only deals with more easily treatable pathologies. More complex pathologies are treated in health centers located in nearby cities. Although an increasing number of people visit the hospital or one of the sanitary posts, some illnesses are still being treated in the domestic realm or with the advice of *medicos campesinos* (peasant doctors or traditional healers) because biomedicine is not considered capable of diagnosing and treating them (Remorini et al., 2012).

Susto is a very frequent ailment throughout the Andean area, whose origin is always associated with a traumatic, unexpected, or stressful experience or event that involves the temporary loss of a person's spirit, causing emotional and organic symptoms at the same time. The origin of *susto* is based on a widespread conception that an individual consists of a body and of an immaterial substance that can separate itself from the body, wander around freely, or else remain captive from supernatural forces. Children are considered especially vulnerable to suffering *susto.* Although *susto* is a very recurrent illness during infancy, the more significant expressions (*aikado* and *quedao*) generate caregivers' concerns. They not only reveal the inefficiency of the given treatment but also imply long-term consequences for children's health and social competence (Remorini et al., 2012; Remorini & Palermo, 2016; Remorini et al., 2018).

Susto has been broadly studied in indigenous communities from Mesoamerica and Andean regions by several scholars in the medical anthropology and cross-cultural psychiatry field (Rubel, 1960, 1964; Yap, 1967; Palma, 1973; Palma & Torres Vildoza, 1974; Crivos, 1978; Bolton, 1981; Trotter, 1982; Cassidy, 1982; Sturzenegger, 1989; Zolla, 1994; Rubel et al., 1995; Elferink, 2000; Idoyaga Molina, 2007; Idoyaga Molina & Sarudiansky, 2011). In these studies, a descriptive and classifying approach predominates. Some other studies have examined how *susto* is experienced and conceptualized regarding changes in the lifestyle and transnational migration. Most of them focus on the emotional disorders (stress, anxiety, depression) that people suffer in their processes of adaptation to novel socio-cultural and economic contexts or due to a person's inability to meet the expectations of their society concerning their social role (Klein, 1978; Signorini, 1982; Tousignant, 1984; Price, 1992; Pribilsky, 2001; Weller, 2001; 2002; Baer et al., 2003; Tseng, 2006; Castaldo, 2015; Brooks, 2016; Remorini & Palermo 2016; Remorini et al., 2018).

Susto and other "folk nosologies" have been classified as a "culture-bound syndrome." It was included as a diagnostic category in the Diagnostic and Statistical Manual of Mental Disorder (APA, 1995) (DSM -IV, Appendix J, p.888). In DSM-IV, the classification system is based on the descriptive approach – categorizing psychiatric disorders by precise sets of behavioral manifestations and symptomatology. Many scholars who studied *susto* in Latin America have criticized the concept of "culture-bound syndromes" and its implications at a theoretical and empirical level (Tseng, 2006). This classification has raised controversies, since some authors state that all knowledge and experiences related to health and illnesses are culturally constructed and, consequently, depend on each cultural context. In this regard, Cassidy affirmed, "(...) because the designation of disease represents a systematic abstraction from experiential reality using explanatory models that are not universal, every defined disease entity must be culture-bound" (1982: 339). In this sense, the culture-bound syndrome can be applied to any disease not only to "forms of unusual individual behavior restricted in distribution to

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discrete areas of the globe" (DSM-IV, 1995) or to "unusual psychiatric disorders" (Yap, 1967; Tseng, 2006; Idoyaga Molina & Korman, 2002; Idoyaga Molina, 2007). Moreover, the wide distribution of *susto* in Latin American communities and the analogies found in its etiology, symptomatology, and therapy, forces us to discuss the "specificity" linked to one culture (Remorini et al., 2012). As Brooks (2016) pointed out, most "cultural syndromes," exist within distinct cultural groups who share some larger cultural-historical similarities. In this regard, Tseng (2006) proposes the term "culture-related syndromes" arguing that it would be more accurate to describe a syndrome that is closely related to determined cultural traits or cultural features rather than bound especially to one cultural system or society.

Taking into account these antecedents and the obtained results, this article is oriented by the following arguments:

1. *Susto,* as a folk illness category, provides a cultural framework to understand and explain children's developmental pathways that are not consistent with local expectations about children's behavior and performance. In other words, *susto* serves as a hypothesis to explain and justify why "things are going wrong" with a child;
2. There exists a close connection between stress or negative emotional states suffered by mothers during pregnancy and postpartum and later child health and developmental issues. In women's narratives, the reconstruction of events that may have triggered developmental disorders, malnutrition or behavioral problems of the child lead mothers to attribute the ultimate cause of them to have suffered from *susto* which has not been suitably and in time cured during pregnancy or in early childhood;
3. Focusing on the process of becoming *asustado,* we recognize the complexity of the therapeutic itineraries. In the process of finding effective options for the resolution of children's episodes, these categories are integrated into new hypotheses about the diagnosis and appropriate treatment. Also, new categories are built to reorient the action. In this regard, we need to go beyond taxonomic, essentialist and dichotomic perspectives that characterize classic studies of "folk medicine" or "traditional medicine" as opposed to "biomedicine";
4. The need for a transdisciplinary approach to these issues, discussing categories and models for explaining growth and developmental process in childhood and children's vulnerability in specific cultural contexts, by integrating socio-cultural, emotional and organic factors into explanations. This approach will allow us to provide a comprehensive understanding of children's pathways and contribute to review interventions from health and education institutions based on monocausal or dichotomic explanations.

II. Theoretical Background and Methodology

We investigated daily childrearing and childcare practices and their relation to caregivers' knowledge and values about child development from an ecological perspective. According to it, human development is a multidimensional and multi-causal process; it is a result of people's participation and engagement with their environments. People are both shaped by and actively shape their environments (Bronfenbrenner, 1987; Weisner, 1998; Rogoff et al., 2003). The Ecology of Human Development (EHD onwards) relates patterns and pathways of development to the enduring and changing environments in which people live (Elder & Rockwell, 1979; Bronfenbrenner, 1987). These perspectives understand child development as an adaptation to different "developmental niches" (Harkness & Super, 1994; Weisner 1998) leading to different development trajectories (Greenfield et al., 2003). Developmental niche is defined as a system that consists of three basic components: (1) the physical and social settings of the child's everyday life; (2) culturally regulated customs of child care and childrearing; and (3) the parental ethnotheories. The latter represents specific cultural models, rooted in the collective history of the community, that provide a framework for adults to build experience and knowledge that guide their rearing practices (Harkness & Super,1994).

From these ethnotheories, particular children's behaviors, skills, and emotional expressions are privileged or sanctioned (Cervera & Méndez, 2006). In this sense, child-rearing is oriented by sociocultural knowledge and values in a particular historical moment. As Greenfield et al. pointed out: "(…) culturally relevant developmental goals are represented in the form of implicit or explicit ethnotheories of development, e.g., a system of beliefs and ideas concerning the nature of the ideal child and the socialization practices necessary to achieve this ideal. These ethnotheories are shared (and negotiated) among members of cultural communities (…)" (2003: 464-465).

Within the developmental niche, Harkness and Super (1994) have assigned parental ethnotheories the leading role in shaping and organizing children's physical and social settings. Following this idea, we seek to understand local ethnotheories about children's health, development, and wellbeing in the framework of more comprehensive cultural ideas about the person, the life course, and the cultural goals for being considered a competent person. About this, our study aimed to analyze and compare women's narratives to uncover their judgment of their own child's behavior

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regarding wider ethnotheories (Harkness & Super, 1994; Cervera & Méndez, 2006) about "normal" and "healthy" child development.

Data analyzed here come from an ethnographic research based on a mixed-methods approach for describing and understanding local ethnotheories and practices around children's health, and their articulation at the micro and meso level. This paper is part of an in-depth study of everyday life starting in 2010, which is based on the complementary use of qualitative and quantitative techniques such as observation, interviews, genealogical surveys, document analysis, case analysis, and audiovisual record among others. Also, it implies rapport and participation in ordinary community activities.

For this article we intentionally selected 15 cases elaborated based on 55 semi-structured interviews with 15 women, all of them caregivers of children under 6 years of age (see Table 1). Interviewers were selected based on 1-women and/or children who have suffered symptoms of illness during the last year; 2-household composition, size, and location; 3-household subsistence activities; 4-women's schooling and access to health and educational services. All of them were between 25 and 55 years old at the moment of the interview.

We apply the case study methodology. Each case consists of a narrative of a temporal sequence of events related to the development of an illness, providing information about the therapeutic alternatives available and effectively used (Crivos, 1998). According to Creswell (1998), each case is a "limited system" in time and space, which includes multiple and highly context-sensitive information. Such cases are, indeed, analytical units of interest for their specificity and their heuristic value in terms of the elaboration and contrast of hypotheses (Creswell, 1998; Sy, 2008).

We analyzed the spontaneous references to episodes of *susto* and its variants, and for each one, we identify categories used by women to refer to these events during pregnancy, childbirth, and the puerperium. Also, we characterized and compared expressions used to describe the symptoms, and the sequence of diagnoses and treatments applied, identifying actors and their links, resources, and institutions involved.

We used Nvivo 11 (QSR International) for the semantic analysis of women's narratives. The software allows us to formalize, codify and systematize data coming from the interviews, to identify "native categories," to identify semantic relationships between them, to create a coding system that consists of nodes (semantic categories) and their horizontal and hierarchical relationships in order to characterize the conceptual domain.

This study has been approved by a Bioethics Committee. The interviewees gave their free and informed consent by provisions of Argentinian law 25,326, and personal data have been protected by using an identifier that corresponds to a database whose access is restricted to the authors.

Table 1: Interviewed socio-demographic characteristics. Source: Own elaboration by the authors, based on 55 interviews

Interviewee	Residence	Age	Children	Schooling	Marital status	Occupation	Household composition
ID 549	Molinos Town	28	3	Incomplete Terciary Studies	Single	Housewife	Extended Family
ID 1113	Molinos Town	37	1	Incomplete University Studies	Single	Merchant	Extended Family
ID 22	Molinos Town	30	2	High School	Single	Housewife	Extended Family
ID 986	Molinos Town	40	6	High School	Consensual union	Housewife	Nuclear Family
ID 340	Farm	34	4	High School	Consensual union	Housewife agriculture and cattle-breedig activities	Nuclear Family
ID 272	Farm	39	6	Elementary	Single	Housewife-agriculture and cattle-breedig activities	Extended Family

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ID 299	Farm	44	9	Incomplete High School	Consensual union	Housewife-agriculture and cattle-breedig activities	Nuclear Family
ID 273	Farm	23	3	Elementary	Single	Housewife	Extended Family
ID 42	Farm	30	3	Incomplete High School	Consensual union	Housewife	Nuclear Family
ID 194	Farm	40	5	Elementary	Married	Housewife	Nuclear Family
ID 120	Farm	19	1	High School	Consensual union	Housewife	Extended Family
ID 157	Farm	43	5	High School	Married	Housewife	Nuclear Family
ID 1355	Farm	32	4	Elementary	Single	Housewife	Extended Family
ID 927	Molinos Town	35	4	Elementary	Single	Housewife	Extended Family
ID 1140	Molinos Town	55	11	Elementary	Consensual union	Housewife	Extended Family

III. Results

a) Becoming asustado: the impact of susto in children's development trajectories

Based on our qualitative analysis of women's narratives of their therapeutic itineraries and following the arguments presented before, in this section, we characterize how mothers of children under six years old, who have suffered themselves from *susto*, link this illness to specific stressful or traumatic events that happened at certain moments in their life trajectories, specifically, in the perinatal stage. We describe the "native" categories and meanings linked with *susto* and its variants, including etiology and symptoms, by confronting our data with other studies on the topic. We are particularly interested in highlighting the connections that women made between the idea of becoming *asustado* and children long term health and developmental issues, as well as their consequences in child-rearing and children later performance in community and institutional endeavors.

Infants and toddlers' health is nowadays a topic of great concern for caregivers in Molinos. The growing spread of biomedical interventions during the last decade in the region generated an increase of medical control of the mother-child health issues and children's growth and nutritional status. Even though we cannot affirm that the degree of influence of medicalization process is as influential as in urban settings, the greater availability of biomedical technologies and knowledge has an impact on how health problems are conceived and treated. Caregivers are more likely to resort to biomedicine for their health care during pregnancy and their children compared to previous generations. In this context, caregivers' knowledge and values, about the risks for children's health and development are confronted with those supported by health professionals. As a result, local cultural ideas are revisited and resignified in this framework of permanent confrontation with new knowledge, values and expectations about children's "healthy" and "normal" growing and development.

Previous research conducted in the region during the last decades (Palma, 1973; Palma & Torres Vildoza, 1974; Crivos, 1978; Crivos & Eguía, 1981; Crivos & Martínez, 1996; Pochettino & Martínez, 1998; Crivos, 1998; 2003) showed that *susto* is a recurrent illness during infancy, and it is naturalized by caregivers: "*Guaguas* (infants) become frightened easily"; "my children, they are all *asustados.*" However, its more critical expressions (*aikado* and *quedao*) generate parents' concern. They not only reveal the inefficiency of the given treatment but also imply long-term consequences on children's health and social competence (See Figure 1).

In describing etiology, *susto* could be attributed to a variety of situations, including the influence of other people, animals, supernatural entities and several

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environmental hazards. However, serious forms of *susto* are always connected with a stressful or unexpected situation, contrary to the social expectations of caregivers, which causes various organic symptoms together with changes in individuals' behaviors. These situations are mainly connected to the display of emotions such as anxiety, anger, or crying, considered abnormal or even dangerous for personal well-being.

The etiology of *susto* in childhood must be understood in the framework of cultural ideas about the person and the life stages. Adults view infants as being particularly vulnerable and at risk for several illnesses. Infants are especially vulnerable to lose their spirit due to the unstable connection between body and spirit during the first months of life. Infants, called *guaguas* in the vernacular language, are considered *tiernitas* (fragile) and their body could be "open" easily. In this regard, the "openness" of the body is one of the most severe consequences of *susto*, originating a disbalance that should be restored, because an "open body" is exposed to several risks (La Riva Gonzalez, 2012). The main symptoms are fever, diarrhea, and vomiting.

Losing the *espiritu* (spirit) may cause losing children's *entendimiento* (understanding) (La Riva Gonzalez, 2012; Remorini, 2013). It could happen during infancy but also in the gestational period if mothers suffer *susto* during pregnancy. This is an especially extreme form of *susto* called *aikado*, which lead to several troubles in childhood and even in adulthood if it is not treated suitably and in time. Women make an etiological connection between *aikadura* and taboo-breaking during pregnancy. The mother could become frightened in situations like passing by cemeteries, attending funerals or *antigales* (places where ancestors are buried), or being near to dead people, and she transfers this condition to the unborn child. As a consequence, the baby will be born *aikado*. This term designates the child who suffers from *aique*, a term which derives from the Quechua term *aykkey* (to flee, to run away, escape) (Crivos et al., 2008) which means that the spirit runs and abandons the child. In these cases, children's symptoms are diarrhea, undernourishment, and slow growth. In brief, the mother figure is the one who, suffering *susto* for natural or supernatural reasons, becomes a vehicle for the *susto*-trauma (Castaldo, 2015). Nevertheless, the mechanism by which the woman transfers the *susto* to the embryo, as well as the effects on her own body and that of the child, has not been explained by our interviewees.

Likewise, the spirit can also flee and abandon the child beyond the gestational stage, for example, when he/she is attracted to some supernatural entity that, in general, is presented to them when they are in isolated or uninhabited places. The main sign of this situation is that children "do not want to return home" or "always want to leave and not return."

> *"[The aikado child is the one] that has problems to improve, to grow, to gain weight, he has diarrhea; during pregnancy it occurs, there, in the belly, babies become aikado, and they are underweight, undernourished"* (ID 927).

> *"[My cousin became frightened] he was cured but not properly, now he is intranquilo [restless], he works in one place and leaves, goes to another place. He is not a stable person; he has no peace of mind"* (ID 1113).

This is the most widely documented etiology of *aikado*. However, a compelling finding of our research is another type of causes we identified in women's narratives related to negative emotional states during pregnancy. They have to do with a diversity of circumstances such as raising their children without a partner and/or experiencing stressful or challenging situations in an unknown environment (e.g., seeking medical treatment for their children outside the town without family support). In their characterization of the circumstances that may cause *susto,* we find a correspondence with other states described for Andean communities, *nervios* and *pena* (nerves and grief) (Guarnaccia et al., 1996, 2005; Oths, 1999; Weller et al., 2008).

Additionally, women refer that suffering *susto* during pregnancy and not be cured accordingly may also cause premature birth or complications during delivery for the mother's health.

As a consequence, not providing proper and in time treatment could lead to children to become *quedaos*, which is considered an extreme condition. This expression designates those individuals affected by particularly severe forms of *susto*, or who were not cured in time. Mothers describe *quedaos* as children that do not grow and develop as expected, which leads to different degrees of disabilities. They included a wide range of symptoms, some of them temporary like crying, vomiting, and diarrhea, while others are more damaging and permanent like deafness and language disabilities (like stammering), cognitive impairment or show a behavior pattern contrary to caregivers' expectations (*being mad, bad, coward, angry, annoying, irritating, nervous, "all the time wants to be the center of my attention"*)

> *"medicos campesinos [local healers] always told me that I suffered a lot when I was pregnant, it is true, I always cry a lot. They told me [her son] is in this way because of that...his deafness, and they told me it was because I suffered from fright, and at that time I didn't recover"* (ID 1355)

> *"He was much more flojito [weak, lazy] than his siblings, he took a long time to walk (…) I saw that he was different, so I was concerned (…) in the hospital they told me he was deaf (…) most of the*

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medicos campesinos that saw him told me he would be a mute child, he is born that way (…)" (ID 1355).

"All the medicos campesinos that saw him [his son] told me he has been asustado (scared) since the womb because I became asustada (scared) when I was pregnant (…) he was like desesperado [desperate], loquito [like crazy], wanted to draw attention all the time (...) A médica campesina told me that when they get asustados (scared) it's like they become malos, loquitos, trastornados, se les sube el mal a la cabeza [evil, crazy, mad of their heads]" (ID 1113).

"[quedaos] when they go to school they do not pay attention (…) they are asustados (scared) and they are not thinking about studying, they seem absent-minded" (ID 1140).

"*If you did not cure him when she/he was little, then when the child is older, they have anger, you don't know what happens to them, why they have that temper*" (ID 549).

"My granddaughter is already six years old, and she lives asustada (scared) since that time there was a fire in the village (...) her mother didn't take her to cure, medicos campesinos no le han llamado [haven't called her spirit], no se ha compuesto [she hasn't cured], she is always worried " (ID 1140).

Women's narrative focuses on "difficult" situations they went through in critical moments of their life (referred to as loneliness, uncertainty, lack of social support, responsibility for domestic care, among others) that put them in a vulnerable state, which combined with unexpected events may trigger *susto* episodes. In this regard, our analysis reveals the variety of meanings attributed to *susto* by women account for a complex interaction of psycho-social factors in the etiology of the illness, in which women's social network plays a prominent role. Thus, the possibility of being *asustado* may result from the non-resolution or accumulation of negative experiences along with the inefficacy of therapy.

"When I was pregnant, I felt like I was depressed. That is why he [her son] must be so nervous. I made him heal once or twice. In fact médicos campesinos say he has to be cured three times, but I did not cure him as they asked me because he did not want to take some remedies and he did not let himself be sahumadito [to be smoked] the medico campesino told me that this is why he is very nervous, asustado (scared), until now" (ID 1113).

Table 2: Illness categories and its consequences on children's behavior and health. Source: Own elaboration by the authors based on 55 interviews

Illness category	Psycho-social and organic symptoms
Asustado	Vomiting, diarrhea, lack of appetite, lack of sleep, underweight, malnutrition "mad", "bad", "coward", "angry", "annoying", "irritating", "nervous", "all the time wants to be the center of attention"
Aikado	Maturation delay, deafness, stutter, recurrence of diseases, underweight, malnutrition • "they are absent minded" • "they do not want to return home" • "they always want to leave and not come back"
Quedao	Maturation delay, underweight, malnutrition, disability, developmental disorders • "they become slow" • "they remain evil" • "they stay behind"

Along with the consequences on behavior, mothers express concern about the consequences of repeated episodes of *susto* on children's weight and nutritional status. Expressions such as "*so far my daughter is skinny,*" "*my daughters were always malnourished,*" "*my son did not gain weight,*" "*he did not want to eat,*" are an example of this. Although lack of appetite and its effects on weight fall within the typical symptoms described for *susto* (Crivos et al., 2008), we believe that changes in the health policies and interventions oriented to pregnancy and early childhood have a significant effect on maternal discourses. They reinforce the concern about the evolution of nutritional status and adequate eating habits, as a result of public health agents' practices, e.g., the promotion of exclusive breastfeeding, monthly height and weight control, report of risk factors for growth and nutrition, prenatal controls, among others (Remorini & Palermo, 2016).

We can say that caregivers made a clear distinction between merely suffering from *susto* as an ordinary experience (normal or everyday *susto*) and becoming *asustado* as a long term health condition (cf. Castaldo, 2015). As women's testimonies reveal, the latter is a result of an accumulation of stressful situations

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and "*sustos mal curados,*" it means, when children were not accurately diagnosed or treated at time, and symptoms could appear later or persist for a long time or up to adulthood.

As we stated at the beginning of this article, *susto* provides a hypothesis to explain why some children being born *"con problemitas"* (with health issues) and to understand children's developmental pathways that differ from those considered "normal". In this sense, we identified specific values and expectations about children labeled as *asustaditos* that do not correspond to the expectations about those of "normal" and "healthy" children.

At that point, it is necessary to highlight that cultural ideas and values about children's health and development are decisive for understanding why some children's behaviors and performance are validated or positively valued while others are sanctioned and/or pathologized.

According to local ethnotheories, *guaguas* are supposed to be *buenitos* (good), obedient and quiet. *Guagua*is the term that refers to younger children (infants and toddlers) in Andean cultures, and it is associated with affection, protection, and innocence. It implies that babies should be protected and cared for not only by parents but also by the whole community; relationships between *guaguas* and their families are mediated by the idea of affection and reciprocity (Arteaga & Dominic, 2007). This means that parents should rear children with tenderness, care for them while they are young and vulnerable, but at the same time, children should behave similarly to their parents. That is, not only give them affection but also collaborate with them, be obedient, and when they are older, protect and nurture them. Caregivers prefer their *guaguas* to be quiet and silent; they should allow their mothers to perform their activities without upsetting them. Children who cry a lot too often make upbringing difficult. Mothers usually complain about *llorones* (weeping children) because they say they are difficult to rear, do not allow their mothers to work and cannot be left in the care of other members of the family. Consistently with these ideas, children are taught early to collaborate in several domestic tasks and adjust their behavior to domestic routines. These references about how young children should behave must be understood in close relation with what is thought to be right for an adult in their society. In this respect, caregivers stressed during the interviews the importance of being *fuertes* (strong) and "*tener coraje*" (be brave) to face different problems during the life course. In this sense, children's autonomy, together with their obedience and responsibility, are strongly valued (Remorini 2012; Remorini & Palermo, 2016).

Based on that, we argue that narratives about symptoms and consequences of *susto* and its variants in children's developmental pathways highlight ideas and values around acceptable ways of behavior and emotions expressions in this ecological niche.

Cultural perception about children's vulnerability is consistent with ideas about risks that may affect infants' growth and development, having several effects on the structure of the caretaking environment, specifically childrearing practices and taboos about places where children circulate and activities in which they are included. Parents guide their actions with their children by their cultural constructions of childhood; thus, they tend to reproduce culturally accepted behavioral phenotypes through the structuring of the developmental niche. They have a significant impact on the attitudes toward children and the quality of care given to them (Harkness & Super, 1994; Cervera & Méndez, 2006).

Explanations about the differences in children's behavior are revealed as a mechanism of social control with practical and moral implications. Ideas, values, and attitudes toward *asustaditos* account for the role of children's social environment in shaping a healthy and socially competent child (Murphy, 2007). As we described above, it is expected that children become aware of their behavior and learn, at an early age, to control emotions like weeping and anger, as they are non-adaptive conducts in this developmental niche. Children should adapt to multiple caregivers and allow mothers to do household chores. Appropriate behavior is defined about cultural expectations related to adult–children interactions and children's contribution to domestic assignments. In this sense, our results are consistent with studies of other Latin American indigenous societies (Gaskings, 2000; De León, 2003; Rogoff et al., 2003; Cervera & Méndez, 2006).

Moreover, women's narrative highlights what it is expected from mothers, e.g., they should avoid situations that put their children at risk, being aware of their behavior, and seek immediate treatment when they are ill. If children suffer from *susto* or *aique*, is because mothers failed in providing care, or they broke down a taboo, not being able to meet social expectations about their performance. Regarding this, our results are consistent with literature that emphasizes the role of the cultural environment in the etiology of *susto*. In this line, research on the topic (Sayres, 1955; Rubel, 1964; Trotter, 1982) shows that one of the most frequently reported factors in medical and psychiatric research as a cause of *susto* is stress; however, studies highlight that it will only appear in settings that patients consider stressful in each cultural context. The variety of situations that are likely to generate *susto* do not prevent us from recognizing that all of them refer to unexpected circumstances or strange contexts. Most studies emphasized individual adaptation difficulties associated with culturally conditioned states of anxiety and dissatisfaction with determined social roles and/or

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relationships, especially in communities that undergo socio-economic and cultural change.

b) When children become asustados: therapeutic options and decision-making process in uncertainty contexts

In this section, we characterize how caregivers deal with children's difficulties in growth and development, once they realized their child is an *asustado*. We do not intend to describe the diagnosis and treatment procedures and resources (traditional local medicine), because they were extensively detailed in our own previous work (Remorini et al., 2012; Remorini & Palermo, 2016) and other studies in the area (Crivos, 1978, 2003; Crivos, Martinez & Pochettino, 2003). Instead, we aim to analyze how caregivers appeal to multiple knowledge and resources coming from different cultural frameworks. In this regard, we claim the need to go beyond taxonomic, essentialist and dichotomic perspectives that characterize classic studies of "folk medicine" as opposed to "biomedicine".

For understanding the process of elaborating the idea of *asustado* as a diagnostic category that explains children's pathways, it is necessary to situate the construction of the diagnosis and the decision making processes involved in the therapeutic itinerary. These itineraries usually begin as a result of seeking medical treatment for another disease or as a consequence of a school report about children's performance and behavior. For example, teachers report children's difficulties in adapting to the school environment, timetable or repeated episodes of seizures without an apparent medical cause. These dissimilar problems lead to multiple biomedical consultations (inside and outside Molinos), resulting in differential diagnoses and treatments. At this point in the itineraries, women attributed to *susto* the ultimate cause of their children's problems. When biomedical treatment demonstrated not being successful to provide a cure, other household members (women's mothers or grandmothers) intervene to support *susto* diagnosis and also for recommending the consultation to a *medico campesino*.

The analysis of women's narrative allowed us to recognize the role of each woman's social network in the itineraries. The decision-making process and its outcomes in seeking adequate resources for treatment depend mainly on women's ability to mobilize their bonds to access healing knowledge and resources located at different organizational levels.

Differences in the etiology of *susto* and the perception of its seriousness result in a variety of therapeutic itineraries in terms of the quantity of actors, resources, and actions involved. We recorded, on the one hand, the validity and relevance of healers, knowledge, and practices of traditional medicine. On the other, how these knowledge and practices are articulated and confronted with others coming from biomedicine, which is treated in fact, as complementary or alternative depending on the results of previous instances as well as the ecological factors that influence the availability of each alternative. For "ecological factors," we mean all the environmental facts, conditions, and relationships that have an impact on the access to different resources for medical care and also shape the trajectories. They include a wide range of variables from geographic location to cultural acceptability of a medical option.

The therapeutic itineraries emerging from women's narrative involve long sequences in which hypotheses about diagnosis and treatments are discarded, redefined, or confirmed through time. In this framework, the semantic extent of some illness categories is also modified, as part of a culturally framed interpretation of different responses to stressful, challenging or novel situations that affect women and children's wellbeing. It means that *asustado* or *aikado* are diagnoses categories to label children who show a set of symptoms, some of which fit with the classical symptomatology described for *susto* in this area and other regions of America.

The narrative stresses how *susto* arises as a hypothesis in the process of understanding a complex set of symptoms and illness problems, which seems to be unpredictable or surprising. Also, when health problems gain seriousness and cannot be solved by invoking existing knowledge. This process of hypothesis generation and testing in the process of seeking medical treatment results in a combination of resources and knowledge to which different roles, functions, and meanings are attributed. For instance, some organic symptoms (diarrhea, vomiting, weight loss) are left in the hands of doctors and nurses, while for treating spiritual symptoms, *médicos campesinos* are the exclusive option.

As we pointed out, we argue that by focusing on the process of constructing the diagnosis of *asustado*, it is possible to recognize that the appeal to nosological categories of local medicine is justified in those cases whose resolution involves long and complex therapeutic itineraries due to the inefficiency of biomedical treatments. Also, when there exists a suspicion - based on the persistence of problems in the behavior and health of children- that these situations derive from *sustos* that are not diagnosed or cured promptly. Thus, in the process of finding effective options to address these problems, the categories of *susto, aikado* and *quedao* are integrated into new hypotheses that reorient women's decision processes and actions.

Inhabitants never visit biomedical professionals for *susto* diagnosis and treatment but turn to traditional medicine because physicians "don't know how to deal with *asustados*." Only *medicos campesinos* can

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diagnose and cure *susto* by the *llamado* (call of spirit) using different procedures that express the syncretism between catholic and indigenous knowledge, practices, and resources (Remorini et al., 2012). In this regard, *susto* does not appear as a diagnosis in medical records. Instead, we found categories such as "anxiety" or "depression". However, it is usual that doctors recommend women to see a *médico campesino* for complementary therapy, recognizing their "limits" for treating such kind of problems. The testimonies of women show that the effectiveness of the treatments derive from their combination and not only from the properties and efficacy of each one considered separately, as various researchers showed (Cosminsky & Scrimshaw, 1980; Alves, 1993; Young, 2004; Bellato, Santos de Araújo & Castro, 2008; Crivos et al., 2008; Remorini et al., 2012).

The situation described here accounts for a complex scenario in which children's health care and upbringing are at the center of health and education institutions and public policies aimed at promoting and protecting child development. However, in this region, these institutions usually show limitations for understanding and solving the diverse problems that affect children (malnutrition, disability, and developmental disorders), taking into account people's particular perspectives, experiences, and opportunities in the local environment.

IV. Concluding Remarks: Toward a Collaboration between Ethnography and Medicine in the Study of Children's Health and Development

In this article, we characterized and analyzed women's narrative around the idea of becoming *asustado*as a cultural way of understanding why children get sick repeatedly, or develop illnesses that become increasingly severe. These situations have a decisive impact on their development trajectories, generating different types of disabilities or moving the child away from the local and biomedical parameters of "normal development."

Studying *susto* facilitated the understanding of the complex risk factors associated with children's development and health in these Andean communities. However, by examining the diversity of symptoms and etiological explanations of *susto,* we were able to recognize intra-cultural variation within Andean populations. Molinos' people's descriptions of organic and behavioral manifestations of children who have been diagnosed as *asustados* or *aikados* do not strictly match with the typical symptomatology described in classic studies about *susto* in Latin-American communities. In this regard, our results are consistent with recent studies on the topic (Tseng, 2006; Weller et al., 2008; Castaldo, 2015; Brooks, 2016). Based on them, we noticed that *susto, nervios* and *pena* usually overlap in terms of etiology and symptoms, mainly, the emotional ones. In this regard, we need to move beyond the idea of "taxons" or discrete diagnostic categories, defined by a set of symptoms and causal explanations mainly associated with the loss of the spirit.

In that framework, our ethnographic research highlights that the definition of becoming *asustado* is highly dependent on the context. To understand women's and children's experiences and itineraries around illness, we need to know that women make a flexible and opportunistic use of these categories (*asustado, aikado, quedao*) to understand, diagnose, and classify, in a post hoc manner, the complex chain of circumstances and factors that causes troubles in their children's developmental pathways.

Although we found similarities in each case analyzed[1], the condition of being *asustado* shows substantial heterogeneity and reveals the intra-cultural variability of the cases. For instance, in some episodes, the organic symptoms are the ones that receive the most attention and generate mothers' deep concern (such as weight loss or delayed motor development). In others, emotional and behavioral symptoms gain more weight. Briefly, it could be said that the heterogeneity of the cases could be recognized in several aspects such as etiology, symptoms, therapy, duration of the episode, the period in life in which *susto* occurs (childhood, adulthood), and its impact on later development.

However, in the ways of perceiving and categorizing vital experiences, and their connection with *susto* episodes, we found similarities in women's narratives. In this sense, "*ser asustadito*" (to be frightened) or "*vivir asustado*" (to live frightened) serves, on the one hand, as a cultural explanation for those people who do not fit with cultural expectations about their phenotype and social performance in childhood and later in adulthood. On the other hand, we agree with Brooks (2016) who stated that *susto* is a culturally acceptable way of dealing with both physical and mental stress. It could be seen as a cultural way to manage stress for women in critical periods of their lives, such as the perinatal stage, perceived by them as full of risks and uncertainty.

Social support provided by male partners and elder women appears to be a central issue. Perception of loneliness during pregnancy and lack of help for child-rearing are associated with negative emotional states, and consequently, alleged as the ultimate cause of *aikado*. Mothers' perception of their exclusive responsibility for child care is reinforced by biomedical services and mother-child focused on public policies.

[1] A detailed analysis of the cases is part of María Laura Palermo's Ph.D. dissertation, which is still in progress and thus unavailable for publication yet.

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Everyday interactions between mothers, teachers, and hospital staff show how different ideas about childhood, health, and "normal" child are shared, confronted and actualized. Moral judgments about mother's priorities, marital status, exposure to risks, and childcare practices are frequent. Expressions such as "lack of responsible care" or "careless treatment" are the most listened to when talking to them. Discourse and practices involved in Primary Health Attention and Social Security policies put the accent on check-ups during pregnancy and early infancy. These ideas about fetuses and infants' fragility and vulnerability contrast with local cultural ideas about women's vulnerability and fragility during pregnancy and puerperium. From health staff discourse, the child wellbeing and their development outcomes are seen as a responsibility of the mother's decisions. This perspective also impacts on how mothers elaborate their narrative about child-rearing and the difficulties they have in doing so. By their part, mothers assume their responsibility as they link *susto* episodes of their children to traumatic events in their life trajectories. As Castaldo (2015: 4) pointed out: "By searching through the memory of the person who has suffered the susto, one or more traumatic events are always recalled (...)." According to the *aikado* etiology "(…) the mother figure is the one who, suffering susto for natural and supernatural reasons, becomes a vehicle for the susto-trauma (...) Women are also responsible for this kind of susto since they can neglect its etiological power and are therefore liable to pass it on to their children" (Castaldo, 2015: 3).

In that sense, our results are in line with those of Lewis-Fernandez et al. (2002), Weller et al. (2008), Castaldo (2015) and Brooks (2016) that demonstrates that there is a relationship between stress and one's ability to enact culturally agreed-upon cultural models in their daily lives. Individuals who are better able to meet the social role expectations are under less stress than those who have trouble living up to the demands of their culturally defined social role.

Women's appeal to cultural nosological models is justified as long as *susto* episodes are linked to traumatic situations for which a favorable response is not found. This requires the resignification of the ways of solving these illnesses whose efficacy is culturally legitimated, such as local traditional healers' techniques for diagnosis and healing. In this sense, "traditional" medical beliefs, because of their practical and symbolic efficacy, offer to the women alternatives for solving problems, and also imply a lower dependence on biomedicine, whose options are not always effective, accessible or acceptable. In this sense, although biomedical professionals are consulted, local healers are mainly involved in the therapy (Remorini et al., 2018). Furthermore, our results stress that etiological explanations based exclusively on organic or physiological factors are simplistic (Tseng, 2006; Remorini et al., 2012). As we pointed out at the beginning of this article, a transdisciplinary approach to these issues is necessary for contrasting and discussing categories and models of children's growth and development and children's vulnerability in specific cultural contexts. This approach should integrate socio-cultural, emotional, and organic factors into the explanations. This will allow us to provide a comprehensive understanding of children's pathways and contribute to the review of interventions from health and education institutions based on monocausal or dichotomic explanations.

For a comprehensive understanding of children's pathways, we need to recognize that *susto* is usually merely the "tip of the iceberg," a label that mothers use to typify and group a set of symptoms, illnesses, behavioral "disorders," and children's inappropriate performance at school. Beneath them, there is a wide range of health and developmental problems that need a collaborative approach and work between disciplines and institutions to help children and their families. An ethnographic approach is necessary to elaborate a cultural description of the complex factors involved in the illness experiences and trajectories, such as cultural beliefs and expectations around personhood and developmental thresholds, family relationships, household and community social organization, women's activities, and material and cultural access to health services, among others. In other words, and following Tseng (2006), to study "culture-related syndromes," we need to move from the clinical scale to the total geopolitical, socioeconomic, and ideological circumstances of the society in which the phenomena occur. Only in this way will we be able to contextualize how individuals face cultural stress in a specific environment, without overlooking the fact that although diseases are suffered by individuals, health and illnesses are never individual processes.

However, we agree with Tseng (2006), who stated that there exists a risk in only focusing on social and cultural features of *susto* without considering clinical, pediatric and psychiatric knowledge and insights. Interpretations simply based on social aspects, ignoring clinical perspectives, or vice versa may suffer from bias.

Despite the wide attention that *susto* has received in the literature, there are still gaps in research about its incidence and prevalence as part of the morbidity profile in specific communities. As we pointed out elsewhere (Remorini et al., 2012), we believe that this omission results in a limited understanding of this illness, its causes and its effects on health, as well as the ecological factors associated with the vulnerability of individuals, following the line of hypotheses posed in classic studies on the topic (Bolton, 1981; Trotter, 1982; Zolla, 1994; Rubel et al., 1995). Accordingly, it is necessary to deepen the investigation into the

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relationship between *susto, aikado, quedao,* and other local and biomedical nosological categories and the particularities of growth and development processes in the region such as low weight, undernourishment and infectious diseases (Remorini et al., 2012; Remorini & Palermo, 2016).

Moreover, we need to be attentive to the criteria and empirical basis used by biomedical and educational institutions to label these children as children with special education needs, developmental disorders, cognitive impairment, PDD (Pervasive Developmental Disorders), among others. The current tendency of "overdiagnosis" may lead children to unnecessary biomedical treatments and put their families at a crossroads if they have no resources and/or social support to afford them. Complex and long itineraries imply for the families to afford several treatments, spend money, traveling long distances to seek treatment outside the town, stay outside their homes and work. In this respect, it is always necessary to know the local social organization of health and education services to support family childcare and child-rearing practices and to provide cultural and clinical adequate treatment.

These findings justify a future in-depth interdisciplinary exploration of the relationship between *susto* and child development, due to its role in the configuration of vulnerability during childhood in communities of the Andean region of South America. This work constitutes an attempt to move in this direction, based on the recognition of the close association between being *asustado* and suffering from psycho-physical development disorders, of varying severity with diverse consequences in adult life. In this regard, health professionals' approach to children who experience developmental troubles needs to be informed by socio-cultural data coming from ethnographic research not only in these rural contexts with indigenous background but in many contemporary societies, which are becoming increasingly multiethnic and multicultural.

Data provided by the ethnographic research about mothers and children's itineraries allow clinicians and psychiatrists to take into consideration, during medical consultation, the diversity of social, material and symbolic dimensions intertwined in the patients' pathways which includes practices, social relationships and decisions that are consistent with the local way of life and are not necessarily linked to their trajectories within medical institutions. Most of these aspects are usually hard to see in the framework of consultation, especially when there is no confidence or previous relationship between patients and medical staff.

Another contribution of ethnographic data to medical diagnosis and treatment is to eradicate dualistic views on diseases, such as organic/psychosocial, objective/subjective, individual/collective, proper/characteristic of the hegemonic medical approach. The narrative of the process of elaborating the diagnosis of *susto* shows that the social environment plays a leading role in etiological explanations. In this sense, *susto* provides a plausible framework for social conflicts that have a decisive impact on mother-child everyday life and life pathways. *Susto* and other "culture-related syndromes" serve to recognize the cultural basis of any disease, even the "ordinary" ones. Additionally, they highlight the necessity of a comprehensive treatment, which may include the collaboration of people with different knowledge, such as traditional healers or spiritual leaders.

A bio-psycho-social, or more accurately, an ecological approach to health and development is needed (Bronfenbrenner, 1987; Herztmann, 2010). It implies integrating clinical, psychiatric, epidemiological, and cultural research (Brooks, 2016), optimizing each discipline´s theoretical and methodological tools, recognizing their boundaries, but also the possibilities of constructing a transdisciplinary research model to study these illnesses.

Acknowledgments

This research was supported by Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET) and Universidad Nacional de La Plata (UNLP), Argentina. We want to thank all women interviewed for sharing their knowledge with us and for their cooperation and warm hospitality during our fieldwork. Also, we would like to thank all the sanitary, educational, religious, and government institutions from Molinos District and Salta Province. Especially, thanks to the reviewers and editors for their comments and invaluable contributions to the final version of this article.

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Global Journal of Medical Research: K
Interdisciplinary
Volume 20 Issue 1 Version 1.0 Year 2020
Type: Double Blind Peer Reviewed International Research Journal
Publisher: Global Journals
Online ISSN: 2249-4618 & Print ISSN: 0975-5888

Insulin Autoimmune Syndrome Treated with Plasmapharesis

By Dr. Kavya Jonnalagadda & Dr. Praveen. V. Pavithran

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Abstract- A 66-year male with a history of Central Serous Retinopathy presented with recurrent episodes of hypoglycemia. On evaluation, he was found to have insulin-mediated hypoglycemia with serum insulin of 300uIU/ml, C peptide 27.51ng/ml, when the blood glucose was 46mg/dl. High insulin levels above 100uIU/ml, led to suspicion of Autoimmune hypoglycemia and were confirmed by a high anti-insulin antibody titer of 300U/ml. Imaging was negative for Insulinoma. The patient was started on low dose oral prednisolone under ophthalmological monitoring, but as there was no symptomatic improvement, the dose was increased following which there was a flare-up of CSR. The patient was initiated on plasmapheresis following which his hypoglycemia improved with drop in anti-insulin antibody titers to 29U/ml. The patient was maintained on low dose steroids, which were tapered and stopped over the next six months with complete resolution of hypoglycemia and normalization of anti-insulin antibody titers.

Keywords: *hypoglycemia, autoimmune, plasmapheresis, anti-insulin antibody.*

GJMR-K Classification: *NLMC Code: WD 305*



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Abstract- A 66-year male with a history of Central Serous Retinopathy presented with recurrent episodes of hypoglycemia. On evaluation, he was found to have insulin-mediated hypoglycemia with serum insulin of 300uIU/ml, C peptide 27.51ng/ml, when the blood glucose was 46mg/dl. High insulin levels above 100uIU/ml, led to suspicion of Autoimmune hypoglycemia and were confirmed by a high anti-insulin antibody titer of 300U/ml. Imaging was negative for Insulinoma. The patient was started on low dose oral prednisolone under ophthalmological monitoring, but as there was no symptomatic improvement, the dose was increased following which there was a flare-up of CSR. The patient was initiated on plasmapheresis following which his hypoglycemia improved with drop in anti-insulin antibody titers to 29U/ml. The patient was maintained on low dose steroids, which were tapered and stopped over the next six months with complete resolution of hypoglycemia and normalization of anti-insulin antibody titers.

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I. Introduction

Autoimmune hypoglycemia is a rare but key cause of hyperinsulinemic hypoglycemia, which either resolves by itself or will need immunomodulators. This case highlights the usefulness of plasmapheresis when routine treatments like steroids are contraindicated and or ineffective. Lack of awareness of the condition can lead to unnecessary interventions for an insulinoma.

II. Case Presentation

A 66-year male with a history of Central Serous Retinopathy was referred for the evaluation of recurrent episodes of Hypoglycemia occurring in both fasting and postprandial state. Four months before presentation, he had tinnitus for which he had taken alternative medicines and multivitamins following which he experienced recurrent episodes of fatigue, palpitations, sweating, and day time sleep, which went unexplained. Hypoglycemia was diagnosed when he was found unresponsive in the bed early in the morning, which led to emergency room admission and documentation of venous plasma glucose as 38 mg/dl. Physical examination was unrevealing. The patient underwent a supervised fasting test and developed hypoglycemia within four hours of fasting. At this time, venous plasma glucose levels were 46.1 mg/dl, and 32.9 mg/dl, Insulin was 300uIU/ml, C-peptide was 27.51ng/ml. High insulin levels more than 100uIU/ml led to suspicion of autoimmune hypoglycemia and confirmed with high levels of anti-insulin antibody titers >300U/ml. The imaging of the pancreas was normal. HLA typing was not done. The patient was started on a low dose of oral prednisolone 20 mg OD, but as the patient continued to have episodes of hypoglycemias the strength of steroids has been increased to 40 mg/day with which the hypoglycemic symptoms improved, but the patient had flare-up of Central Serous Retinopathy, and the ophthalmologist advised to decrease the dosage of steroids. In view of this, a trial of plasmapheresis was initiated, and he underwent six sessions on alternate days following which anti-insulin antibody titers have dropped to 29U/ml, and the frequency of hypoglycemic episodes still reduced. The patient was maintained on low dose steroids, which were tapered and stopped over the next six months. Presently the antibody titer has dropped to 1.3U/ml. Currently, he is free of hypoglycemic symptoms.

III. Discussion

Hirata disease or Insulin autoimmune syndrome (IAS), is a rare cause of hyperinsulinemic hypoglycemia with autoantibodies to native insulin in individuals without prior exposure to exogenous insulin.[1] More than 300 cases of Insulin autoimmune syndrome were published.[2]Highest number was recorded in Japan, followed by Europe and the US.[3] In these patients, the cause of hypoglycemia was due to the binding of the antibodies to the endogenous insulin, which leads to increased levels of bioavailable insulin, which were physiologically inappropriate, causing either hyper or hypoglycemia. [4] More than half of IAS patients had recent exposure to drugs containing a sulfhydryl group. [5]Methimazole, is the most common trigger for IAS. Other drugs that can cause IAS include imipenem, penicillins, isoniazid, glutathione, carbimazole, tolbutamide, D penicillamine, Interferon-alpha, procaine-mide. There are many other drugs that can cause IAS, but the above-mentioned drugs are common drugs that can provoke IAS.[6] Alpha-lipoic acid, a health supplement with antioxidant and anti aging properties used in the treatment of neurological symptoms of diabetes, was associated with IAS in recent years.[7]

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IAS is a transient condition with spontaneous resolution within 3–6 months of diagnosis in the majority of the patients.[8]Small frequent meals low in carbohydrates remain the first line of treatment in those with intractable hypoglycemia. Drugs responsible for hypoglycemia, if present, should be stopped. Glucocorticoids are the mainstay of treatment. Other therapeutic options include acarbose, which delays carbohydrate digestion and absorption, plasmapheresis to reduce insulin autoantibody titers. All these therapeutic options have demonstrated varying success in the management of IAS.[4][9] If hypoglycemia persists, combination therapy with Glucocorticoids and immunosuppressants like azathioprine or 6-mercaptopurine along with plasmapheresis should be considered.[9]In our patient as there is a flare in the CSR steroids could not be continued at a higher dose and we opted to go ahead with a combination of steroids and plasmapheresis with which we were able to come down on the dose of steroids following which his ocular symptoms and hypoglycemic symptoms have improved. An anti-CD20 monoclonal antibody Rituximab, which acts by blocking antibody responses and suppress insulin autoantibodies, is the last hope for those with refractory hypoglycemia.[10]

IV. Conclusion

1. Autoimmune hypoglycemia is one of the usual causes of hyperinsulinemic hypoglycemia if drug-induced etiology could be ruled out
2. High insulin levels >100uIU/ml during documented hypoglycaemic episodes should initiate workup for autoimmune etiology as insulin is rarely above 100uIU/ml in insulinomas.
3. Spontaneous remission is seen in up to 80% of patients.
4. Most patients respond to steroids.
5. Plasmapheresis is a second line therapy which is beneficial in many patients, although the effect may be delayed.

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Global Journal of Medical Research: K
Interdisciplinary
Volume 20 Issue 1 Version 1.0 Year 2020
Type: Double Blind Peer Reviewed International Research Journal
Publisher: Global Journals
Online ISSN: 2249-4618 & Print ISSN: 0975-5888

Quantitative Outcomes of a One Health Approach to Investigate the First Outbreak of African Swine Fever in the Republic of Sierra Leone

By Raoul Emeric Guetiya Wadoum, Dr. Jacqueline Kasiiti Lichoti, Dr. Nantima Noelina, Dr. Bitek Austine, Dr. Leno Amara, Abdul K. Sesay, David Heingola JoJo, Abdulai Mahmood Conteh, Mohamed Haddy Leigh, Joseph Marah, Hawa M. Sesay, Gbassay Caulker, Samuella T. Kanu, Benjamin H. Sesay, Joseph A. Turay & Dr. Germain BoBo

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Summary- African swine fever (ASF) outbreaks have been reported in Sub-Saharan countries, including West Africa states, but has never been notified in the Republic of Sierra Leone. This is the first report describing field epidemiological and laboratory investigations into the outbreak of fatal pig disease in western rural and urban districts, Freetown. A preliminary finding indicated that pigs exhibited clinical and necropsy signs suggestive of ASF. Serological (ELISA) and molecular (qRT-PCR) methods used to confirm and investigate the outbreak yielded three positive results for the ASF antibody and all negative for Swine flu; thus, confirming ASF as the etiology agent.

Keywords: *one health; zoonotic diseases; african swine fever virus; influenza a viruses; sierra leone.*

GJMR-K Classification: *NLMC Code: QY 60.S8*



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Keywords: one health; zoonotic diseases; african swine fever virus; influenza a viruses; sierra leone.

I. Introduction

African swine fever (ASF) is a significant disease of domestic pigs caused by a DNA arbovirus virus belonging to the family *Asfaviridae* (Dixon et al., 2005). To date, there are 22 different genotypes described based on the p72 sequences, all of which circulate on the Africa continent (Boshoff et al., 2007). Due to its devastating economic impact in affected countries, the World Organization for Animal Health (OIE) listed ASF as a notifiable disease.

Outbreaks of ASF have been reported in Sub-Saharan countries, including West Africa states particularly in Benin, Burkina Faso, Cote d'Ivoire, the Gambia, Ghana, Guinea, Guinea-Bissau, Mali, Nigeria, Senegal, and Togo; however, the Republic of Sierra Leone never reported an epidemic of ASF [Bastos et al., 2003; Brown et al., 2018; Penrith et al., 2013]. Nonetheless, the Ministry of Agriculture and Forestry (MAF), together with the Ministry of Health and Sanitation (MoHS) jointly announced on 23 October 2019 that an outbreak of an unknown disease was killing pigs in western rural and urban districts, Freetown. Preliminary investigation jointly conducted by MAF and the Food and Agriculture Organization of the United Nations (FAO) in the affected areas, indicated that pigs exhibited clinical signs matching suspect case definition for ASF as defined by OIE which included; high fever, depression, loss of appetite, hyperemia and cyanosis (seen as reddening) of the skin, particularly the ears and snout and eventually death.

Recognizing that pigs host various zoonotic pathogens, One Health (OH) approach aligned with global recommendation was established and implemented to investigate the etiological agents responsible for the epidemic, and institute prevention and control measures. OH approach promoted interdisciplinary collaboration and coordination, bringing

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together health scientists and practitioners at the human, animal, and environment to strengthen emerging and re-emerging infectious disease surveillance and outbreak response.

Consequently, a OH rapid response team composed of epidemiologists from MAF, MoHS, FAO, and scientists from the University of Makeni, Njala University and CDC/AFFENET/FELTP intermediate students was deployed in affected communities to gather epidemiological information (morbidity, mortality and cases fatality rates, risk factors) in affected and unaffected farms, collect biological samples for laboratory confirmation and institute prevention and control measures to contain the outbreak.

Here we report preliminary field epidemiological and laboratory investigations findings into the first outbreak of ASF in the Republic of Sierra Leone.

II. Materials and Methods

a) Localization of the study

Investigations were carried out from 29 October to 1 November 2019 by three sub teams derived from the One Health rapid response team. Each team was assigned communities where reports of death pigs had occurred to undertake active disease searches to identify cases using case definition for ASF provided by FAO. The case definition used was any pig herd with one or more age groups affected with high fever, depression, and loss of appetite, hyperemia, and cyanosis of the skin, particularly at the ears and snout and eventually death within 2-10 days in the affected areas from 10th September 2019 to present.

Areas visited included Monkey Bush, Campbell Town, Samuel Town in Waterloo, Maburieh, Bengumah, Ibo Town, Bomeh in waterloo, Bomeh/Kingtom, Kroobay, Susan Bay, Moawharf and Racecourse Clintown (Figure 1). Each investigation team received forms/questionnaires for collecting epidemiological and laboratory data, and case definition checklist to assist them to identify cases.

b) Sample Collection

Infected and non-infected farms were visited for inspection and specimen recovered from more than 60 pigs of ages between 4 -12 months. Moreover, each team recorded GPS coordinate of various communities visited during the five days of field activities. For each pig, oral pharyngeal swabs, nasal mucosae swabs were collected using sterile swab collection kits and placed in 2 mL cryovial containing RNAlater (Ambion Inc., Austin, TX, USA). Cardiac puncture method was used for blood sample collection into a vacutainer tube with or without containing EDTA and plasma or serum recovered and stored until analysis. Fecal samples and tissues (spleen, liver, lymph nodes, lungs, heart, and kidneys) from dead pigs at postmortem were also collected.

During field expedition, scientists kept all samples on dry ice, and upon returning to the laboratory they were transferred to a - 20 °C freezer then – 80 °C until further analysis.

All specimens were collected in duplicate and transported to Central Veterinary Laboratory (CVL), Teko Makeni for testing for ASF, and to the University of Makeni Infectious Diseases laboratory (IDRL) for Swine Flu and other potential zoonotic diseases analysis.

c) Serology assay for detection of ASF

All serum and blood samples were analyzed using a Multi-antigen indirect ELISA kit for the detection of ASF antibodies against P32, P62, and P72 ASF antigens manufactured by ID Vet diagnostics (ID Vet, 2019). Briefly, samples were added to the antigen pre-coated plate and incubated at room temperature, after washing to eliminate excess serum, a specific conjugate was added and incubated. The plates were further washed, and upon addition of substrate and stop solution respectively, incubated and optical density read on a Multiskan Sky Microplate Spectrophotometer (ThermoFisher Scientific).

d) Detection of Swine Flu

i. *RNA Extraction and qRT-PCR*

RNA from oral swabs, nasal swabs, serum, and plasma was extracted using QiaAmp Viral RNA Mini Kit (Qiagen, Hilden, Germany) following manufacturer's instruction and material eluted in 60μL of AVE buffer and stored at – 80 °C until needed. Quantitative reverse transcription real-time PCR (qRT-PCR) for the detection of Human Influenza A H1 and H3 viruses was performed on a Light Cycler® 96 Instrument (Roche, Life Science) using a Primer Design™ genesig kit (Southampton, United Kingdom) following the manufacturer's instruction with cut-off Ct set at 38. The PCR amplification reaction was performed in a 20 μL reaction mix as follows; 50 °C for 600 s (reverse transcription) and 95 °C for 15 min (DNA polymerase activation), followed by 50 cycles at 95 °C for 10 s (denaturation), and finally 60 °C for 60 s (annealing and extension). Positive results obtained were characterized by a sigmoid curve, showing an initial, rapid, exponential increase in fluorescence signal followed by a plateau. Negative reactions did not show any increase in fluorescence signal. A standard curve was created automatically with the Light Cycler® software in each run by plotting the cycle threshold number against the copy numbers of each standard, and quantification of unknown samples were inferred from the regression line.

e) Data Analysis

Microsoft excel was used for all analyses and animal-related factors characterizing animals or herd such as breed, age, herd size, grazing system, morbidity, mortality, and breeding system were established through univariate analysis.

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Recent and past exposure to ASF was determined by the presence of ASF specific antibodies, and seroprevalence defined as the proportion of positive ASF IgG/IgM antibodies among the sampled pigs, and molecular assay data analysis performed on the LightCycler® 96 Application Software Version 1.1.

III. Results and Discussion

Pig production in Sierra Leone is mainly small-scale traditional using indigenous breeds of pigs, which are small, short, and sturdy with little hair covering on the skin. Some farmers keep exotic breeds, mainly large white race, and Duroc. There has been a lot of cross-breeding between the local and the exotic breeds, giving rise to hybrids. The country has an estimated pig population of 57,877 pigs representing 1% of the total livestock population in the country (Table 1). Western Urban and Western areas have an estimated pig population of 4,343 and 6,603 respectively representing about 20% of the total pig population in the country.

The OH teams visited 48 households in 12 communities in Monkey Bush, Campbell Town, Samuel Town in Waterloo, Maburieh, Bengumah, Ibo Town, Bomeh in waterloo, Bomeh/Kingtom, Kroobay, Susan Bay, Moawarf and Racecourse. The majority of the pig farmers visited were keeping pigs on the free-range system, and they were roaming and scavenging under very poor hygienic conditions. Also, the farmers were dumping dead pigs in the nearby streams/tributaries where other pigs were scavenging, which increased the risk for ASF spreading to others districts such as Port Loko and Tonkolili; thus, representing a major risk of contamination in those districts.

Studies have highlighted that indiscriminate disposal of pig viscera, waste materials, poor biosecurity measures and salvage sale of survivor and sick pigs without testing contribute to in-country maintenance and spread of ASF (Kabuuka et al., 2014; Muhangi et al., 2015; Nantima et al., 2015).

The estimated herd mortality in the sampled households ranged from 0 to 99.4%. The mortality rate was highest in local communities within the Western Urban district compared to the Western Rural district (Table 2). Kroobay in Western Urban had the highest herd mortality rate of 99.4% while Colvert and Benguima in Western Rural districts had 0% herd mortalities. These mortality disparities are concordant with previous studies indicating that ASF mortality varies between 30-70% for moderately virulent strains and 100% in naïve herds of domesticated pigs (Spickler, 2019).

Three hundred and thirty-nine (339) specimens were collected during investigation including, whole blood, serum, oral swabs, nasal swabs, fecal samples, and organs. The samples collected included; whole blood, serum, nasal and oral pharyngeal swabs as well as fecal samples. A post-mortem was undertaken on dead pigs, and organs collected, including spleen, lymph nodes, kidneys, liver, and heart.

Among the samples collected during the investigation, ASF ELISA detected antibodies in three samples from sick pigs (2 URC serum and 1 UKT (blood and serum)), indicative of exposure to the ASF virus (Table 3). Currently, there is no vaccine against ASF; therefore, the presence of antibodies in sick pigs is a result of exposure to the ASF virus. The behavior of farmers quickly selling off sick pigs to mitigate economic impact compromised the detection of virus and antibodies. By the time the response team arrives for investigation, most of the farmers didn't have sick animals. Also, most pigs sampled may not have been exposed to ASF, reason for a large number of negative samples. Considering the epidemiologic features of communities where the massive death of pigs occurred, the most probable source of infection suggested was through virus-contaminated pork products. OIE terrestrial manual for diagnostics of ASF recommends that investigation of new outbreaks should include the detection of specific antibodies in serum or extracts of tissues (OIE, 2019). These results confirmed the initial suspicion of ASF being the etiology agent responsible for the outbreak.

Even though findings confirmed ASF as the leading etiology of the outbreak, concerns raised about pigs been co-infected with other zoonotic disease were legitimate given that pigs are known to be susceptible to zoonotic diseases such as Ebola virus disease (*Reston ebolavirus*) and Swine flu (CDC, 2019; Nelson et al., 2019). Accordingly, a total of 204 RNA derived from oral swabs, nasal swabs, and serum/plasma were screened by qRT-PCR for the detection of Human Influenza A H1 and H3 gene. Results reveal that no amplification was produced in the no-template control reaction wells while positive control used as standard at various concentration upon amplification, yielded a typical sigmoidal curve; thus, validating the assay. However, all samples tested were negative, with the amplification curve failing to display sigmoidal curves as positive control. Presently, the laboratory diagnosis of influenza virus infection in pigs typically relied upon the detection of the virus in nasal swabs. Serology to detect antibodies is of low value for swine Influenza virus surveillance because vaccination against the disease rely on inactivated H1N1 and H3N2 vaccines, and current serologic tests do not differentiate between vaccinated and infected animals (Detmer et al., 2013). Therefore, virological assays are currently preferred over serology for surveillance. In the current study, Human influenza A virus H1 and H3 weren't detected in the various samples analyzed; thus, supporting that pigs weren't co-infected with the Swine flu virus. Nevertheless, the non-detection of these viruses was crucial as appropriate information was tailored and provided to decrease public fear of the zoonotic

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potential of the outbreak in Freetown. The intensive community sensitization by the OH teams was satisfactory as farmers were engaged about issues of implementing biosecurity measures and had to bury and burn dead pigs in some localities. Some farmers that still had few pigs surviving was advised on the benefit of isolating sick pigs even though most farmers reported to have lost all their pigs.

Sierra Leone has never reported an outbreak of African swine fever. During the epidemiological investigations, some farmers revealed that they experienced an outbreak similar to this one about three years ago. It is possible that outbreaks have been occurring without being reported to Livestock and Veterinary Services Division of MAF, or no response was provided by the weak Veterinary service of Sierra Leone.

The major risk factors that could have exacerbated the spread of ASF during this outbreak were selling sick and dead pigs by the affected farmers, disposal of dead pigs in the streams/tributaries where other pigs were scavenging, and inadequate biosecurity measures. These could have been among the reasons why the disease was more severe in localities in Western Urban compared to Western Rural district.

There is no specific policy for controlling ASF in Sierra Leone. The control of ASF is governed under the Animal Diseases Ordinance (1948). The challenge is that most of the legislation is outdated and therefore lacks relevant provisions in controlling the disease. The old law is currently being revised, and hopefully, the new law will address ASF control. The country does not have a compensation policy to support farmers that have lost pigs to ASF. Also, there is no surveillance study related to ASF, and other pig diseases currently being carried out in the country.

IV. Conclusion

Our findings confirmed ASF as the etiology of the reported outbreak of ASF in the republic of Sierra Leone. We demonstrated that rapid response and community engagement following the One Health approach is an effective means to alleviate fear and panic during an outbreak.

Recommendations

1. African Swine Fever is a notifiable disease in Sierra Leone, and the Government should urgently notify OIE and RECs about the outbreak
2. A program to train farmers on implementation of biosecurity practices should immediately be undertaken by Government
3. Adequate community engagement in future should be undertaken before investigations to improve compliance by the farmers and communities
4. There should be a rapid response to outbreaks by Government to mitigate the impact from such outbreaks
5. A strategy for ASF control should be developed and implemented
6. The One Health Multisectoral approach adopted during this investigation involving; MAF, MOHS, UNIMAK, Njala University, and other partners should be continued and cascaded to other outbreak investigations.
7. Security personnel should be included especially while investigating an outbreak associated with high mortality rates
8. Training of investigation teams in basic skills of Biosafety and biosecurity, use of PPEs, sample labeling, collection, transportation, processing, and storage should be provided to the teams in future before investigation
9. The government should provide feedback to the farmers after testing the samples to improve compliance in future
10. Assembly of emergency sampling equipment for a timely and quick response
11. Emergency funds for rapid response to an outbreak

Ethics Statement

The authors confirm that the ethical policies of the journal, as noted on the journal's author guidelines page, have been adhered to. No ethical approval was required as this was the Sierra Leone government investigation into the outbreak. However, animal handling and sample collection respected the rules formulated under the Animal Welfare Act by the United States Department of Agriculture (USDA) and by adopting ARRIVE guidelines (Kilkenny et al., 2011).

Acknowledgments

We thank the Western Urban and Rural districts community stakeholders for their support and for allowing us to perform sampling; officers of the Ministry of Health and Sanitation, Ministry of Agriculture and Forestry; the Food and Agriculture Organization of the United Nations including Dr. Mohamed Vandi, Dr. Amadu Tejan Jalloh, Sorie Kamara, Bayoh Musa, Tommy Josephine; Minkailu, field teams including Mary, Satta, Zainabu, Leigh, Kadijja Kamara, Bintah Bah, Bangura, Ishmail, Lamin Bangura, Mohamed Jalloh, Hajja Bah, Saidu AB Turay, Christian Scoff, Fafia Bona, and Alhassan Jalloh for participating in community engagement and supporting sample collection.

Conflict of Interest

The authors declare that there are no conflicts of interest regarding the publication of this paper.

Funding Statement

This work was supported by the Food and Agriculture Organization of the United Nations, Sierra Leone.

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Table 1: Livestock population data in Sierra Leone

District name	Province	Poultry	Cattle	Donkeys	Goats	Pigs	Sheep
Kailahun	Eastern	363,690	3,289	48386	75,090	8,645	36,173
Kenema	Eastern	284,730	2,308	33193	27,272	2,493	19,799
Kono	Eastern	233,799	40,051	26793	69,082	4,765	45,637
Bombali	Northern	355,298	47,592	17025	78,727	3,190	56,684
Kambia	Northern	402,805	16,375	34167	63,983	1,755	50,719
Koinadugu	Northern	374,373	309,291	22298	212,634	2,892	191,788
Port Loko	Northern	602,327	20,105	57607	92,740	4,801	68,581
Tonkolili	Northern	384,659	9,852	56268	68,086	4,380	41,473
Bo	Southern	307,955	4,931	23511	30,643	6,166	13,303
Bonthe	Southern	191,121	1,584	13719	20,369	1,588	9,967
Moyamba	Southern	346,812	2,464	21434	42,286	4,918	15,206
Pujehun	Southern	220,030	720	18563	15,598	1,338	10,206
Western Area/Rural	Western Area	203,106	5,241	16950	13,876	6,603	10,763
Western Area/Urban	Western Area	65,644	2,014	6189	3,883	4,343	4,407
Total		4,336,349	465,817	396,103	814,269	57,877	574,706

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Table 2: Morbidity and Mortality in affected communities

District	Community	Number of Suspect Cases				Number of deaths				Total Herd Size	Mortality (%)
		Adults		Young		Adults		Young			
		Males	Females	Males	Females	Males	Females	Males	Females		
Western Urban	Kanikay	1	1	1	2	5	5	15	10	40	88%
Western Urban	Kroo Bay	0	0	0	0	4	3	0	0	7	99.4
Western Urban	Susans Bay	0	1	0	0	4	3	0	0	8	88%
Western Rural	Benguima	2	12	10	21	0	0	0	0	45	0%
Western Rural	Bomeh	86	93	97	80	86	89	87	65	685	48%
Western Rural	Bomeh	2	9	0	1	0	0	2	2	16	25%
Western Rural	Colvert	0	0	2	6	0	0	0	0	8	0%
Western Rural	Ibu Town	1	1	1	0	2	2	0	0	7	57%
Western Rural	Last Banking	6	9	10	7	3	3	3	2	36	31%
Western Rural	Mabureh	0	1	0	0	2	7	0	0	10	90%
Western Urban	Kingtom	40	58	30	28	60	75	31	35	415	48.4%
	Total	**138**	**185**	**151**	**145**	**166**	**187**	**138**	**114**	**1277**	**52.3%**

Table 3: Detection of ASF antibodies in samples using iELISA

Sampling Area	Code	Type of Sample	Positive	Negative	Total samples
Urban Racecourse	URC	Serum	2	21	23
Urban Kingtown	UKT	Serum	1	2	3
Urban Kingtown	UKT	Blood	1	2	3
Urban Kanikay	UKN	Serum	0	1	1
Rural Monkey Bush	RMB	Serum	0	14	14
Urban Kroobay	UKB	Serum	0	1	1
Rural Campbell Town	RCT	Serum	0	3	3
Rural Bomeh	RBe	Serum	0	6	6
Rural Ibo	RIB	Serum	0	1	1
Bengumah	BE	Serum	0	7	7
Bengumah	BE	Blood	0	13	13
Mabureh	MA	Serum	0	8	8
Mabureh	MA	Blood	0	13	13

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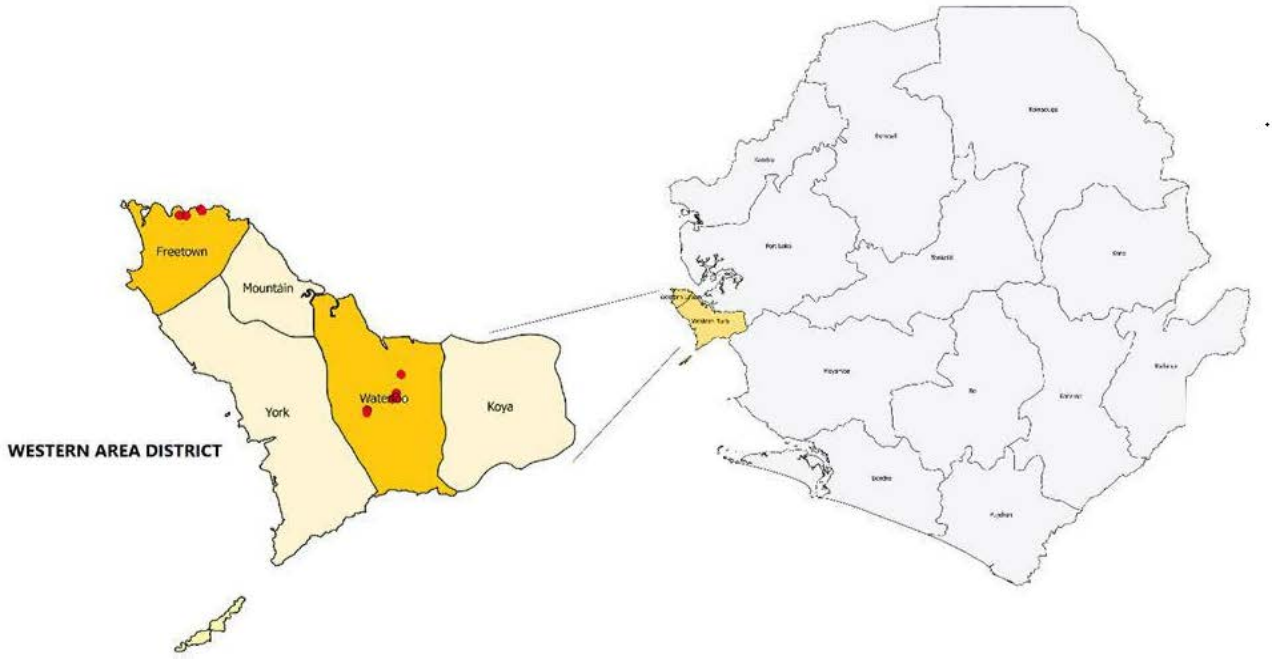


Figure 1: Localities where investigations were conducted in the Republic of Sierra Leone

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Global Journal of Medical Research: K
Interdisciplinary
Volume 20 Issue 1 Version 1.0 Year 2020
Type: Double Blind Peer Reviewed International Research Journal
Publisher: Global Journals
Online ISSN: 2249-4618 & Print ISSN: 0975-5888

Factors Influencing the Timing of the First HIV Virological Test for HIV Exposed Infants; A Cross Sectional Descriptive Study of HIV Positive Breastfeeding Mothers and their Infants in 10 Selected High-Volume Health Facilities in a Rural District in Western Uganda

By Enos Mirembe Masereka, Edson Musungu Bwambale, Edson Katsomyo & Clement Munguiko

Mountains of the Moon University

Abstract- *Introduction:* Although Option-B plus has registered tremendous success in the Prevention of Mother to Child Transmission (PMTCT) of HIV, the failure to follow the HIV testing algorithm for HIV Exposed Infants (HEIs) after birth is likely to make achieving zero new HIV infections among children unrealistic. Due to this, we sought to determine the factors affecting uptake of first Polymerase Chain Reaction (PCR) test among HEIs to inform the selection of strategies to strengthen Early Infant Diagnosis (EID), an indicator that tracks progress towards achieving zero new HIV infections in children.

Keywords: *HIV virological test, PCR HIV test, HIV exposed, infants, western uganda.*

GJMR-K Classification: *NLMC Code: QW 168.5.H6*



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Factors Influencing the Timing of the First HIV Virological Test for HIV Exposed Infants; A Cross Sectional Descriptive Study of HIV Positive Breastfeeding Mothers and their Infants in 10 Selected High-Volume Health Facilities in a Rural District in Western Uganda

Enos Mirembe Masereka [α], Edson Musungu Bwambale [σ], Edson Katsomyo [ρ] & Clement Munguiko [ω]

Abstract- ***Introduction:*** Although Option-B plus has registered tremendous success in the Prevention of Mother to Child Transmission (PMTCT) of HIV, the failure to follow the HIV testing algorithm for HIV Exposed Infants (HEIs) after birth is likely to make achieving zero new HIV infections among children unrealistic. Due to this, we sought to determine the factors affecting uptake of first Polymerase Chain Reaction (PCR) test among HEIs to inform the selection of strategies to strengthen Early Infant Diagnosis (EID), an indicator that tracks progress towards achieving zero new HIV infections in children.

Methods: This was a cross-sectional descriptive study conducted among 323 randomly selected HIV positive mothers and their HEIs receiving PMTCT services at10 selected ART accredited health facilities in western Uganda from 19thJuly to 19thAugust 2018. Data was collected using a questionnaire; HEIs, whose PCR test was taken within two months, and those after two months of birth were all randomly selected and included in this study. We used descriptive statistics to understand characteristics of HEIs and their mothers, and multivariable logistic regression model to obtain factors associated with first PCR testing among HEIs. Data were analyzed using SPSS version 20.

Results: Slightly more than half (54.2%) of HEIs had their first PCR test done after two months of birth. HEIs born to HIV positive mothers with more than three children were less likely to have their first PCR test within two months after birth (AOR = 0.47, CI= 0.318-0.789, p = 0.01), those whose mothers travel a distance less than 5 kilometers to the nearest health facility (AOR = 6.22, CI=4.223-9.865, p = 0.036) were more likely to have their PCR test within two months after birth, and those whose mothers were not informed about testing their HEIs for HIV within two months by the health worker (AOR = 0.39, CI =0.208-0.965, p = 0.042) were less likely to have the first PCR test within two months of birth.

Conclusions: we found out that slightly more than half of HEIs had their first PCR test done more than two months after birth. We recommend the implementation of policies fostering small families for HIV positive women, taking ART services closer to the people through outreaches and health workers informing HIV positive mothers about the correct timing for HIV testing of HEIs.

Keywords: HIV virological test, PCR HIV test, HIV exposed, infants, western uganda.

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I. Background

Globally, about 36.9 million people were living with the Human Immunodeficiency Virus (HIV) in 2017;70% of these were residing in sub-Saharan Africa[1]. About 1.8 million people in the same year were newly infected, and of these, 180000 were children [1]. About 90% of children acquire HIV from their mothers during pregnancy, delivery, and breastfeeding [2]. However, the introduction of Option B- plus where HIV positive mothers are started on lifelong ART as early as possible in pregnancy and throughout breastfeeding has continued to yield tremendous results in the Prevention of Mother to Child Transmission (PMTCT) of HIV. This is shown by a decline in the proportion of new HIV infections among children by 35%from 270,000 in 2010 to 180,000 in 2017 globally [1] and by 50.6% from 31, 000 in 2011 before the introduction of Option B- plus in Uganda to 15,000in 2013[3].

The PMTCT strategy in Uganda comprises of the provision of treatment, care, and support to women

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infected with HIV, their children, and their families [4]. It also defines the postnatal PMTCT package for HEIs that includes Early Infant Diagnosis (EID) through first HIV PCR testing of HEIs within two months (between 6 and 8 weeks) of birth, followed by second HIV PCR testing at six weeks after cessation of breastfeeding and a rapid HIV test at 18 months of age [4]. Health workers, caretakers, and the community must follow the HIV HEI testing algorithm to achieve EID for appropriate prevention, treatment, care, and support; and to track progress towards achieving zero new HIV infections in children [4].

Despite the rollout of the HIV testing algorithm to health workers, timelines for these tests are not followed, affecting infant treatment, care, and support. In Uganda, only 40.2% in 2012, 41.9% in 2013, 33% in 2014, and 38% in 2015 of HEIs received a PCR test for HIV within two months of birth [3]. This was far below the national target of 80% [3] and indicated an increasing trend of missed opportunities for EID[3]. The poor timing of first virological HIV testing among HEIs is attributed to low rate of health facility deliveries, poor attendances for postnatal care services, low male involvement, poor sensitization, and cultural perceptions coupled with patriarchal based traditions which are dominant in Uganda [3, 4].

Delay in testing HEIs after birth makes breastfeeding mothers stay in a zone of comfort and not to put much effort on measures to prevent their HEIs from acquiring HIV; this predisposes to increasing HIV positivity rate among HEIs and retards the country's progress towards achieving zero new HIV infections among children [4]. Due to this, we sought to determine the factors influencing uptake of first PCR testing among HEIs to inform the evidence-based selection of strategies to improve Early Infant Diagnosis (EID) and ensure that every HEI testing positive is initiated on lifelong ART as soon as possible.

II. Methods

a) Study area, population and design

This study employed a cross-sectional descriptive study design and was carried out from 19th July to 19th August 2018. The study area had a total of 45 ART accredited health centers; of these ten high volume health centers located in Bwera, Kilembe, Rukoki, Hiima, Karambi, Kasanga, St Paul Cathedral, Katadoba, Kasese Municipality, and Bishop Masereka foundation in the Rwenzori sub-region, Western Uganda were selected. These were considered because of the large numbers of HEIs in care. The study included HIV positive mothers and their HEIs aged between 6 weeks and 18 months; those eligible forthe first PCR test and receiving PMTCT services from the selected health centers. These health centers had a total of 626 HEIs in care. The majority of HIV positive mothers selected for this study live along the foothills of the Rwenzori ranges where they engage in small scale crop growing, animal rearing, and business activities.

b) Sample size determination

The sample size was determined using the Leslie Kish survey sampling formula [10]; Z (the value from standard normal distribution) corresponding to desired confidence level of 95%, was 1.96, p is the proportion of HEIs who miss first virological testing within two months of birth, estimated at 69.8% (0.698)[3], e is the desired level of precision, set at 5% (0.05); arriving at N (actual sample size)of 323.

c) Sampling of study participants

We obtained lists of HIV positive breastfeeding women per selected health facility offering ART services by searching ART registers at the postnatal clinic for HIV positive mothers with HEIs aged 6 weeks to 18 months. The Art number, cohort, date of next appointment, and other details of every mother and infant found were written down. Preliminarily, each health facility had an independent list and later merged to come up with a single general list. All registered HIV positive breastfeeding women were entered in the computer excel sheet from which we randomly selected 323 HIV positive women and their infants.

The distribution of respondents per study health Center following random selection [table 1]

Table 1: Distribution of respondents per study health center

Health Facility	No Exposed Infants in Care	No. of Respondents
Rukoki Health Centre III	52	33
Bwera hospital	122	87
Kasanga PHC HC III	33	12
St Paul HC IV	34	5
Kasese Municipal HC III	135	65
Karambi HC III	20	6
Hiima Health Centre III	62	33
Kilembe Mines Hospital	123	66
Katadoba HC III	23	12
Bishop Masereka HC III	22	4
Total		323

HC: Health Centre

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Initially, we noted the date of the next appointment of each selected HIV positive mother and her HEI.We interviewed mothers as they came to the postnatal clinic at every study health centre. If amother did not turn up for services on her appointment date, she was followed up through existing follow up systems such as Village Health Teams (VHTs) and peer mothers the following day and interviewed from her home.

d) Data collection

Data was collected using a questionnaire. Questions on client socio-demographics, client factors, health center factors, and community factors influencing uptake of first PCR HIV test were asked. We asked questions related to the timing of the first PCR for HEIs, whether the mother was informed about testing her HEI within two months of birth or not and how mothers are generally handled at the clinic by the attending health worker. Data collection was done in separate rooms at the postnatal clinics of the different study health centers. Every woman who was followed up at home was requested to find a separate place in her compound or sitting room with maximum privacy and confidentiality. We asked mothers to respond to questions genuinely. We read the questions on the questionnaire as the participants listened. Participant responses were ticked on given responses on the questionnaire to minimize errors in recording.

e) Data analysis

Data were analyzed using SPSS version 20. Participant demographic characteristics were summarized using descriptive statistics. We used multivariable logistic regression to determine factors associated with low uptake of the first PCR test. Variables with p-value <0.2 after bivariate analysis were included in the multivariate logistic regression model.

f) Ethical considerations and protection of study participants

Approval from a local ethics committee at the Faculty of Health Sciences (FHS), Uganda Martyrs University (UMU), was obtained. Written consent was obtained from all mothers and legal caretakers of HIV Exposed Infants.

III. Results

a) Socio-demographic characteristics of respondents

A total of 323 mothers of HEIs participated in this study. Nearly half, 152(47.1%) of the respondents were Bakonzo by the tribe. About three quarters, 236(73.1%) were aged 25 years and above. Most, 227(70.3%) were married and living with their spouses. More than half, 203 (62.8%) had not completed the primary level of education [see table 2].

Table 2: Socio- demographic characteristics of respondents

Variable	Frequency (N=323)	Percentage
Age (in years)		
≤25	87	26.9
>25	236	73.1
Marital Status		
Married	227	70.3
Not married	96	29.7
Tribe		
Bakonzo	152	47.1
Other tribes	171	52.9
Education Level		
<primary level	203	62.8
≥primary level	120	37.2
Source of income		
None	103	31.9
Has income source	220	68.1
Monthly income (average)		
≤ 100,000	251	77.7
> 100,000	72	22.3
Has someone to escort her to health facility		
Yes	136	42.1
No	187	57.9
Has support for transport means to health facility		
Yes	256	79.3
No	67	20.7
Number of children born while mother is HIV-positive		
≤ 2	261	80.8
> 2	62	19.2

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Timing of first HIV virological test among HIV Exposed Infants in a rural District in Western Uganda

Slightly more than half of the HEIs, 175(54.2%)had their first virological test (PCR) after two months of birth.

Socio-demographic, client, and health center factors influencingtiming of first virological HIV test among HIV Exposed Infants in a rural district in western Uganda.

HEIs born to HIV positive mothers with more than three children were less likely to have their first PCR test within two months after birth (AOR = 0.47, CI=0.318-0.789, p = 0.001), those whose mothers travel a distance less than 5 kilometers to nearest health facility (AOR = 6.22, CI=4.223-9.865, p = 0.036) were more likely to have the first PCR test within two months, and those whose mothers were not informed about testing their HEIs for HIV within two months by the health worker (AOR = 0.39, CI=0.208-0.965, p = 0.042) were less likely to have the first PCR test within two months of birth [see table 3].

Table 3: Socio-demographic, client, and health center factors influencing the timing of first virological HIV test among HIV Exposed Infants in a rural district in western Uganda

Variable	Timing of first PCR		Unadjusted OR (95% CI)	p-value	Adjusted OR (95% CI)	p-value
	≤2months Freq (%)	>2 months Freq. (%)				
Tribe						
Bakonzo	81(54.7)	71(40.6)	1.76(1.19-7.83)	0.038	4.33(0.23-5.89)	0.432
Other tribes	67(45.3)	104(59.4)	1		1	
Religion						
Protestant	43(29.1)	80(45.7)	0.49(0.23-0.89)	0.001	0.54(0.45-8.46)	0.453
Other religions	105(70.9)	95(54.3)	1		1	
Number of children						
> 3	55(37.2)	107(61.1)	0.38(0.26-0.86)	0.001	0.47(0.32-0.79)	0.001*
≤ 3	93(62.8)	68(38.9)	1		1	
Knows the timing for confirmatory test						
Yes	80(54.1)	124(70.9)	0.48(0.21-0.68)	0.001	0.31(0.12-0.66)	0.015*
No	68(45.9)	51(29.1)	1		1	
Distance to health facility						
≤5 Kilometres	56(37.8)	41(23.4)	1.99(1.77-8.89)	0.004	6.22(4.22-9.87)	0.036*
>5 Kilometres	92(62.2)	134(76.6)	1		1	
Health worker informed mother about testing child for HIV within 2 months of age						
No	39(26.4)	63(36.0)	0.64(0.26-0.99)	0.041	0.39(0.21-0.97)	0.042*
Yes	109(73.6)	112(64.0)	1		1	
Handling of mothers at Health centre						
Well	35(23.6)	58(33.1)	0.62(0.96-0.88)	0.039	4.38(0.91-12.85)	0.545
Not well	113(76.4)	117(66.9)	1		1	

IV. Discussions

Slightly less than half (45.8%) of the HEIs had their first virological test within two months after birth, far below the national target of 80% [3]. Delay in testing HEIs makes women stay in a comfortable zone and are more likely to under estimate the risk that the infant can acquire HIV through breast feeding. Non-adherence tovirological testing among HEIs is a sign that the mother and her HEI are not retained in HIV care, which increases the risk of MTCT and consequently retarding the country's progress towards achieving zero new HIV infections among children [4].

In this study, an HIV positive mother having more than three children influences the timing ofthe first HIV virological test for her HEI. A mother is overburdened taking care of many children on addition to taking care of herself resulting in late first virological testing for her HEI[5]. The burden is worsened when a mother is single or in a polygamous family and thus not expecting any spousal support [5, 6]. Similarly, hailing from a distance less than 5 kilometers to the nearest health facility was more likely to cause infant PCR testing within two months after birth. Conversely, hailing from a distance more than 5 kilometers from a health facility results in untimely virological testing of HEIs.

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Long-distance to health center limits access to health services, especially with mothers who cannot afford transport costs. As a result, mothers keep on postponing dates of taking their HEIs to the health centre for virological testing. In so doing, HEIs are tested after two months of age [7, 8, and 9]. HEIs of HIV positive mothers not informed about testing within two months after birth were less likely to have their first virological tests within the recommended time. Similarly, mothers who knew the timing for the confirmatory test were less likely to have their HEIs tested within two months after birth. A mother knowing the date of the confirmatory test and not knowing the date of the initial virological test is an indication that health workers could have emphasized the timing of the confirmatory test more than the initial test. Due to this, mothers end up not following the timelines for the initial virological test. Poor information giving by health workers to HIV positive mothers contributes to delays in first HIV virological testing increasing the chances of HIV transmission to HEIs[11, 12].

V. Conclusions

We found out that slightly more than half of HEIs had their first PCR more than two months after birth. We recommend the implementation of policies fostering small families for HIV positive women, taking ART services closer to the people through outreaches, and health workers informing HIV positive mothers about the correct timing for HIV testing of HEIs.

Study limitation

The study relied on responses from mothers and some of these might have been affected by recall bias. We endeavored to clearly articulate the questions to ensure that the mothers respond accurately.

List of Abbreviations

HEI: HIV Exposed Infants
DBS: Dry Blood Sample
PCR: Polymerase Chain Reaction
ARVs: Antiretroviral Drugs
PMTCT: Prevention of Mother to Child Transmission
EID: Early Infant Diagnosis
VHT: Volunteer Health Team

Declarations

- *Ethical approval and consent to participate*

Approval was sought from a local ethics committee at the Faculty of Health Sciences, Uganda Martyrs University. Written consent was sought from all mothers and legal caretakers of HIV Exposed Infants.

Consent for publication

Not applicable

Availability of data and materials

All data and materials for this study shall be availed whenever requested by editorial team and other users. The data set can be accessed by sending a request to mirembeenos@gmail.com

Acknowledgement

The authors of this study would like to thank the leadership of Kasese District Local Government for allowing this study to be conducted in Kasese District, Western Uganda; we also thank all HIV positive breastfeeding women who participated in this study.

Funding

This study was entirely funded by the principal investigator

Competing interests

None of the authors has competing interest in this study

Authors' contribution

EMM and EMB conceived the study, collected data and participated in data analysis. EMM, EMB, EK and CM wrote the manuscript.

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Questions that were asked

	SECTION A: Client-related factors affecting uptake of first virological testing of HIV exposed infants
1	How old are you?
2	Are you married or staying with a spouse? a) Yes b) No
3	What is your tribe? a) Mukonzo b) Mutoro c) Munyankole, d) Musongora e) other (specify) ……..
4	What is your religion? a) Catholic b) Anglican c) Muslim d) Pentecostal e) SDA f) Other (specify)……
5	Which health facility do you receive your HIV drugs? …….
6	What is your level of education a) None b) primary c) secondary d) tertiary e) university
7	What do you do to earn a living? a) Peasant b) large scale farming c) business d) office work e) Other (specify) …….
8	How much do you earn per month (in Ugandan Shillings)?
9	Do you have someone to escort you to the hospital during pregnancy and delivery? a) Yes b) No
10	Do you have any one to support you on transport to the health centre? a) Yes b) No
11	How many children do you have?
12	How many children were born while you were HIV positive?
13	When did you get to know about your sero status? (Indicate month and year)
14	Is your husband aware about your HIV status? a) Yes b) No
15	Did you attend antenatal care for this current baby? a) Yes b) No
16	Where did you deliver from this baby? a) Health facility b) Home/with assistance of TBA c) Other specify …….
17	At what age are you expected to bring your baby for; a) First PCR……
18	At what age are you expected to bring your baby for; a) Second test ……
19	At what age are you expected to bring your baby for; c) Confirmatory test. ……..
	SECTION B: Health system factors affectig uptake of first virological testing of HIV exposed infants
20	How far is your home from this facility? a) Less than 5 km b) 5km and more
21	Do you sometimes miss an appointment because of the distance a) Yes b) No

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22	Has the nurse or doctor ever told you about testing the child for HIV? a) Yes b) No
23	How old was your child when blood was taken from him/her for HIV testing? a) Within 6-8weeks b) not within 6-8weeks c) other (specify) …….. Never taken
24	Were you given a referral letter to come and test your child for HIV when he/she is two and a half months? a) Yes b) No
25	Do you get all services concerning your child like immunization, testing, weighing from one place in this facility a) Yes b) No d) I do not know
26	How do the health workers treat you when you come for your medication? a) Well b) bad c) very bad d) declined to answer
27	Have you ever missed an appointment because of the way they treated you on the previous appointment a) Yes b) No c) not sure
28	Have you ever received a reminder about your appointment/ testing of your child at the facility before the actual day? a) Yes b) No
29	Have you ever been followed up when you missed your appointment/ testing of your child at the facility from the health workers or VHT/Peer mother a) Yes b) No
30	If yes in 29 above, how were you following up? a) Home visit by VHT/peer b) phone call c) health worker
	SECTION C: Community related factors affectig uptake of first virological testing of HIV exposed infants
31	Do you have TBA in the community you leave in a) Yes b) No
31	Have you been involved in peer groups for people living with HIV at the facility or in the community? a) Yes b) No
32	Have you had messages in your community sensitizing about how to protect you baby form acquiring HIV a) Yes b) No
33	Do you have any community health worker, VHT or peer mother that you know of in this community that provide you services about HIV? a) Yes b) No
34	If yes in question 33 above, which services do they provide you? a) Home visit b) community health education c) HIV testing counseling d) Referral to the facility e) follow up when you miss appointment f) Others specify…….
	The End Thank You So Much

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Certificate, LoR and Momento **2** discounted publishing/year **Gradation** of Research **10** research contacts/day **1 GB** Cloud Storage **GJ** Community Access	**Certificate,** LoR and Momento **Unlimited** discounted publishing/year **Gradation** of Research **Unlimited** research contacts/day **5 GB** Cloud Storage **Online Presense** Assistance **GJ** Community Access	**Certificates,** LoRs and Momentos **Unlimited** free publishing/year **Gradation** of Research **Unlimited** research contacts/day **Unlimited** Cloud Storage **Online Presense** Assistance **GJ** Community Access	**GJ** Community Access

Preferred Author Guidelines

We accept the manuscript submissions in any standard (generic) format.

We typeset manuscripts using advanced typesetting tools like Adobe In Design, CorelDraw, TeXnicCenter, and TeXStudio. We usually recommend authors submit their research using any standard format they are comfortable with, and let Global Journals do the rest.

Alternatively, you can download our basic template from https://globaljournals.org/Template

Authors should submit their complete paper/article, including text illustrations, graphics, conclusions, artwork, and tables. Authors who are not able to submit manuscript using the form above can email the manuscript department at submit@globaljournals.org or get in touch with chiefeditor@globaljournals.org if they wish to send the abstract before submission.

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Authors must ensure the information provided during the submission of a paper is authentic. Please go through the following checklist before submitting:

1. Authors must go through the complete author guideline and understand and *agree to Global Journals' ethics and code of conduct,* along with author responsibilities.
2. Authors must accept the privacy policy, terms, and conditions of Global Journals.
3. Ensure corresponding author's email address and postal address are accurate and reachable.
4. Manuscript to be submitted must include keywords, an abstract, a paper title, co-author(s') names and details (email address, name, phone number, and institution), figures and illustrations in vector format including appropriate captions, tables, including titles and footnotes, a conclusion, results, acknowledgments and references.
5. Authors should submit paper in a ZIP archive if any supplementary files are required along with the paper.
6. Proper permissions must be acquired for the use of any copyrighted material.
7. Manuscript submitted *must not have been submitted or published elsewhere* and all authors must be aware of the submission.

Declaration of Conflicts of Interest

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Authors are solely responsible for all the plagiarism that is found. The author must not fabricate, falsify or plagiarize existing research data. The following, if copied, will be considered plagiarism:

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- Writings
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- Printed material
- Graphic representations
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2. Drafting the paper and revising it critically regarding important academic content.
3. Final approval of the version of the paper to be published.

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The corresponding author should mention the name and complete details of all co-authors during submission and in manuscript. We support addition, rearrangement, manipulation, and deletions in authors list till the early view publication of the journal. We expect that corresponding author will notify all co-authors of submission. We follow COPE guidelines for changes in authorship.

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Unless specified in the notification, the Editorial Board's decision on publication of the paper is final and cannot be appealed before making the major change in the manuscript.

Acknowledgments

Contributors to the research other than authors credited should be mentioned in Acknowledgments. The source of funding for the research can be included. Suppliers of resources may be mentioned along with their addresses.

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Preparing your Manuscript

Authors can submit papers and articles in an acceptable file format: MS Word (doc, docx), LaTeX (.tex, .zip or .rar including all of your files), Adobe PDF (.pdf), rich text format (.rtf), simple text document (.txt), Open Document Text (.odt), and Apple Pages (.pages). Our professional layout editors will format the entire paper according to our official guidelines. This is one of the highlights of publishing with Global Journals—authors should not be concerned about the formatting of their paper. Global Journals accepts articles and manuscripts in every major language, be it Spanish, Chinese, Japanese, Portuguese, Russian, French, German, Dutch, Italian, Greek, or any other national language, but the title, subtitle, and abstract should be in English. This will facilitate indexing and the pre-peer review process.

The following is the official style and template developed for publication of a research paper. Authors are not required to follow this style during the submission of the paper. It is just for reference purposes.

Manuscript Style Instruction (Optional)

- Microsoft Word Document Setting Instructions.
- Font type of all text should be Swis721 Lt BT.
- Page size: 8.27" x 11'", left margin: 0.65, right margin: 0.65, bottom margin: 0.75.
- Paper title should be in one column of font size 24.
- Author name in font size of 11 in one column.
- Abstract: font size 9 with the word "Abstract" in bold italics.
- Main text: font size 10 with two justified columns.
- Two columns with equal column width of 3.38 and spacing of 0.2.
- First character must be three lines drop-capped.
- The paragraph before spacing of 1 pt and after of 0 pt.
- Line spacing of 1 pt.
- Large images must be in one column.
- The names of first main headings (Heading 1) must be in Roman font, capital letters, and font size of 10.
- The names of second main headings (Heading 2) must not include numbers and must be in italics with a font size of 10.

Structure and Format of Manuscript

The recommended size of an original research paper is under 15,000 words and review papers under 7,000 words. Research articles should be less than 10,000 words. Research papers are usually longer than review papers. Review papers are reports of significant research (typically less than 7,000 words, including tables, figures, and references)

A research paper must include:

a) A title which should be relevant to the theme of the paper.
b) A summary, known as an abstract (less than 150 words), containing the major results and conclusions.
c) Up to 10 keywords that precisely identify the paper's subject, purpose, and focus.
d) An introduction, giving fundamental background objectives.
e) Resources and techniques with sufficient complete experimental details (wherever possible by reference) to permit repetition, sources of information must be given, and numerical methods must be specified by reference.
f) Results which should be presented concisely by well-designed tables and figures.
g) Suitable statistical data should also be given.
h) All data must have been gathered with attention to numerical detail in the planning stage.

Design has been recognized to be essential to experiments for a considerable time, and the editor has decided that any paper that appears not to have adequate numerical treatments of the data will be returned unrefereed.

i) Discussion should cover implications and consequences and not just recapitulate the results; conclusions should also be summarized.
j) There should be brief acknowledgments.
k) There ought to be references in the conventional format. Global Journals recommends APA format.

Authors should carefully consider the preparation of papers to ensure that they communicate effectively. Papers are much more likely to be accepted if they are carefully designed and laid out, contain few or no errors, are summarizing, and follow instructions. They will also be published with much fewer delays than those that require much technical and editorial correction.

The Editorial Board reserves the right to make literary corrections and suggestions to improve brevity.



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Format Structure

It is necessary that authors take care in submitting a manuscript that is written in simple language and adheres to published guidelines.

All manuscripts submitted to Global Journals should include:

Title

The title page must carry an informative title that reflects the content, a running title (less than 45 characters together with spaces), names of the authors and co-authors, and the place(s) where the work was carried out.

Author details

The full postal address of any related author(s) must be specified.

Abstract

The abstract is the foundation of the research paper. It should be clear and concise and must contain the objective of the paper and inferences drawn. It is advised to not include big mathematical equations or complicated jargon.

Many researchers searching for information online will use search engines such as Google, Yahoo or others. By optimizing your paper for search engines, you will amplify the chance of someone finding it. In turn, this will make it more likely to be viewed and cited in further works. Global Journals has compiled these guidelines to facilitate you to maximize the web-friendliness of the most public part of your paper.

Keywords

A major lynchpin of research work for the writing of research papers is the keyword search, which one will employ to find both library and internet resources. Up to eleven keywords or very brief phrases have to be given to help data retrieval, mining, and indexing.

One must be persistent and creative in using keywords. An effective keyword search requires a strategy: planning of a list of possible keywords and phrases to try.

Choice of the main keywords is the first tool of writing a research paper. Research paper writing is an art. Keyword search should be as strategic as possible.

One should start brainstorming lists of potential keywords before even beginning searching. Think about the most important concepts related to research work. Ask, “What words would a source have to include to be truly valuable in a research paper?” Then consider synonyms for the important words.

It may take the discovery of only one important paper to steer in the right keyword direction because, in most databases, the keywords under which a research paper is abstracted are listed with the paper.

Numerical Methods

Numerical methods used should be transparent and, where appropriate, supported by references.

Abbreviations

Authors must list all the abbreviations used in the paper at the end of the paper or in a separate table before using them.

Formulas and equations

Authors are advised to submit any mathematical equation using either MathJax, KaTeX, or LaTeX, or in a very high-quality image.

Tables, Figures, and Figure Legends

Tables: Tables should be cautiously designed, uncrowned, and include only essential data. Each must have an Arabic number, e.g., Table 4, a self-explanatory caption, and be on a separate sheet. Authors must submit tables in an editable format and not as images. References to these tables (if any) must be mentioned accurately.

Figures

Figures are supposed to be submitted as separate files. Always include a citation in the text for each figure using Arabic numbers, e.g., Fig. 4. Artwork must be submitted online in vector electronic form or by emailing it.

Preparation of Eletronic Figures for Publication

Although low-quality images are sufficient for review purposes, print publication requires high-quality images to prevent the final product being blurred or fuzzy. Submit (possibly by e-mail) EPS (line art) or TIFF (halftone/ photographs) files only. MS PowerPoint and Word Graphics are unsuitable for printed pictures. Avoid using pixel-oriented software. Scans (TIFF only) should have a resolution of at least 350 dpi (halftone) or 700 to 1100 dpi (line drawings). Please give the data for figures in black and white or submit a Color Work Agreement form. EPS files must be saved with fonts embedded (and with a TIFF preview, if possible).

For scanned images, the scanning resolution at final image size ought to be as follows to ensure good reproduction: line art: >650 dpi; halftones (including gel photographs): >350 dpi; figures containing both halftone and line images: >650 dpi.

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Tips for writing a good quality Medical Research Paper

1. Choosing the topic: In most cases, the topic is selected by the interests of the author, but it can also be suggested by the guides. You can have several topics, and then judge which you are most comfortable with. This may be done by asking several questions of yourself, like "Will I be able to carry out a search in this area? Will I find all necessary resources to accomplish the search? Will I be able to find all information in this field area?" If the answer to this type of question is "yes," then you ought to choose that topic. In most cases, you may have to conduct surveys and visit several places. Also, you might have to do a lot of work to find all the rises and falls of the various data on that subject. Sometimes, detailed information plays a vital role, instead of short information. Evaluators are human: The first thing to remember is that evaluators are also human beings. They are not only meant for rejecting a paper. They are here to evaluate your paper. So present your best aspect.

2. Think like evaluators: If you are in confusion or getting demotivated because your paper may not be accepted by the evaluators, then think, and try to evaluate your paper like an evaluator. Try to understand what an evaluator wants in your research paper, and you will automatically have your answer. Make blueprints of paper: The outline is the plan or framework that will help you to arrange your thoughts. It will make your paper logical. But remember that all points of your outline must be related to the topic you have chosen.

3. Ask your guides: If you are having any difficulty with your research, then do not hesitate to share your difficulty with your guide (if you have one). They will surely help you out and resolve your doubts. If you can't clarify what exactly you require for your work, then ask your supervisor to help you with an alternative. He or she might also provide you with a list of essential readings.

4. Use of computer is recommended: As you are doing research in the field of medical research then this point is quite obvious. Use right software: Always use good quality software packages. If you are not capable of judging good software, then you can lose the quality of your paper unknowingly. There are various programs available to help you which you can get through the internet.

5. Use the internet for help: An excellent start for your paper is using Google. It is a wondrous search engine, where you can have your doubts resolved. You may also read some answers for the frequent question of how to write your research paper or find a model research paper. You can download books from the internet. If you have all the required books, place importance on reading, selecting, and analyzing the specified information. Then sketch out your research paper. Use big pictures: You may use encyclopedias like Wikipedia to get pictures with the best resolution. At Global Journals, you should strictly follow here.



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6. Bookmarks are useful: When you read any book or magazine, you generally use bookmarks, right? It is a good habit which helps to not lose your continuity. You should always use bookmarks while searching on the internet also, which will make your search easier.

7. Revise what you wrote: When you write anything, always read it, summarize it, and then finalize it.

8. Make every effort: Make every effort to mention what you are going to write in your paper. That means always have a good start. Try to mention everything in the introduction—what is the need for a particular research paper. Polish your work with good writing skills and always give an evaluator what he wants. Make backups: When you are going to do any important thing like making a research paper, you should always have backup copies of it either on your computer or on paper. This protects you from losing any portion of your important data.

9. Produce good diagrams of your own: Always try to include good charts or diagrams in your paper to improve quality. Using several unnecessary diagrams will degrade the quality of your paper by creating a hodgepodge. So always try to include diagrams which were made by you to improve the readability of your paper. Use of direct quotes: When you do research relevant to literature, history, or current affairs, then use of quotes becomes essential, but if the study is relevant to science, use of quotes is not preferable.

10. Use proper verb tense: Use proper verb tenses in your paper. Use past tense to present those events that have happened. Use present tense to indicate events that are going on. Use future tense to indicate events that will happen in the future. Use of wrong tenses will confuse the evaluator. Avoid sentences that are incomplete.

11. Pick a good study spot: Always try to pick a spot for your research which is quiet. Not every spot is good for studying.

12. Know what you know: Always try to know what you know by making objectives, otherwise you will be confused and unable to achieve your target.

13. Use good grammar: Always use good grammar and words that will have a positive impact on the evaluator; use of good vocabulary does not mean using tough words which the evaluator has to find in a dictionary. Do not fragment sentences. Eliminate one-word sentences. Do not ever use a big word when a smaller one would suffice.

Verbs have to be in agreement with their subjects. In a research paper, do not start sentences with conjunctions or finish them with prepositions. When writing formally, it is advisable to never split an infinitive because someone will (wrongly) complain. Avoid clichés like a disease. Always shun irritating alliteration. Use language which is simple and straightforward. Put together a neat summary.

14. Arrangement of information: Each section of the main body should start with an opening sentence, and there should be a changeover at the end of the section. Give only valid and powerful arguments for your topic. You may also maintain your arguments with records.

15. Never start at the last minute: Always allow enough time for research work. Leaving everything to the last minute will degrade your paper and spoil your work.

16. Multitasking in research is not good: Doing several things at the same time is a bad habit in the case of research activity. Research is an area where everything has a particular time slot. Divide your research work into parts, and do a particular part in a particular time slot.

17. Never copy others' work: Never copy others' work and give it your name because if the evaluator has seen it anywhere, you will be in trouble. Take proper rest and food: No matter how many hours you spend on your research activity, if you are not taking care of your health, then all your efforts will have been in vain. For quality research, take proper rest and food.

18. Go to seminars: Attend seminars if the topic is relevant to your research area. Utilize all your resources.

19. Refresh your mind after intervals: Try to give your mind a rest by listening to soft music or sleeping in intervals. This will also improve your memory. Acquire colleagues: Always try to acquire colleagues. No matter how sharp you are, if you acquire colleagues, they can give you ideas which will be helpful to your research.

20. Think technically: Always think technically. If anything happens, search for its reasons, benefits, and demerits. Think and then print: When you go to print your paper, check that tables are not split, headings are not detached from their descriptions, and page sequence is maintained.

21. Adding unnecessary information: Do not add unnecessary information like "I have used MS Excel to draw graphs." Irrelevant and inappropriate material is superfluous. Foreign terminology and phrases are not apropos. One should never take a broad view. Analogy is like feathers on a snake. Use words properly, regardless of how others use them. Remove quotations. Puns are for kids, not grunt readers. Never oversimplify: When adding material to your research paper, never go for oversimplification; this will definitely irritate the evaluator. Be specific. Never use rhythmic redundancies. Contractions shouldn't be used in a research paper. Comparisons are as terrible as clichés. Give up ampersands, abbreviations, and so on. Remove commas that are not necessary. Parenthetical words should be between brackets or commas. Understatement is always the best way to put forward earth-shaking thoughts. Give a detailed literary review.

22. Report concluded results: Use concluded results. From raw data, filter the results, and then conclude your studies based on measurements and observations taken. An appropriate number of decimal places should be used. Parenthetical remarks are prohibited here. Proofread carefully at the final stage. At the end, give an outline to your arguments. Spot perspectives of further study of the subject. Justify your conclusion at the bottom sufficiently, which will probably include examples.

23. Upon conclusion: Once you have concluded your research, the next most important step is to present your findings. Presentation is extremely important as it is the definite medium though which your research is going to be in print for the rest of the crowd. Care should be taken to categorize your thoughts well and present them in a logical and neat manner. A good quality research paper format is essential because it serves to highlight your research paper and bring to light all necessary aspects of your research.

Informal Guidelines of Research Paper Writing

Key points to remember:

- Submit all work in its final form.
- Write your paper in the form which is presented in the guidelines using the template.
- Please note the criteria peer reviewers will use for grading the final paper.

Final points:

One purpose of organizing a research paper is to let people interpret your efforts selectively. The journal requires the following sections, submitted in the order listed, with each section starting on a new page:

The introduction: This will be compiled from reference matter and reflect the design processes or outline of basis that directed you to make a study. As you carry out the process of study, the method and process section will be constructed like that. The results segment will show related statistics in nearly sequential order and direct reviewers to similar intellectual paths throughout the data that you gathered to carry out your study.

The discussion section:

This will provide understanding of the data and projections as to the implications of the results. The use of good quality references throughout the paper will give the effort trustworthiness by representing an alertness to prior workings.

Writing a research paper is not an easy job, no matter how trouble-free the actual research or concept. Practice, excellent preparation, and controlled record-keeping are the only means to make straightforward progression.

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Specific editorial column necessities for compliance of a manuscript will always take over from directions in these general guidelines.

To make a paper clear: Adhere to recommended page limits.



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Mistakes to avoid:

- Insertion of a title at the foot of a page with subsequent text on the next page.
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- Submitting a manuscript with pages out of sequence.
- In every section of your document, use standard writing style, including articles ("a" and "the").
- Keep paying attention to the topic of the paper.
- Use paragraphs to split each significant point (excluding the abstract).
- Align the primary line of each section.
- Present your points in sound order.
- Use present tense to report well-accepted matters.
- Use past tense to describe specific results.
- Do not use familiar wording; don't address the reviewer directly. Don't use slang or superlatives.
- Avoid use of extra pictures—include only those figures essential to presenting results.

Title page:

Choose a revealing title. It should be short and include the name(s) and address(es) of all authors. It should not have acronyms or abbreviations or exceed two printed lines.

Abstract: This summary should be two hundred words or less. It should clearly and briefly explain the key findings reported in the manuscript and must have precise statistics. It should not have acronyms or abbreviations. It should be logical in itself. Do not cite references at this point.

An abstract is a brief, distinct paragraph summary of finished work or work in development. In a minute or less, a reviewer can be taught the foundation behind the study, common approaches to the problem, relevant results, and significant conclusions or new questions.

Write your summary when your paper is completed because how can you write the summary of anything which is not yet written? Wealth of terminology is very essential in abstract. Use comprehensive sentences, and do not sacrifice readability for brevity; you can maintain it succinctly by phrasing sentences so that they provide more than a lone rationale. The author can at this moment go straight to shortening the outcome. Sum up the study with the subsequent elements in any summary. Try to limit the initial two items to no more than one line each.

Reason for writing the article—theory, overall issue, purpose.

- Fundamental goal.
- To-the-point depiction of the research.
- Consequences, including definite statistics—if the consequences are quantitative in nature, account for this; results of any numerical analysis should be reported. Significant conclusions or questions that emerge from the research.

Approach:

- Single section and succinct.
- An outline of the job done is always written in past tense.
- Concentrate on shortening results—limit background information to a verdict or two.
- Exact spelling, clarity of sentences and phrases, and appropriate reporting of quantities (proper units, important statistics) are just as significant in an abstract as they are anywhere else.

Introduction:

The introduction should "introduce" the manuscript. The reviewer should be presented with sufficient background information to be capable of comprehending and calculating the purpose of your study without having to refer to other works. The basis for the study should be offered. Give the most important references, but avoid making a comprehensive appraisal of the topic. Describe the problem visibly. If the problem is not acknowledged in a logical, reasonable way, the reviewer will give no attention to your results. Speak in common terms about techniques used to explain the problem, if needed, but do not present any particulars about the protocols here.

The following approach can create a valuable beginning:

- Explain the value (significance) of the study.
- Defend the model—why did you employ this particular system or method? What is its compensation? Remark upon its appropriateness from an abstract point of view as well as pointing out sensible reasons for using it.
- Present a justification. State your particular theory(-ies) or aim(s), and describe the logic that led you to choose them.
- Briefly explain the study's tentative purpose and how it meets the declared objectives.

Approach:

Use past tense except for when referring to recognized facts. After all, the manuscript will be submitted after the entire job is done. Sort out your thoughts; manufacture one key point for every section. If you make the four points listed above, you will need at least four paragraphs. Present surrounding information only when it is necessary to support a situation. The reviewer does not desire to read everything you know about a topic. Shape the theory specifically—do not take a broad view.

As always, give awareness to spelling, simplicity, and correctness of sentences and phrases.

Procedures (methods and materials):

This part is supposed to be the easiest to carve if you have good skills. A soundly written procedures segment allows a capable scientist to replicate your results. Present precise information about your supplies. The suppliers and clarity of reagents can be helpful bits of information. Present methods in sequential order, but linked methodologies can be grouped as a segment. Be concise when relating the protocols. Attempt to give the least amount of information that would permit another capable scientist to replicate your outcome, but be cautious that vital information is integrated. The use of subheadings is suggested and ought to be synchronized with the results section.

When a technique is used that has been well-described in another section, mention the specific item describing the way, but draw the basic principle while stating the situation. The purpose is to show all particular resources and broad procedures so that another person may use some or all of the methods in one more study or referee the scientific value of your work. It is not to be a step-by-step report of the whole thing you did, nor is a methods section a set of orders.

Materials:

Materials may be reported in part of a section or else they may be recognized along with your measures.

Methods:

- Report the method and not the particulars of each process that engaged the same methodology.
- Describe the method entirely.
- To be succinct, present methods under headings dedicated to specific dealings or groups of measures.
- Simplify—detail how procedures were completed, not how they were performed on a particular day.
- If well-known procedures were used, account for the procedure by name, possibly with a reference, and that's all.

Approach:

It is embarrassing to use vigorous voice when documenting methods without using first person, which would focus the reviewer's interest on the researcher rather than the job. As a result, when writing up the methods, most authors use third person passive voice.

Use standard style in this and every other part of the paper—avoid familiar lists, and use full sentences.

What to keep away from:

- Resources and methods are not a set of information.
- Skip all descriptive information and surroundings—save it for the argument.
- Leave out information that is immaterial to a third party.



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Results:

The principle of a results segment is to present and demonstrate your conclusion. Create this part as entirely objective details of the outcome, and save all understanding for the discussion.

The page length of this segment is set by the sum and types of data to be reported. Use statistics and tables, if suitable, to present consequences most efficiently.

You must clearly differentiate material which would usually be incorporated in a study editorial from any unprocessed data or additional appendix matter that would not be available. In fact, such matters should not be submitted at all except if requested by the instructor.

Content:

- Sum up your conclusions in text and demonstrate them, if suitable, with figures and tables.
- In the manuscript, explain each of your consequences, and point the reader to remarks that are most appropriate.
- Present a background, such as by describing the question that was addressed by creation of an exacting study.
- Explain results of control experiments and give remarks that are not accessible in a prescribed figure or table, if appropriate.
- Examine your data, then prepare the analyzed (transformed) data in the form of a figure (graph), table, or manuscript.

What to stay away from:

- Do not discuss or infer your outcome, report surrounding information, or try to explain anything.
- Do not include raw data or intermediate calculations in a research manuscript.
- Do not present similar data more than once.
- A manuscript should complement any figures or tables, not duplicate information.
- Never confuse figures with tables—there is a difference.

Approach:

As always, use past tense when you submit your results, and put the whole thing in a reasonable order.

Put figures and tables, appropriately numbered, in order at the end of the report.

If you desire, you may place your figures and tables properly within the text of your results section.

Figures and tables:

If you put figures and tables at the end of some details, make certain that they are visibly distinguished from any attached appendix materials, such as raw facts. Whatever the position, each table must be titled, numbered one after the other, and include a heading. All figures and tables must be divided from the text.

Discussion:

The discussion is expected to be the trickiest segment to write. A lot of papers submitted to the journal are discarded based on problems with the discussion. There is no rule for how long an argument should be.

Position your understanding of the outcome visibly to lead the reviewer through your conclusions, and then finish the paper with a summing up of the implications of the study. The purpose here is to offer an understanding of your results and support all of your conclusions, using facts from your research and generally accepted information, if suitable. The implication of results should be fully described.

Infer your data in the conversation in suitable depth. This means that when you clarify an observable fact, you must explain mechanisms that may account for the observation. If your results vary from your prospect, make clear why that may have happened. If your results agree, then explain the theory that the proof supported. It is never suitable to just state that the data approved the prospect, and let it drop at that. Make a decision as to whether each premise is supported or discarded or if you cannot make a conclusion with assurance. Do not just dismiss a study or part of a study as "uncertain."

Research papers are not acknowledged if the work is imperfect. Draw what conclusions you can based upon the results that you have, and take care of the study as a finished work.

- You may propose future guidelines, such as how an experiment might be personalized to accomplish a new idea.
- Give details of all of your remarks as much as possible, focusing on mechanisms.
- Make a decision as to whether the tentative design sufficiently addressed the theory and whether or not it was correctly restricted. Try to present substitute explanations if they are sensible alternatives.
- One piece of research will not counter an overall question, so maintain the large picture in mind. Where do you go next? The best studies unlock new avenues of study. What questions remain?
- Recommendations for detailed papers will offer supplementary suggestions.

Approach:

When you refer to information, differentiate data generated by your own studies from other available information. Present work done by specific persons (including you) in past tense.

Describe generally acknowledged facts and main beliefs in present tense.

The Administration Rules

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References	Complete and correct format, well organized	Beside the point, Incomplete	Wrong format and structuring

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ISSN 9755896



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