


Intersectoral (in)activity: towards an understanding of public sector department links between water, sanitation and hygiene (WASH) and childhood undernutrition in South Africa

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Accepted on 23 March 2020

Abstract

Associations between different forms of malnutrition and environmental conditions, including water, sanitation and hygiene (WASH), contribute to poor child health, nutritional status and physical growth. The primary responsibility for the provision of water and sanitation, as a basic service and human right, lies with the State, as such, a number of stakeholders are involved. Despite relatively high levels of WASH infrastructure coverage in South Africa, enteric infections and stunting remain high for a middle-income country. The aim of this study is to elucidate the landscape of WASH in South Africa in relation to nutritional status of children under the age of 5 years in the South African, Gauteng and City of Johannesburg contexts. The authors detailed the national and provincial public sector departments and through purposive sampling proceeded to map the various departments and associated policies that are responsible for the provision of WASH facilities, as well the nutritional status of children. Of the six policies identified for review, three mentioned WASH, nutrition and children; however, none explicitly linked WASH to nutritional status in children. An in-depth review and analysis of these three crucial policy documents was conducted. Finally, a set of expert interviews were conducted and a consensus development conference convened, with experts at the intersection between WASH and nutritional status. The authors found that the public sector would benefit from better integration of the concept of WASH into their policy, planning and implementation frameworks. The WASH sector should emphasize the role in which WASH plans consider the impact of WASH on the nutritional status of children. The various public sector departments involved in WASH service provision, and other WASH stakeholders, including community-based organizations, non-governmental organizations and intergovernmental organizations, should be involved in the decision-making of the nutrition sector.

Keywords: South Africa, WASH, nutrition, policy, children

Key Messages

- Biological links between water, sanitation and hygiene (WASH) and nutritional status in children are well known; however, there is no clearly defined link between the various WASH components in government departments, and as such no defined responsibility.
- Government departments would benefit from better integrating the concept of WASH into their policy, planning and implementation frameworks.
- Gaps remain in relating governance and public policy analysis to health-related outcomes.

Introduction

Undernutrition stems from a range of biological, contextual and structural determinants, including antenatal, intrauterine and post-natal malnutrition. Undernutrition is the outcome of inadequate macro- and micronutrient intake and repeated infections, defined as <2 SD from the median of the reference population, and includes underweight (low weight-for-age; WAZ < -2 SD), stunting (low height-for-age; HAZ < -2 SD) and wasting (low weight-for-height; WHZ < -2 SD) (Fernandez *et al.*, 2002; Members of the WHO Multicentre Growth Reference Study Group, 2006; Black *et al.*, 2008). Undernutrition in children is of particular concern from a public health perspective because of its association with health and risk of diseases such as diabetes, hypertension and cardiovascular disease in adulthood and is also a predictor of physical growth, mental and cognitive development in childhood (Victora *et al.*, 2008; de Onis *et al.*, 2012; Spears *et al.*, 2013; WHO/UNICEF/USAID, 2015; Piper *et al.*, 2017). In this regard, childhood physical growth is used as a proxy for childhood nutritional status. Studies indicating that growth cannot be entirely improved by optimized diet have shown that environmental factors, including water, sanitation and hygiene (WASH), contribute to poor child growth and nutritional status (Mbuya and Humphrey, 2016). The composite concept of WASH is comprised the three spheres of WASH. While each represents a separate field of work, each is dependent on the presence of the other. For example, without toilets, water sources become contaminated and, without clean water, basic hygiene practices are not possible (UNICEF, 2016). Aspects of water include focus on the quantity and quality, as well as type of, and distance to, infrastructure, while the sanitation component includes focus on the access to, type of, and distance to, infrastructure; finally, the hygiene component emphasizes access to handwashing facilities with soap and nurturing good hygiene practices (UNICEF, 2016). Exposure to poor WASH during early childhood has been associated with higher risks of infections and poor nutritional status, including stunting (McDade, 2012; Guerrant *et al.*, 2013). Stunting is the result of a cyclical process of chronic exposure to undernutrition and repeated infections where women who were themselves stunted are at higher risk of having stunted offspring, creating an intergenerational cycle of poverty, reduced human capital and disease that is difficult to break (Prendergast and Humphrey, 2014; Norris *et al.*, 2017). Specific faeco-oral pathways are proposed by the so-called 5-F diagram, whereby faeces and associated pathogens are transmitted via fluids, fields/floors, flies and fingers to foods and then to the infant, which causes disease and infection, which in turn leads to growth faltering (Cumming and Cairncross, 2016). Growth faltering is one of the physical consequences of undernutrition stemming from an imbalance between nutrient requirement and intake, resulting in cumulative deficits of energy, protein or micronutrients that negatively

affect growth and development (Victora *et al.*, 2010; Leroy *et al.*, 2014; Nabwera *et al.*, 2017; McAlpine *et al.*, 2019). An analysis of Demographic and Health Survey data from 70 low- and middle-income countries (LMIC) found that increasing access to and use of improved water sources reduced the risk of stunting in children under the age of 5 years (Fink *et al.*, 2011).

The United Nations Children's Fund has advocated for the link between WASH and nutritional status for ~30 years and through the Conceptual Framework (1990), for Improved Nutrition of Children and Women in Developing Countries (The United Nations Children Fund, 1990), and provides a lens through which maternal and child undernutrition can be analysed. A scalar model is presented that highlights immediate, underlying and basic causes, incorporating the circumstances and determinants of maternal and child undernutrition from disease and dietary intake, to household environment and food security, to socio-economic and political context (The United Nations Children Fund, 1990). The Lancet Series on Maternal and Child Nutrition (2008) highlighted the link between WASH and nutritional status by reviewing evidence-based interventions that affect maternal and child nutrition-related outcomes, emphasizing the importance that WASH plays in preventing undernutrition (Bhutta *et al.*, 2008). The 2013 follow-up series provided an updated framework including recommendations for intersectoral approaches to the challenges of malnutrition in LMIC settings, including an emphasis on WASH (Bhutta *et al.*, 2013; Black *et al.*, 2013).

While the WASH concept was permeating the public health arena, from a policy perspective, the United Nations (UN) formally declared the right to water in 2002, noting it as indispensable to human dignity and a prerequisite for the realization of other human rights. The right to water entitles everyone to sufficient, safe, acceptable, physically accessible and affordable water for personal and domestic use (United Nations High Commissioner for Human Rights, 2003). This provided the first reference to the responsibilities that Governments and service providers have in delivering clean water and sanitation to everyone (Mwebaza and Kotze, 2009). In 2010, the UN General Assembly extended this remit and adopted a resolution including and recognizing sanitation as a human right (Dugard, 2016). In the African context, Article 14 of the African Charter on the Rights and Welfare of the Child (ACRWC) (African Union, 1990) ensures the provision of adequate nutrition and safe drinking water and that all sectors of society are informed and supported in the use of basic knowledge of child health and nutrition and the importance of hygiene and environmental sanitation.

Despite the ACRWC having been ratified by 49 member states, the situation is most critical in sub-Saharan Africa (SSA), where at the closing of the Millennium Development Goals cycle in 2015, the portion of people relying on untreated surface water for drinking was eight times higher than any other region. During this period,

>70% of SSA populations were living without adequate sanitation and the total number of people practising open defaecation actually increased (Markle and Donnenfeld, 2016). Conversely, between 2000 and 2017, the percentage of people in SSA using safely managed sanitation and drinking water increased from 20% to 32% and from 18% to 27%, respectively (UNICEF/WHO, 2019). However, these improvements did not significantly reflect in the nutritional status of African children. While stunting among children in Africa has decreased in percentage terms from 38.3% (2000) to 30.3% (2017), over the same period, due to population growth, the actual number of stunted children has risen (UNICEF, WHO and World Bank, 2017; Independent Expert Group of the Global Nutrition Report, 2018).

The South African setting is characterized by various transitions resulting in a multiple burden whereby the population faces under- and over-nutrition as well as micronutrient deficiencies (Norris *et al.*, 2014). Over-nutrition exists when the amount of nutrients exceeds the amount required for normal growth, development and metabolism.

With regard to WASH infrastructure, in 2015, the national percentage of households with access to piped or tap water in their dwellings was 89.4. In terms of national sanitation coverage, 270 000 South African households were reliant on buckets, while one in five households did not have access to improved sanitation facilities (Statistics South Africa, 2016; Parliamentary Monitoring Group, 2017).

National budgetary data suggest that spending on water and sanitation is increasing, accounting for 15.3% of public sector expenditure amounting to a total of R132 billion disbursed via various infrastructure grants (National Treasury: Republic of South Africa, 2019). At the provincial level, due to service provision for water and sanitation not being administered at this level, but rather national and local levels, there are sparse budgetary data for this.

Despite the high coverage levels of WASH infrastructure in South Africa, diarrhoeal diseases are the second leading cause of mortality in children under 5 years of age (Rispel and Padarath, 2018). The aetiology of diarrhoea in the South African context is closely linked to socio-economic status, and illnesses such as HIV/AIDS, access to vaccinations and poor environmental conditions (Chola *et al.*, 2015). Between 2011 and 2016, in children under 5 years of age, the prevalence of stunting was 27.4% and, over the same period, 5.9% were underweight and 2.5% were wasted (Statistics South Africa, 2017; Rispel and Padarath, 2018). Worryingly, despite the provision of social grants, free primary health care and vitamin supplementation, this prevalence rate has been unchanged since 1994 (Said-Mohamed *et al.*, 2015; Devereux, *et al.*, 2019). The relationship between WASH at household level and infant growth has received little attention in the South African context, which drastically limits our capacity to disentangle which installations and/or caregiver practices expose infants to such risks (Padarath *et al.*, 2016).

Intergovernmental organization (IGO) and regional organization, national governments and academic research at global, regional and national levels have recognized the importance of the link between WASH and nutritional status in children. Disappointingly, however, continued siloed efforts to reduce the prevalence of under-nutrition in SSA, and in particular, South Africa, one of the most economically developed countries of the region, via improving infrastructure and access to WASH, have not been sufficient. Globally, much of the literature concerned with health policy analysis has focused exclusively on the content of policy documents and has neglected the actors involved in policy implementation and reform,

while emphasis on health policy analysis in LMIC settings is still lacking (Walt and Gilson, 1994). In SSA settings, gaps remain in relating governance and public policy analysis to health-related outcomes (Mombberg *et al.*, 2020), while in the South African context, there is no clear delineation of roles and responsibilities relating to the integration of WASH and nutritional status, including intergovernmental relations (IGR) on how to address the nutritional status of children.

The aim of this study is therefore to elucidate the landscape of WASH in South Africa in relation to nutritional status of children under the age of 5 years. While interested in the broader South African context, emphasis is placed on the specific manner in which this manifests in Gauteng and the City of Johannesburg (CoJ). Of particular interest was to learn which public sector departments were involved at the confluence of WASH and nutritional status in children, their level of co-ordination, barriers to the implementation of strategies designed to address the link between WASH and nutritional status and, finally, make recommendations to address these barriers.

This study has three interrelated objectives: first, to map public sector departments that are responsible for the provision of WASH facilities, as well as the nutritional status of children; second, to identify and examine policy documents related to the confluence of WASH and nutritional status to explore the extent to which they address the link between WASH and nutritional status in children; and finally, to engage with experts at the intersection between WASH and nutrition to understand the vertical and horizontal co-ordination of public sector departments.

Methods

Study design

This study, initiated in 2019, used an exploratory qualitative study design (Walt and Gilson, 1994; Gilson, 2012) to reflect on the nexus between WASH and nutritional status in children, in the public sector in South Africa focusing on the Gauteng province and the CoJ.

Study site

The study site, the CoJ metropolitan council, is situated in the Gauteng province and is home to the largest township in South Africa, Soweto. Soweto's population is officially estimated at 1.3 million, with between 600 000 and one million people in the township regarded as living in extreme poverty (Harrison and Harrison, 2014). In 2015, Gauteng had 97.7% piped water coverage and 91.0% sanitation coverage (Statistics South Africa, 2016; Parliamentary Monitoring Group, 2017). The CoJ, in 2016, reported that 99.5% of inhabitants had access to sanitation facilities and 99.9% had access to water (Statistics South Africa, 2018). The CoJ, which is an urban area, is better resourced as compared to other parts of South Africa, and although the provision of infrastructure is well covered, the provision of operation, maintenance and repair services can become a risk factor for infant nutritional status/growth. In terms of water quality, 2019 data from Johannesburg Water indicate a total of 12 incidents of non-compliance for microbiological safety requirements (presence of *Escherichia coli*) and 10 chemical and physical incidents of non-compliance (related to turbidity). Despite these incidents of non-compliance, overall compliance targets were maintained (Johannesburg Water, 2019). For the CoJ, spending on water and sanitation infrastructure is decreasing, however so too are the absolute number of people without access to basic water and sanitation services. Spending,

however, for repair, maintenance and upgrading of existing infrastructure is increasing (City of Johannesburg, 2019). The South African Health Review reported that, in Gauteng, between 2011 and 2016, the prevalence of children under the age of 5 years who were wasted was 1.3%, 4.6% were underweight and 34.2% were stunted, representing the highest prevalence of stunting in the country (Rispel and Padarath, 2018).

Data collection

Institutional mapping

The authors detailed all national and provincial government departments in South Africa. South Africa is constituted on a quasi-federal system with three spheres of government at national, provincial and local levels (Butler, 2009; Muthien, 2014; Mahlangu *et al.*, 2018). National government is responsible for developing policy frameworks, defining norms and standards for service provision and distributing revenue in an equitable manner; provincial and local governments are responsible for implementing most public functions and for putting into effect the policies developed at national level (Department of Public Service and Administration, 2003; Butler, 2009; Mahlangu *et al.*, 2018). Provincial government enjoys legislative and executive powers concurrent with national government; local government on the other hand can take the form of either metropolitan councils or district or local municipalities and have varying degrees of legislative and executive authority (Republic of South Africa, 1998).

After collating the national and provincial government departments in South Africa, purposive sampling (Gilson, 2012) and an institutional analysis and development framework (Aligica, 2006) were used to select and include public sector departments that are responsible for the provision of WASH, as well as nutrition, presented in Table 1. The following inclusion criteria were used: participants (the public sector departments tasked with responsibility for the provision of WASH facilities and those tasked with ensuring the adequate nutritional status of children); scale (level at which the particular departments work, either national, provincial, or local); mandate (the department's responsibility in the provision of WASH facilities, as well as the nutritional status of children); and finally, scope for action (the department's agency to act in a co-ordinating or independent capacity to address the link between WASH and nutritional status in children).

Document review

Electronic searches for each of the departments included were conducted to identify and examine current policies and to determine whether any explicit link between WASH and nutritional status in children was present. A document review guide was developed to

structure the review process and was informed by the Walt and Gilson (1994) model for health policy analysis, focusing on understanding the content of policy documents, actors, context and process of interaction between public sector departments (Walt and Gilson, 1994).

Expert interviews

Key informants, informed by the institutional mapping and document review, located at national, provincial and local levels, in government departments, community-based organizations (CBO), non-governmental organizations (NGO) and IGO with unique insight and experience of the confluence between WASH and nutrition as it relates to nutritional status in children in South Africa were identified. The authors approached respondents and, in the process, identified alternative key informants from those that did not consent to participate. Those that were approached were also asked if they themselves were not able to participate if they could recommend others that the authors could contact.

An open-ended interview guide was used to conduct key informant in-depth interviews as well as a consensus development conference reflecting upon: (1) the perceived links between WASH and nutritional status; (2) barriers to the implementation of strategies designed to address the link between wash and nutritional status; and (3) solutions and/or recommendations to the aforementioned barriers.

In addition to key informant in-depth interviews, a modified consensus development conference method (Jones and Hunter, 1995; James and Warren-Forward, 2015) was convened providing a forum for discussion and deliberation and was comprised an expert panel of representatives from academia, public sector departments, CBO, NGO and IGO. The panel was presented with evidence pertaining to the institutional mapping and document review. The discussion was moderated by an independent chairperson ensuring that all panel members had an opportunity to contribute.

Data analysis

The authors identified and mapped actors and their respective mandates and identified factors that determine patterns of interaction (Aligica, 2006). The information gathered was analysed following the World Health Organization's methodology for mapping governance and health for well-being (World Health Organization, 2018) outlining the public sector departments included in this study. This provides a graphical representation of the structure and processes within a system and a map reflecting the relationships between the different components within the system.

Within the policy documents, the content was analysed by identifying actors, both individual and groups, implicated in the

Table 1 Institutional and development framework for departments purposively sampled

IAD framework	Purposive sampling		
	National	Provincial	Local
Scale			
Participants	National Department of Water and Sanitation National Department of Social Development	Gauteng Provincial Department of Health Gauteng Provincial Department of Social Development	Johannesburg Water CoJ Department of Health
Scope for action	National Department of Health National Sanitation Policy Food and Nutrition Security Policy Integrated Early Childhood Development Policy		

confluence between WASH and nutritional status in children. The processes of how these policies are realized were considered in terms of the particular mechanisms that provide for horizontal co-ordination between departments on the same level and vertical co-ordination between departments at different spheres of government. Finally, the environment within which these documents came into existence and that which they are meant to address was contextualized. This process was conducted by DJM and BCN and checked by RSM and PM.

Data from the document review were analysed using Walt and Gilson's policy analysis framework, which provides information about actors, process, content and context (Walt and Gilson, 1994). Data from the key informant interviews and the consensus development conference were minuted and analysed using the thematic content analysis. Both the data-driven inductive method and a deductive method drawing from the Christensen framework of co-ordination were used (Christensen and Lægheid, 2008). Christensen's framework was selected because it allows for reflection on co-ordination vertically between spheres of government and horizontally between departments as it relates to WASH and nutritional status in children. Data from the *a priori* selected themes were extracted from the document review, expert interviews and consensus development conference. Theme 1: link between WASH and nutritional status in government departments; Theme 2: complexity and lack of cross communication between government departments; and Theme 3: recommendations. All minutes and recordings were analysed by DJM and the findings from the analysis further discussed and reviewed with RSM and PM.

Results

Institutional mapping

Table 2 presents all national and provincial government departments and highlights the various public sectors as delineated by national departments and displays overlaps and/or absence of certain public sector departments in the various provinces. It demonstrates how each province has their own unique constellation of departments and that not all national departments are represented at provincial and/or local levels. Responsibility for the provision of water and sanitation does not reside at provincial level but rather directly with local government (Republic of South Africa, 1998). Thus, responsibility is located with the CoJ metropolitan council rather than the Gauteng provincial government. Health, on the other hand, falls under the purview of provincial government, except where the responsibility for service provision is shared, as is the case with metropolitan councils such as the CoJ (Republic of South Africa, 1998; Butler, 2009).

Nationally, it was determined that the National Department of Water and Sanitation (DWS), National Department of Social Development (DSD) and the National Department of Health (DOH) should be included. At the provincial level, the following departments were included: Gauteng Provincial DOH and the Gauteng Provincial DSD. Within the Metropolitan Council of the CoJ, Johannesburg Water and the CoJ Department of Health were identified for inclusion.

The results of the World Health Organization's methodology for mapping governance and health for well-being (World Health Organization, 2018) are presented in Figure 1 outlining the public sector departments included in this study.

The DSD finds its core legislative mandate in terms of Sections 27 and 28 of the Constitution and aims to ensure protection against

vulnerability by creating an enabling environment for the provision of a comprehensive, integrated and sustainable social development service (National Department of Social Development, 2019). The DWS states its responsibility in terms of the formulation and implementation of policy governing the water and sanitation sector, while striving to ensure that all South Africans gain access to clean water and dignified sanitation (National Department of Water and Sanitation, 2019). Finally, the DOH is concerned with improving health status through the prevention of illnesses and the promotion of healthy lifestyles (National Department of Health, 2019b).

The scope of action, vertical and horizontal, for each of these departments is provided for, in principal, through the 1996 Constitution and the IGR Framework Act of 2005. The Constitution (1996) states that the three spheres of government should function in a cooperative, interrelated and interdependent manner and ensure that there are IGR, formal and informal processes and institutional arrangements and structures for co-ordination within and between spheres of government (Government of South Africa, 1996; Butler, 2009; Mahlangu *et al.*, 2018). Chapter 3 of the IGR Framework Act (2005) outlines the process to be followed to ensure co-ordination in service delivery between national, provincial and local governments. The extent to which this is operationalized was explored through the document review and expert interviews.

Document review

The following key policies were identified, sourced and reviewed: National Development Plan 2030 (National Planning Commission, 2012), National Sanitation Policy (National Department of Sanitation, 2016), National Water Policy (National Department of Water Affairs, 2013), National Policy on Food and Nutrition Security (Department of Social Development and Department of Agriculture Forestry and Fisheries, 2017), National Integrated Early Childhood Development Policy (Department of Social Development, 2015) and the National Environmental Health Policy (National Department of Health, 2013).

Of the policies reviewed, three mentioned WASH, nutrition and children, however, none explicitly linked WASH to nutritional status in children. An in-depth review and analysis of these three crucial policy documents was conducted.

With regard to the National Sanitation Policy (National Department of Sanitation, 2016), children, irrespective of age, are mentioned in the policy in so far as sanitation contributes to the fight against child mortality and that basic sanitation should be safe for children to use. The policy explicitly mentions the link between sanitation, nutrition and health and acknowledges hygiene education and the importance of systematic approaches to encourage the widespread adoption of safe hygiene practices to reduce diarrhoeal and other WASH-related diseases. Communication and education-related activities are delegated to local government. While overall policy co-ordination is emphasized to achieve these objectives, responsibility for co-ordination and compliance is deferred to the Department of Cooperative Governance and Traditional Affairs as the regulator of local government.

The Food and Nutrition Security Policy (Department of Social Development and Department of Agriculture Forestry and Fisheries, 2017) acknowledges the constitutional mandate that guarantees every citizen the right to have access to sufficient food and water. With reference to children, no particular age range is proposed; however, the policy notes that the existence and extent of malnutrition is an important proxy indicator of access to food and in

Table 2 National and provincial government departments

	Gauteng	Western Cape	Eastern Cape	Northern Cape	KwaZulu-Natal	North West	Limpopo	Free State	Mpumalanga
National government Health									
Social Development									
Office of the Presidency	Office of the Premier								
Human Settlements			Human Settlements	Human Settlements	Human Settlements	Local Government and Human Settlements	Human Settlements	Human Settlements	
National Treasury	Provincial Treasury Education		Provincial Treasury Education	Provincial Treasury Education		Provincial Treasury Education	Provincial Treasury Education		
Basic Education									
Higher Education and Training									
Agriculture, Land Reform and Rural Development	Agriculture and Rural Development	Agriculture	Rural Development and Agrarian Reform	Agriculture and Land Reform	Agriculture and Rural Development	Rural, Environmental and Agricultural Development	Agriculture and Rural Development	Agriculture, Rural Development, Land and Environmental Affairs	
Environment, Forestry and Fisheries		Environmental Affairs and Development Planning		Environment and Nature Conservation	Economic Development, Tourism, and Environmental Affairs		Economic Development, Environment and Tourism		
Economic Development		Economic Development and Tourism	Finance, Economic Development, Environmental Affairs and Tourism	Economic Development and Tourism	Finance, Economic Development, Tourism, and Environmental Affairs	Finance, Economic, and Enterprise Development Tourism	Economic Development, Environment and Tourism	Economic Development and Tourism	
Tourism									
Public Works and Infrastructure	Infrastructure Development	Transport and Public Works	Roads and Public Works			Public Works, Roads, and Infrastructure	Public Works and Infrastructure	Public Works, Roads and Transport	
Transport	Roads and Transport								
Police	Department of Community Safety	Department of Safety and Liaison	Department of Safety and Liaison	Transport, Safety and Liaison	Transport Department of Community Safety and Liaison	Community Safety and Transport Management	Transport and Community Safety	Police, Roads and Transport	Community Safety, Security and Liaison
Sports, Arts and Culture	Sports, Arts, Culture, and Recreation	Cultural Affairs and Sport	Sports, Recreation and Arts and Culture	Sports, Arts and Culture	Arts and Culture Sports and Recreation	Culture, Arts, and Traditional Affairs	Sports, Arts and Culture	Sports, Arts, Culture, and Recreation	Culture, Sport and Recreation
Cooperative Governance and Affairs	Cooperative Governance and Traditional Affairs	Local Government	Cooperative Governance and Traditional Affairs	Cooperative Governance, Human Settlements, and Traditional Affairs	Cooperative Governance and Traditional Affairs	Culture, Arts, and Traditional Affairs	Cooperative Governance, Human Settlements, and Traditional Affairs	Department of Cooperative Governance and Traditional Affairs	
Water and Sanitation									
Justice and Correctional Services									
Mineral Resources and Energy									

(continued)

Table 2 (continued)

	Gauteng	Western Cape	Eastern Cape	Northern Cape	KwaZulu-Natal	North West	Limpopo	Free State	Mpumalanga
National government Health									
Social Development									
Office of the Presidency	Office of the Premier								
Communications and Digital Technologies	Office of the Premier								
Home Affairs	Office of the Premier								
International Relations and Cooperation	Office of the Premier								
Employment and Labour	Office of the Premier								
Defence and Military Veterans	Office of the Premier								
Public Enterprises Science and Technology	Office of the Premier								
Small Business Development	Office of the Premier								
State Security	Office of the Premier								
Telecommunications and Postal Services	Office of the Premier								
Trade and Industry Public Service and Administration	Office of the Premier								

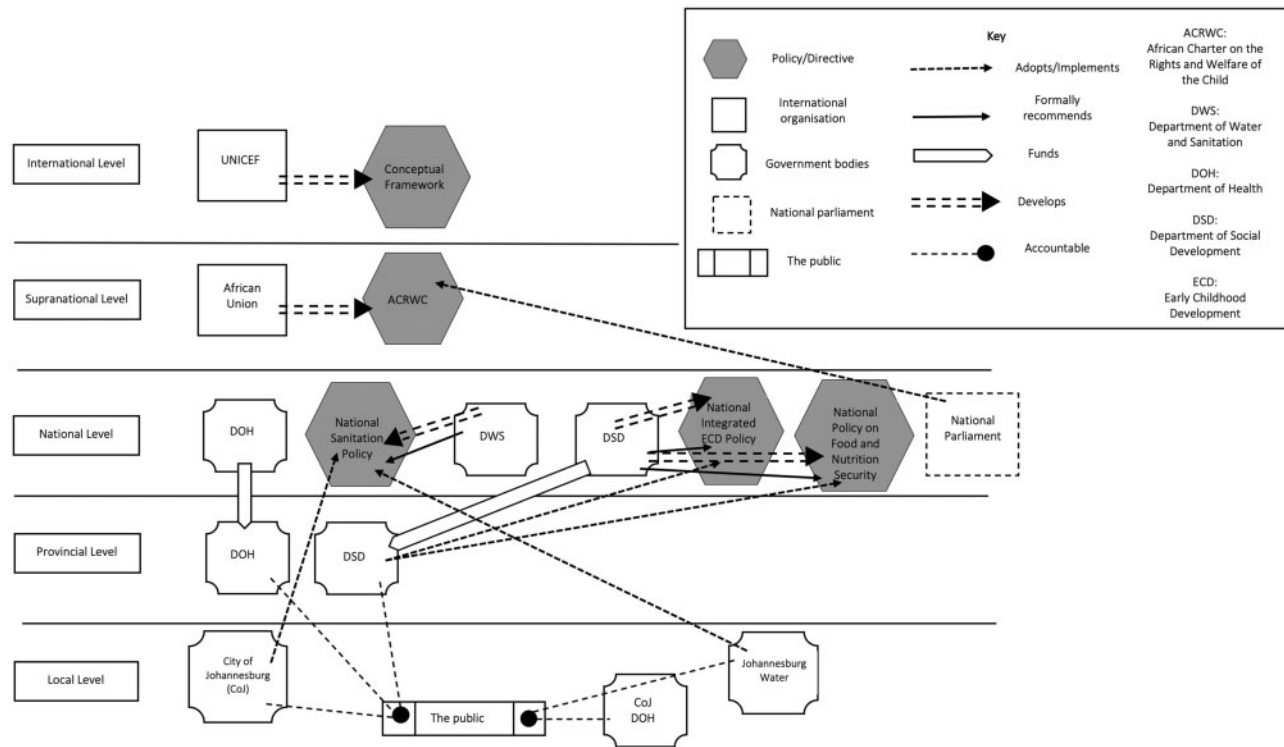


Figure 1 National mapping.

particular that health-related measures such as stunting and wasting are particularly concerning when it comes to urban informal settlements. The policy also states that food and nutrition security requires well-managed intersectoral co-ordination and the integration of existing policies and programmes in health, education and environmental protection and calls for the involvement of CBO and NGO. Furthermore, the policy advocates for a comprehensive Food and Nutrition Security and Vulnerability analysis, which would serve as a national data set including health, nutritional status and sanitation. Water and hygiene are not explicitly included.

The final policy that was reviewed, the Integrated Early Childhood Development Policy (Department of Social Development, 2015), states that it aims to provide an overarching multisectoral enabling framework of early childhood development services, inclusive of national, provincial and local spheres of government. The policy covers the period from conception until the year before children enter formal school, or until age 6 years. Essential components that need priority attention as a government obligation include healthcare and nutrition programmes, water and sanitation. The policy recognizes that early childhood development programmes result from a series of mutually dependent partnerships of role players responsible for the well-being and development of children in South Africa, which include different government departments, organizations, agencies and individuals. The national DSD is responsible for policy development; national planning; regulation and development of norms and standards for service provision; and evaluation of efficiency and effectiveness while the provincial DSD is responsible for provincial population-based planning and management of the services described above. The DOH is responsible for the provision of the health and nutrition programmes. The DWS is responsible for formulating and implementing policy governing this sector and has an overriding responsibility for water and sanitation services provided by local government. It is thus responsible for

ensuring that national water and sanitation policies and laws securing the rights of young children to access to sanitation and clean piped water. The policy goes so far as to delegate specific roles and responsibilities to all government departments as it pertains to early childhood development.

Expert interviews

Invitations to 15 respondents from government, NGO, IGO and academia were extended to participate as key informants. Three of those approached were from academia, six were from the government sector, four were from NGO and two were from IGO.

Of those approached, two consented to participate for in-depth interviews: one respondent came from an international NGO and the other from the governmental health sector.

Important points made by the key informants targeted the need for training around early identification of chronic forms of malnutrition in early childhood through regular clinic visits and that parents need to have a better understanding of the Road-to-Health Card (an instrument used by doctors and nurses to monitor and record growth rate, development and immunizations—given to mothers when their infant is born) and the anthropometric measurements being conducted. The respondents noted that the policy environment is very complex and that a lack of cross communication between departments both horizontally and vertically hinders planning and implementation. Another key challenge relates to the lack of data sharing, between provinces as well as between departments. Integration of data with indicators that are relevant for particular outcomes based on shared concerns was also highlighted. For instance, clinicians may not be immediately concerned with the environmental causes of diarrhoea over and above if the child presents with acute malnutrition. One respondent commented that 'there is a lack of agency in tracing and addressing WASH-related issues from

a clinical standpoint, however from a disease surveillance perspective the incidence of diarrhoea at various scales is important to identify and address potential outbreaks as well as more pervasive and chronic issues including growth faltering’.

A panel for the consensus development conference was convened from a pool of stakeholders and experts comprised professionals from the public health sector, NGO, IGO, CBO and academia. Invitations to participate in the consensus development conference were extended to 20 respondents, of whom 13 agreed to participate. The panel acknowledged that there is a strong link between WASH and nutritional status in children and that the biological pathways are well defined. The complexity of mapping the public sector departments is however made difficult due to the fact that there is no clearly defined link between the various WASH components in a public sector setting and as such no defined responsibility. The panel highlighted that there is a lack of advocacy for the link between WASH and nutritional status in children due to a survival-driven agenda, which is more concerned with childhood mortality than morbidity. The panel noted that the extent that WASH affected nutritional status children and the cost of inaction needed to be quantified at various scales to increase the political will around addressing WASH and chronic undernutrition in children. The panel pointed to a number of policies, including those reviewed in this exposition, that include WASH. They highlighted that none clearly define or create a causal link between governance, WASH and nutritional status in children and that there are competing priorities between the various levels of government both in terms of mandate and in terms of party politics. It was furthermore suggested that national government is much better it seems at cooperation than the provinces; however, implementation and operationalization is key at local level.

Discussion

After the institutional mapping and review of policy documents, key informant interviews and consensus development conference, the study found that the key actors involved in addressing WASH and nutritional status in the study site include the national DWS, national DSD and national DOH, Gauteng provincial DOH, Gauteng provincial DSD, Johannesburg Water and CoJ Department of Health. The research has also highlighted the limited integration and co-ordination around service provision of these key areas related to WASH. Departments function in silos, and there are limited efforts and implementation of efforts that are meant to allow for co-ordinated service delivery. IGR between levels of government are also poor, and there is limited harmonization of efforts between the national, provincial and local levels of government.

The WASH landscape is comprised a complex set of actors from various sectors that engage with one another on an *ad hoc* basis, and while acknowledging that there are biological associations between WASH, morbidity, nutrition and growth, the precise pathways are not well articulated in the policy sphere. The horizontal and vertical intersectoral collaborations are also particularly difficult to delineate.

The South African Constitution provides for the provision of health care, food, water and social security under Section 27 of the Bill of Rights, and Section 28 further extends the right to basic nutrition in the case of children; however, no explicit mention is made to the provision of sanitation (Government of South Africa, 1996; Dugard, 2016; Durojaye and Chilemba, 2018). This has led to the South African Human Rights Commission to link the right to sanitation to the right to human dignity, privacy and a clean environment

(National Department of Water Affairs, 2012; Dugard, 2016; South African Human Rights Commission, 2018). Furthermore, the National Development Plan (National Planning Commission, 2012) aims to achieve compliance with sustainable development goal (SDG) 6 (clean water and sanitation for all) by 2030 (Parliamentary Monitoring Group, 2017). If these are to be achieved, a more co-ordinated effort will need to be leveraged at policy, planning and implementation levels. WASH is furthermore among the strategic priorities for the WHO Thrive Agenda 2030 (WHO *et al.*, 2018). The report details the fact that, while most countries have a policy for WASH in healthcare facilities or infection prevention and control, <25% of these are fully funded and being implemented. As of 2017, 75% of the 75 countries that participate in the UN-Water Global Analysis and Assessment of Sanitation and Drinking-Water initiative indicated that financial data were available and utilized for decision-making around WASH and health issues. Of these countries, over two-thirds indicated the existence of a financing plan or budget for WASH, but less than one-third reported that a financial plan was in place and consistently followed. The report details the fact that, while most countries have a policy for WASH in healthcare facilities or infection prevention and control, <25% of these are fully funded and being implemented. Thus, advocating for the strengthening of nutrition and WASH sectors, which enable improvements in newborn and child health (WHO *et al.*, 2018).

Theme 1: link between WASH and nutritional status in government departments

WASH is a complex concept, with many components, both individual factors (WASH) and within each component (quality, quantity, access, infrastructure, etc.), interacting in the system, while the individual WASH components occur in different governmental spheres. As such, articulation of the link between the various WASH components and nutritional status in children is sparse and, although the various components, namely WASH, are mentioned, the relationship between them is rarely elaborated upon.

The various departments are primarily concerned with their core mandates. As such they are restricted in addressing crosscutting issues that fall outside of their immediate remit. For instance, the DOH (and/or clinicians and allied medical services) is responsible and concerned with direct/acute clinical issues and is not necessarily empowered to address the underlying and environmental causes of clinical conditions that they are confronted with. While the link between WASH and nutritional status is not new and the pathways are well established, given the complex public sector landscape, it is difficult to translate these into the policy realm. The public sector would therefore benefit from better integrating a consolidated concept of WASH (UNICEF, 2016) that coherently incorporates the various individual components namely WASH into their policy, planning and implementation frameworks, rather than dealing with each component in isolation as well as ensuring that consistent, co-ordinated and complementary indicators across clinical and service provision sectors may also help co-ordination between sectors.

Theme 2: complexity and lack of communication between government departments

The 1996 Constitution provides that the three spheres of government national, provincial and local should function in a cooperative, interrelated and interdependent manner (Government of South Africa, 1996; Butler, 2009; Mahlangu *et al.*, 2018). The arrangement of government departments is by no means static and has gone

through many functional and structural iterations at all levels since the transition to democracy in 1994 (Naidoo, 2018).

In the South African context, there is a lack of a guiding framework to operationalize and address the link between nutritional status and WASH and to guide and inform implementation at national, provincial or local levels. There is also a lack of clarity about roles and responsibilities of various sectors that need to be involved and how the link between WASH and nutritional status should be monitored. This is perpetuated by a constellation of departments at various levels, which complicates vertical and horizontal co-ordination, cooperation and collaboration.

While municipalities hold the mandate to deliver services, politics, both party and personal, intrude into co-ordination within municipalities (across wards and between departments), between municipalities and the province (and cutting across different departmental mandates) and with national government. The impact of politics intensifies the closer the authority is to the councillors and ward committees who are lobbying for resources, and party affiliations matter as much as personal connections. Municipal debt, which across South Africa totalled R72.4 billion in 2019, is another issue that should be mentioned in this regard (Statistics South Africa, 2019; Nkadimeng, 2020). The various wards that cumulatively comprise the municipal jurisdiction are often purchasing utilities from the national service providers and are tasked with recouping those costs from residents. Recent protests about service delivery and the shutting down of services due to mounting municipal debt in the CoJ further demonstrate the tension between the various levels of government and the various levels of service provision (Charles, 2020; Seleka and Grobler, 2020).

On a positive note, the public sector involvement in the HIV and AIDS response in South Africa has had many successes, suggesting that such co-ordination is possible. Among the biggest gains has been the prevention of mother to child transmission and important lessons can be learned as to how best to leverage a multisectoral response (Padarath *et al.*, 2016; Mahlangu *et al.*, 2018; Rispel and Padarath, 2018). Progress in this regard has been achieved through mainstreaming HIV in the public sector, in both health and non-health sector departments (Mahlangu *et al.*, 2018). In addition, deeper vertical co-ordination at international and supranational levels could further assist in developing strategies for addressing the burden of undernutrition from a WASH perspective. In recent years, countries such as Brazil, Peru and Senegal have found success in reducing undernutrition significantly through tailored multisectoral approaches, ascribing successful interventions by agriculture, health care and WASH to jointly targeted populations and geographic areas (Skoufias *et al.*, 2019).

Theme 3: recommendations

During the course of this study, it became evident that providing recommendations on how best to address the challenges faced by the various public sector departments was not an easy task. However, a few recommendations were echoed through a number of sources. The establishment of a database of tools, policies and implementation strategies around best practice, relating to successful attempts at combining WASH and nutritional status, at all levels of government would help leverage experience of successful programmes. Use of the National Dashboard of priority indicators was also noted as a powerful tool for driving implementation as there is visible monitoring and accountability for specific indicators (National Department of Health, 2019a). Integration of data with indicators that are relevant for particular outcomes based on shared concerns is essential.

For instance, clinicians may not be immediately concerned with the environmental causes of diarrhoea over and above if the child presents with acute malnutrition, thus integrating a clear and defined set of indicators will be essential in trying to address the problem of growth from a WASH perspective. Harmonizing indicators across clinical and service provision sectors may therefore help co-ordination across sectors. Using consistent language for both WASH and nutritional status-related indicators is integral to harmonizing such co-ordination efforts. Understanding what each of term and indicator means, using them appropriately in the right context, is key to communication between actors but also measuring the impact of policies and other interventions. For instance, while the issues underpinning undernutrition could be addressed appropriately, seeing changes in linear growth can be seen at later stages, even in the next generation due to other determinants (including epigenetics), which can take two or three generations to overcome. Underweight is a poor indicator due to the fact that it does not distinguish between weight and height contributions. Furthermore, undernutrition includes hidden hunger, i.e. micronutrient deficiencies, which are hardly measured in routine or in survey assessments. Of the policies reviewed in this exposition, none clearly define or create a causal link between governance, WASH and nutritional status in children. There are competing priorities between the various levels of government both in terms of mandate and in terms of party politics, and because the various WASH and nutritional status components fall under different public sector departments, there is no defined responsibility for how WASH should be operationalized to help address the burden of malnutrition in children. The SDG indicators may therefore be of use for synchronizing targets from international to local scales, while providing a framework for linking policy to health-related outcomes. Localizing the SDGs is critical to align the competing priorities between departments at various levels of government.

Understanding the associations between WASH, growth and nutrition is integral, and the way that these pathways are articulated in the policy sphere has real-world implications. An important distinction is that it is in fact not WASH that will improve nutrition but rather WASH will improve growth, which is in this case a marker of nutritional status. In addition, low-cost WASH interventions often fail to improve health because they require much more user effort, time and compromise than is required from residents of high-income countries for WASH services (Humphrey, 2019). For instance, trial results showed that an intervention testing the effect of a device that automatically chlorinates piped water on child diarrhoea delivered less-than-perfect disinfection but required no user effort (or even awareness of its presence) significantly reduced child diarrhoea by 23% (Humphrey, 2019; Pickering *et al.*, 2019). Among the policies reviewed, there was little reflection on when during childhood, or at what age, it would be ideal to intervene. Timeous targeting of interventions, especially during the first 1000 days, is integral. In addition, while a conceptual understanding of what the links are, WASH interventions have had mixed success when it comes to improvements of linear growth. Policy is the first step, and to take WASH policies to the next level, it is important to acknowledge policy gaps and also focus attention on the complexities of implementation and communication, collaboration and cooperation between the various actors and stakeholders. Future studies would benefit from including an SWOT analysis focusing on strengths, weaknesses, opportunities and threats in the South African and study contexts to better understand the dynamics of addressing nutritional status through WASH.

Finally, it is imperative to note that governance is not only for government, but private sector involvement is also imperative in

order to create sustainable solutions at scale. Furthermore, the role that CBO, NGO and IGO play in the intersection between WASH and nutritional status cannot be overstated.

While intersectoral collaboration is, in principal, facilitated at a national level through policy frameworks, there exists a deeper need to ensure that co-ordination around implementation is operationalized at provincial and local levels. Unfortunately, this is problematized in the case of metropolitan councils, which are politically highly contested due to the fact that they enjoy legislative and executive authority. In certain cases where the provincial and metropolitan council government are opposing political parties, or competing factions within parties, collaboration and cooperation can be particularly difficult.

While we have highlighted the institutional restraints of the public sector departments, this study has in itself a number of limitations. The authors reached out to a number of key informants within each of the government departments included; however, most declined to participate in this study. They indicated an appreciation for the importance of the topic but expressed a lack of confidence in commenting on the intersection between WASH components and links nutritional status in children. Although they considered the link between WASH and childhood malnutrition to be important, they did not consider themselves sufficiently competent to comment. This reinforces our contention that this is a neglected issue in SA policy and implementation.

While the authors have mentioned the specific mandates of the various government units, explicit indication and discussion about past, present and future programmes was outside the immediate scope of this exposition. The authors remain cognisant about the importance of describing and evaluating such initiatives in the context of the current research and suggest this as a focal point for future research on the topic.

A lack of data at local government level made an analysis across various scales difficult, and while this study utilized simplified models to describe complex systems and interactions, based on these findings, future research needs to focus on the barriers to implementation. Experiences may also differ in other municipalities and provinces that emphasize and feature WASH more prominently in their policy and implementation frameworks and as such further research and insight is required. Despite these challenges, the authors managed to compile data in each of the proposed fields providing insight into the status quo while presenting a novel use of methods offering critical advantages and strengthening the work conducted from traditional scoping and desk reviews.

Conclusion

This exposition sought to elucidate the landscape of WASH in South Africa in relation to nutritional status of children under the age of 5 years. The authors found that utilizing consistent and established terminology and indicators when referring to the challenges and recommendations for service provision would allow for a more targeted discussion around which particular aspects of the WASH components require further consideration. The public sector would benefit from better integrating the concept of WASH into their policy, planning and implementation frameworks.

The WASH sector should take stronger action to integrate nutrition; too few WASH plans consider the impact of WASH on nutritional status of children. The various public sector departments involved in WASH service provision, and other WASH stakeholders, including CBO, NGO and IGO, should be involved in the decision-

making, monitoring and evaluation and implementation of policies and strategies within the nutrition sector.

In addition, further targeted research on the governance of WASH through the identification of the various role players and stakeholders at various levels, while understanding the policy environment in relation to particular health-related outcomes, is imperative to address the burden of child undernutrition.

Acknowledgements

The support of the DSI-NRF Centre of Excellence in Human Development (ACC2017007), DSI-NRF Centre of Excellence in Food Security (160502) and SAMRC/Wits Developmental Pathways for Health Research Unit towards this research is hereby acknowledged. Opinions expressed and conclusions arrived at are those of the authors and not necessarily to be attributed to the CoE in Human Development, CoE in Food Security or the SAMRC/Wits Developmental Pathways for Health Research Unit. We would like to acknowledge and thank all the respondents that participated in making this exposition possible through their valuable contributions and insights.

Conflict of interest statement. None declared.

Ethical approval. Ethical clearance (M170872) was obtained from the Human Research Ethics Committee (Medical) of the University of the Witwatersrand. All discussions were conducted in English, minuted and recorded upon consent.

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