

Professorial Inaugural Lecture



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Title:

**Physical activity and health: building health-promoting schools in
Gqeberha and beyond.**

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Physical activity and health: building health-promoting schools in Gqeberha and beyond

I would like to set the scene for my lecture with a poem, *Hopscotch in Helenvale*, by Olwethu Mxoli.

The setting for this poem is a writing session of a group of poets, known as the Helenvale Poets, situated in the vibrant community of Helenvale, where poverty, gangsterism, alcohol and drug abuse are commonplace.

Hopscotch in Helenvale - Olwethu Mxoli (2018).

The writers sag over their books
like wet rags
tired and dripping in the stale office
when someone suggests a break
and we pour into the open air

Outside the lines of childhood
crawl colourfully across the quad
calling for an instant game of hopscotch
and our writers are children again
jumping from square to square

conjuring the sounds of the young
laughter and arguments over whose turn it is
whose foot was on the line

As we move back
to hammer out one final poem
the muffled popping
of a gun in the distance
loudens towards us
turning everyone into meerkats
heads snap left and right

We clap
to call them quickly inside
behind the concrete walls and barred windows
into the illusion of safety

As we write I think about how they must walk home
through the bullets
and maybe
maybe one of them . . .

but we keep on writing
and writing
and writing

This has been the setting for my learning and teaching and for my research for the last 10 to 15 years. The hopscotch lines referred to in the poem were painted by 3rd year Human Movement Science students participating in the PasSPORT to Health project, an experiential learning project aimed at promoting physical activity and school sport at schools situated in the impoverished Northern areas and townships of Gqeberha. And this school in the township of Helenvale was also part of the DASH research project, which I will come back to later. I have come to learn, firsthand, of the many challenges facing our children in the northern areas and townships of Gqeberha, and their resilience in the face of adversity.

For this address, I thought it would be appropriate to share information on the research into the physical activity, health and wellbeing of primary school children living in the Northern Areas and townships of Gqeberha – which formed part of the 10-year collaboration between the Department of Human Movement Science at Nelson Mandela University, the Department of Sport, Exercise and Health at the University of Basel and the Swiss Tropical and Public Health Institute, in Basel, Switzerland. Three large studies formed the core of the 10-year collaboration: the Disease, Activity and Schoolchildren's Health (DASH) study, the *KaziBantu* Project and the *KaziAfya* study.

The research was and is being conducted in poor impoverished areas of Gqeberha, Eastern Cape, where 95% of the schools are categorized as quintile one, two or three, signifying that they are “no fee schools”, which is indicative of the poverty status of the surrounding communities (Ncanywa, 2015). Research from the South African National Health and Nutrition Examination Survey (SANHANES-1) (Shisana *et al.*, 2013) found that 42.6% of households nationally had no income and 51.7% of Eastern Cape households reported insufficient money for basic needs. The Eastern Cape had the country's worst unemployment rate at 52.6% in the first quarter of 2022 (the national rate stands at 34.5%) (STATSSA, 2022). This has resulted in an increase in food insecurity in the region, where 14 children below the age of five in Gqeberha were reported to have starved to death and 216 cases of severe acute malnutrition were reported in April 2022 (Ellis, E. 2022). The lifelong impact of poor nutrition has been described as the “slow violence of malnutrition” by the Children's Institute at the University of Cape Town (May, Witten & Lake, 2020). The poverty and growing inequality in our province and country has a detrimental effect on the health and well-being of children, which is a shame in the context of the country's wealth, prosperity and opulence. It is sad when children are the victims of South Africa's purported status as the most unequal country in the world.

It is well-known that physical activity contributes to physical and mental wellbeing of children and adolescents (Chaput *et al.*, 2020). The World Health Organization (WHO) recommends that children and adolescents aged 5 to 17 years should engage in at least 60 minutes per day of moderate-to-vigorous intensity, mostly aerobic physical activity across the week, with the inclusion of vigorous-intensity aerobic activities and strength exercises, at least 3 days a week (WHO, 2020). However, the WHO reported that 81% of children aged 11 to 17 years are insufficiently physically active globally, which is a serious threat to the health and wellbeing of populations around the world.

South Africa is a part of the 49-country Active Healthy Kids Global Alliance involved in reviewing country-specific evidence on the physical activity, nutrition and body composition of children and adolescents and producing a Report Card on the status of children's health (Draper *et al.*, 2018). The Healthy Active Kids South Africa (HAKSA) Report Cards were produced in 2007, 2010, 2014, 2016 and 2018, with the latest

coming out shortly in 2022. The evidence is used to guide policy, develop interventions and programmes and to strengthen advocacy to create healthy environments and promote and support healthy nutrition and physical activity in South African children and adolescents. In the 2018 Report Card, while there were no significant changes from the 2016 report, grades for certain indicators were downgraded, bringing these to the attention of relevant stakeholders. Overall, Physical Activity remained a C, but School Physical Education and School Sport were downgraded to a D- and C respectively. Four nutrition indicators were downgraded, and these included the National School Nutrition Programme, vegetable gardens, school tuck-shops and the advertising and media relating to nutrition. The 2018 Report Card also highlighted key priorities for action, which included safe opportunities for physical activity, the gap between policy and implementation and the double-burden of over- and undernutrition which relates to the continuing concern about food insecurity in South Africa.

With research indicating the importance of physical activity for children, it is imperative to examine the status of Physical Education in our schools – particularly Quintile 1, 2 and 3 schools that make up 95% of the schools in the Eastern Cape. Since 1997, Physical Education lost its standalone status and now forms part of the learning area Life Skills or Life Orientation, and is a low priority in the school curriculum. It is taught by generalist teachers, many of whom are not adequately trained to teach physical education. In many Quintile 1 to 3 schools, it may appear on the school timetable, but it is not taught purposefully. A large national research project was undertaken on the state and status of physical education in public schools of South Africa, commissioned by UNICEF in partnership with the Department of Basic Education (Burnett, 2018). The research highlighted the low status of Physical Education in most township schools as parents, school management and educators emphasize the importance of academic subjects. The lack of recognition and resource provision from the Department of Basic Education and government entities were also noted. Challenges impacting negatively on the teaching of PE in Quintile 1 to 3 schools were: the lack of funding (budget from the Department of Basic Education) and inability to raise funds, the lack of qualified educators with good didactical skills, large classes and student-teacher ratios, the lack of basic physical resources and equipment, amongst others (Burnett, 2018). A gap has been created in the teaching of PE in many schools. In recent years, this gap has been found by Non-government Organizations (NGOs), and PE is being outsourced to volunteers or NGOs. There is a growing trend in township and rural schools for these external agencies or NGOs to offer the PE and extramural sports programmes at these schools, without any involvement of the educators. It is estimated that 14.7% of PE is being offered by outside agencies (Burnett, 2018). These external agencies and NGOs obtain funding, they employ youth leaders and/or bring in paying volunteers from abroad to deliver the service. While it is beneficial for children to receive these programmes, it is not sustainable, as programmes come and go depending on the funding secured. I do feel strongly that many of the NGOs are simply funding their own salaries and have limited long term impact on school PE and sport. PE should not be outsourced as this is not sustainable, and it does not become ingrained in the culture of the school. South Africa needs systemic changes and PE should remain insourced and remain the responsibility of the Department of Basic Education, schools and teachers.

Given this background, I would like to present selected research findings in the area of children's health, conducted in Gqeberha, through the 3 large studies, as well as the toolkits developed, which formed the core of our 10-year collaboration with the University of Basel and the Swiss Tropical and Public Health Institute.

Disease Activity and Schoolchildren's Health (DASH) Study (2014 – 2018)

The DASH study, or in full the Disease, Activity and Schoolchildren's Health, was one of 12 projects funded as part of the Swiss-South African Joint Research programme (SAAJRP). The project duration spanned from 2014 to 2018. The aim was to assess the burden and distribution of communicable diseases and non-communicable diseases among school-aged children in selected underprivileged areas in Gqeberha, and to assess their effect on children's physical fitness, cognitive performance and psychosocial health (Yap, *et al.*, 2015). In addition, setting specific interventions which included a physical education programme, health and hygiene education and a nutritional intervention were implemented to assess their effect on measured health parameters. Approximately 1000 Grade 4 primary schoolchildren, aged 8 to 12 years, from 8 quintile 3 schools in Gqeberha (four in the Northern areas and four in the townships) participated in the study.

Here are just a few findings from the DASH study (although there were many more) that I would like to share:

A high prevalence of soil transmitted helminth (STH) was recorded at two of the eight schools participating in the project (*Ascaris lumbricoides* 60% and 72%; *Trichuris trichiura* 65% each) (Müller *et al.*, 2016). These schools are situated in a similar geographical area where the water and sanitation cannot cope with the high population density. The children in these two schools had the highest levels of stunting (up to 30% and 24% respectively). The results of the DASH study also showed that children infected with STH had lower levels of cardiorespiratory fitness, in addition to lower levels of concentration and lower school grades (Gall *et al.*, 2017). STH was shown to have a detrimental effect of the physical growth and development as well as on the cognitive performance of children, thereby limiting their potential and their life chances. It should be noted that school health authorities were notified of the results and that children were treated in accordance with WHO deworming guidelines. Bi-annual mass deworming at these schools in particular, was recommended and implemented for the duration of the study. A concerning point for me is whether this has continued, and what can be done to ease the burden of STH infections in this community.

The DASH study was challenged to make an impact on the lives of children in the school, and not just use schools for data collection. The setting specific intervention in the project (which aimed to do just that) comprised four elements: weekly physical education and dancing to music lessons, health and hygiene lessons, nutrition and deworming. Additionally, bathroom facilities were renovated with the help of schools and kind donors, food preparers were trained in basic hygiene, food safety and meal preparation and school play areas were upgraded into physical activity-friendly environments with simple painted games and activity stations. The study results found that the multidimensional physical activity intervention had positive effects on selected health variables in children (Müller *et al.*, 2019), and recommended that the intervention should be of longer duration and extend over the school year to enhance effectiveness.

The DASH study documented the poor health status and double burden from communicable and non-communicable diseases of children living in disadvantaged communities in Gqeberha. It also revealed the potential for improvement through PA and health literacy interventions, following the principles that PA

is key in promoting health and well-being among school children and that early interventions can have long-lasting effects throughout life.

KaziBantu: Healthy Schools for Healthy Communities (2018 – ongoing)

The WHO advocates that every school should be a health-promoting school and stipulates that no education system is effective unless it promotes the health and well-being of learners, staff and the community (WHO & UNESCO, 2021). Targeting schools for health promotion initiatives makes sense. Children spend most of their waking time at schools, this is where most children can easily be reached and it is an important life-stage for establishing healthy behaviours. Schools are important institutions in communities. Schools in many poor communities in South Africa are often the only few safe spaces for children, responsible not only for their academic growth and development, but where children can play in relative safety and receive a nutritious meal through the National School Nutrition programme.

The *KaziBantu* project – healthy schools for healthy communities, translated from Swahili and Xhosa into “active people” – supports the WHO as a health promoting school initiative. It a comprehensive school-based intervention programme aimed at promoting the health literacy for both schoolchildren and teachers of primary schools from disadvantaged communities in Nelson Mandela Bay (www.kazibantu.org). The main goals of the *KaziBantu* project are closely aligned to the UN’s sustainable development goals 3 and 4, namely “good health and well-being” and “quality education”, respectively. Emanating from the knowledge gained in the DASH study, two programmes were designed, namely *KaziKidz* and *KaziHealth*. A large team of Swiss and South African students, researchers and content experts from both countries collaborated on the development of these toolkits.

KaziKidz is a holistic educational and instructional tool aimed at consolidating the practice of Physical Education and Lifeskills in school, to enhance children’s overall health. The teaching material comprises freely available pre-made lessons covering topics of Physical Education, Moving-to-Music, and Health, Hygiene and Nutrition. The lesson plans are aligned with the countries’ Curriculum and Assessment Policy Statement (CAPS) and include lessons for grades 1 to 7. The *KaziKidz* Teaching material also entails cue-card summaries, sing-a-long songs and cartoons. A recent addition, complementing *KaziKidz*, is *KaziPlay*, a playground and sanitation intervention aimed at creating a health-promoting school environment.

KaziHealth is a workplace health intervention programme, designed specifically for teachers, working within low-resourced school settings. The programme aims to educate and improve health behaviours in teachers by integrating three lifestyle interventions: physical activity, nutrition and stress management. The programme starts with an individualised health risk assessment, followed by face-to-face lifestyle coaching sessions and self-monitoring and motivation through the *KaziHealth* app. Additionally, the risk assessment tool *KaziCHAT* is used by researchers to capture, rate and track teachers’ health and well-being indicators. The intervention is aimed at reducing cardiovascular risk factors and improving physical activity, diet and nutrition, and psychosocial health. Teachers are important role models for schoolchildren and can have a profound impact. Thus, promoting good health among teachers ultimately also promotes learner’s health.

The *KaziBantu* project has produced open-sourced material and resources for use by teachers in schools. The project has recognized the need to develop sustainable solutions to the teaching of PE and Lifeskills in schools and to promote the health and well-being of both children and teachers, by working with the Department of Basic Education and finding solutions within the system. The *KaziKidz* and *KaziHealth*

resources have been developed into short learning programmes accredited by Nelson Mandela University. More recently, we have received accreditation from the South African Council of Educators (SACE) for the Foundation Phase PE SLP (15 CPD points), and work is underway to achieve SACE accreditation for the Intermediate/Senior Phase PE SLP, as well as the *KaziHealth* SLP on teacher's health.

How effective is the *KaziBantu* programme in meeting its aims and objectives? In 2018, the *KaziBantu* project undertook research to investigate the efficacy of the school-based intervention programmes on risk factors for non-communicable diseases, wellbeing and psychosocial health in school-aged children from marginalized communities in Gqeberha. In addition, a workplace health intervention programme for primary schoolteachers was pilot-tested. For schoolchildren, the study was designed as a 9-month randomized controlled trial (*KaziKidz* intervention), while for teachers a 6-month intervention phase (*KaziHealth* intervention) was planned (Muller *et al.*, 2019). At each survey, disease status, anthropometry and levels of physical fitness and psychosocial health were assessed in both schoolchildren and their teachers. An additional sustainability component was added to the study to assess whether the desired health effects were achieved and sustained over time, and whether the programme was sustainable under routine conditions, or in other words, will it produce beneficial effects when the intervention is entirely implemented by the schools and teachers themselves. Selected results are being shared here, while the majority of the data is still being analysed and discussed by the postgraduate students linked to the research project.

Hypertension in children has increased globally over the past 20 years; yet, little is known about this issue among disadvantaged communities from low- and middle-income countries. The paper by PhD student in the project, Patricia Arnaiz, evaluated and compared different international references to identify hypertension among South African school-aged children from disadvantaged communities, and highlighted the caution to be exercised when using international guidelines when analysing blood pressure of South African pediatric populations, due to the underrepresentation of African children in the development of those guidelines (Arnaiz *et al.*, 2022). Our research resulted in the HMS Department being invited to join a national consortium of Universities working on developing South African norms for pediatric hypertension. Two of our colleagues are currently working in the consortium.

PhD student, Danielle Dolley, recently had a paper published entitled, "Clustered cardiovascular disease risk among children aged 8–13 years from lower socioeconomic schools in Gqeberha, South Africa" (Dolley *et al.*, 2022). The research found that 43.3% of children had at least one elevated CVD risk factor: 27.7% elevated triglycerides, 20.7% depressed high-density lipoprotein cholesterol and 15.9% elevated total cholesterol. An elevated clustered risk was identified in 17% (n=104) of the sample; girls exhibited a significantly higher CRS >1 SD than boys (p=0.036). An interesting finding was that estimated odds of an elevated clustered risk are doubled every 2 mL/kg/min decrease in VO₂max (95% CI 1.66 to 3.12) or every 49 min reduction in MVPA (95% CI 27 to 224), from which we can conclude that increased levels of CRF and MVPA may aid in the prevention and reduction of elevated clustered CVD risk.

Preliminary assessment of the impact of the *KaziKidz* school-based physical activity (PA) intervention on the risk factors for non-communicable diseases (NCDs), among children, have yielded interesting results. The intervention consisted of 3 components: namely: (1) the *KaziKidz* toolkit, physical education coach, and teacher workshop. After randomization, four of the eight schools received a staggered intervention, and the remaining four schools served as the control group. The results indicate that the intervention that offered full support to the non-specialist PE teacher had a greater positive impact on NCD risk factors.

These findings reinforce the importance of rolling out the *KaziKidz* SLPs, and the support that teachers need.

KaziHealth

The *KaziHealth* workplace health promotion programme, designed specifically for teachers working in low-resourced settings, embraces a behaviour change model and focuses on improving lifestyle behaviours through easy-to-follow steps. The assessment protocol components included personal information, including a medical history, anthropometry and body composition, clinical examination measuring hypertension, dyslipidemia, hyperglycemia and haemoglobin concentration, physical activity and physical fitness, diet and nutrition and wellness. Baseline results showed that 50% of the teachers were either prehypertensive or hypertensive; 35% were classified as pre-diabetic or diabetic and 33% had borderline or high cholesterol values. For the body composition results, 83% of the teachers assessed were classified as overweight or obese class 1, 2 or 3. A personal health risk profile was generated for each teacher, and they each received individual feedback from a biokineticist. This was followed by two lifestyle coaching sessions facilitated and presented by a psychologist, a dietician and biokineticist. The face-to-face intervention has also been converted into an online SLP, with the assistance of the Centre for Community Technology. There are 2 PhD students currently working on this part of the project, and we are looking forward to the results of this unique study.

KaziAfya: Schools for Healthy and Active Kidz (2018 – 2021)

The *KaziAfya* study investigated the effects of a school-based physical activity and multi-micronutrient supplementation intervention on the growth, health and well-being of school children in three African countries, namely South Africa, Tanzania and Côte d'Ivoire (Gerber *et al.*, 2020). This study is reportedly among the first to explore the associations between objectively assessed physical activity/fitness, micronutrient deficiencies, infectious diseases, risk factors for NCDs, and other health indicators in African children. The study seeks to provide information about influences preventing schools from participating in health promotion programmes, and factors that negatively affect the quality of the implementation of the measures. The research timeline was affected by Covid19, and had to be adapted accordingly, which meant that data collection was only completed in 2021. This study resulted in the *KaziKidz* toolkit being translated into Swahili and French, and being used in selected schools in Tanzania and Côte d'Ivoire. While much of the data is still being analysed, here are some of the results:

PhD student Siphesihle Nqweniso in her paper entitled “Physical activity, cardiorespiratory fitness and clustered cardiovascular risk in South African primary schoolchildren from disadvantaged communities: a cross-sectional study” showed a rise in both individual and clustered cardiovascular risk in children (Nqweniso *et al.*, 2021). The data shows that higher CRF/PA is associated with lower clustered cardiovascular risk already from a young age. Given that clustered cardiovascular risk present during childhood can track into adulthood, we advocate for PA participation and a healthy weight from a young age onwards.

Another publication from the *KaziAfya* study highlighted the double burden of malnutrition in South Africa. Findings showed that growth impairment is associated with greater overall fat mass, which has important implications for the long-term consequences of children's health (Long, *et al.*, 2021). Increased

childhood adiposity, especially in the abdominal region, can lead to greater risk of obesity in adulthood, which is associated with an increased risk of chronic metabolic disease. These co-occurring risks require intervention approaches that simultaneously prevent or reduce the risk of both nutritional deficiencies leading to underweight, wasting, and stunting, and problems of obesity and NCDs.

When investigating the baseline data of moderate-to-vigorous physical activity (MVPA) and its association with cardiorespiratory fitness among primary schoolchildren in the three countries, it was found that most children met recommendations by the WHO for MVPA and achieved high CRF scores (Gerber, *et al.*, 2021). It was concluded that in all three settings, higher levels of MVPA were associated with higher CRF scores. Nevertheless, children living in the most urbanized setting (such as observed in South Africa) were physically less active and had lower CRF than peers living in more rural areas (such as observed in Côte d'Ivoire and Tanzania). Particularly for girls, urbanization might increase the risk for insufficient MVPA, which may have negative effects on their CRF, thus negatively influencing health and well-being at a later age.

The research produced by the DASH, *KaziBantu* and *KaziAfya* projects has contributed to the scientific body of knowledge. We await the research findings and publications from the 6 PhD students still busy with their research. The socially engaged research has deepened our understanding of the growth, health and well-being of children living in marginalized communities in Gqeberha – and reinforced the need for local research. It has highlighted the detrimental effects of poverty and inequality and the need for the longitudinal monitoring of children's health.

Besides the scientific research, the study has a deep human element, as suggested by the poem Olwethu read at the beginning of this lecture. Projects and programmes are implemented in human spaces, by humans. The backstory of this research is that of troubled communities, and – naturally, challenges have been identified.

For the project, these issues revolve around sustainability and the uptake and integration of the *KaziBantu* programme into schools. We may question why this is the case – when the toolkits are there and freely available. Our research is beginning to shed light on the many difficulties and challenges that we need to engage with and address. Building healthy schools for healthy communities is onerous, but an ideal we should all be working towards. It requires a multidisciplinary team approach from many stakeholders: government departments, civil society, communities, parents, school governing bodies, principals, teachers and learners. It is not a luxury, but a necessity.

The success of any programme is dependent on many people. What our publications do not reveal are the human champions in many of our communities and among our research team. One such person (and there were quite a few) is Mrs Dorelle Isaacs, who at the time of the DASH project was the Head of Department at one of the two schools which had a high prevalence of STH infections. She took it upon herself to visit the homes of children who were absent from school, to ensure that they received their deworming treatment. In all 3 research projects, children were examined by nurses to ascertain their health readiness to participate in a cardiorespiratory fitness test. The examination by the study nurses went beyond what the study protocol required, identifying health conditions that required treatment. On average, 10% of the children participating in the three studies were referred to clinics for dental carries, scabies, ringworm, rashes, ear and eye infections, amongst other conditions. This does indicate a need for parental education and for the regular monitoring of children's health by the school health Department.

Many of our poor communities are “broken” as can be seen by recent reports in the newspapers (the death of children in taverns, alcohol and drug abuse at schools to cite a few recent examples). As I always say to my students, if we can make a difference in the life of **one child**, or a few children in a school, it should be motivation enough to continue.

Schools and communities are made up of those individuals, ones who can benefit from projects such as ours, and who are still at risk. As Olwethu Mxoli’s poem says:

We clap
to call them quickly inside
behind the concrete walls and barred windows
into the illusion of safety

As we write I think about how they must walk home
through the bullets
and maybe
maybe one of them . . .

but we keep on writing
and writing

And we need to keep on researching, working on interventions, publishing, advocating, hoping to make a difference in the lives of “one of them”, at least, and maybe more.

Let us start with our schools, building healthy schools for healthy communities. In the words of Nelson Mandela: “History will judge us by the difference we make to the everyday lives of children”.

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