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Infectious Diseases & Neglacted tropical Diseases 2018

4th Annual Congress on **INFECTIOUS DISEASES**

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Poster Presentation

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Knowledge, attitudes and practices on schistosomiasis in sub-saharan africa: A systematic review

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Background: The World Health Organization emphasizes on the use of integrative approaches in the control and elimination of schistosomiasis. A detailed understanding of sociocultural factors that may influence the uptake of the intended health activities and services is vital. Thus, our study sought to understand the knowledge, attitudes, perceptions, beliefs, and practices about schistosomiasis in various communities in Sub-Saharan Africa.

Methods: A systematic search of literature for the period 2006-2016 was done on Medline, PubMed, CINAHL, Psych info and Google Scholar using the following keywords "Schistosomiasis, *S. mansoni*, *S. haematobium*, knowledge, attitudes, perceptions, beliefs and practices in Sub-Saharan Africa" in combination with Boolean operators (OR, AND). In this context, we reviewed studies conducted among school children, community members and caregivers of preschool children.

Results: Studies reviewed reflected inadequate knowledge, attitudes, and practices in relation to schistosomiasis. Age, gender, occupation, and level of education were widely shown to have an impact on schistosomiasis knowledge and practices. About 60% of the studies reviewed reflected widespread misconceptions on the transmission and prevention of schistosomiasis. The disease was mostly believed to be caused by HIV, consuming unclean water and contaminated food. Risky water-related practices such as swimming, bathing and washing clothes in open water bodies were identified as key factors promoting transmission of the disease.

Conclusion: The study concluded that a comprehensive health education programme using contextual and standardized training tools may improve peoples' knowledge, attitudes, and practices in relation to schistosomiasis prevention and control.

Biography

Miss Hlengiwe is an applied researcher who draws from her experience in health systems research, program designing, and evaluation to address real societal problems, particularly in vulnerable communities. She holds a Master of Science degree in Public Health where she effectively utilized the structural equation modeling approach to study high-risk sexual behaviors for HIV among in-school youth in Swaziland. She is currently pursuing a Ph.D. in Public Health at the University of KwaZulu-Natal. Her Ph.D. research is on schistosomiasis and soil-transmitted helminthiasis treatment coverage and efficacy of praziquantel among preschool children aged 1-5 years in rural KwaZulu-Natal, South Africa. Her studies will contribute towards the redefining of guidelines for schistosomiasis prevention and control among children in South Africa.

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Lipocalin 2 (LCN2) play a protective role in host defense against *Burkholderia pseudomallei* infection

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Burkholderia pseudomallei (BPS) is a Gram-negative, facultative intracellular pathogen which is the causative agent of melioidosis, a serious invasive disease of humans and animals. Melioidosis is an important yet neglected infectious disease that is endemic to tropical regions. BPS utilizes numerous strategies that enable it to survive in such a specialized niche as the intracellular environment. In this study, we aim to understand the intracellular survival mechanisms of BPS at the host-pathogen interface and at the nutritional levels. Iron is required by both the host and the pathogen. Using in-vitro cell culture model we aim to identify the role of iron in the intracellular infection of BPS and the role of host lipocalin 2 (LCN2) protein in iron either facilitating or restrict the BPS access to the cellular iron stores. High pathogenic *B. pseudomallei* (K96243) and *B. thailandensis* (E264) (BT) were used in the study. All experiments with BPS were performed in a BSL-3 containment facility. Initially, we determined that iron is required for both extracellular and intracellular BPS infection. We then identified that LCN2 is induced during the intracellular BT/BPS infection both at RNA and protein levels and toll-like receptors- TLR2/TLR4 are involved in the induction of LCN2. Further, using RNA interference technology we found that LCN2 is required for the intracellular *Burkholderia* infection and also confirmed that the LCN2 controls the infection through iron regulation. With the findings, we conclude that iron plays a crucial role in the BPS infection and LCN2 play a protective role in host defense and suggest a potential avenue for therapeutic intervention against melioidosis.

Biography

Mr. Sandeep is a Research Associate at Duke-National University of Singapore (NUS), Medical School, Singapore. He obtained his Master's degree in 2009 in Biotechnology from the Bangalore University, India. He has been working in the field of Emerging Infectious diseases and therapeutic research for more than 8.0 years. His research interest includes pathogenesis studies on various newly emerging and re-emerging respiratory pathogens such as pH1N1 influenza virus, high pathogenic avian influenza H5N1 virus strains, respiratory bacterial pathogens such as *Klebsiella, A. baumannii* and also high pathogenic bacterial strain like *Burkholderia pseudomallei*. Mr. Sandeep has a good publication track record in his research work.

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Notes:

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Probing CD4-HIV-1 gp120 Glycoprotein Interaction

Xiaobo Yu, Poulami Talukder, Zhongjie Wang, Chandrabali Bhattacharya, Nour Eddine Fahmi, Jamie A Lines, Larisa M Dedkova, Joshua LaBaer, Sidney M Hecht and **Shengxi Chen**
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CD4-gp120 interaction is the first step for HIV-1 entry into host cells. A highly conserved pocket in gp120 protein is an attractive target for developing gp120 inhibitors or novel HIV detection tools. Here we incorporate seven phenylalanine derivatives having different sizes and steric conformations into position 43 of domain 1 of CD4 (mD1.2) to explore the architecture of the 'Phe43 cavity' of HIV-1 gp120. The results show that the conserved hydrophobic pocket in gp120 tolerates a hydrophobic side chain of residue 43 of CD protein, which is 12.2 Å in length and 8.0 Å in width. This result provides useful information for developing novel gp120 inhibitors or new HIV detection tools. A fluorescently modified CD4 domain 1 (mD1) protein was also designed and elaborated in an *in vitro* expression system. This fluorescent probe contains a Förster resonance energy transfer (FRET) pair, which uses a tryptophan residue as the fluorescence donor and an acridon-2-ylalanine (Acd) as the acceptor. When excited at 260 nm, energy was transferred from tryptophan to the Acd residue of mD1 and emitted fluorescence at 420 nm. This fluorescence was quenched after Evans blue (EB) inhibitor or HIV-1 gp120 protein binding, presumably as a consequence of changes in the distance and dipole orientation between the donor and acceptor; the emission intensity at 420 nm decreased in a concentration-dependent fashion. This fluorescent CD4 probe could be developed into a novel tool for HIV-1 gp120 protein detection. It also could be used to screen small molecules that inhibit the gp120–CD4 interaction.

Biography

Poulami Talukder has her expertise in designing and synthesizing molecules as novel treatments for infectious diseases. As a graduate student at Biodesign Institute at Arizona State University, she successfully synthesized structurally optimized phenylalanine derivatives for incorporation into human CD4 protein to increase the binding affinity to HIV gp120 protein which provides useful information for developing novel gp120 inhibitors. She had also worked on developing a fluorescent CD4 probe as new HIV detection tool. While working as a postdoctoral fellow at UCSF School of Pharmacy she developed novel strategies for increasing the efficacy of known antibiotics against the gram-negative bacteria. She also worked on structure-activity relationship (SAR) of the antimalarial ozonides artefenomel (OZ439) and arterolane (OZ277) to improve their efficacies and ADME properties.

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Differential expression of miRNA in peripheral blood cells from acute dengue and dengue hemorrhagic fever patients

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Dengue is the most prevalent arboviral disease transmitted by mosquitoes common in tropical areas of the world. Lack of proper medication or vaccines for dengue fever and inability to distinguish severe cases of dengue fever (DF) known as dengue hemorrhagic fever (DHF) during the early stages of infection, renders this disease life-threatening for people living in endemic areas. Early symptoms of DHF are similar to those of non-life threatening DF. However, DHF patients manifest plasma leakage, elevated hematocrit, and pleural effusions after 3-5days of fever. Early diagnosis and disease management can alleviate DHF related complications. Therefore, biomarkers that distinguish DHF at the acute phase of infection can help reduce mortality. Due to their role in post-transcriptional regulation of cellular gene expression and remarkable stability, altered expression of miRNA can serve as clinically relevant biomarkers. Therefore, we evaluated the expression of five miRNA targets in Peripheral blood cells (PBC) collected from 20 DF and 20 DHF positive patients within four days of fever onset by qRT-PCR. Relative expression of has-let-7e, has-miR-30b, has-miR-30e-3p, has-mir-33a, and has-miR-150-5p were evaluated against the geometric mean of has-miR-103a-3p and has-miR-16-5p as reference genes. While has- let7e, has-miR-30b, has-miR-30e-3p and hsa-mir-33° did not show differential expression between and DHF patients during the acute phase of infection, has-miR-150-5p showed over two-fold upregulation indicating that miR-150 may serve as an early biomarker of DHF.

Biography

Nimanthi Jayathilaka earned her PhD from University of Southern California and conducted her postdoctoral studies at University of California, San Diego. Currently she serves as a Senior Lecturer in Chemistry at the University of Kelaniya, Sri Lanka. Her primary research interest is transcriptional regulation in diseases.

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Plasma nitric oxide and salivary oxidized LDL as early predictive biomarkers of progression to dengue hemorrhagic fever

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Dengue is mosquito-borne disease characterized by a mild febrile illness as dengue fever (DF) and severe stage of illness as dengue hemorrhagic fever (DHF) and dengue shock syndrome that can lead to mortality. Early clinical management is critical in preventing mortality. Virus-induced activation of phagocytes is associated with oxidative stress. Several markers of oxidative stress have been reported to differentiate between DF and DHF. This study was carried out to assess the potential of biochemical markers of oxidative stress; nitric oxide (NO) and oxidized LDL (Ox LDL) to serve as markers of disease severity during the early stages of infection. We assessed the levels of NO and Ox LDL in both plasma and saliva due to the potential of salivary biomarkers to serve as a non-invasive prognostic tool. Plasma and saliva samples collected within 4 days from fever onset were analyzed. Griess reaction was used to quantify plasma and salivary NO levels. Plasma NO concentration in the DF group (n= 36) was significantly higher than that of those who later developed DHF (n=31) ($p<0.05$). Although salivary NO concentration in DF (n=16) and DHF groups (n=18) also show a difference, there was a high standard deviation of data probably due to the influence of oral health and diet. Plasma and saliva Ox LDL in DF and DHF groups were analyzed using ELISA. Plasma Ox LDL concentration in DF (n= 16) was higher than that of DHF groups (n=16), while salivary Ox LDL in DF patients (n=8) was significantly higher ($p<0.05$) than that of DHF patients (n=8). Therefore, the plasma NO levels and salivary Ox LDL may serve as reliable biomarkers of the severity of Dengue infection during the acute phase.

Biography

Nimanthi Jayathilaka earned her Ph.D. from the University of Southern California and conducted her postdoctoral studies at the University of California, San Diego. Currently, she serves as a Senior Lecturer in Chemistry at the University of Kelaniya, Sri Lanka. Her primary research interest is transcriptional regulation in communicable and non-communicable diseases.

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Role of FoxO in the regulation of Metformin-stimulated energy stress in *Echinococcus spp*

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We have previously shown that Metformin (Met), an anti-hyperglycemic and anti-proliferative drug, exhibits considerable in vitro and in vivo activity against *E. granulosus* metacestodes. Here, we extended the study and demonstrated that the drug also possess chemopreventive properties against alveolar echinococcosis in mice. As drug administration was shown to induce the Eg-AMPK activation, its anti-echinococcal effects might be a consequence of cellular energy charge depletion in the parasite. Based on this and the fact that only one FoxO transcription factor is present in the genome of *Echinococcus spp,* the aim of this work is investigate the activation state of FoxO and its relation with the expression of genes encoding sirtuins and key autophagy-related proteins in parasites incubated under both control and energy-stress conditions. Eg-FoxO sequence reveals several post-translationally modifiable residues highly conserved. By in totoimmunolocalization assays, we detected the expression and subcellular localization of a phosphorylated (Ser352) and an acetylated (Lys373) form of Eg-FoxO in control and Met-treated protoscoleces. Interestingly, similar expression patterns were observed in both samples. Additionally, by qPCR analysis, we found that Met produced an increase in the transcriptional expression of sirt and/or atg genes in *E. granulosus* protoscoleces and metacestodes and in *E. multilocularis* primary cells. In this regards, BLASTn analysis of the upstream sequences in putative promoters of several of these genes showed the conserved binding motif described for FoxO-activated genes. These results suggest a possible role of FoxO in the transcriptional regulation of *Echinococcus spp*. under energy stress conditions. We also detected expression of Atg8 polypeptide (LC3) with both a diffuse and punctate staining in control and Met-treated *E. granulosus* protoscoleces and *E. multilocularis* vesicles. However, western blot analysis demonstrated higher levels of Eg-Atg8-PE (LC3-II) in Met-treated protoscoleces, suggesting a possible induction of autophagy under this condition. Altogether, our data indicate that FoxO, Sirt and autophagy might participate in the regulation of Met-stimulated energy stress in *Echinococcus spp*.

Biography

Julia A Loos has a PhD in Biological Science (National University of Mar del Plata, 2017) and she is currently working as a postdoc under the direction of Prof. Dr. Andrea Cumino. She has been serving as assistant teacher for subjects such as Histology, General Microbiology and Pharmacology that are part of the Biology, Biochemistry and Medicine courses of study. She participates in several research projects on Parasitology and has published original articles. Currently, her research is focused on the study of intermediary metabolism and energy control in the larval stage of *Echinococcus spp*.

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Accepted Abstracts

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Snakebite envenoming: The most neglected public health crisis

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Snakebite envenomings are estimated to affect more than 2 million people every year, killing at least 125,000 and leaving about 400,000 with permanent disabilities. People from rural tropical and subtropical regions suffer the highest toll due to the coexistence with venomous snakes and no access to proper treatment. Currently, the only available treatment for snakebite is antivenom, a mixture of antibodies obtained after immunization of a domestic animal with snake venom. Although being effective, antivenoms come with drawbacks such as possible adverse reactions and expensive price. Furthermore, venom is composed of a complex mixture of proteins which can cause a variety of health issues ranging from hemorrhage to paralysis and respiratory failure depending on the snake species, geographical distribution, and ontogeny; hence, the development of a universal antivenom represents a considerable challenge. For all these reasons, in 2017 the World Health Organization included snakebite envenoming in the list of Neglected Tropical Diseases and established a working group of experts to prepare a strategic plan to tackle the global burden of this disease. At the same time, researchers around the world are working intensely on improving the efficacy of antivenoms as well as developing novel therapeutics, while several organizations are operating on a local level spreading awareness about snakebites in rural communities to mitigate the conflicts between humans and snakes. Snakebite envenoming represents a devastating tropical disease that can only be overcome by means of a holistic approach involving the concerted efforts of scientists, policy-makers, pharmaceutical companies, NGOs, and locally-involved organizations.

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An exploratory study of the factors influencing the acceptability of indoor residual spraying (IRS) in upper western Ghana

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Despite the implementation and good coverage of the WHO recommended malaria control program IRS, malaria continues to be a very serious public health challenge in the upper west region compared to other regions of Ghana. We explored enablers and barriers of community uptake of this program in a highly malaria endemic region in Ghana. Between April and October 2016 we conducted a qualitative inquiry, focus group discussion and semi-structured interviews with program stakeholders. Participants included community members, program operators and health system officials in upper western Ghana. 105 participants were involved in the study. Findings identified significant barriers to program uptake by communities including religious beliefs, superstition, and fear of insecticides among others. Enablers of program uptake by the communities included malaria prevention, the efficacy of the intervention, and incidental benefits. Program providers and health system officials detailed the following as a necessity to improve implementation: effective collaboration between stakeholders and the need to intensify public education. Despite challenges from both the program recipient and operator ends, IRS is an accepted intervention in the region. In order to improve the uptake and effective implementation, strategies to improve community uptake and streamline operations will be needed. These findings have policy and practice significance to improve community uptake and service operations of this novel public health intervention.

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Vaccinomics approach for designing potential peptide vaccine by targeting pyruvate kinase of *Madurella mycetomatis*

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Background: Mycetoma is one of the neglected tropical diseases that considered as a public health problem with socio-economic impact in several developing countries. It is a chronic progressive destructive suppurative disease can affect any part of the body, caused by certain fungi (*Eumycetoma*) or bacteria (*Actinomycetoma*). Madurella mycetomatis(*M mycetomatis*) is the predominant isolated organism causing eumycetoma in Sudan. .There is no effective treatment or a vaccine for it, thus the aim of this study is to design a peptide-based vaccine against *M.mycetomatis* infection via in silico approaches, using the immunogenic site Pyruvate kinase (PK).

Material and Methods: In 26th September 2017 sequence of PK of *M. mycetomatis* protein was retrieved from the National Center for Biotechnology Information (NCBI). Immunoinformatics tools were used to predict B and T-cell epitopes and to calculate the population coverage.

Result and discussion: Two epitopes predicted for b cell (gsypseav, dftkv) as a peptide-based vaccine. for t-cell epitopes, four epitopes showed high affinity to mhc class i (amaavrsal, yrgvpflf, hlyrgvypf, yrpvcpiim) and high coverage against the whole world (58.35%, 57.91%, 54.01%, 52.73%) respectively. in mhc class ii, si\x epitopes that interact with the most frequent mhc class ii (fvlstsges, ivescamaa, lkaensipy, ikwglshai) with high coverage against the whole world (80.93%, 80.02%, 73.12%,70.55%) respectively. moreover, one shared epitope (lkaensipy) predicted in b-cell, mhc-i, and mhc-ii with high population coverage world combined mhc-i and mhc-ii (77.92%) and (57.78%) in sudan. also, four shared epitopes (yrgvypflf, lkaensipy, lyrgvypfl, ikwglshai) between mhc-i and mhc-ii with epitope set 94.62% worldwide and 92.38% in sudan. till now there is no study was done to predict peptide-based vaccine against mycetoma infection, so this study will provide a strong base for development of vaccine after *in vivo* and *in vitro* studies confirmation of all this candidate epitopes as effective peptide vaccine.

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Mobile SMS effectively improves dengue prevention practices in community: An implementation study in Nepal

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Dengue is an emerging public health problem in Nepal that pose threat with frequent outbreaks. Dengue control activities are mostly outbreak driven, still, lack systematic interventions and people have poor knowledge and practices. This study aimed to explore the acceptability, appropriateness, and effectiveness of mobile SMS intervention in improving dengue control practices. This is an implementation research that used mixed-methods design with intervention. A total of 300 households were divided into three groups, i.e. one control group, one dengue prevention leaflet (DPL) only intervention group and DPL with mobile SMS intervention group (DPL+SMS). We used a structured questionnaire to collect information regarding the knowledge and practice of dengue prevention, and in-depth interviews to measure the acceptability and appropriateness of intervention. Mean difference, one way ANOVA, paired t-test and regression analyses were used to assess the effectiveness of the interventions. Thematic analysis was used to assess acceptability, appropriateness and barriers and enablers of the intervention. DPL+SMS intervention produced significantly higher mean knowledge difference (32.68±13.68 SD vs 13.32±8.79 SD) and mean practice difference (27.94±11.44 SD vs 4.88±5.42 SD) compared to DPL only group (p=0.000). Multivariate analysis showed that DPL+SMS intervention was effective to increase knowledge by 28.62 points and practice by 24.06 points compared to the control group. The intervention was perceived as acceptable and appropriate by the study participants and key stakeholders. Mobile SMS is an effective, acceptable and appropriate health intervention to improve dengue prevention practices. This intervention can be adopted as a promising tool for health education against dengue and other diseases.

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Expression profile of toll-like receptors mrnas in latently infected and non-infected school: Age children and adolescents

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Background: About one-third of the global population is considered to be latently infected with tuberculosis (TB) causing bacteria, *Mycobacterium tuberculosis*. Only 10% progress to active disease, while the majority contain the infection. Latently infected individuals are considered as reservoirs for continuous new TB infections.

Objective: The aim of this study is to measure the mean fold change in mRNA gene expression of Toll-like receptors (TLRs) during latent TB infection as a diagnostic biomarker tool for detection of TB progression.

Methodology: Quantitative real-time PCR (qRT-PCR) was used to measure the expression of selected TLRs (TLR-1, TLR-2, TLR-4, TLR-6 and TLR-9) in a total of 64 cDNA samples, retrieved from AHRI biorepository and collected from 32 tuberculin skin test (TST) positive and 32 TST negative, using convenient sampling, apparently healthy school children and adolescents, aged between 11 and 20 years. Specific primers and fluorescent labeled probes were used to span exon-intron junctions to prevent amplification of genomic DNA. Human acidic ribosomal protein (HuPO) was used as an internal control. A comparative CT method was used to describe fold change in the relative expression of TLR genes. Data were analyzed using Graph-Pad Prism 7.01 for Windows and a p-value of less than 0.05 was considered statistically significant. This study was approved by the AHRI/ALERT Ethics Review Committee (AAERC), AAU-CHS IRB and the National Research Ethics Review Committee (NRERC).

Result: An increased mean fold change in the relative expression of TLR-2 and TLR-6 mRNA was observed in TST positives relative to TST negatives ($p<0.05$), whereas a slight fold decrease was observed for TLR-1 gene. A strong positive linear correlation ($r=0.7$) was also observed between intra-compartment receptor, TLR-9 and surface receptors, TLR-1, TLR-2, TLR-4, and TLR-6 expression in latently infected tuberculosis relative to non-infected. A similar comparison was done between different age groups and both sexes; however, no apparent difference was observed in the fold change expression of TLRs.

Conclusion: Overall, an increased mean fold change in the mRNA expression of TLRs was observed in latently infected individuals relative to non-latently infected individuals, possibly showing a role for TLRs during latent tuberculosis infection, thereby maintaining and continuously stimulating immune responses through TLRs signaling pathways.

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Detection of lyssavirus antigen and assessment of the levels of anti-rabies antibodies in unvaccinated, apparently healthy and rabies-suspect dogs

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Rabies is an acute and progressive encephalitis caused by members of the genus *Lyssavirus* (Family Rhabdoviridae, order Mononegavirales). An estimated 59 000 human deaths occur annually in Africa and Asia, with the majority of these deaths due to dog bites. In this study, we undertook a cross-sectional survey for the presence of lyssavirus antigen in brain tissues and anti-rabies antibodies in sera of unvaccinated, apparently healthy and rabies-suspect dogs slaughtered for consumption at local markets in South Eastern Nigeria. Samples (both brain tissues and serum) from 278 dogs were tested for lyssavirus antigen and rabies antibodies, using the direct fluorescent antibody test (DFA) and a commercial enzyme-linked immunosorbent assay (ELISA), respectively. Twenty three brain tissues (8.3%) were shown to contain lyssavirus antigen, whereas 2.5% (n=25) of the serum samples had anti-rabies antibodies. There was an inverse relationship between the presence of lyssavirus antigens and levels of rabies antibodies. The inverse relationship between the presence of lyssavirus antigens and levels of rabies antibodies underscores the notion of immune evasion following lyssavirus infection. The low percentage of anti-rabies antibodies in the dog population studied suggests a dog population susceptible and at very high risk to rabies virus (RABV) infection. These findings indicate a big challenge to local and global rabies elimination efforts considering that most of the dog population in Africa is confined to the rural areas where parenteral dog vaccination is not routinely or adequately undertaken.

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Trypanosoma congolense versus geranylacetone: *In vivo* activity with *in vitro* and in silico antisialidase studies

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The menace of animal trypanosomiasis, especially caused by *Trypanosoma congolense*, still wreaks havoc in the livestock industry of the African continent which demands concerted efforts aimed at reducing the disease burden. An important strategy targeted against the disease is the use of chemotherapeutic agents but the presently available approved drugs are no longer effective which necessitates the search for novel agents. In the present study, geranylacetone was investigated for *in vivo* activity against *T. congolense* infected rats as well as the effects on trypanosome-induced pathological changes and *in vitro* and in silico anti-T. congolense sialidase activity. At a dose of 100 mg/kg bw, geranylacetone significantly ($P<0.05$) decreased the number of T. congolense in infected animals whilst an insignificant ($P>0.05$) reduction was observed with 50mg/kg bw of the compound. Furthermore, the compound was able to reverse the *T. congolense*-induced anemia and organ damages as evidenced by the significantly ($P<0.05$) lower values of packed cell volumes as well as hepatic and renal functions parameters in the treated group compared with infected untreated animals. Considering the crucial role of anemia in the pathogenesis of the *T. congolense* infection, the effects of geranylacetone on the *T. congolense* sialidase was further probed using *in vivo*, *in vitro* and in silico approaches. The *in vitro* studies suggested that the compound inhibited purified bloodstream *T. congolense* sialidase using an uncompetitive inhibition pattern. The mode of binding and critical interactions alongside the relevant amino acids were predicted using the molecular docking. We concluded that geranylacetone is also another molecule with therapeutic potency against *T. congolense* and could be added into the library of compounds with validated *in vivo* activity against trypanosomes for further studies as possible next generation trypanocides.

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Epidemiological surveys of and research on, soil-transmitted helminths in Southeast Asia: A systematic review

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This review analyses published data on STH prevalence and intensity in Southeast Asia over the time period of 1900 to the present to describe age related patterns in these epidemiological measures. This is with a focus on the four major parasite species affecting humans. Data were also collected on the diagnostic methods used in the published surveys and how the studies were designed to facilitate comparative analyses of recorded patterns and changes therein over time. PubMed, Google Scholar, EMBASE, ISI Web of Science, Cochrane Database of Systematic Reviews and the Global Atlas of Helminth Infections search engines were used to identify studies on STH in Southeast Asia with the search based on the major key words, and variants on, "soil-transmitted helminth" "Ascaris" "Trichuris" "hookworm" and the country name. A total of 280 studies satisfied the inclusion criteria from 11 Southeast Asian countries. It was concluded that the epidemiological patterns of STH infection by age and species mix in Southeast Asia are similar to those reported in other parts of the world. In the published studies there were a large number of different diagnostic methods used with differing sensitivities and specificities, which makes comparison of the results both within and between countries difficult. There is a clear requirement to standardise the methods of both STH diagnosis in faecal material and how the intensity of infection is recorded and reported in future STH research and in monitoring and evaluation (M&E) of the impact of continuing and expanding mass drug administration (MDA) programmes.

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Seroprevalence of dengue fever in febril patients consulted in Laquintinie hospital of Douala-Cameroon

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Background: Dengue is a disease caused by a virus which belongs to the Flaviridae's Family. It is transmitted to human by a mosquito bite of the Gender Aedes. It is the most widespread disease caused by an arthropod, with 40% (2.5 billion peoples) of the population exposed. This disease has four serotypes named DEN-1, DEN-2, DEN-3, and DEN-4, only the serotype 1 and 2 are present in Cameroun. However, it is difficult to diagnose the disease because it has similar symptoms with many other diseases such as malaria which is the leading cause of morbidity of mortality in our country, yellow fever and other. We did not have any dengue fever epidemic in our country. So, the disease is really neglected here. The study was aimed to contribute for the epidemiological data for the growing awareness of the medical corps and the population upon the responsibility of dengue in some cases of observed fever.

Material and Methods: Two hundred feverish patients coming for consultation at Laquintinie Hospital of Douala between April and June 2017 gave blood samples for serological analysis. The serodiagnosis was done in the central hospital laboratory of Laquintinie Hospital with rapid IgM/IgG kit.

Results: The rapid test revealed an IgG seroprevalence of 13,5% while IgM gave a prevalence of 2%. Moreover, this seroprevalence was high in the age group, 20 to 60 which belong to the active population. This is justified by the fact that the Aedes mosquito bites the day between 11 am and 18 pm. Finally, the patient's localization (Bepanda, New-bell, Bonamoussadi) were identified to have high-risk factors for dengue infection; the nature of these localities is favorable for vectors pullulation. These neighborhoods are very unhealthy and the population is very large. Some cities of Cameroon like Douala present a real risk of a dengue epidemic.

Conclusion: Dengue fever is a reality in Cameroon; so, some strategies for fighting against it should be taken despite our country did not have any dengue fever epidemic. The risk is real.

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Macrofilaricidal activity of silver nanoparticle synthesized from a plant andrographis paniculata

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Lymphatic filariasis is a neglected tropical disease, causing a major health hazard in the developing world. WHO has ranked the disease as one of the world's leading causes of permanent and long-term disability. The currently available anti-filarial drugs are most effective against microfilaria. Therefore there is urgent need of drug that are macrofilaricidal. Nanoparticles have gained significance in medical fields due to their high surface-area-to-volume ratio. In this study, we synthesize AgNPs from a medicinally important plant Andrographis paniculata. The plant have been reported for their antimicrobial, cytotoxicity, anti-protozoan, anti-inflammatory, anti-oxidant, and antiparasitic activities. This nanocomposite was characterized by UV-visible spectroscopy, FT-IR, XRD, SEM, and TEM. Nanocomposite anti-filarial activity was evaluated using motility and viability assay as well as by measuring ROS generation, antioxidant level, and apoptotic markers. The exposure of the nanocomposite to the worms caused a significant decrease in motility and viability leading to their death. Down-regulation of the antioxidant enzymes, as well as alteration in Ca2+ signaling, suggested the ER stress-induced mitochondrial-mediated apoptosis. The proteome analysis of treated parasites showed the marked alteration in the protein expression in comparison to the control. In conclusion, the nanocomposite synthesized using plant A. paniculata showed strong anti-filarial activity.

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Prevalence and spatial distribution of soil transmitted helminthiasis and water, sanitation and hygiene resource in ogun state, nigeria

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Soil-Transmitted Helminthiasis (STH) is one of the major public health problems in Nigeria. Efforts channeled towards complimenting preventive chemotherapy with a provision of water, sanitation, and hygiene (WASH) resources have been hampered by lack of empirical evidence on transmission hotspots to guide integrated control programme and resource distribution. A cross-sectional study involving 1,499 households across 33 communities was conducted in Ogun State in 2016-2017. Field visitations were made to recruited households for georeferencing and assessment of the condition of WASH resources using carefully WHO/UNICEF set standards. 1027(68.5%) of the sampled households provided fresh fecal samples for laboratory diagnosis of helminths ova using ether concentration. The WASH and STH data were compiled into a GIS database and subjected to the preliminary descriptive statistic. Spatial Maps were constructed using ArcGIS software. By demography, 600(40%) male and 899(60.0) female respondent participated in the study. Of the 20 LGAs examined, 19(95.0%) were endemic for one or more kind of the three main STH species (except Ijebu-Ode). Ascaris lumbricoides infections are the most geographically distributed species, found in 28/33(84.8%) locations and in 19LGAs. Hookworm was present in 19/33(57.6%) locations and in15LGAs. Trichuris trichiura infection was found in 9/33(27.3%) locations and in 7LGAs. An overall cumulative score of 52.9% was recorded for WASH resource conditions. The percentages score ranges between 65.7% and 38.6% across the LGAs. By categories, cumulative scores of 64.1%, 32.8%, 69.0% and 49.3% were recorded for water, sanitation, household hygiene and individual hygiene respectively. This study provides information on the prevalence and spatial risk of STH and WASH resources in Ogun State. This will serve as a decision-support visual tool for Ogun State programme managers to help facilitate the integration of STH control into WASH resource programming efforts.

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Trypanosoma congolense versus geranylacetone: *In vivo* activity with *in vitro* and in silico antisialidase studies

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The menace of animal trypanosomiasis, especially caused by *Trypanosoma congolense*, still wreaks havoc in the livestock industry of the African continent which demands concerted efforts aimed at reducing the disease burden. An important strategy targeted against the disease is the use of chemotherapeutic agents but the presently available approved drugs are no longer effective which necessitates the search for novel agents. In the present study, geranylacetone was investigated for *in vivo* activity against *T. congolense* infected rats as well as the effects on trypanosome-induced pathological changes and *in vitro* and in silico anti-*T. congolense* sialidase activity. At a dose of 100 mg/kg bw, geranylacetone significantly ($P<0.05$) decreased the number of *T. congolense* in infected animals whilst an insignificant ($P>0.05$) reduction was observed with 50mg/kg bw of the compound. Furthermore, the compound was able to reverse the *T. congolense*-induced anemia and organ damages as evidenced by the significantly ($P<0.05$) lower values of packed cell volumes as well as hepatic and renal functions parameters in the treated group compared with infected untreated animals. Considering the crucial role of anemia in the pathogenesis of the *T. congolense* infection, the effects of geranylacetone on the T. congolense sialidase was further probed using *in vivo*, *in vitro* and in silico approaches. The *in vitro* studies suggested that the compound inhibited purified bloodstream *T. congolense* sialidase using an uncompetitive inhibition pattern. The mode of binding and critical interactions alongside the relevant amino acids were predicted using the molecular docking. We concluded that geranylacetone is also another molecule with therapeutic potency against *T. congolense* and could be added into the library of compounds with validated *in vivo* activity against trypanosomes for further studies as possible next generation trypanocides.

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Addressing the double burden of disease: Improving health systems for Non-communicable and Neglected Tropical Diseases

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Background and Aim: Because of chronic nature, Non- Communicable Diseases and Neglected Tropical Diseases are known to cause the burden on the household and individual. The primary health care response to them has lacked adequate response. This study establishes a baseline regarding current non-communicable diseases (diabetes and hypertension) and leprosy management in Nepal at policy, health system and community levels and suggests relevant and contextually adapted interventions.

Methods: Policy analysis included policy documents review, stakeholder mapping, and qualitative interviews with 12 key stakeholders. Mixed-methods data collection techniques included interviews with 162 interviewees at macro, meso and micro level. The study sites were Baniyani and Itahari of Sunsari district. Fifteen focus group discussions, 36 in-depth interviews, and survey of 1209 households (Baniyani) and 1650 households (Itahari) were done. The study period was from 2016 to 2017. Co-creation process engaging stakeholders at community and macro level through consultations produced suggestions. Prioritization of the suggestions yielded intervention to refine further.

Results: Nepal has been followings ever policies and technical guidelines developed by WHO. The utilization of services in the primary health care center for diabetes and hypertension is low as compared to leprosy. Both the supply side and demand side barriers existed with regard to diabetes and hypertension. In Baniyani, more people were illiterate, below the poverty line with the expenditure exceeding the available resources. Most of them visit Primary Health Center. In Itahari, fewer people were illiterate and below the poverty line. Most people used to visit private hospitals as compared to Primary Health Center. Hypertension (29.6%) and diabetes (12.7%) in Itahari and hypertension (12.3%) diabetes (11.6%) in Baniyani were reported. The synthesized suggestions forwarded for interventions were as the engagement of key stakeholders on diabetes, hypertension, and leprosy, for the improvement in the management of those diseases at studied PHC level.

Conclusion: The areas for improvement of policy, health system and community level are opportunities for a better case of diabetes and hypertension through an assistance from refined relevant interventions.

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Drug development for cutaneous leishmaniasis: on the importance of relating anti-parasitic efficacy to skin pharmacokinetics

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Today, a small arsenal of drugs is available for the treatment of the parasitic skin infection cutaneous leishmaniasis (CL), but the unmet medical need for this disease of poverty remains high. While there has been recent progress in the discovery and development of new drugs for visceral leishmaniasis, the search for new drugs to cure CL remains a neglected area. One aspect of the problem is the vast challenges that the complex biology of CL poses to effective pharmacology: from drug penetration into the infected dermal skin tissue and macrophage host cells, to exerting activity against the plethora of pathogenic *Leishmania* parasite species. Taking the evaluation of a number of new drug candidates as an example, we will present a strategy to take compounds across the drug development pipeline from hit identification to preclinical development. We will focus in particular on the PK/PD relation between skin pharmacokinetics (tissue homogenates, microdialysis) and antileishmanial pharmacodynamics (qPCR, in vivo imaging). With this approach, we aim to develop new oral or topical treatments for CL that are safe, effective, affordable and patient-friendly.

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Molecular survey of non-culturable enteroviruses present in feacal samples of children with acute flaccid paralysis

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Despite WHO declaration in 2016 that Nigeria has been removed from the list of polio endemic countries, Acute Flaccid Paralysis (AFP) caused by Enteroviruses remains an important clinical presentation in the country. The objective of the study was to retrieve and identify Human Enteroviruses (HEV) from faecal samples of children with AFP whose faecal samples were inoculated on healthy monolayer L20B and RD cell lines but showed no cytopathic effect. Purposive consecutive sampling methods were used to collect 1260 feacal samples (achieved between the period of 2015 to 2016) from children (0 to 15years) with AFP living in the rural area of North-Western Nigeria. The study determined the prevalence of non-cultureable HEV species from children with AFP using Reverse Transcriptase semi-nested Polymerase Chain Reaction (RT-snPCR) and BigDye sequencing method. Overall, enteroviruses from three different species fo Enteroviruse were retrieved and identified: Specie A, B and C. Coxsakieviruses had the (highest) prevalence of 61.5%, Enterovirus-99 had prevalence of 23.7%, Enterovirus-2 had prevalence of 7.6% and Poliovirus had prevalence of 7.6%. Recombination analysis from this study showed that the circulating CVA-19 recovered from this study is recombined (87 % nucleotie similarity in the VP1 region) with Poliovirus-2 which was last isolated in 2006, consequently this have contributed to a fall in the control strategy and outbreak of recombinant form of Poliovirus in the Northern Nigeria. This study first document, identify and characterize CV-A10 in Nigeria and it first describe the molecular sequence of the isolate in Nigeria. Furthermore, this study first record and show evidence of cases of recombination between non-polio enterovirus-C (NPEV-C) (most especially CVA-17 and CVA20 retrieved in this study) and Sabin Poliovirus-2 in northern Nigeria.

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Some notes about medical applications for bacterial siderophore

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Statement of the problem: Some diseases need to treating by iron and some elements removing which achieved by production of bacterial siderophore.

Methodology & Theoretical Orientation: Under the iron-restricted condition many bacteria produced iron-chelating molecules called siderophore. Siderophore chelate iron and supply to the bacterial cell by outer membrane receptors. There are three main types of siderophores known as hydroxamate, catecholate, and carboxylate. It having many medical application, includes iron overload diseases treatment, such as ß-thalassemia. In the treatment of ß -thalassemia and certain other anemias, siderophores used as chelating agents, which having ability to bind with iron to produce complexes that lead to formation of ferrioxamine. The ferrioxamine is soluble in water and readily excreted through the kidneys. It binds with iron in the blood and enhances its elimination via urine and faeces, Selective Drug Delivery-Trojan horse strategy (Siderophore-antibiotic conjugates–Sideromycins, It can be used for selective delivery of antibiotics in antibiotic-resistant bacteria. Antimalarial Activity, Desferrioxamine B produced by Streptomyces pilosus used for the treatment of malaria caused by *Plasmodium falciparum*. Siderophores used for removing some elements from the body such as Aluminium overload, which occurs in dialysis encephalopathy, Vanadium removal, Desferal can be used for removal of vanadium from the body. Iron chelators in the treatment of cancers e.g. Dexrazoxane. Also used for the clearance of non-transferrin bound iron in serum which occurs in cancer therapy as a result of some chemotherapies. Iron chelation therapy may be useful against malignant cells without any significant cytotoxicity on nonmalignant cells. Siderophore has an ability to chelate various other metal ions which paved a way to concentrate the application of siderophore towards wound care products. Deodorant–Siderophore for Klebsiella pneumonia has been used in cosmetics as deodorant.

Findings: Using siderophore having an important role in disease treatment and other medical applications.

Conclusion & Significance: There are many medical applications for siderophore includes, Iron overload diseases treatment, Selective Drug Delivery, Antimalarial Activity, as Iron chelation therapy, as wound care products, also used in cosmetics as a deodorant.

Recommendations: Detection on the production of other types Siderophores which having the possibility for diseases treatment.

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Prospective evaluation of pain in dogs undergoing ovariohysterectomy and castration

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Six female dogs were operated for ovariohysterectomy and six male dogs were castrated to assess the severity of pain, wound healing and its complications if any from post-operative care. The heart rate, body temperature, and respiratory rate were also recorded. Body temperature, heart rate and respiration in male and female dogs during the process of operation differed significantly ($P<0.05$). On average the body temperature of female dogs was significantly higher (102.01±0.91°F) than the male dogs (1 OI .86±0.60°F). The heart rate of female dogs was significantly higher (109.42±23.06 beats/minute) than the male dogs (95.42±15.97 beats/minute). Respiratory rate of female dogs was significantly higher (40.68±5.07 breath/minute) than the male dogs (35.93±6.03 breaths/1 minute). The post-operative body temperature on average of female dogs (ovariohysterectomy) was higher than the male dogs castrated. The heart rate varied between animals of the same sex and on the average heart rate of female dogs was higher than the male dogs. The respiration also varied between animals as well as between male and females, but respiration rate was higher in female dogs than the male dogs. The female and male dogs varied markedly in relation to postoperative pain due to their respective operations. There was great variation between dogs for the degree of pain or severity of pain after ovariohysterectomy surgery and is might be associated with the physical health of these animals. The male dogs physically were of different health conditions and may be the weaker dogs felt prolonged pain as compared to those with good health.

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Artemisinin derivatives and synthetic trioxane trigger apoptotic cell death in asexual stages of *Plasmodium*

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Statement of problem: Although over the last fifteen years, the prevalence of malaria became reduced by over half but developing resistance against artemisinin derivatives and its combinations, which are the only ray of hope to treat resistant malaria set back the control efforts and the key hindrance to achieve the goal of malaria elimination till 2030. In spite these artemisinins are precious antimalarials, their action mechanism is yet to be fully understood. Reactive oxygen species (ROS) produces by cleavage of endoperoxide bridge of artemisinin derivatives are known to be its antimalarial efficacy. Since ROS could induce apoptosis, here we had explored the effect of artemisinin derivatives on the apoptotic machinery of the malaria parasite, Plasmodium falciparum, and its survival.

Methodology: The effect of α/β arteether, artesunate and a synthetic 1,2,4 trioxanes was studied on the apoptotic machinery of asexual blood stages of *Plasmodium falciparum* 3D7. We have evaluated the hallmark marker of the apoptotic pathway; disturbance in mitochondrial membrane potential, caspase activation and in situ DNA fragmentation.

Findings: Results have shown that cleavage of peroxide bridge of artemisinin derivatives and 1,2,4 trioxane generate reactive oxygen species which depolarize mitochondrial membrane potential and make it permeable which further followed by downstream events of apoptotic cell death like activation of the caspase-like enzyme and DNA fragmentation.

Conclusion and significance: The results suggested that artemisinin derivatives and synthetic trioxane induce apoptosis in the erythrocytic stage of malaria parasite: *Plasmodium falciparum*. Since Plasmodium has metacaspase at the place of caspases, which are found in human, it could be exploited as the new therapeutic target for malaria.

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Absolute eosinopenia as a surrogate marker for enteric fever

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Enteric Fever is caused by gram-negative bacilli *Salmonella typhi* and *para-typhi*. It is associated with high morbidity and mortality worldwide. Timely initiation of treatment is a crucial step for the prevention of any complications. Cultures of body fluids are diagnostic, but not always conclusive or practically feasible in most centers. Moreover, the results of cultures delay the treatment initiation. Serological tests lack diagnostic value. The blood counts can offer a promising option in diagnosis. A retrospective study to find out the relevance of leucopenia and eosinopenia was conducted on 203 culture proven enteric fever patients and 159 culture proven non-enteric fever patients in a tertiary care hospital in New Delhi. The patient details were retrieved from the electronic medical records section of the hospital. Absolute eosinopenia was considered an absolute eosinophil count (AEC) of less than 40 / mm3 (normal level: 40-400/mm3) using LH-750 Beckman Coulter Automated machine. Leucopoenia was defined as total leucocyte count (TLC) of less than 4 X 109 /l. Blood cultures were done using BacT/ALERT FA plus automated blood culture system before first antibiotic dose was given. Case and control groups were compared using the Pearson Chi-square test. It was observed that absolute eosinophil count (AEC) of 0-19 /mm3 was a significant finding ($p<0.001$) in enteric fever patients, whereas leucopenia was not a significant finding ($p=0.096$). Using Receiving Operating Characteristic (ROC) curves, it was observed that patients with both AEC <14/mm3 and TCL <8 x 109/l had 95.6% chance of being diagnosed as enteric fever and only 4.4% chance of being diagnosed as non-enteric fever. This result was highly significant with $p<0.001$. This is a very useful association of AEC and TLC found in enteric fever patients of this study which can be used for the early initiation of treatment in clinically suspected enteric fever patients.

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Profile of geohelminth eggs, cysts, and oocysts of protozoans contaminating the soils of ten primary

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Soil-transmitted infections are neglected tropical diseases that refer to the traditional lack of attention paid to these infections by research communities, while they are the second leading cause of death among children under six in Africa. The purpose of this study was to evaluate the risks of parasitic infection of school-age children through the soils of 10 primary schools in Dschang. To allow for specific conclusions, 400 soil samples collected around latrines, at playgrounds, and behind classrooms in each school were analyzed using the sucrose flotation method. From the results obtained, an overall contamination rate of 7.75% was observed. Five genera of nematodes (Ascaris, Trichuris, Capillaria, Cooperia, and hookworms) were identified, while neither cysts nor oocysts of protozoans were detected. The contamination rate and the number of species found were significantly different in the wet season as compared to the dry season. During the rainy season, this rate was 12.5% with all the parasitic stages identified, while, in the dry season, the soil contamination rate was 3% with the presence of only two genera (Ascaris and Trichuris). Also, the soils around latrines were more contaminated (11.9%) as compared to those collected behind classrooms (7.5%) and those at a playground (2.5%). Pupils of these schools may have played a major role in the contamination of their environment. Thus, sanitary education and deworming remain a necessity in the entire population of the study area in order to prevent helminth infections and to ensure effective environmental health.

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Community based active case finding of tuberculosis by involving lady health workers in muzaffargarh and faisalabad districts punjab province

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Background: In Pakistan, the case detection rate of TB is 63% in 2016, which means that the country is on track to achieve the global targets of "Reach at least 90% of people with TB" by 2020 although very slowly because still, 37% cases fail to be detected without introducing different strategies. In line with the WHO 'End TB Strategy,' the national TB control programme has developed a national strategic plan 2017–2020 with innovative methodologies, expanding partnerships, and multisectoral approaches by engaging all stakeholders.

Setting: To achieve these targets of 2020 and to enhance the case detection rate, Punjab TB Program started an innovative community-based strategy in two districts; Faisalabad and Muzaffargarh through the involvement of Lady Health Workers (LHWs). The verbal screening was done for TB and those with presumptive TB were investigated using smear microscopy and the Xpert MTB/RIF test was performed on smear-positive patients. All the diagnosed TB patients were linked to TB treatment and care.

Objective: The main objective was to increase the case detection rate of TB by enhanced active case finding through LED microscopy and Expert at the community-based screening by engaging the LHWs in Punjab province.

Results: From 20th November 2017 to 3rd March 2018, the total of 44, 479 sputa collected in Muzaffargarh and Faisalabad. Among them 18, 818 were processed for examination, out of total processed, 689 were positive and registered. Of total positive, 479 in Muzaffargarh and 210 were in Faisalabad as shown in below graphs.

Conclusion: From 20th November 2017 to 3rd March 2018, the total of 44, 479 sputum collected in Muzaffargarh and Faisalabad. Among them 18, 818 (44%) were processed for examination, out of total processed, 689 (4%) were positive and registered. Of total positive, 479 (69%) in Muzaffargarh and 210 (31%) were in Faisalabad as shown in below graphs.

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