A SYSTEMATIC REVIEW OF THE ECONOMIC IMPACT OF HIV/AIDS ON SWAZILAND

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ABSTRACT

Swaziland is currently faced with a deepening HIV/AIDS epidemic. A systemic review of the economic impact of HIV/AIDS on Swaziland was undertaken to collate data and document this impact in order to inform decision makers and planners.

There is a dearth of research on the impact of HIV/AIDS on the public sector, rural households and the macroeconomy. HIV/AIDS Impact studies on Swaziland have faced difficulties of identifying HIV-infected entities and attributing observed impacts to HIV/AIDS.

HIV/AIDS has increased the vulnerability of affected Swaziland rural households to environmental shocks by four-fold. There is an increased burden of orphans due to HIV/AIDS, reduced household labour and income as adults die of AIDS. HIV/AIDS has reduced farm productivity leading to worsening of food insecurity and poverty in affected households.

Due to HIV/AIDS, absenteeism in Swaziland organizations has increased by 20-fold. HIV/AIDS is currently the leading cause of death accounting for over 60 percent of all employee deaths. Tuberculosis amongst employees is a major cause of prolonged absence from work and also the most common cause of AIDS deaths. Organisations that have implemented HIV/AIDS workplace responses have been less affected.

The micro-sector is the worst affected and it is recommended that policy makers ensure that this sector is protected from the negative impact of HIV/AIDS. The epidemic of negative impacts of HIV/AIDS in Swaziland has not yet reached the peak. It is therefore recommended that researchers commission longitudinal impact studies to document the impact of HIV/AIDS on Swaziland with increased validity and reliability.
ACKNOWLEDGEMENTS

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1.0 BACKGROUND

1.1 Extent of the HIV/AIDS epidemic in Swaziland

Swaziland is the smallest country in Southern Africa comprising of approximately 17,000 square kilometres. HIV\(^1\)/AIDS\(^2\) was first detected in Swaziland in 1986 and a National AIDS Control Programme was established in 1987. The 8\(^{th}\) sentinel survey of 2002 puts the national adult HIV prevalence at 38.6 percent (1). Current UNAIDS estimates have reported a prevalence of 38.8 percent, the highest in the world, with Botswana second at 37.3 percent (2).

The United States Census Bureau (3) projected the adult HIV prevalence to level off and stabilize at 34 percent. However, this has not happened, instead there was a sharp rise in prevalence from 34 percent in the year 2000 to 38.6 percent in the year 2002. The sharp rise was largely due to a 6 percent increase in HIV prevalence amongst the 15-19 year age group. Infections in this age group represent newly acquired infections (1,3).

Various factors have been linked to the worsening of the epidemic in Swaziland. First is the high proportion of sexually active youths aged 15-19 (4,5). Secondly, the prevalent pattern of labour migration internally towards commercial agricultural farms and externally to mines in South Africa and, increased population mobility across the borders (6,7,8). The third factor is the prevalent gender inequalities within the Swazi society (9). Lastly, the failure of government to respond adequately to the epidemic has been cited as another major factor (10).

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\(^1\) HIV – Human Immunodeficiency Virus.
\(^2\) AIDS - Acquired Immunodeficiency Syndrome
1.2 Objectives of the review

Swaziland is facing a high prevalence of HIV/AIDS and the epidemic is in an advanced stage with already large numbers of people falling sick and dying (1,2,3). This is the stage when the negative impacts begin to manifest. The impact of HIV/AIDS on the Swazi economy is therefore diverse and there is need to collate data and document this impact in order to inform decision makers and planners.

A systematic review of available literature on the impact of HIV/AIDS on Swaziland was, therefore, undertaken to explore and collate data on the socio-economic impact of HIV/AIDS in Swaziland. The main objectives of this systematic review were:

**Objective 1**: To identify completed research conducted on the economic impact of HIV/AIDS in Swaziland;

**Objective 2**: To make a preliminary assessment of the quality of existing research so far done on the socio-economic impact of HIV/AIDS on Swaziland, identify trends and gaps in the research and identify methods of dealing with these gaps;

**Objective 3**: Determine the ways and extent to which HIV/AIDS has affected the various sectors of the Swazi economy.

The literature search covered all the three levels of the economy outlined above, but, given the available literature, particular issues were specifically considered in relation to each level. These issues are discussed in the next section.
1.3 The Swaziland economy

Cohen (11) has described the economy in three major levels – the micro-economic, meso-economic and macro-economic sectors.

At micro-level, the systematic review focussed on the rural households and their farm systems. Whereas rural household agriculture contributes only 1.2 percent to Swaziland Gross Domestic Product (GDP), it is practiced by over 70 percent of the Swaziland population. It is also the main source of maize, which is the staple food for the Swaziland people (12,13). Rural households and their farm systems are one of the major sectors in the Swazi economy.

At meso-level, the review covered the private and public sector organisations. The private sector is the largest employer in Swaziland accounting for over 70 percent of total labour force. At the end of 2002, the private sector employed 63,598 of the 92,152 total number of Swaziland population in paid employment (14).

Secondly, the private sector contributes over 50 percent of Swaziland’s GDP, 48 percent being from export of manufactured goods and 10 percent from commercial agriculture (14).

Thirdly, the private sector contributes 10 percent of government revenue (14); only second to the revenue from the Southern African Customs Union (SACU) that provides over 50 percent of state revenue (15). SACU comprises of five southern African countries, namely, Botswana, South Africa, Lesotho, Namibia and Swaziland. Its aim is to maintain the free interchange of goods between member countries.

In the public sector organizations, the review covered the central agencies of government and education. Amongst the central agencies of government were the Ministries of Agriculture and Co-operatives; Finance, Economic Planning and Development, Public service and Information.
The public sector is the second largest employer, employing over 30 percent of the total labour force, only second to the private sector (14). Moreover, the social services offered by the public are key to survival of all the other sectors of the economy. A typical example is the agricultural extension officers that provide technical advice to rural farmers. Breakdown of continuity in such services could have major downstream effects to rural farming and so have a negative impact on food security.

The impact of HIV/AIDS on individuals, households, companies, government, political and legal institutions collectively impact negatively on the macro-economic performance and economic development. This is referred to as the macro-economic impact of HIV/AIDS (16).

Several studies done in the early 1990s addressed the link between HIV/AIDS and macro-economic growth (16). This was when the full scale of the epidemic had not been recognized. Since then, there has been little research in this area.

1.5 The impact of HIV/AIDS on the economy

The excess morbidity and mortality due to HIV/AIDS amongst the productive age group induces negative labour and income supply at all levels of the economy (11). This section briefly discusses the mechanism through which HIV/AIDS impacts on the three levels of the economy.

1.5.1 HIV/AIDS Morbidity and labour and income supply changes.

At the microlevel, as productive members of the household who are infected begin to fall sick, there is diversion of labour from the household farm to look after the sick member (17). Secondly, the sick member of the household is unable to work on the farm. There is increased expenditure on healthcare for infected members on the household (18).
At the mesolevel, HIV infected workers take time off to seek health care and look after household members that may be sick as well. The increased absenteeism reduces productivity and is a cost to the organisation as salaries are paid or work not done (11, 19). The increased utilisation of healthcare leads to increased expenditure of the organisations on healthcare for staff and dependants (20).

1.5.2 Mortality and labour and income supply changes.

When those infected with HIV/AIDS die, there is permanent loss of labour and skills to households and organisation (11, 21).

At micro-level, loss of the productive member of the household is a loss of income to the household (22). Further, the household spends money on funerals and burial costs (18). At meso-level, there is increase expenditure on death benefits and funeral benefits (20).

1.5.3 Net result of HIV/Aids morbidity and mortality on labour and income supply

The net result at microlevel is reduced income and labour for the farm. These manifest as reduced farm productivity, reduced farm area cultivated, moving to crops that require less labour and farm inputs and less livestock kept (23). With increasing poverty children drop out of school (24).

At mesolevel, the net result is increased expenditure on wages and reduced profitability (25).

The combined effect of micro and meso level impacts is reduction in growth of Gross Domestic Product (GDP) (16).
1.6 What is a systematic review?

A systematic review is a summary of all past research on a topic of interest (26). Data from multiple studies is synthesized, in the event the synthesis yields comparable effects, the effect is reported (27). In the event the effect varies across studies, the source of variations is tracked down (28).

1.6.1 Rationale for a systematic review

This systematic review was done with the major aim of synthesising data from multiple studies on the socio-economic impact of HIV/AIDS on Swaziland in order to yield comparable results on the impact across the various sectors of the Swazi economy. The review explored the variations in impact across sectors and provided insight into the source of these variations.

Secondly, the review identified sectors that have been heavily affected by HIV/AIDS. The review provided reasons why these sectors were heavily affected. This is information is critical to planning. The information feeds into discussions on the design and implementation of effective intervention to the epidemic. According to Mulrow (29), systematic reviews efficiently integrate valid information and provide a basis for rational decision-making and planning.

Thirdly, there have been debates in both technical and political circles that have cast doubt on the extent of the HIV/AIDS epidemic and the level of impact to the Swazi economy. The prolonged drought of 2001/2002 that left many rural Swazis famine stricken raised debates on the impact of HIV/AIDS. Technical reports pointed to HIV/AIDS as the major underlying factor. However, government was convinced this was a mere famine brought about by prolonged drought (30,31). These debates have created uncertainty amongst planners about the extent of the impact of the HIV/AIDS epidemic. Light and Smith (32) have suggested that whenever there is a substantive research question, with
disparate findings and substantial uncertainty, systematic reviews should be done to clarify the evidence.

Earlier studies on the impact of HIV/AIDS on Swaziland projected a huge negative socioeconomic impact on the country (33). The systematic review was therefore done to collate and synthesise information from various studies on the impact of HIV/AIDS on Swaziland. The systematic review would therefore provide reliable results on which to draw conclusions on the impact of HIV/AIDS on Swaziland and provide information for planning.

Wolf (34) lends further support to the value of a systematic review for planning by suggesting that even in cases where the review fails to provide definitive information, it can yield vital information that could be used to plan new research.

1.5.2 Advantages of a systematic review over traditional literature review

Because of the limitations of a single study, researchers have long recognised that data from multiple studies must be synthesised to yield definitive results. Prior to systematic reviews, the synthesis took the form of narrative reviews. However, these narratives were at best subjective and at times misleading (35). This necessitated the use of systematic reviews. Unlike the traditional approach to reviewing literature, systematic reviews utilise the same principles and rigor that is expected of primary research (36).

Systematic reviews are systematic in approach and use methods that are pre-planned and documented in a systematic review protocol. On completion of the review, the methods used are documented in the review report, to allow users the opportunity to appraise the quality of the systematic review (37).

Secondly, systematic reviews take great care to find all relevant studies published and unpublished, assess each study, synthesise the findings from
individual studies in an unbiased way and present a balanced and impartial summary of the findings with due consideration of any flaws in the evidence (26, 38).

Thirdly, by synthesising data from multiple studies and in a systematic approach, systematic reviews limit systematic errors and reduce chance errors (39, 40). One is able to report more precisely on the result thereby providing more reliable results upon which to draw conclusions and make decisions.

2.0 Methodology

The methodology for the systematic review was based on the guidelines described by Alderson, Green and Higgins (37) in the Cochrane Reviewers’ handbook. The methodology included seven steps, namely; identification of a research question, development of a protocol, search strategy, inclusion and exclusion criteria, critical appraisal of the studies, data extraction and synthesis of the data. The steps are briefly discussed in this section.

2.1 Identification of research question for the review

The research question, “The systematic review of the economic Impact of HIV/AIDS on Swaziland”, was identified based on the author’s experience and involvement in the prevention and control of HIV/AIDS in Swaziland.

2.2 Development of a review protocol.

The protocol fulfilled the same role as a research proposal and was approved by the University of Witwatersrand University, School of Public Health Post-Graduate Committee, Johannesburg.
2.3 Search strategy to identify the studies for inclusion.

According to Deville, Buntix, Bouter, et al (41), a systematic review should include all available evidence. To ensure a comprehensive search and identify all available literature the search was done in four phases, namely;

- Search of electronic databases.
- Reference checking for additional studies missed during database searches
- Search for unpublished studies by consulting researchers and organisations and; searching conference abstracts.
- The titles and abstracts of identified citations were screened based on the inclusion criteria.

2.4 Pre-determined inclusion and exclusion criteria

The following criteria was used to select studies for inclusion in the review:

- Primary research studies that evaluate the impact using well defined indicators, methods of data collection and time frame.
- Studies that model the impact on the various sectors using valid epidemiological data

The following criteria was used to exclude studies from the systematic review:

- Articles not based on Swaziland.
- Secondary literature especially writing involving anecdotal theorisation on the impact of HIV/AIDS on Swaziland.
- Articles not based on primary data collection or modelling of the impact.
2.5 Critical appraisal of the included studies

To facilitate the appraisal process checklists were developed for quantitative and qualitative studies.

2.5.1 Appraisal of quantitative studies

The design of the checklist for critical appraisal of quantitative research was based on the approach as described by Crombie (42) and the three basic stages of critical appraisal as described by Greenhalgh (43).

The elements of the checklist included the following:

- **The message**
  
  In the message the checklist looked at the aims of the study, the findings and what these findings mean. The message further looked at how findings compared with previous reports.

- **Validity of study**
  
  Validity looked at whether the conclusions were justified by the description of the methodology, description of data and the findings.

- **Utility and relevance of results**
  
  Utility and relevance looked at whether the findings were justified and could be generalised.

2.5.2 Appraisal of qualitative studies

Whereas methods to assess quantitative research are widely known and accepted, it has been debated whether the quality of qualitative research can be legitimately judged and how this could be done (44,45). It is now widely agreed that qualitative research can be judged on three key areas: methodological
design, validity and relevance of findings (46). These three key areas are captured extensively in a checklist developed by Bromley, Dockery, Fenton, et al., (47). This checklist was used to appraise qualitative research. The checklist covered six key areas namely: theoretical issues, study design, sampling and data collection, description of procedure for analysis of data, relevancy and trustworthiness and; discussion of the implications and limitations of the study.

2.6 Extraction of data to be synthesised

In order to determine the impact of HIV/AIDS on Swaziland, a data extraction form based on Boaz, Hayden and Bernard (48) was designed to extract indicators for the impact. Data extraction was done simultaneously with, but separately from critical appraisal of the studies.

2.7 Synthesis of the data

Common sets of indicators were compiled from the data extracted from the studies. This was done in a standardised format to avoid extractor bias (37). The common sets of indicators were then synthesised to collate the impact of HIV/AIDS on Swaziland.

Following the guidelines for synthesis of quantitative data described by Alderson, et al., (37) and McClish (49), indicators extracted from the studies were synthesised in five steps, namely:

- Presentation of the results of individual studies in a Forrest plot.
- Searching for heterogeneity amongst the studies.
- Dealing with heterogeneity.
- Deciding which model to be used if statistical pooling was appropriate.
- Statistical pooling and/or qualitative descriptive analysis studies that are not suitable for statistical analysis.
2.8 Definition of Indicators used in quantitative data analysis.

Means were calculated for six indicators. Two indicators at micro-level, three at meso level and one at macro-level. The Indicators are defined in this section.

**Indicator 1: Increased vulnerability of on rural households**

According to Baylies (50) and De Waal (51), households affected by adult morbidity and mortality are significantly more vulnerable to environmental shocks. Some of these shocks include food insecurity, increased poverty and drought. Households use their livelihood assets to cope with these challenges. These assets include human labour, income and remittances from adults in employment, capital assets like livestock and land, and social networks in the community. HIV/AIDS through increased morbidity and mortality of adults in the household and the community decimates these livelihood assets. By doing so, HIV/AIDS exacerbates the vulnerability of the affected households to environmental shocks.

Therefore the impact of HIV/AIDS on rural households is measured as the increase in vulnerability to environmental shocks that the epidemic presents to affected households as compared to those not affected by HIV/AIDS. The outcome is an odds ratio. Outcomes on the impact of HIV/AIDS on farm productivity, household expenditure, income and children’s education were calculated. These outcomes are outline below.

- Impact on rural household farm productivity expressed as number of households who had experienced:
  - Reduction in land area under cultivation
  - Reduction in crop yield
  - Change in cropping patterns
  - Diversion of labour from the farm to care for the sick relative
• Number of households who had experienced an increase in expenditure on health due to HIV/AIDS.
• Number of households who had children dropping out of school.
• Number of households who had lost of remittances due to death of breadwinner from HIV/AIDS.

The odds ratios were calculated using the observed impact amongst households where no deaths had occurred as the reference. This was based on the understanding that if it were not for HIV/AIDS, the productive and younger age group would not have died.

Indicator 2: Children orphaned by HIV/AIDS

Children orphaned by HIV/AIDS refer to children under the age of 15 who have lost a mother or both parents to HIV/AIDS (5). The burden of children orphaned by HIV/AIDS is the total number of orphans in the country due to HIV/AIDS.

Indicator 3: AIDS Mortality rate

AIDS mortality is defined as the deaths among persons in whom HIV infection had been diagnosed through testing, those that had HIV-related illness or met the clinical definition of AIDS (52). Therefore, the AIDS mortality rate amongst employees is the number of deaths due to HIV/AIDS per one thousand employees per year.

Indicator 4: HIV/AIDS Absenteeism

HIV/AIDS absenteeism was calculated as the mean sick leave utilisation rate due to HIV/AIDS. Sick leave utilisation rate is the number of sick leave days due to HIV/AIDS per employee per year (19).

The formula for sick leave utilisation (X) is a/b.
Where: \( a \) = Total number of sick leave days taken by all HIV-infected employees in the whole year

\[ b = \text{Average number of employees in that year} \]

**Indicator 5: Cost of AIDS as percentage of total wage bill**

Cost of AIDS as a percentage of total wage bill is given by the formula:

\[
= \frac{\text{Total cost due to AIDS}}{\text{Annual Total wage bill}}
\]

The annual total wage bill is the amount of money that the organisation spends on maintenance of the workforce. This includes salaries and benefits provided. (20, 25).

**Indicator 6: Impact of HIV/AIDS on Gross Domestic Product (GDP)**

Gross Domestic Product (GDP) is the total output of goods and services produced by all resident producers, plus any product taxes (less subsidies) not included in the valuation output (16).

The percentage average annual loss in growth of GDP or GDP per capita represents the additional average annual percentage points by which GDP or GDP per capita would have grown in the absence of HIV/AIDS.
3.0 Search results

The search yielded over one hundred fifty articles that cited Swaziland and the impact of HIV/AIDS on its various sectors. One hundred-sixteen articles were eliminated on basis of title and abstract alone, because they were not impact studies.

This left thirty-four articles that were selected for full review. Of these, eighteen articles met the inclusion criteria (Table 3.1). This number was adequate for a systematic review. Alderson, et al., (37), and Borenstein and Rothstein (53) contend that any number of studies more than two is adequate for a systematic review.

Sixteen studies were excluded from the systematic review (Table 3.2). The major reasons for exclusion were:

- Narrative reports that quoted primary research studies
- Primary research that did not have any indicators for the impact of HIV/AIDS
- Focus of study was not impact of HIV/AIDS on Swaziland.

3.1 Studies Included in the review

Eighteen studies were included in the systematic review (Table1). Nine articles were primary research, one combined both primary research and economic modelling and; eight articles were projections based on economic modelling. The studies included in the review covered the impact of HIV/AIDS on the three levels of the Swaziland economy.

Two studies covered impact on the micro-sector. These are studies by Muwanga (69) and the Vulnerability Assessment Committee (68).
Fourteen studies covered the impact at the meso-level of the economy. Four of these studies covered the public sector, namely Ministry of Education study on Impact of HIV/AIDS on education (59), Muwanga (69), study that covered Ministry of Agriculture and Cooperatives and Government of Swaziland study on the impact of HIV/AIDS on central agencies (67) and Impact on the health sector (66).

Ten studies covered the impact on the private sector. These are studies by Gilbertson and Whiteside (54), Whiteside (55), Coutinho (56,58), Whiteside and Wood (57), Bollinger and Stover (60), Muwanga (61,63), Haacker (64) and Fridge Masters (65).

Three studies covered the impact of HIV/AIDS at the macro-economic level. These are Haacker (64), the World Bank study on Swaziland (70) and International Labour Office (71).

A description of these studies including sample size, target population, design methodology, data collection methods, focus of study, sampling methodology, sector covered, indicators under study and outcomes is given in Table 3.1 below.
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<tr>
<th>Study</th>
<th>Sample size/ target population</th>
<th>Design/ Time</th>
<th>Data collection</th>
<th>Focus</th>
<th>Sampling</th>
<th>Sector(s)</th>
<th>Main result/indicators</th>
</tr>
</thead>
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<td>Review of personnel and clinic records</td>
<td>Employee mortality due to AIDS AID$cost</td>
<td>Purposive sampling</td>
<td>Private sector – agroestate</td>
<td>AIDS as a major cause of increased mortality amongst employees Increased operational costs</td>
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<tr>
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<td>Economic modelling</td>
<td>-</td>
<td>Employee mortality due to AIDS</td>
<td>-</td>
<td>Private sector – agroestate</td>
<td>Increased mortality of employees</td>
</tr>
<tr>
<td>Coutinho (56)</td>
<td>3750</td>
<td>Economic modelling</td>
<td>-</td>
<td>Employee mortality due to AIDS</td>
<td>-</td>
<td>Private sector – agroestate</td>
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<tr>
<td>Coutinho (58)</td>
<td>3295 employees over a five year period</td>
<td>Cross-sectional study</td>
<td>Review of clinic and personnel records Estimation of cost of HIV/AIDS</td>
<td>AIDS mortality Healthcare utilization Incidence of TB Absenteeism Cost of AIDS</td>
<td>Simple random sampling</td>
<td>Private sector – (Agro-estate)</td>
<td>Increased healthcare utilization rate by HIV infected employees Increased Incidence of TB Increased Cost of AIDS as Percentage of total wage bill Increased absenteeism</td>
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<tr>
<td>Government of Swaziland – (59)</td>
<td>36 schools Heads of schools and inspectors Primary and High school children Parents Out of school youth &amp; orphans</td>
<td>Economic modelling 1991-1999 Cross-sectional study for the qualitative part</td>
<td>Economic modelling 137 Focus group discussions 48 Key Informant Interviews Field interviews Case studies</td>
<td>Impact on demand &amp; supply of education Impact on delivery of quality of education Cost of training new teachers Increase in number of orphans</td>
<td>Purposive sampling</td>
<td>Education</td>
<td>Percentage reduction in modelling Increase in pupil:teacher ratio Increased cost of training extra teachers Change in curriculum to accommodate HIV/AIDS needs Reduced demand for education Increased death of deaths Increased payout of sick and death benefits</td>
</tr>
<tr>
<td>Bollinger &amp; Stover. (60)</td>
<td>-</td>
<td>Economic modelling with review of studies</td>
<td>-</td>
<td>Macroeconomic and Sectoral Impact</td>
<td>-</td>
<td>Multi-sectoral</td>
<td>Demographic impact GDP</td>
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<td>440 businesses registered with the Federation of Swaziland Employers</td>
<td>Cross-sectional study</td>
<td>Questionnaire on management of the businesses</td>
<td>Businesses that have felt the impact of HIV/AIDS and Workplace Responses implemented</td>
<td>Stratified random sampling – according to number of employees</td>
<td>Private sector</td>
<td>Most businesses had felt the increase in number of deaths of employees, absenteeism due to sickness and increased utilization of healthcare.</td>
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<tr>
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<td>Economic modelling</td>
<td>-</td>
<td>Demographic impact</td>
<td>-</td>
<td>Multi-sectoral</td>
<td>Increase in number of AIDS orphans</td>
</tr>
<tr>
<td>Study</td>
<td>Sample size/target population</td>
<td>Design/Time</td>
<td>Data collection</td>
<td>Focus</td>
<td>Sampling</td>
<td>Sector(s)</td>
<td>Main result/indicators</td>
</tr>
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<tr>
<td>Muwanga (63)</td>
<td>689 employees</td>
<td>Cross-sectional study 1992-2001</td>
<td>Review of clinic and personnel Records</td>
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<td>Simple random sampling</td>
<td>Transport sector</td>
<td>Increased AIDS Mortality rate, Increased Sick leave utilization rate</td>
</tr>
<tr>
<td>Haacker (64)</td>
<td>-</td>
<td>Economic modelling</td>
<td>-</td>
<td>Economic cost of AIDS</td>
<td>-</td>
<td>Multisectoral</td>
<td>Negative impact on various sectors and the macro-economy</td>
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<td>1600 employees</td>
<td>Cross-sectional study</td>
<td>Review of personnel records</td>
<td>Employee mortality due to AIDS</td>
<td>Purposive sampling</td>
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<td>Increased employee mortality</td>
</tr>
<tr>
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<td>Five regional hospitals</td>
<td>Cross-sectional study</td>
<td>Review of Hospital Records</td>
<td>HIV/AIDS bed occupancy</td>
<td>Purposive sampling</td>
<td>Health sector</td>
<td>Increase bed occupancy due to HIV/AIDS</td>
</tr>
<tr>
<td>Government Of Swaziland (67)</td>
<td>Four government ministries</td>
<td>Cross-sectional study</td>
<td>Review of personnel records</td>
<td>Mortality, Cost of AIDS</td>
<td>Purposive sampling</td>
<td>Public sector</td>
<td>Increase in mortality, Increase in cost as percentage of total wage bill.</td>
</tr>
<tr>
<td>Vulnerability Assessment Committee (68)</td>
<td>18,528 rural households</td>
<td>Cross-sectional study</td>
<td>Interviews of rural household members</td>
<td>Mortality and morbidity in households, Burden of orphans</td>
<td>Simple random sampling</td>
<td>Rural households</td>
<td>Increased mortality, Increased dependency ratios and number of orphans</td>
</tr>
<tr>
<td>Muwanga (69)</td>
<td>456 rural households, 92 private sector companies, 120 private commercial farms, 34 government commercial farms, 53 cooperative societies, 92 private sector companies</td>
<td>Cross-sectional study 1992-2001</td>
<td>Population survey, Review of company and clinic records, Key informant interviews of managers, Case studies, Focus group discussions, In-depth interviews with 300 employees, 24 managers, 10 healthcare workers</td>
<td>AIDS mortality, HIV/AIDS absenteeism, AIDS orphans, Farm productivity in infected households, Changes in household expenditure, Risk factors at the various workplaces</td>
<td>Stratified systematic sampling (rural households), Multistage sampling (commercial farms and co-operative societies), Simple random sampling (private sector), Random sampling (qualitative research)</td>
<td>Private sector, Rural households, Public sector, Commercial agriculture – private and government, Co-operative societies</td>
<td>Increased employee mortality due to AIDS, Increased sick leave utilization by workers, Increase in number of AIDS orphans, Increase in dependency ratios, Reduced productivity of household farms by, Reduced food security, Increase in children dropping out of school, Reduced farm area cultivated by, Reduction in household income</td>
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<tr>
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<td>Economic projection</td>
<td>Modelling using the growth model</td>
<td>GDP growth</td>
<td>Modelling</td>
<td>Macroeconomy</td>
<td>GDP growth, GDP per capita</td>
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<td>GDP growth</td>
<td>Modelling</td>
<td>Macroeconomy</td>
<td>GDP growth, GDP per capita</td>
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<td>Design</td>
<td>Focus</td>
<td>Indicators</td>
<td>Reasons for Exclusion</td>
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<td>Cost of AIDS</td>
<td>AIDS mortality amongst teachers</td>
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<td>Impact on education</td>
<td>Narrative</td>
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<td>No HIV/AIDS specific data</td>
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<td>UNDP. (77)</td>
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<td>Government of Swaziland, HIV</td>
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<td>HIV/AIDS prevalences</td>
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<td>Surveillance reports. (78)</td>
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<td>Commentary</td>
<td>-</td>
<td>Narrative</td>
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<td>Whiteside, et al., (80)</td>
<td>Narrative</td>
<td>Review of death notices in the print media</td>
<td>Adult mortality</td>
<td>No specific indicators</td>
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<td>Loewenson and Whiteside (81)</td>
<td>Directory of studies</td>
<td>Impact studies</td>
<td>-</td>
<td>No indicators</td>
<td></td>
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<tr>
<td>Government of Swaziland (82)</td>
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<td>Childhood mortality, education</td>
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<td>No HIV/AIDS specific indicators for impact</td>
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<td>SAF AIDS (83)</td>
<td>Narrative</td>
<td>HIV/AIDS prevalences</td>
<td>-</td>
<td>Not on impact</td>
<td></td>
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<td></td>
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<tr>
<td>AIDS Analysis Africa (84)</td>
<td>Cross sectional</td>
<td>Cost of AIDS to business, mortality</td>
<td>AIDS mortality, absenteeism, cost of AIDS</td>
<td>Excerpts from a study already included.</td>
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<tr>
<td>David. (85)</td>
<td>Risk assessment</td>
<td>Risk factors for HIV/AIDS</td>
<td>-</td>
<td>Focus not on impact</td>
<td></td>
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<tr>
<td>Mushala (86)</td>
<td>Narrative</td>
<td>Subsistence agriculture</td>
<td>Reduced farm productivity</td>
<td>Narrative</td>
<td></td>
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<tr>
<td>Muwanga (87)</td>
<td>Survey</td>
<td>Business response</td>
<td>-</td>
<td>Not on impact</td>
<td></td>
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</tbody>
</table>
4.0 RESULTS

The systematic review synthesised information from various studies on five indicators for the impact of HIV/AIDS on Swaziland. Two indicators were on the micro-sector and three on the meso-sector. The results of the review are presented in this section

4.1 Increased vulnerability of Swaziland rural households affected by HIV/AIDS

Figure 4.1 shows, that HIV/AIDS increases the vulnerability of rural households to environmental shocks by four times (95% CI 4.03-4.35).

Areas that are worst affected are the reduction in farm area cultivated and reduction in crop yield. Affected households are seven-times more likely to have a reduction in farm area under cultivation (95% CI 3.79-14.4) and 5-times more likely to have a reduction in crop yield from their farms (95% CI 2.93-9.04).

Other severely affected aspects are diversion of labour from the farm and children dropping out of school, with vulnerability increased four-fold.
Figure 4.1 Increased vulnerability of Swazi rural households due to HIV/AIDS

4.2 Increase in number of orphans due to HIV/AIDS

Increased mortality of the productive age group members of society has left many children orphaned. The orphans have to be taken care of by other families.

Figure 4.2 shows that Swaziland at end of 2002 had an average of 44,000 orphans due to HIV/AIDS, with a lower estimate of 34,000 and an upper estimate of 59,300 orphans.
Seventeen percent of Swaziland rural households (95%CI 14-22) are caring for orphans. On average each of these households had taken under their care two dependants (95%CI 0.7– 4) in addition to their biological children (68,69).

![Figure 4.2](image)

**Figure 4.2** Burden of orphans due to HIV/AIDS in Swaziland, end of 2002

### 4.3 AIDS mortality amongst the Swaziland workforce

The results in Figure 4.3 show that the pooled estimate for deaths due to HIV/AIDS amongst the Swaziland work force is 10.54/1000 employees per year (95% CI 9.04-12.12). The estimate covers eight homegenous studies and excludes one study (59) that was found to be an outlier. The pooled estimate with outlier included escalates to 13.2/1000 employees per year (95%CI 11.84-14.69). The mean crude mortality rate of Swaziland employees was found to be 16.77/1000 per year (Figure 4.3).
The mortality rate of teachers employed by the Ministry of Education was 34.76 deaths/1000 teachers per year. This was adjudged to be an outlier from heterogeneity tests. It was therefore excluded in the pooled estimate.

From Figure 4.3, highest mortality of workers from AIDS were recorded by the Ministry of Agriculture and Cooperatives with 16.75 deaths /1000 employees per year (95%CI 16.06-17.44) and private small farms with 14.01 deaths/1000 employees per year (95%CI 12.64-15.38). The least affected was the Royal Swaziland Sugar Corporation (RSSC).

However, the mortality rate of 4.8 deaths/1000 employees per year (95%CI 4.7-4.9) for RSSC should be interpreted with caution as the company offered voluntary retirement packages to 152 employees in 1999 as part of the company’s response to avoid the cost of AIDS. Twenty-three of these employees were terminally ill and only retired to go and die at home (58). This effectively reduces the mortality rate from AIDS, as those deaths were not captured in the company records. If the twenty-three deaths were added to the number of deaths from the company, the mean death rate would increase from 4.8/1000 to 7/1000 employees per year for RSSC.

Tuberculosis was the most commonly reported cause of death for AIDS related deaths in the private sector and rural households. On average tuberculosis was the cause of death in 57 percent (95%CI 40-65), of AIDS deaths.
**Figure 4.3** AIDS Mortality amongst the Swazi workforce.

### AIDS Mortality in Swazi workforce

<table>
<thead>
<tr>
<th>Citation</th>
<th>Effect Name</th>
<th>Lower Effect</th>
<th>Upper</th>
<th>N total</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coutinho (78)</td>
<td>Mortality</td>
<td>4.7</td>
<td>4.8</td>
<td>3419</td>
<td>0.006</td>
</tr>
<tr>
<td>Sugar estate</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mawanga (83)</td>
<td>Mortality</td>
<td>10.8</td>
<td>11.2</td>
<td>839</td>
<td>0.003</td>
</tr>
<tr>
<td>Swaziland Railway</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coutinho (78)</td>
<td>Mortality</td>
<td>8.4</td>
<td>12</td>
<td>3750</td>
<td></td>
</tr>
<tr>
<td>Sugar estate</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Whiteside (75)</td>
<td>Mortality</td>
<td>4.9</td>
<td>9.6</td>
<td>3750</td>
<td></td>
</tr>
<tr>
<td>Sugar estate</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mawanga (85)</td>
<td>Mortality</td>
<td>12.6</td>
<td>14.0</td>
<td>216</td>
<td>0.003</td>
</tr>
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<td>Private small farms</td>
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</tr>
<tr>
<td>Mawanga (88)</td>
<td>Mortality</td>
<td>8.39</td>
<td>8.48</td>
<td>1800</td>
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<td>Fridge Masters Ltd</td>
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<td>6.50</td>
<td>7.50</td>
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<td>0.002</td>
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<tr>
<td>Manufacturing (85)</td>
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<td></td>
</tr>
<tr>
<td>Mawanga (89)</td>
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<td>16.75</td>
<td>2202</td>
<td>0.001</td>
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<td>Ministry of Agric.</td>
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<tr>
<td>Pooled estimate</td>
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<td>9.34</td>
<td>10.54</td>
<td>12.12</td>
<td>0.001</td>
</tr>
</tbody>
</table>

**Crude employee Mortality rate**
4.4 HIV/AIDS absenteeism in Swaziland organisations

Increase in sick leave utilisation has been noted amongst Swaziland organizations with the advent of HIV/AIDS. Results were combined from five organizations, all from the private sector.

Figure 4.4, shows that on average the private sector organisations lose 2.97 days (95%CI: 2.88-3.06) per employee per year to HIV/AIDS related absenteeism.

The worst affected are the Manufacturing sector which loses 4.93 days per employee per year (95%CI 4.24-5.79) and private small-holder farms that lose 3.66 days per employee per year (95%CI 3.27-4.10). The Royal Swaziland Sugar Corporation (RSSC) was least affected with a sick leave utilisation rate of 1.43 days per employee per year (95% CI 1.4 -1.46). This was attributed to the organisation’s implementation of HIV/AIDS workplace responses (58).

Tuberculosis was the biggest contributor to prolonged absenteeism in the private sector. Tuberculosis contributed to over 70 percent of sick leave longer than thirty days (58,69).
4.5 AIDS Cost to the Swaziland organisations

The extra expenditure on welfare of employees due to HIV/AIDS is calculated as a percentage of the total wage bill. It has been popularly referred to as the direct cost of HIV/AIDS. Most organisations do not keep accurate records of these expenses. The pooled estimate therefore combined costs from only four organisations; three of these organisations are from the private sector.

Figure 4.5 shows, that HIV/AIDS cost the Swaziland organisations on average 2.65 percent (95%CI: 2.46-3.03) of their annual total wage bill. Smallholder agricultural farms are the worst affected at 3.46 percent (95% CI 3.27-4.52) while RSSC is the least affected at 1.83 percent (95% CI 1.74-1.92). This again is attributed to implementation of HIV/AIDS workplace responses by RSSC.
Figure 4.5  Cost of HIV/AIDS to Swaziland organisations.

4.6 Impact of HIV/AIDS on the macro-sector

Three studies reported the projected macroeconomic impact of HIV/AIDS on Swaziland. The World Bank Technical group on Africa (70) and Haacker (64) both reported a 1 percent reduction in GDP growth due to HIV/AIDS, while International Labour Office (71) reported a higher impact of 2.8 percent.

Table 4.1, gives the mean loss in GDP growth due to HIV/AIDS as 1.6 (95% CI 1.59-1.61) and the mean loss in GDP per capita as 1.73 (95% CI 1.71-1.74).
Table 4.1 Macroeconomic impact of HIV/AIDS on Swaziland

<table>
<thead>
<tr>
<th>Study</th>
<th>Percentage annual loss (%)</th>
<th></th>
<th></th>
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<tbody>
<tr>
<td></td>
<td>GDP growth</td>
<td>GDP per capita growth</td>
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</tr>
<tr>
<td>Haacker (64)</td>
<td>1.0</td>
<td>2.3</td>
<td></td>
</tr>
<tr>
<td>World Bank (70)</td>
<td>1.0</td>
<td>1.1</td>
<td></td>
</tr>
<tr>
<td>ILO (71)</td>
<td>2.8</td>
<td>1.8</td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>1.6 (95% CI 1.59 -1.61)</td>
<td>1.73 (95% CI 1.72-1.74)</td>
<td></td>
</tr>
</tbody>
</table>

4.7 ORGANISATIONAL RESPONSES TO EPIDEMIC

Swaziland organisations have implemented several responses to the epidemic in an attempt to avoid the cost of AIDS (61). The responses include:

- Increasing awareness amongst employees to prevent new infections
- Absence management programme
- Restructuring of employee benefits to reduce costs on healthcare and death benefits,
- Disease management protocols for prevalent diseases in the workforce. This reduces time spent on seeking healthcare for these diseases as there is timely diagnosis and management.
- Targeted retrenchment where sick employees are offered voluntary retirement packages.

There is evidence pointing to the effectiveness of HIV/AIDS workplace responses in mitigating the impact of on organizations (58,63,69).

In 1997, Swaziland Railway implemented an absence management system and disease management protocols for common illnesses amongst employees. This was in response to increasing absenteeism.
There was a significant reduction in sick leave due to non-injury on duty (IOD)\(^3\) cases for the period, 1998-2001 (69). The reduction in absenteeism is shown in Figure 4.6.

Figure 4.6 Absenteeism at Swaziland Railways, 1992-2001.

In 1999, Royal Swaziland Sugar Corporation (RSSC) offered voluntary retirement packages to 152 employees. Twenty-three of whom were terminally ill (58). This effectively reduced the AIDS mortality of RSSC (See Figure 4.7 below). The company in offering retirement packages avoided the costs of healthcare that the terminally ill employees would have incurred in the last days of their lives, the funeral costs and wages paid for no work done.

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\(^3\) IOD refers to Injury on duty. Non-IOD sick leave is sick leave due to sickness not arising out of trauma cases from workplace injuries.
Figure 4.7 AIDS Mortality at Royal Swaziland Sugar Corporation, 1995-2000

Figure 4.8 below, shows that whereas RSSC was able to reduce AIDS mortality through targeted retrenchment, Swaziland Railways’ absence management and disease management protocols had no effect of AIDS mortality. It could be argued here that incorporating anti-retroviral therapy in the disease management protocols could have reduced both AIDS mortality and absenteeism at Swaziland Railways. As these organisations begin providing anti-retroviral therapy, there is need to follow-up cohorts of infected staff on anti-retroviral and those opting not to take anti-retroviral to determine the impact of anti-retroviral therapy on absenteeism and mortality in these organisations.
Figure 4.8  AIDS mortality at Swaziland Railway and Royal Swaziland sugar Corporation, 1997-2001.
5.0 DISCUSSION

In this chapter, the results of the systematic review on impact of HIV/AIDS in Swaziland are discussed. The discussion is stratified into the three levels of the economy, namely micro-level, meso-level and macro-level impact.

5.1 Impact of HIV/AIDS on the micro sector.

This chapter covers the micro-level impact of HIV/AIDS in Swaziland. The increased vulnerability of Swazi rural households to natural shocks and the burden of orphans due to HIV/AIDS are discussed in this chapter.

5.1.1 Increased Vulnerability of Swazi rural households affected by HIV/AIDS

Rural households rely on household capabilities, assets both material and social resources for a means of living. These capabilities and assets include labour and human capital, income from the farm and remittances from households' members in regular employment. They sustain their livelihood by utilising these assets and capabilities to cope and recover from stresses and shocks. These shocks include drought, wars, death and war.

The erosion of human capital and removal of income by decimating the productive members of society increases vulnerability of these households to stresses and shocks within the environment. HIV/AIDS is not only a shock to the households but also erodes the capabilities and assets that these households can rely on to cope and recover from this shock. These households are therefore vulnerable to environmental shocks operating within their community and the negative impacts of the HIV/AIDS epidemic. The negative impacts of the epidemic on households include reduced income and increased expenditures,
children dropping out of school, reduced farm area cultivated and farm productivity.

From this systematic review, HIV/AIDS has increased the vulnerability of households affected by HIV/AIDS in Swaziland to environmental shocks and the negative impacts of the epidemic by four-fold. The areas most affected are farm area cultivated and reduction in crop yield per household per year.

The reduction in farm area cultivated and crop yield is due to three major reasons (Figure 4.1). First, the loss of labour on the farm as the productive age group who are the sources of labour in the household start to sicken and die of AIDS. This reduces the amount of labour available on the household farm.

Secondly, there is diversion of labour from the farm to care for the sick members of the household. Since AIDS is a prolonged illness, this diversion of labour from the farm is for a long period of time. This prolonged diversion of labour denies the household farm labour over a long time. This results in less farm area cultivated and reduction in the farm yield. In Tanzania, when a household had a member with AIDS, 29 percent of the household labour was spent on AIDS-related matters (17). From the systematic review, households in Swaziland that had experienced an AIDS-related death were five-times more likely to report diversion of labour from the farm to care for the sick relative.

A big proportion of the affected households in Swaziland resorted to crops that require less labour as a coping mechanism to the reduction in household labour. Muwanga (69) found that 42 percent of affected rural households in Swaziland had changed their cropping patterns. The affected households were 3-times more likely to change cropping patterns as compared to those households that had not been affected by HIV/AIDS (Figure 4.1).
The third factor is death of relatives who are either breadwinners or regularly remit money to the households, leads to loss of income. The importance of loss of income has previously been shown in Rwanda(18), Uganda(88), Tanzania(89) and Ethiopia(90). This is income that the households use to purchase farm inputs. With less farm inputs less land is cultivated and also productivity from the farm is less. Swaziland households that have experienced AIDS-related deaths faced a 34.2 percent reduction in land area under cultivation, 54.2 percent reduction in maize production and 29.6 percent reduction in number of cattle kept (69).

A study done by the Zimbabwe Farmers Union showed that death of a breadwinner due to HIV/AIDS reduced maize production by 61 percent and cattle kept by 29 percent (91). The percentage reduction in maize production is slightly higher than the results from the Swaziland studies. This has been attributed to the reduction in maize production in Swaziland due to prolonged drought, reducing the reference point for calculation of the percentage reduction (69).

The combined result of reduction in farm area, loss of remittances and reduction in crop yield is reduction in income and food for the household. Swaziland households rely of the farm produce for income and food supply (69).

The reduction in income happens at a time of increased expenditure on health. Households affected by HIV/AIDS were 3-times more likely to report an increase in health expenditure than those not affected (Figure 4.1). In Tanzania, households affected by HIV/AIDS spend 8 percent of total household expenditure on healthcare compared to 0.8 percent for those not affected (89). This was a ten-fold increase in expenditure on health. While in Ethiopia, expenditure on health, funerals and mourning exceeded the average household income (90).
The multiple impacts make it impossible for the affected households to mount any effective coping strategies. The end result is children dropping out of school and increased food insecurity. Affected households were four-times more likely to have children dropping out of school (Figure 4.1). In 1994, Swaziland had 0.5 percent fewer 6-year olds entering school as result of the HIV/AIDS. This has been projected to increase to 5 percent in the year 2000 and to 16.6 percent by the year 2006 (57). In Zambia, orphans were 1.3 times more likely to drop out of school compared to non-orphans (92).

By cutting agricultural productivity of households and undermining the ability of these households’ ability to recover from natural shocks, HIV/AIDS has become a major factor in the changing nature of famine in Swaziland.

5.1.2 Burden of orphans due to AIDS

HIV/AIDS predominantly affects young adults. Therefore high mortality amongst this age group leads to increasing number of orphans.

Figure 4.2 shows, that Swaziland had 44,000 orphans due to AIDS by the end of 2002 (95% CI 34,000-59,3000).

In their end of 2003 report, UNAIDS defined an orphan as “a child under the age of 15 who has lost the mother or both parents to HIV/AIDS”. This definition has been used by the three studies – Government of Swaziland (59), Muwanga (69) and the Vulnerability assessment Committee (68). However, UNAIDS in the 2004 report (62) define an AIDS orphans as “a child under the age of 18 who has had at least one parent die of HIV/AIDS”. The extended age for cut off means that the new definition included more orphans than the earlier definition.
Projections have estimated the burden of children orphaned by AIDS to increase by between 10,000-20,000 every year (59, 62, 69). At the end of the year 2003, UNAIDS, estimated Swaziland to have between 43,000-93,000 orphans, with an average of 65,000 orphans due AIDS (62). This figure lies within the results of this review.

Haacker (64) has projected that by the year 2010, 7.9 percent of Swaziland population will be under age orphans between the ages of 0-14 years. Of these 80-90 percent would be orphaned by AIDS. Only Botswana is estimated to have a higher burden of orphans due to AIDS in Southern Africa (62, 64).

The burden of looking after these orphans is left to other households. From the review, 17 percent of Swazi households had taken in at least two orphans per household. The effect is worsening dependency ratios. Before the advent of HIV/AIDS Swaziland had a dependency ratio of 116.8, only second to Zambia that had a dependency ratio of 120.8 in the year 2000. Other countries in the region are expected to improve their dependency ratios with Zambia moving from 120.8 in the year 2000 to 106.6 in the year 2010 (93).

However, because of the impact of HIV/AIDS, Swaziland is estimated to have the worst dependency ratios in southern Africa by the year 2010, estimated at 112.6 (93).
5.2 Impact of HIV/AIDS on the meso-sector.

Three indicators of the impact of HIV/AIDS at the meso-sector were combined across studies. These are employee mortality due to HIV/AIDS, HIV/AIDS absenteeism and cost of AIDS to the organisations. In this section the indicators for the impact on the meso-sector in Swaziland are discussed.

5.2.1 Employee Mortality due to HIV/AIDS in Swaziland.

From Figure 4.3 the pooled estimate for mortality due to HIV/AIDS amongst the Swazi workforce is 10.54/1000 (95% CI 9.04-12.12), with the highest mortality amongst workers of the Ministry of Agriculture and Co-operatives and the private smallholder farms.

By the year 2001, 73 percent of Swazi organisations had reported a worker dying from HIV/AIDS and 64 percent of the businesses had felt the negative impact of HIV/AIDS on their organisations (61).

From studies done earlier in the epidemic (54, 55, 56), it is evident that mortality due to HIV/AIDS is on the increase. By 1998, HIV/AIDS had become the leading cause of death amongst employees in Swaziland. AIDS deaths contributed to over 60 percent of all employee deaths by the year 1999 (58,63). From Figure 4.3, the mean employee crude mortality rate was calculated at 16.77 deaths/1000 per year. Therefore AIDS mortality rate of 10.54/1000 per year is 63 percent of all deaths in the Swazi workforce. It is estimated that by the year 2010, mortality amongst the workforce will have peaked to 30/1000 employees per year (57).
The Ministry of Agriculture and Cooperatives (MOAC) shows the highest mortality rate. From earlier studies, it has been reported that the public sector has not implemented HIV/AIDS workplace programmes and are therefore vulnerable to the negative impacts of HIV/AIDS including high mortality of employees (61). The public service is crucial sector to the national development and efforts to eradicate poverty. The governance provided by this sector is key to translating macro-policies into programmes and initiatives that lead to development and reduction of poverty.

The public sector provides essential services to other sectors. These services include agricultural advice, roads, telecommunications, health and education. As technocrats involved in planning and provision of these services begin to sicken and die, there are serious negative consequences for implementation of government policies and programmes.

Further, the essential services rendered by the public service sector are required by the private sector to enhance their productivity. As income growth in the country declines, private sector future growth also declines.

Tuberculosis was cited as cause of death in over 50 percent of AIDS-related deaths (69). (Figure 5.1) Tuberculosis also contributed to over 70 percent of sick leave longer than thirty days (see section 5.2.2).
Comparing the mortality rate of the Swazi workforce from HIV/AIDS with internationally reported figures, it is evident that Swaziland has not yet reached the high death rates amongst workers that other countries like Zambia and Uganda experienced.

Barclays Bank-Zambia recorded an increase of employee mortality due to HIV/AIDS from 4/1000 in the year 1987 to 22/1000 in the year 1998 (94). Higher death rates have been reported by Uganda Railways, 100/1000 employees per year (95). This resulted in Uganda Railways experiencing a 15 percent labour turnover. The highest employee mortality rate due to HIV/AIDS reported in Swaziland was, 17/1000, by Swaziland Railway in the year 2001. This is comparable to studies in Tanzania that reported AIDS mortality amongst employees of 5-15/1000 per year (96), but far lower than employee mortality rates reported in Uganda and Zambia.
There are several reasons why Swaziland has not recorded the very high death rates recorded elsewhere in the region. Either the studies are reporting a lower death rate than what is on the ground or if the studies give a fairly true picture of the death rate, then the epidemic of AIDS deaths in Swaziland is still in the early stages.

The other reason may be that organisations and businesses have responded to the epidemic by implementing measures that protect them against these negative impacts.

There are facts that favour each side of the argument. First, records on AIDS deaths amongst workers have only been forthcoming from those organisations that accurately keep records on their employees. Usually these are organisations that have substantive human resource managers. It is these companies that have invested in implementing HIV/AIDS workplace programmes (63). Therefore, AIDS mortality within these organisations might not be expected to be too high if the workplace programmes have succeeded in protecting the organisations from negative impacts. A typical example is RSSC, which in addition to having implemented a comprehensive workplace programme, also implemented cost avoidance measures by retrenching terminally ill employees (58).

Secondly, up to late 2002, death certificates did not give cause of death as HIV/AIDS. Studies done earlier relied on case definition of HIV/AIDS to make an inference of AIDS as cause of death. As earlier discussed, misclassification of cause of death could lead to a reduction in impact reported.

However, the mortality statistics have showed a trend of increasing deaths due to HIV/AIDS over the past six years (see figures below). Statistics from Swaziland Railways (see Figure 5.2) and RSSC (see Figure 4.7) show an increase in employee deaths from HIV/AIDS (69). Whiteside, et al., (80), using death notices
from The Times of Swaziland Newspaper, noted a dramatic increase in death notices from 1995-1999. The trend matched the projected total AIDS deaths by the Futures Group. Therefore the studies cannot be dismissed as not representing the true picture on the ground.

Figure 5.2 AIDS mortality at Swaziland Railway, 1997-2001

If the studies are instructive and fairly represent the true picture on the ground, then the lower than expected death rates recorded could be due to the following reasons:

- The epidemic of AIDS deaths in Swaziland is yet to reach its peak. Some estimates have projected that the death rate will peaked at 30/1000 by the year 2010 (57). Current UNAIDS estimates put HIV/AIDS adult prevalence in Swaziland at 38.8 percent, the highest in the world (2). An increase of 0.2 percent from 2002 statistics (1). Figure 5.3 below, shows the earlier projected and actual adult HIV prevalence in Swaziland.
Swazi businesses have had the benefit of the recent knowledge in effective responses to HIV/AIDS at the workplace. Some of the organisations have effectively avoided costs related to HIV/AIDS by implementing comprehensive HIV/AIDS workplace programmes. Some of these responses have involved rather unpopular measures like targeting terminally ill employees for retrenchment (58). This has proven an effective measure to avoid costs as most of the healthcare utilisation and sick leave occurs in the last six months before death. (See Figures 4.7 and 4.8).

Those sectors that have not implemented HIV/AIDS workplace programmes show relatively high mortality rates. A typical example is the private smallholder farms who lack the expertise to implement workplace programme, they recorded death rates of 14.01 /1000 employees per year (Figure 4.3). But this is still far lower than AIDS mortality rates reported elsewhere in Africa. The epidemic of AIDS mortality in Swaziland has therefore not reached its peak.
5.2.2 Absenteeism

The prolonged illness associated with AIDS leads to increased absenteeism of sick workers. Previous studies have all documented a significant increase in absenteeism due to sickness, but most of these studies did not quantify the rate of absenteeism. Figure 4.4, shows that Swaziland organisations lose 2.97 working days per employee per year due to HIV/AIDS absenteeism (95% CI 2.88-3.06). Considering a total of 250 working days in a year, 2.97 sick leave utilisation is equivalent to 1.2 percent rate of absenteeism. The most affected sector of those studied is the manufacturing industry losing 4.93 working days per employee per year (95% CI 4.24-5.79).

The pooled estimate of 2.97 mean sick leave utilisation (1.2 percent) in Swaziland is comparable to that of 1.03 percent recorded by Kenyan firms in 1997(97).

Reports from international studies have quoted higher rates of HIV/AIDS absenteeism. Companies in Zambia and South Africa have recorded higher rates of HIV/AIDS absenteeism. Nakambala sugar estate in Zambia, reported a sick leave utilisation rate due to HIV/AIDS of 2 percent in 1992 (98), while Hillside Aluminium manufacturing company in South Africa recorded a rate of 2.4 percent in 1998(99). In United Kingdom, sick leave utilisation from all causes has been reported to be 7 days per employee per year (2.8 percent)(100).

There are several reasons why Swaziland organisations have not recorded high rates of HIV/AIDS absenteeism. First, not all HIV infected employees are known to the organisations and their utilisation of sick leave would not be recorded as HIV/AIDS absenteeism. Further, most organisations in Swaziland do not keep accurate records on absenteeism.
However, previous studies show that HIV/AIDS has tremendously increased absenteeism in Swaziland organisations. At RSSC, sick leave utilisation for other illnesses not related to HIV/AIDS was 0.9 days per employee for the year 1999, while each employee suffering from HIV/AIDS related illnesses utilised 18 days of sick leave during the year (58). At Swaziland Railway average sick leave utilisation for non HIV/AIDS related illnesses in the year 2001 was 0.6 days per employee per year, while utilisation due to HIV/AIDS was 11.82 days per infected employee per year (63,69). HIV/AIDS induced a 20-fold increase in sick leave utilisation for these two organisations. Chilanga Cement in Zambia reported a 15-fold increase in absenteeism between 1992-1995 due to HIV/AIDS (101). This is comparable to the 20-fold increase in absenteeism recorded in Swaziland.

As prevalence of HIV/AIDS increases amongst employees, the impact of absenteeism is expected to increase in Swazi organisations. Absenteeism leads not only to reduced productivity but is also a cost to the organisation as the employee is paid for work he has not performed. Further, costs may be incurred to pay for his replacement. Haacker (64) estimates that absenteeism contributes 24 percent of AIDS costs for affected companies in southern Africa. This is equivalent to 1.6 -2.4 percent of the total wage bill.

Tuberculosis has been cited as the biggest cause of absenteeism. Muwanga (69) found that over 70 percent of sick leave taken by an employee longer than 30 days was due to tuberculosis. Swaziland Railways managed to reduce absenteeism by implementing disease management protocols and an absence management system (see section 4.7 and Figure 4.6). This was largely through reduction of sick leave of less than five days (69). Because of the increase in number of employees suffering from tuberculosis, most of whom were co-infected with HIV, sick leave of longer than thirty days continue to increase (See Figure 5.4).
Royal Swaziland Sugar Corporation reported an increase in incidence of tuberculosis amongst the workforce from 11.9/1000 in 1997 to 12.7/1000 in 1999 (58). Swaziland Railway reported a tuberculosis incidence rate of 10.95/1000 in 2001, with 90 percent of these cases co-infected with HIV (69).

Swaziland with a tuberculosis prevalence of 769 cases/100,000, currently has the second highest prevalence of tuberculosis in sub-Saharan Africa (102). The Government of Swaziland 2001 HIV sero-surveillance report (103), found that 70 percent of tuberculosis cases in Swaziland were co-infected with HIV.

Considering the co-infection of tuberculosis and HIV, tuberculosis presents the greatest challenge to organisations controlling absenteeism.

![Figure 5.4 Number of employees taking sick leave longer than 30 days – Swaziland Railways, 1992-2001.](image)
5.2.3 The direct cost of HIV/AIDS to Swaziland organisations

HIV/AIDS affects organisations’ costs through a variety of channels. The most important are healthcare utilisation, disability and retirement payments, funeral and burial costs, recruitment and training costs and absenteeism. However, costs for absenteeism have not been determined by any study in Swaziland and therefore not part of the cost analysis in this review.

Figure 4.6 shows, that HIV/AIDS cost Swazi organisations 2.65 percent (95% CI 2.46-3.03) of their annual total wage bill. This figure would have been substantially higher if the cost of absenteeism was included in the cost. Absenteeism has been estimated to cost organisations between 1.6-2.4% of total wage bill (64, 60). Therefore the total figure with absenteeism included should be between 4-5 percent.

At Nakambala sugar estate in Zambia, AIDS costs represented 1.9 percent of company costs in 1992-1993 (98). In Cote d’Ivoire the cost was calculated to be between 0.8-3.7 percent of total wage bill (104). Projections made for Botswana in 1997 estimated HIV/AIDS to cost organisations 5 percent of total wage bill by the year 2004 (105). However, recent projections have come up with higher estimates of 7-8 percent of total wage bill (64). This is due to higher than expected prevalence and adult AIDS mortality that has occurred in Botswana. Similar high figures have been quoted in South Africa. A study by Metropolitan Life Insurance company (106) estimate AIDS to cost South African companies between 7 and 14.6 percent of total wage bill.
The cost of AIDS to the organisation depends on the level of benefits provided to the employees. Swaziland organisations have largely provided limited benefits to their employees, with most of the benefits reserved for the skilled workforce (67). It is the unskilled workforce that is predominantly affected by HIV/AIDS (61). The cost of AIDS to Swaziland organisations may therefore not reach the high figures seen in South Africa and Botswana who provide wider benefits to their workforce.

5.3 The impact of HIV/AIDS on the macro-sector

The impact of HIV/AIDS at the macro-level is the combined effect of the micro-level and meso-level impacts. From Table 4.1, HIV/AIDS will cause a mean annual loss in GDP growth of 1.6 percent (95%CI 1.59-1.61) and annual loss in GDP per capita growth of 1.73 percent (95% CI 1.72-1.74).

Swaziland GDP is estimated to grow by 3.2 percent per year without HIV/AIDS. An annual loss of GDP growth by 1.6 percent due to HIV/AIDS would leave Swaziland with a GDP growth of 1.6 – 1.8 percent per year and a 70 percent loss in GDP per capita growth (102).

Botswana and Swaziland are projected to have the highest percentage annual loss in GDP and GDP per capita growth due to HIV/AIDS (71). The other African countries that are projected to suffer a high annual percentage loss in GDP growth and GDP per capita growth are Lesotho, Namibia, and Zimbabwe. Table 5.1 below shows the comparison between these countries.
Table 5.1 Macroeconomic impact of HIV/AIDS in southern Africa

<table>
<thead>
<tr>
<th>Country</th>
<th>Percentage annual loss (%)</th>
<th>GDP growth</th>
<th>GDP per capita growth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Swaziland</td>
<td></td>
<td>2.8</td>
<td>1.8</td>
</tr>
<tr>
<td>Botswana</td>
<td></td>
<td>2.8</td>
<td>1.8</td>
</tr>
<tr>
<td>Zimbabwe</td>
<td></td>
<td>2.3</td>
<td>1.4</td>
</tr>
<tr>
<td>South Africa</td>
<td></td>
<td>2.1</td>
<td>1.3</td>
</tr>
<tr>
<td>Lesotho</td>
<td></td>
<td>2.4</td>
<td>1.6</td>
</tr>
<tr>
<td>Namibia</td>
<td></td>
<td>2.1</td>
<td>1.3</td>
</tr>
</tbody>
</table>

Source: International Labour Office (71).

5.4 Quality of studies

Comparing the impact of HIV/AIDS on the Swaziland economy with international studies, it clear that the recorded impact is less than what has been observed in other affected countries. In the discussion above the author has advanced several reasons. One, that the epidemic of negative impacts due to HIV/AIDS has not reached the peak. Second, the responses implemented by Swaziland organisations have been successful in mitigating the impact.

In this section the author discusses the quality of studies and how this could have affected the extent of impact recorded by the studies.

5.3.1 Design of studies

The first weakness is that all impact studies that were based on primary research were observational studies. The observational studies were either cross-sectional or case control study designs. Observational studies face the problems inherent of such methodology, namely bias in case identification and selection (107), recall bias (108,109) and misclassification of cases and non-cases (107).
First, observational studies rely on either review of records or interview of respondents to select subjects. The accuracy of the information therefore depends on the respondents’ recall of events. This makes observational studies vulnerable to recall bias. This has the potential to affect the validity of the results recorded by the study (107).

Secondly, case-control studies rely on accurate identification of cases and non-cases (108). With limited access to voluntary counselling and testing in Sub-Saharan Africa, most people do not go for HIV testing. Even when they do so, because of stigma, they do not freely disclose their status. This leaves researchers to rely on signs and symptoms suffered in terminal stages to associate an illness or death with HIV/AIDS. However, there are many other diseases with similar signs and symptoms to HIV/AIDS. This approach is therefore subject to failure to identify and select the correct subjects leading to a selection bias (107).

Kahn, Tollman, Garenne and Gaer (110) have suggested that in situations where death certificates are unavailable or if available do not state cause of death accurately, cause of death can be determined by use of verbal autopsy method. Verbal autopsies involve trained investigators who interview relatives who were the closest caregivers about signs and symptoms suffered in terminal stages of the illness. The information from the questionnaires is then summarised by two independent researchers using pre-defined criteria to determine likely cause of illness and death.

Verbal autopsy has been used to determine casual of death in under-fives and in adults for infectious diseases in communities where death certificates are not readily available (111). It is now increasingly being used to identify causes of adult death, including death from AIDS (110,112,113). Verbal autopsy may be the only method to identify HIV-infected and affected households in communities where stigma to HIV/AIDS is prevalent. However, for verbal autopsies to be
comparable, they need to be based on similar interviews, and the cause of death needs to be arrived at in the same way in all cases. Therefore standardisation and local validation of the verbal autopsy tool by calculating sensitivity and specificity is important (114). This reduces information bias and misclassification of causes of death.

The failure to identify the HIV-infected cases accurately means that some of these cases are misclassified as non-cases and vice-versa. Since the impact of HIV/AIDS is measured as the impact in excess of what is observed in non-HIV infected cases, the misclassification of cases and non-cases has the potential to reduce the impact of HIV/AIDS recorded by the studies (107,115).

5.3.2 Alternative explanations for Impacts measured.

The second weakness faced by the impact studies is associating the impacts observed amongst those infected with HIV/AIDS to the epidemic as opposed to other factors operating within the environment. There are alternative factors operating within the environment that could produce similar effects to HIV/AIDS. Some of the confounding factors include changes in markets, increased poverty levels, and drought. Confounding is the distortion of an exposure-outcome association brought about by the association of another factor with both the outcome and exposure (107,116). The study on impact of HIV/AIDS on rural households faced these difficulties as it was done at a time when Swaziland was faced with drought and famine. The source of confounding is the fact that poverty, which is a risk factor to HIV infection, is also associated with increased vulnerability of households to food insecurity.

According to Stokes (117) control of alternative explanations is essential in inferring the impacts of one set of variables from another. Only one study, Muwanga (69) reported controlling for confounding factors in the analysis of results. The researchers stratified the households into those that had not
experienced any deaths, those that experienced deaths but not AIDS related and those households that had experienced AIDS deaths.

According to the Faculty of Accident and Emergency Medicine (118), dealing with confounding is easy if the confounders are known, as the results can be stratified according to the confounders. It is therefore important for the researchers to identify possible sources of confounding. Other methods that can be used to control for confounding factors include:

- Randomisation at design stage so that the confounders are randomly distributed between the cases and non-cases (118).
- Collecting data on known and possible confounders and feeding these into a multiple regression analysis (118,119).
- Doing longitudinal studies where cohorts of infected and non-infected entities are matched and/or followed over a period of time (120).

5.3.3 Limited number of Impact studies

Most of the impact studies in Swaziland have been done on the private sector. There are limited studies on the impact of HIV/AIDS on the micro, macro and public sectors. Important sectors like the health sector have not been adequately covered in this systematic review.
6.0 Conclusions

This section clarifies how the author addressed the objectives of the systematic review and highlights the implications that results of this systematic review have on policy and future research.


In this section the results of the systematic review on the impact of HIV/AIDS on the three sectors of the Swaziland economy and the policy implications are summarised.

6.1.1 The impact of HIV/AIDS on the micro-sector in Swaziland.

The micro-economy represented by the rural households is a key sector in the economy. However, with the vulnerability of rural households to negative impacts of HIV/AIDS and environmental shocks increased four-fold (Figure 4.1), the micro-sector in Swaziland is greatly affected by HIV/AIDS.

The increased death of breadwinners and productive age group due to HIV/AIDS has affected the sources of labour and income to the rural households. Affected rural households are therefore left with minimal resources at their disposal to effectively cope with the negative impacts of HIV/AIDS. This has resulted in reduced farm productivity and children dropping out of school. This will have serious consequences for food security and children's education attainment for these households.

HIV/AIDS has increased the burden of orphans in Swaziland rural households. Over 17 percent of Swaziland rural households are taking care of orphans due to AIDS. Swaziland was estimated to have had 44,000 orphans due to AIDS by the end of year 2002. This number will increase by 10,000-20,000 every year.
Some of responses that the private sector has implemented to mitigate the impact of HIV/AIDS on their organisations have increased the burden of rural households. These measures include targeted retrenchment and restructuring of workers’ benefits. These measures effectively transfer the burden of terminal care and funeral costs from the employer to the households. Therefore policies and responses implemented by the meso sector to mitigate the impact of HIV/AIDS at this level may have negative consequences for rural households. Planners, policy makers and those involved in implementing development programmes should ensure that policies and responses implemented by organisations and institutions at meso-level do not harm rural households and their communities.

Lastly, rural households rely on the public sector for the planning and provision of basic social services like health, education and agricultural extension services. This requires good governance and translation of macro-policies into programmes by technical staff in the public sector. With increasing mortality of the workforce, the skilled workers at meso-level are being decimated by HIV/AIDS. This has the potential to affect governance and programme implementation. This has its greatest impact on rural households.

The micro-sector is therefore not only greatly affected but also does not have the means to cope effectively with the negative impacts of HIV/AIDS. It will therefore note escape the negative impacts of HIV/AIDS.
6.1.2 The impact of HIV/AIDS on the meso-sector in Swaziland.

This systematic review has shown that Swaziland organisations have experienced the negative impacts due to HIV/AIDS.

AIDS is currently the leading cause of death amongst Swazi employees, contributing to over 60 percent of all deaths. The pooled AIDS mortality rate is currently 10.54/1000 employees per year, while the mean crude mortality rate of Swazi employees is 16.77/1000 employees per year.

The public sector has experienced higher mortality of workers than the private sector. The high mortality of skilled workers in the public sector will affect governance. This has the potential to affects government’s implementation of policies and programmes aimed at alleviating poverty and maintaining security.

HIV/AIDS has increased absenteeism in Swaziland organisations by over 20-fold. On average, Swaziland organisations are losing of 2.97 days per employee per year due to HIV/AIDS related absenteeism. Increased absenteeism reduces productivity and the organisations incur costs as the employee is paid for work not done.

In addition, HIV/AIDS has increased the expenditure of Swaziland organisations on employee welfare. The costs include costs due to increased utilisation of healthcare, funerals and death benefits. Swaziland organisations are spending 2.65 percent of their total wage bill on HIV/AIDS related costs. As the epidemic progresses these costs will increase.

However, the private sector in Swaziland has not experienced high mortality rates and costs due to AIDS to the magnitude projected earlier in the epidemic. The impacts experienced by Swaziland private sector is so far lower than that experienced by organisations in other African countries.
The epidemic in Swaziland is a late epidemic that has come at a time when knowledge on impact mitigation has been articulated. Swaziland organisations may have therefore avoided the cost of AIDS through workplace responses. There responses should be emulated by other organisations, especially, the smaller organisations and the public sector.

To reduce HIV/AIDS absenteeism and healthcare costs, HIV-infected staff should be kept health through the provision of anti-retrovirals. Providing access to care, support and treatment for infected staff and their dependants would improve quality of life of infected employees and their productivity and, protect the organisations and households of infected staff from the negative impacts of HIV/AIDS. For staff to access antiretroviral treatment, they need to know their sero-status. Organisations should therefore provide access to voluntary counselling and testing for staff and their dependants as part of the workplace programme.

Co-infection of HIV and tuberculosis is a major cause of AIDS deaths and HIV/AIDS absenteeism. Over 60 percent of all AIDS deaths were due to tuberculosis, while 70 percent of prolonged absenteeism of longer than 30 days was due to tuberculosis. There is need to increase tuberculosis surveillance and case identification. This will increase on timely diagnosis and initiation of treatment. This will reduce spread of tuberculosis.
6.1.3 Macroeconomic impact of HIV/AIDS on Swaziland.

Swaziland will face a 1.6 percent annual loss in GDP growth and 1.73 percent GDP per Capita growth due to HIV/AIDS. However, these figures do not project the true picture of the impact of HIV/AIDS on Swaziland. With the highest rate of HIV prevalence in the world and increasing mortality, Swaziland will face huge micro-level and meso-level impacts. These are likely to have enormous negative impacts on national economy.

6.2 Quality of existing research on impact of HIV/AIDS on Swaziland.

There is an increasing number of research studies on the impact of HIV/AIDS on Swaziland. Thirty-four studies on the impact of HIV/AIDS on Swaziland were identified and eighteen of these studies met the inclusion criteria. However, most of these studies, ten out of eighteen, covered the private sector. There is still a limited number of studies on the public sector, micro-level and the macroeconomic impact of HIV/AIDS on Swaziland. Four studies covered the public sector, three covered the macroeconomic level and only one covered the micro-sector. Future studies should focus on the public sector, rural households and the national economy.

The studies identified were predominantly observational studies. These studies have faced several difficulties including recall bias, misclassification and identification of cases and, confounding. Secondly, most organisations did not keep accurate records on HIV/AIDS at the workplace. These factors could have reduced the impact recorded by these studies.
There is therefore need for increased use of longitudinal studies to determine impact of HIV/AIDS on economies. Longitudinal studies involve enrolling a cohort of confirmed cases of HIV/AIDS and a control group of non-HIV cases and follow them over time. This has the advantage of tracking the long-term impacts of HIV/AIDS, eliminate recall bias and confounding factors and; misclassification of cases.

Further longitudinal studies would identify and control for alternative and confounding factors operating in the environment that produce similar effects to HIV/AIDS. Since the alternative explanations would be expected to affect both cases and control group randomly, any impact in excess of these alternative factors would be attributed to HIV/AIDS. As access to voluntary counselling and testing increases, researchers will have opportunities to enrol cohorts of infected individuals in longitudinal studies.

Participatory appraisals and key informant interviews should be included in future research studies to explore and identify alternative and confounding factors. This would facilitate the identification of alternative factors and control for such factors in the final analysis.

The second solution that is increasingly being used, is to identify HIV-infected cases through the use of verbal autopsy. Verbal autopsy may be the only method to identify HIV-infected and affected households in communities where stigma to HIV/AIDS is prevalent and death certificates not readily available.

There is a dearth of research on the impact of HIV/AIDS on the micro sector, public sector and the macroeconomic level in Swaziland. There is need to initiate more studies on these sectors.
References for sections 1-3


12. Food and Agriculture Organisation (FAO). Food and agriculture indicators: Swaziland. Available at:


38. Davies HT, Crombie IK. Getting to grips with systematic reviews and meta-analyses. Hosp Med. 1998 Dec; 59(12):955-8


Studies Included in the review


**Studies excluded from the review**


References for sections 5 - 6


118. Faculty of accident and Emergency Medicine. Bias & Confounding.
Available at:

Powerpoint Presentation, University of Maryland. Available at:

120. Booysen F le R, Arntz T. The methodology of HIV/AIDS impact studies: