

ADVANCING THE HYGIENE MANAGEMENT SYSTEM AT RED MEAT ABATTOIRS IN GAUTENG

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ABSTRACT

Direct control by government over abattoirs shifted in the late 1980s through privatisation. The legislated food safety system, namely the Hygiene Management System (HMS), coupled with the Hygiene Assessment System (HAS) attempted to address problems of control. The responsibility to implement and maintain these systems is now the responsibility of abattoir operators who must ensure that meat is processed within the risk-based HMS. However requirements for the HMS are scattered throughout legislation, government policies and guideline documents.

The research aim was to suggest themes toward the development of an implementation guideline document for HMS implementation by conducting gap assessment audits at abattoirs using the Hygiene Assessment System (HAS).

Keywords: Hygiene Assessment System, Hygiene Management System, HACCP, abattoir, meat inspection

1. INTRODUCTION

Perishable foods such as meat may be regarded as high risk foods because they contain an abundance of nutrients which favour the growth of micro-organisms (Subratty & Gurib, 2003). Studies in the United Kingdom show a strong correlation between meat consumption and food-borne disease outbreaks (Holt and Henson, 2000). Contamination of meat during processing at abattoirs occurs through cross contamination of meat by personnel and equipment such as knives and saws used during processing (Van Zyl, 1998). Food safety systems such as the Hazard Analysis Critical Control Point (HACCP) system have been adopted internationally to minimise the risk of contamination during abattoir processing with the aim of protecting consumer safety (Hilton, 2002).

Public awareness of food safety issues has increased dramatically (Shareen, 2004), and more recently in developing countries (United Nations, 2005). *Consumer awareness has led to controlling authorities internationally to legislate the implementation of risk-based food safety systems including the meat industry (Mead, 1994; Vandendriessche, 2008) in order to provide food safety assurance to both local and international markets (Sofos, 2008).*

2. BACKGROUND

Up until the late 1980s, the South African government had direct control over safe meat production at South African abattoirs by direct management of abattoirs. Thereafter government abattoirs were closed down due to de-regulation, allowing for private enterprise. Meat inspection was also privatised and this function was transferred to a private company namely, the Meat Board (National Agricultural Marketing Council, 2001:3).

Without direct government control over privately owned abattoirs that were still emerging all over the country, hygiene control at abattoirs became an issue of concern for the government whose only method of ensuring hygiene at abattoirs was routine weekly, or in some cases monthly, inspections at abattoirs.

The Meat Safety Act, Act 40 of 2000 (SA, 2000) attempted to address this problem by regulating the Hygiene Management System (HMS). The requirements of the HMS are regulated under the standing regulations of the Meat Safety Act, namely, the Red Meat Regulations (SA, 2004). There are also additional requirements to the HMS however, scattered throughout legislation, government policies and other guideline documents.

As with all other legislation in South Africa, the enforcement of the Meat Safety Act, Act No. 40 of 2000 (SA, 2000) functions on the basis that the sector to which the legislation applies, namely the abattoir industry, has the responsibility to know and interpret this Act. This implies that the industry is also familiar with the HMS and any additional requirements included in the HMS. However, there is currently no single document that brings together all of the requirements to be met by an abattoir in order to be fully compliant with the HMS. It is up to the owners of abattoirs to collate the information from these requirements, and to interpret all of these as basis for food safety and quality management in abattoirs.

In such a scenario it is possible that different individuals may interpret the requirements differently and may translate the interpretations into practices that are not comparable across the abattoir industry. A single document which brings together all the requirements in a coherent way, and which provides meat safety and quality assurance guidelines, could support consistent understanding and implementation of the HMS, thus fostering ownership of the HMS in abattoirs as the means to regulate the quality and safety of their products.

As a result, HMS implementation has been retarded due to a lack of clear guidelines available for abattoir operators to consult during HMS implementation.

3. AIM

This research attempted to identify implementation gaps of the HMS and to suggest themes to inform a guideline document in an attempt to advance the HMS implementation in Gauteng, and extended for use nationally.

4. OBJECTIVES OF THE RESEARCH

In order to achieve the aim of the research, the objectives set were to assess the hygiene status and level of HMS implementation in different grades of red meat abattoirs, using the HAS; to identify HMS implementation gaps from this assessment; and to use this information to propose themes toward the development of a guideline document that clarifies HMS implementation.

5. METHODOLOGY

The study focused on registered red meat abattoirs in the Gauteng province. Sample selection was done in accordance with the requirements of the Abattoir Hygiene Act, Act No 121 of 1992 (SA, 1992) because it provides greater representation of the different grades of red meat abattoirs.

Seidman (1998) states that the consideration of an adequate and acceptable sample size for qualitative research is dependant on two criteria, namely (1) a sufficient number to reflect the range of participants in each category, and (2) saturation of information, for example, hearing the same comments from different participants. McCracken (1988) further states that no fewer than eight participants may be necessary to extract intensive information during research. This is supported by McMillan and Schumacher (2001), who advocate that such an approach would be sufficient to make inferences regarding the situation in the general population.

In selecting an adequate sample size for this research, considerations influencing this decision were that the number of gaps was not the focus in the study, but rather the range of HMS implementation problems. The operational processes within abattoirs are fairly generic, and each abattoir in the sample was studied in great depth through an intensive audit.

A sample size of ten (10) abattoirs, two from each grade, was selected for this research. The sample represented 29% of the total population of Gauteng abattoirs. A larger sample was not considered necessary, as the number of gaps were not the focus, but rather the range of HMS implementation problems. Further, because the operational processes within abattoirs are fairly generic, and each abattoir in the sample was studied in depth, it was considered that the information gained from the sample would be sufficient to make inferences regarding the situation in the general population (McMillan & Schumacher, 2001).

Abattoirs in South Africa are audited by a national instrument, namely the Hygiene Assessment System (HAS), which is based on the HMS requirements of the Red Meat Regulations, and was thus the logical instrument of choice for the acquisition of meaningful qualitative data from abattoirs. HAS checklists are available for both high (grades A, B and C) and low (grades D and E) throughput abattoirs. The HAS contains ten weighted categories, namely ante-mortem inspection; slaughter and dressing; meat inspection; chilling and dispatch; offal processing; sanitation and pest control; personnel; general conditions; maintenance and Hygiene Management System.

The South African National Accrediting System (SANAS) has accredited the Gauteng Veterinary Services Branch as a competent inspection body within a technical scope that includes conducting HAS audits at abattoirs according to the ISO 17020:1998 system. The procedure followed during the research audits using the HAS was adapted from the Gauteng Veterinary Services HAS inspection procedure as this method is generally accepted within the province.

A cut-off point was necessary to identify those areas that probably require greater explanation in the HMS based on research audit findings at the ten sampled abattoirs. It was reasoned that 50% would not be a useful cut-off point, since 50% non-compliance could mean partial understanding, or complete understanding but indifference. However, 60% compliance probably suggests that most persons understand the issue, but not necessarily all the ramifications, and can therefore implement that aspect, although perhaps not fully. It thus seemed as if 40% non-compliance would be a reasonable cut-off point, accepting that this could include non-conformances due to lack of understanding, or resources, or even indifference.

The assessment framework was then formulated as follows:

- any criterion item that indicated non-compliance across abattoirs of 40% and more. The reasoning was that if non-compliance was as high as 40%, then whatever the underlying reason, it would be useful to clarify and emphasise this aspect of the framework; and
- any criterion item that indicated a non-compliance rate of less than 40%, but which was critical to ensure public health, e.g. meat inspection.

Findings, displayed in the next section, were grouped based on the root cause of the finding as opposed to the finding itself, for example, if workers were found sitting on the ground during breaks, the root cause would be stated as “no code of conduct in place” or “training on personal hygiene not provided”.

6. RESULTS

The weighting allocation for HAS categories has been allocated in terms of the risk of compromising safety of the product. Categories of greater importance

are those which have a direct impact on the safe processing of meat at abattoirs. Those categories that have an indirect impact, although still important to consider within the HMS, are of lesser importance in terms of having a direct impact on the safe processing of meat at abattoirs. These allocations per category are ante-mortem inspection (0.10); slaughter and dressing (0.15); meat inspection (0.15); chilling and dispatch (0.15); offal processing (0.03); sanitation and pest control (0.10); personnel (0.10); general conditions (0.05); maintenance (0.07) and Hygiene Management System (0.10). Figure 1 below provides a graphical representation of the findings per HAS category.

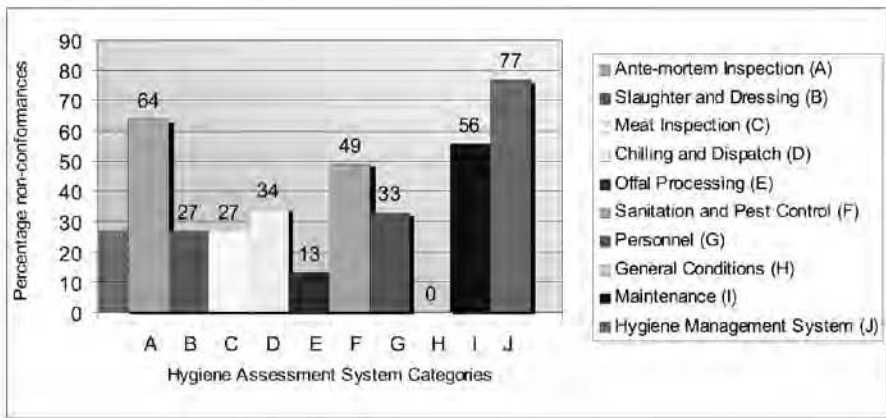


Figure 1: Hygiene Assessment Systems audit findings per category

An overall view of the greatest concentration of findings can be found in category J where it was observed that 90% (nine) of the test abattoirs still required further implementation of their HMSs towards full compliance to the Red Meat Regulations (South Africa, 2004).

Category A represents 10% of the total final HAS score which is indicative of its greater importance to meat safety. In Category A, represented graphically in Figure 2 below, 16 non-conformances were observed from a total of 25 audited aspects. Themes identified here include training verification, internal standard operating procedures (SOPs), and the role of the inspector. Training of staff could not be verified in documentation. In addition, no guiding procedure could be produced at some of the abattoirs regarding how training is conducted for new staff e.g. induction training. Standard operating procedures regarding handling and processing of injured and dirty livestock were lacking at most abattoirs. In addition, due to the on-line inspection duties of the meat inspector, ante-mortem inspection was not done at some of the abattoirs.

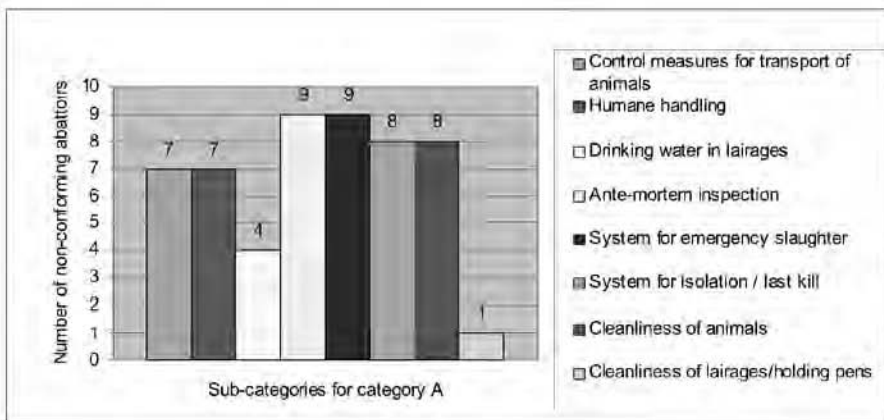


Figure 2: Non-conforming abattoirs as per Category A: Ante-mortem inspection

Category B represents 15% of the total final HAS score which is indicative of its greater importance in meat safety. In Category B, represented graphically in Figure 3 below, 11 non-conformances were observed from a total of 41 audited aspects.

The regulation two-knife system was written in the procedures at some abattoirs, but workers at many of the abattoirs audited revealed that this system is not practised as it is documented. In addition supervision of activities such as stunning, bleeding and dressing was inadequate for many of the abattoirs audited.

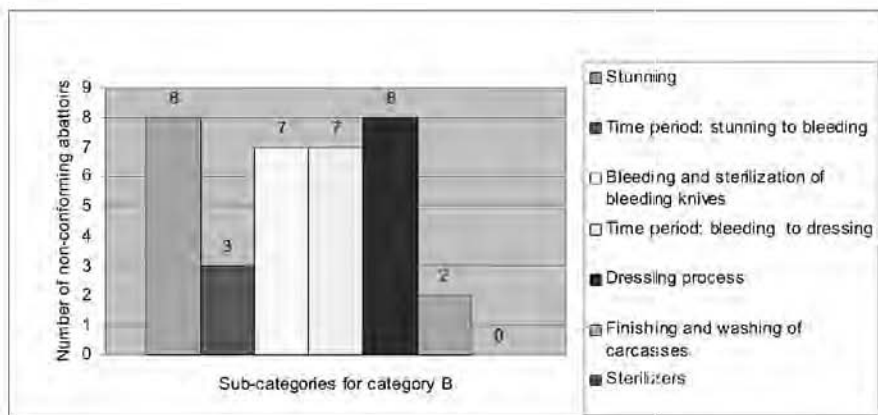


Figure 3: Non-conforming abattoirs as per Category B: Slaughter and Dressing

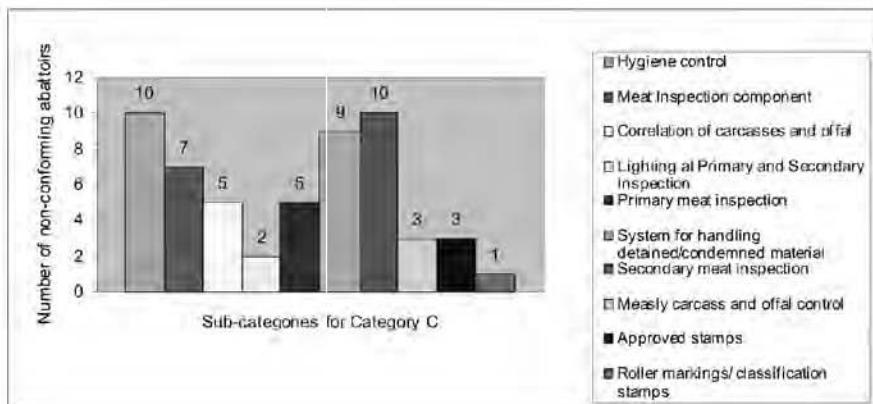


Figure 4: Non-conforming abattoirs as per Category C: Meat Inspection

Category D represents 15% of the total final HAS score which is indicative of its greater importance to meat safety. In Category D, represented graphically in Figure 5 below, 11 non-conformances were observed from a total of 32 audited aspects. It was observed that re-inspection of meat coming into abattoirs for whatever reason/s was not done by inspectors, and when re-inspection was done, no reports on findings or actions taken could be produced. Protocols for informal traders were not provided by many abattoirs despite the fact that they were working with such traders. Finally checklists for truck inspections regarding compliance and decisions relating to non-conforming trucks by inspectors could not be produced during test audits.

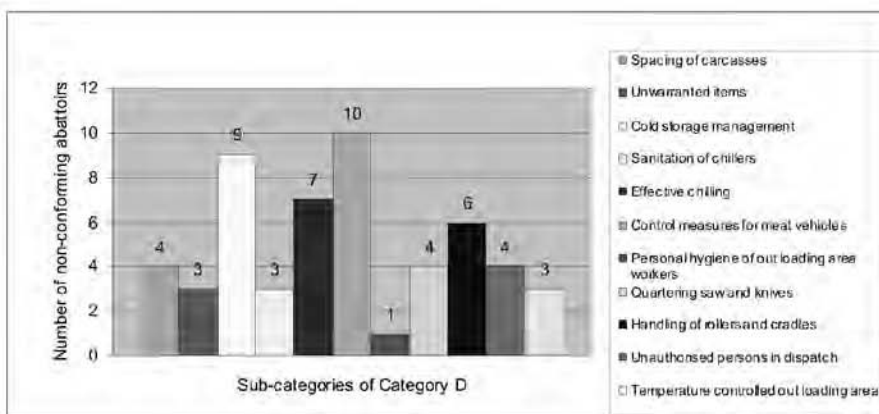


Figure 5: Non-conforming abattoirs as per Category D: Chilling and Dispatch

Category E represents 3% of the total final HAS score which is indicative of its lesser importance to meat safety. In Category E, represented graphically in Figure 6 below, 3 non-conformances were observed from a total of 23 audited

aspects. Bottlenecks were observed during processing. In addition vehicles transporting offal away from abattoirs did not fully comply with the requirements laid down for transportation of meat.

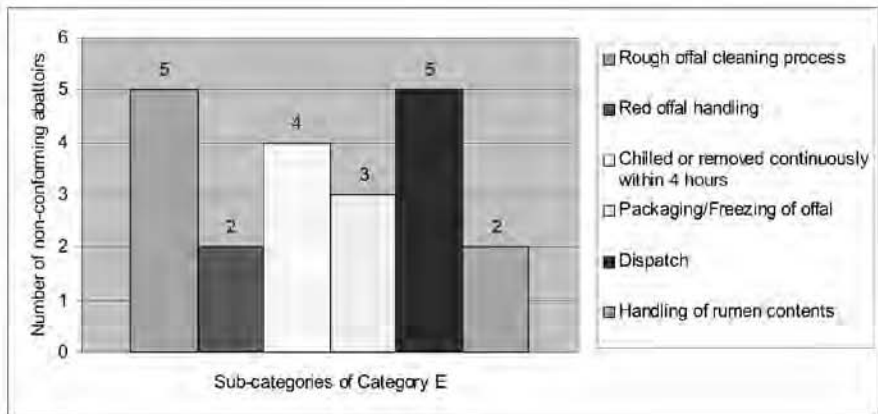


Figure 6: Non-conforming abattoirs per Category E: Offal Processing

Category F represents 10% of the total final HAS score which is indicative of its greater importance to meat safety. In Category F, represented graphically in Figure 7 below, 17 non-conformances were observed from a total of 35 audited aspects. A master cleaning schedule for the whole plant was not documented at many of the abattoirs in addition to other procedures such as those required for effective cleaning. Cleaning procedures were not carried out as documented e.g. cleaning in the presence of edible products, using detergents in the presence of blood and waste pieces of meat on the floor.

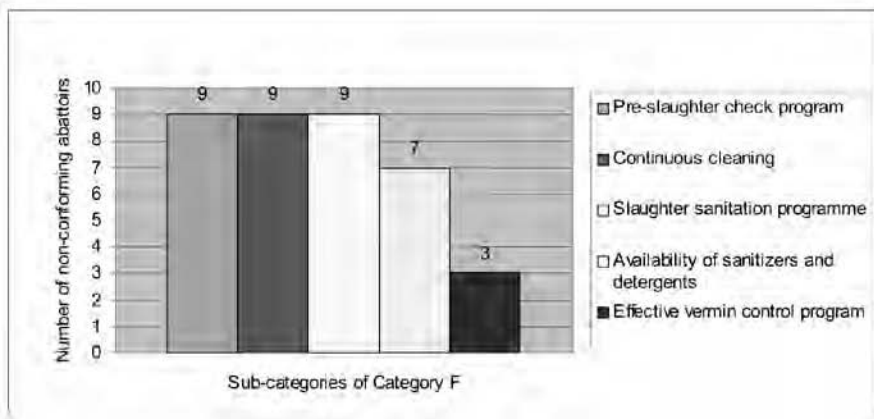


Figure 7: Non-conforming abattoirs as per Category F: Sanitation and Pest control

Category G represents 10% of the total final HAS score which is indicative of its greater importance to meat safety. In Category G, represented graphically in Figure 8 below, 7 non-conformances were observed from a total of 21 audited aspects. At many of the abattoirs audited it was observed that codes of conduct for employees were not documented and if so, they were very generic and not specific to the particular facility. Employees were observed violating fundamental rules of personal hygiene during audits e.g. sitting on the ground during lunch breaks.

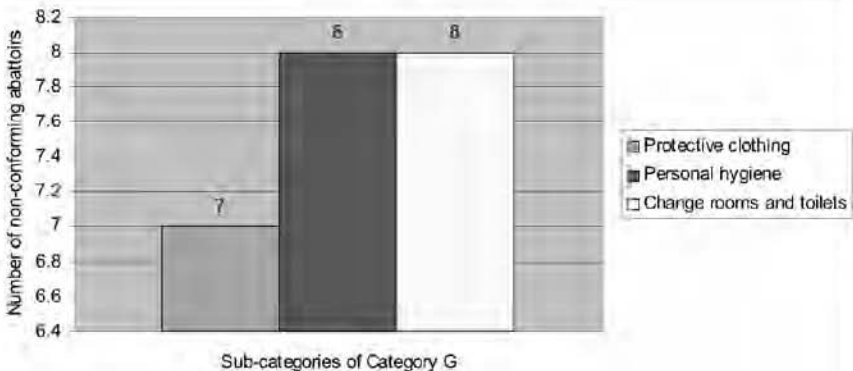


Figure 8: Non-conforming abattoirs as per Category G: Personnel

Category H represents 5% of the total final HAS score which is indicative of its importance to meat safety. Category H, represented graphically in Figure 9 below, contained non-conformances that were minor and the application for raising a finding required 40% or 4 abattoirs to be non-compliant. There was general compliance with the majority of the abattoirs sampled during the research regarding this category.

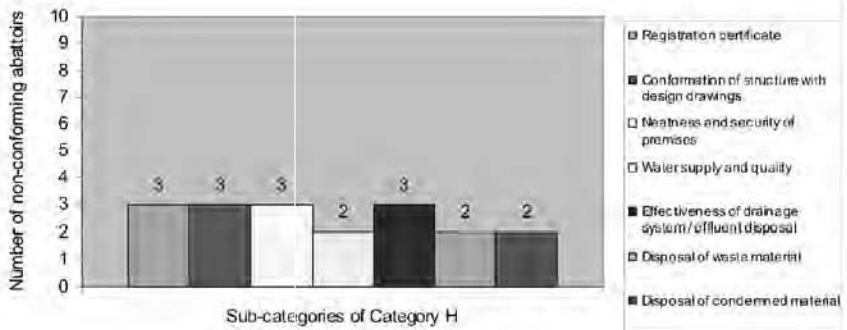


Figure 9: Non-conforming abattoirs per Category H: General Conditions

Category I represents 7% of the total final HAS score which is indicative of its lesser importance to meat safety. In Category I, represented graphically in Figure 10 below, 10 non-conformances were observed from a total of 18 audited aspects. A comprehensive maintenance plan for the whole plant at

many of the sampled abattoirs was not documented. As a result maintenance at some of the abattoirs was not carried out timeously and maintenance is based on the philosophy of reactive maintenance as opposed to preventative maintenance.

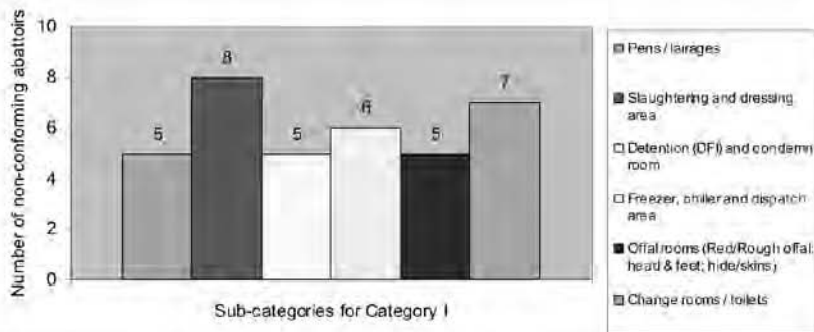


Figure 10: Non-conforming abattoirs per Category I: Maintenance

Category J represents 10% of the total final HAS score which is indicative of its greater importance to meat safety. In Category J, represented graphically in Figure 11 below, 60 non-conformances were observed from a total of 78 audited aspects. As a general observation at all audited abattoirs, procedures required by the HMS were not documented and if they were documented, they were generic versions provided to abattoir management by meat inspection service providers. Some abattoirs documented procedures but did not follow them. A comprehensive risk assessment was not conducted and documented at many of the abattoirs audited. This assessment forms the basis upon which procedures within the HMS are developed. Therefore the HMS at all abattoirs, although implemented, was not fully implemented in full compliance to the Red Meat Regulations.

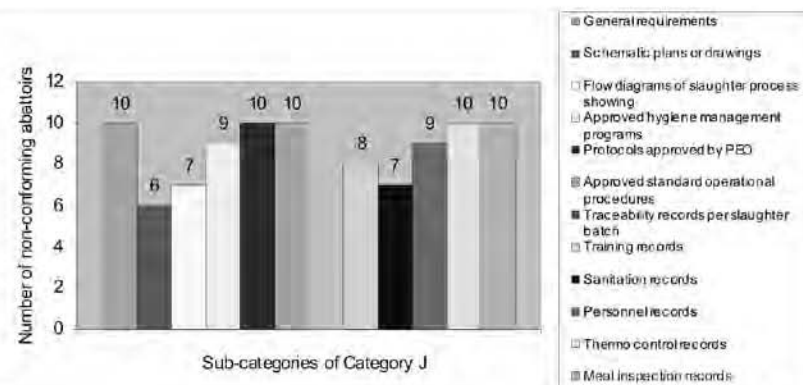


Figure 11: Non-conforming abattoirs per Category J: HMS

Research audits found that gaps existed in the HMS across all grades of abattoirs. The next section of this paper discusses the results in greater detail where audit findings are used to develop themes of implementation gaps that are suggested as a basis upon which implementation guidelines may be developed.

7. DISCUSSION OF RESULTS

Ten themes emerge from the analysis of the results presented above and include (1) risk assessments, (2) meat safety manual and related documentation, (3) record keeping, (4) training and skills maintenance, (5) meat inspection, (6) management and supervision, (7) internal and external communication of the HMS, (8) maintenance, (9) internal audits and (10) corrective action and continual improvement of the management system. A more elaborative discussion is provided on these themes below.

7.1. Risk assessments

It was observed that risk assessment may not be an established approach in the HMS implementation. Risk assessment methodologies differed greatly from abattoir to abattoir with certain methodologies fundamentally flawed. Without meaningful risk assessments, adequate control measures cannot be established as part of a preventive approach to safe meat processing.

7.2. Meat safety manual

There are currently no definitions given to operators regarding Hygiene Management Programmes (HMPs) and SOPs nor guidelines on what information these documents should present. It was a general observation that SOPs contained inadequate information about the responsible person/s, purpose, scope and actual process steps. The lack of named responsibility does not foster process ownership. This in turn may result in inadequate mitigation of anticipated risks during processing.

7.3. Record keeping

Records were generally not available at abattoirs e.g. training, sanitation, thermo-control and meat inspection records. Records that were available indicated that work was inconsistently carried out. Although some abattoirs used checklists for monitoring a range of activities, these were used infrequently. These records are intended to be used by management to ensure continued compliance, for demonstration during government audits, and improvement of the HMS using the corrective action analysis.

7.4. Training and skills maintenance

Authors like Tebbutt (1992) emphasise the importance of training food

handlers, but studies have shown that food-borne disease outbreaks still occur despite training given to food handlers (Powell, Attwell & Massey, 1997). While the specific training model may be important, as Clayton *et al.* (2002) suggest, the researcher argues that the documented system plays a key role. Where generic procedures are the basis for training, sufficient information to complete the task in the particular environment may mean that employees are not able to develop the appropriate behaviours. Most abattoirs did not have skills maintenance programmes in place.

7.5. Meat inspection

Inspectors generally perform ante-mortem inspections, primary and, in some cases, secondary meat inspections, conduct HAS inspections, conduct, attend to emergency slaughter cases, inspect delivery vehicles for compliance, conduct re-inspection of meat entering the abattoir and general administration and reporting to government. It was observed in some abattoirs that inspectors, in addition to the above tasks, were also responsible for the grading of meat. In abattoirs where only one inspector is employed, these tasks cannot be performed adequately. Where such duties (excluding grading) are not being performed, or are performed inadequately due to time constraints, the risk of compromising public health is increased. Also the unavailability of records pertaining to the meat inspector, particularly competency checks, could not demonstrate that meat inspection is verified at test abattoirs.

7.6. Management and supervision

Supervision is vital to ensure compliance with procedures and the personal hygiene code, attending to observations and findings raised by the inspector or veterinarian, animal welfare compliance such as preventing double stunning during stunning and communicating more serious findings to management for rectification. During the audits, many instances were observed where adequate control was not exercised to ensure that procedures are performed according to SOPs, and those procedures are documented and records kept. This indicated that supervision was generally less than adequate, even in abattoirs where supervisors were employed.

7.7. Internal and external communication

During the audits it emerged that the lack of effective internal communication within most of the test abattoirs may be at the root of some of the non-conformances. A number of observations related to communication between management and the inspectorate. Some examples were:

- inspectors do not re-inspect returned products because they are not within the communication loop with clients;
- carcasses brought into the abattoir premises for further processing

are not inspected by inspectors because they do not know of their entry into the abattoir;

- inspectors are not always informed of live animals off-loaded for slaughter and consequently ante-mortem inspection is not done on these batches; and
- inspectors are typically not informed of production plans which may result in overstocking of pens or chillers should production not be synchronised with processing.

7.8. Maintenance

Most of the abattoirs audited did not have maintenance plans in place. Properly functioning equipment is critical for the safe and hygienic processing of animals. During the audits several instances of soiled facilities and equipment were observed. A well maintained facility is not only in the interest of employees' health and safety but also in that of public health in ensuring a safe product.

7.9. Internal audits

It was observed that 100% of abattoirs sampled do not engage in regular internal audits as a means of determining how effective the HMS is functioning. Generally internal audits assist in fine-tuning management systems and providing a basis for continual improvement. A serious disadvantage is that abattoirs therefore do not identify non-conformances. Consequently, no corrective action plans, follow-ups or reporting takes place.

7.10. Corrective action and continual improvement of the HMS

Deviations from the planned HMS are to be corrected, investigated and the root causes to be integrated back into the existing HMS procedures. The consequences for the lack of improvement may be described as repetition of risk practices which may eventually lead to contamination of meat which is supplied to consumers resulting in food-borne illness. This may be avoided if the "lessons learned" through corrective action analysis are integrated into the dynamic HMS that evolves through experience and working towards prevention. This research found that corrective action and continual improvement was less than adequate but more importantly the extent to which the HMS supports continual improvement is unclear.

Implementation gaps were formulated into the above themes that are suggested to be used during the development of the guideline document.

8. RECOMMENDATIONS

In addressing the identified themes, the guideline document should explore all legislation and relevant regulations pertaining to each theme, at each step of the red meat processing process. The aim would be to ensure integration of the different sources and clear directions, so that greater understanding of the expectations of red meat hygiene control is fostered. It is proposed that the guideline document clarify government expectations regarding primary and secondary meat inspections and the obligation of abattoir owners to ensure sufficient inspection staff for the range of tasks for which inspectors and veterinarians are responsible.

It is proposed that the guideline document address regular internal audits, followed by corrective action plans, closing-out and reporting of non-conformances. It is further proposed that abattoirs consider using a resident inspector to conduct internal HAS audits, to render audits more objectively. In this way, abattoirs could establish a continuous improvement cycle of their HMS.

9. CONCLUSION

The necessity for clear implementation guidelines has been demonstrated particularly around those themes identified during the research.

Abattoir owners have done well in terms of implementation of the HMS based on the research audits but common implementation gaps across all grades of abattoirs still exist. These gaps may be closed if useful guidelines are available to operators to consult with to provide clarity on government expectations of full compliance. Such a guideline document may assist greatly with advancing the implementation of the HMS to a point where continual improvement of the system may be contemplated.

It was observed that what was common to all grades of abattoirs was that there remains a disparity between the documented HMS and operational practice. Government should work towards overcoming this disparity in order to promote practical HMSs. Government should also promote awareness of internal audits by operators using HAS because the HMS will stagnate and over time render it redundant.

A more challenging proposal centres on the extension of red meat hygiene control to the level of the informal red meat supplier. In a developing country such as South Africa, the informal business sector delivers an important service to the less affluent sectors of the population. Slaughtering in this instance occurs in residential areas and meat is sold unchilled and unprotected in open markets. Projects to instill a hygiene control approach at this level will raise the standard of red meat provision and offer improved protection against food-borne disease to the public.

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