Assessment of food handler's compliance to personal hygiene practices in fast food outlets in Thohoyandou, South Africa

Article · January 2016

CITATIONS
0

READS
53

3 authors, including:

Tino Murwira
University of Venda
2 PUBLICATIONS 0 CITATIONS

Ademola M Amosu
University of Venda
28 PUBLICATIONS 96 CITATIONS

Some of the authors of this publication are also working on these related projects:

IMPACT OF NUTRITION THERAPY PROGRAM ON THE GLOBAL ACUTE MALNUTRITION RATE- AN EXPERIENCE IN A WAR-TORN LAKES STATE OF SOUTH SUDAN View project

All content following this page was uploaded by Tino Murwira on 25 July 2016.
The user has requested enhancement of the downloaded file.
Assessment of food handler’s compliance to personal hygiene practices in fast food outlets in Thohoyandou, South Africa

T.S. MURWIRA¹, A.M. AMOSU² AND L.H. NEMATHAGA³

¹Department of Public Health, University of Venda, Thohoyandou, South Africa; E-mail: murwiratinotenda@gmail.com
²Department of Public Health, School of Public and Allied Health, Babcock University, Ilishan-Remo Ogun State, Nigeria
³Department of Advanced Nursing, University of Venda, Thohoyandou, South Africa;

(Received: 4 July 2015; Revision accepted: 28 September 2015)

Abstract

Food safety is becoming a key public health priority because a large number of people consume their meals outside their homes. As a result, they are exposed to food borne illnesses that originate from food stalls, restaurants and other food outlets. Hence the major objective of carrying out this research study was to assess food handler’s adherence to personal hygiene practices in fast food outlets in Thohoyandou as stipulated in national food hygiene and regulations. The data was collected using participant observational checklist. Simple random sampling was used to select 122 food handlers as participants in the study. Data analysis involved descriptive statistics (frequencies and percentages). Result analysis was made based on the standards and the requirements prescribed by Regulation R962 of November 2012. The findings showed that food handlers observed personal hygiene by wearing clean uniforms, covering their heads with hair nets, and washed their hands, indicating that food handlers maintained accepted standards in terms of personal hygiene regulations. Regarding health surveillance practices majority of food handler were not medically examined regularly, however they reported illness to management when sick, but some prepared food when they had cough and open sores on their hands. The study recommends that strict adherence to Regulations R962 be enforced and adhered to in order to ensure and assure the preservation and maintenance of food safety.

Keywords: Assessment, food handlers, personal hygiene, fast food outlets.

How to cite this article:

Introduction

The World Health Organisation (WHO) defines food safety as the conditions and measures that are necessary during production, processing, storage, distribution and preparation of food to ensure that it is safe, sound, and wholesome and fit for human consumption (WHO, 1984). Food safety remains a critical issue among professionals in the food service sector as well as consumers (Griffith, 2000). Food contamination may occur at any point during its journey through production, processing, distribution, and preparation (Green et al., 2005; Hennessy et al., 2004). The risk of food getting contaminated depends largely on
the health status of the food handlers, their personal hygiene, knowledge and practice of food hygiene.

In South Africa providing safe food to consumers is the responsibility of the food service provider. There is an added obligation on authorities to ensure that any establishment serving food to the general public does so in a manner that complies with the regulations, and to monitor compliance. These regulations are detailed in the Health Act, No. 63 of 1977 and the Foodstuffs, Cosmetics and Disinfectants Act of 1972. Furthermore, standards have been developed to guide food service establishments in providing safe food for human consumption. Regular sanitary inspection can improve adherence of food handlers to personal hygiene and food safety practices. In South Africa, the food handlers have to adhere to a number of health regulations and guidelines which are updated with international standards from Code Alimentarius regulations on food hygiene.

Regulations governing General Hygiene Requirements for Food Premises and the Transport of Food R962 of November 2012 of Foodstuffs, Cosmetics and Disinfectants Act of 1972.

**Personal hygiene**

(a) Protective clothing: The health regulations, state that no person shall be allowed to handle food without wearing suitable protective clothing. Such clothing should be 1) clean and neat before any food is handled, 2) in a clean condition at all times during the handling of food, 3) of such design and material that it would not contaminate the food, and 4) designed not to come into direct contact with any part of the food. Management is responsible for the cleaning and issuing of protective clothing and should ensure that it is not removed from the premises for cleaning or repair without authorization (South African Bureau of Standards, 2001).

(b). Hair

Hair is constantly falling out and, along with dandruff, can result in contamination of food. As the scalp often contains pathogenic organisms such as staphylococcus aureus, steps must be taken to prevent contamination from this source. Hair should therefore be kept clean and completely enclosed by suitable head covering (Regulation 962 of 2012, promulgated under the Foodstuffs, Cosmetics and Disinfectants Act, No. 54 of 1972 of Republic of South Africa Republic of South Africa).
(c) Hands

Since hands are often in direct contact with food, they are considered one of the principal agents in transferring pathogens to food. That is why handling should be reduced to a minimum. Although the use of gloves in the handling of food should be limited to cases in which workers’ hands need to be protected against physical, chemical, or temperature harm, or where foodstuffs are to be protected from possible contamination by the worker (South African Bureau of Standards, 2001), health regulations stipulate that no food handler may touch ready-to-eat non-pre-packed food with his or her bare hands unless doing so is unavoidable for preparation purposes (Regulation 962 of 2012, promulgated under the Foodstuffs, Cosmetics and Disinfectants Act, No. 54 of 1972 of Republic of South Africa Republic of South Africa).

According to Section 9(i) (2) and 11(i) (ii) and (iii) of Regulation 962 of 2012, promulgated under the Foodstuffs, Cosmetics and Disinfectants Act, No. 54 of 1972 of Republic of South Africa Republic of South Africa standard and requirements for facilities: No person is allowed to handle unpacked food if: (i) His/her fingernails, hands or clothes are not clean; (ii) who has not washed his or her hands thoroughly with soap and water or cleaned them in another effective manner. Hands should be washed, immediately prior to the commencement of each work shift; at the beginning of the day's work or after a rest period; after every visit to a latrine or urinal; every time he or she has blown his or her nose or after his or her hands have been in contact with perspiration or with his or her hair, nose or mouth; after handling a handkerchief, money or a refuse container or refuse; after handling raw vegetables, fruit, eggs, meat or fish and before handling ready-to-use food.

The food hygiene regulations stipulate that it is the responsibility of food handlers to wash their hands thoroughly with soap and water under all relevant circumstances (R962 of 2012). Facilities for personnel should be adequate, and all hand washing basins in toilet areas must be supplied with hot and cold water, and hand-cleaning preparations in dispensers and paper towels or air hand-dryers should be provided (Codex Alimentarius, 1997).

Health surveillance

People known, or suspected, to be suffering from, or to be a carrier of a disease or illness likely to be transmitted through food, should not be allowed to enter any food handling area if there is a likelihood of their contaminating food. Any person so affected should immediately report illness or symptoms of illness to the management. The Codex Alimentarius (2003) determines that persons, who are known or suspected of having any disease that might be transmitted by food, are forbidden to handle food items. It should also be pointed out that any such individual must immediately inform management about the disease or symptoms in addition to undergoing a medical examination. The Codex and the WHO do
not require periodical health examinations. Medical examination of a food handler should be carried out if clinically or epidemiologically indicated. Conditions which should be reported to management so that any need for medical examination and/or possible exclusion from food handling can be considered, include, jaundice, diarrhoea, vomiting, fever, sore throat with fever, visibly infected skin lesions (boils, cuts and discharges from the ear, eye or nose (Alimentarius, 2003). Therefore purpose of this study was to assess the adherence of food handlers in fast food outlets in Thohoyandou to regulations regarding personal hygiene practices by focusing on personal hygiene and health surveillance practices.

Methodology

A quantitative, cross-sectional descriptive study which took the form of an observation survey was adopted to assess the adherence of food handlers to personal hygiene practice in fast food outlets in Thohoyandou.

Probability random sampling method was used in this study and a total of 122 food handlers were recruited to the study. Assessment of personal hygiene was done by using a pretested observation checklist in November and December 2014. Data were collected using an observation checklist. Data collected include socio-demographic characteristics of food handlers which were age distribution, sex distribution, level of education and food safety training attended; personal hygiene such as finger nails cut, washing hands with soap wearing clean clothes, covering of hair, hand shaking changing money when preparing food and health surveillance practices such as medical examination, reporting illnesses to management, preparing food with cough and any visible open wound (Burns & Grove, 2009; Polit & Hungler, 2006). Analysis was made based on the standards and the requirements prescribed by Regulation R962 of November 2012. Frequencies and percentages of responses to the questions were computed and represented using frequency distribution tables and graphs.

Ethical considerations

The nature and purpose of the study were explained to the respondents and management of the fast food outlets. Ethical approval was obtained from the University of Venda Research and Publication Committee. Approval to conduct the study was granted by Vhembe district municipality. Confidentiality, anonymity and privacy were assured to the respondents to maintain secrecy on names and personal information.
Results

The socio demographic characteristics of food handlers are shown in Table 1. One hundred and twenty two respondents participated in the study. Out of these, 38(31%) were males and 84(69%) were females. Fifty eight (48%) were between age 26-35, 29(24%) were between ages 19-25 years and 35(29%) were 36 years and above. Twenty five (20.5%) had primary education while 66(54.1%) had matriculated and 31(25.4) had tertiary qualification Forty (33%) of the respondents attended food safety training regularly and 82(67%) did not attend training regularly.

Table 2 shows personal hygiene practices of the respondents. One hundred and fifteen (94%) had their finger nails cut, 87(71%) washed hands with soap. Furthermore, 118(98%) were observed wearing clean uniforms while 122(100%) use aprons or hair nets to cover head.

In Table 3 other unhygienic behaviors were spotted by the researchers. Only 2(1.6%) of the respondents were observed shaking hands whilst preparing food, whilst 1(0.8%) were found chewing whilst preparing food and 5(4%) of respondents were observed collecting money at the same time serving or dishing food.

Table 1: Demographic characteristics of study sample (N=122)

<table>
<thead>
<tr>
<th>Age (years)</th>
<th>(n)</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>19-25</td>
<td>29</td>
<td>24%</td>
</tr>
<tr>
<td>26-35</td>
<td>58</td>
<td>48%</td>
</tr>
<tr>
<td>&gt;36</td>
<td>35</td>
<td>29%</td>
</tr>
<tr>
<td>Gender:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>84</td>
<td>69%</td>
</tr>
<tr>
<td>Female</td>
<td>38</td>
<td>31%</td>
</tr>
<tr>
<td>Level of education:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary</td>
<td>25</td>
<td>20.5%</td>
</tr>
<tr>
<td>Secondary</td>
<td>66</td>
<td>54.1%</td>
</tr>
<tr>
<td>Tertiary</td>
<td>31</td>
<td>25.4%</td>
</tr>
<tr>
<td>Food safety raining:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>40</td>
<td>33%</td>
</tr>
<tr>
<td>No</td>
<td>82</td>
<td>67%</td>
</tr>
<tr>
<td>Total</td>
<td>122</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Figure 1 shows that 122 (100%) respondents wore hairnets and apron, while 25(20.5%) were observed wearing gloves when preparing food. Furthermore thirty three (27%) were observed wearing work suits.

In Table 4, 44 (36%) food handlers undergo regular medical checkup, 108(89%) reported illness to their supervisors when sick, whilst 26(21.3%) prepared food when suffering from cough. Furthermore, 30(24.5%) were observed with open sore on hands.
Table 2: Personal hygiene practices (N=122)

<table>
<thead>
<tr>
<th>Personal hygiene practices</th>
<th>(n)</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Finger nails cut short</td>
<td>115</td>
<td>94</td>
</tr>
<tr>
<td>Wash hands with soap</td>
<td>87</td>
<td>71</td>
</tr>
<tr>
<td>Wearing clean clothes while working</td>
<td>118</td>
<td>98</td>
</tr>
<tr>
<td>Wearing apron</td>
<td>122</td>
<td>100</td>
</tr>
<tr>
<td>Hair covered</td>
<td>122</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 3: Distribution of personal unhygienic behavior observed (N=122)

<table>
<thead>
<tr>
<th>Other personal unhygienic behavior</th>
<th>(n)</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shaking hands whilst preparing food</td>
<td>2</td>
<td>1.6%</td>
</tr>
<tr>
<td>Chewing whilst preparing food</td>
<td>1</td>
<td>0.8%</td>
</tr>
<tr>
<td>Changing money when preparing food</td>
<td>5</td>
<td>4%</td>
</tr>
</tbody>
</table>

Figure 1: Types of protective wear worn by food handlers

Table 4: Health surveillance practices N=122

<table>
<thead>
<tr>
<th>Health surveillance practices</th>
<th>(n)</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Have medical examination</td>
<td>44</td>
<td>36</td>
</tr>
<tr>
<td>Reported illness to management</td>
<td>108</td>
<td>89</td>
</tr>
<tr>
<td>Preparing food with cough during visit</td>
<td>26</td>
<td>21.3</td>
</tr>
<tr>
<td>Any visible open wounds, injuries at time of visit</td>
<td>30</td>
<td>24.5</td>
</tr>
</tbody>
</table>

Discussion

According to Section 9(i) (ii) and 11(i) (ii) and (iii) of regulation 962 of 2012, promulgated under the Foodstuffs, Cosmetics and Disinfectants Act, No. 54 of 1972 of Republic of South Africa the standard requirements regarding food handling hands are that no person is allowed to handle unpacked food, whose fingernails, hands or clothes are not clean; who has not washed his or her hands
thoroughly with soap and water. The current study with regard to personal hygiene practices found varying levels of compliance.

The observation visits showed that 115(94%) had their finger nails cut and only (71%) washed their hands with soap. Short and clean fingernails are also important for prevention of transmission of food borne illness. Most of the food handlers had their finger nail cut short as prescribed by clauses (i) (ii) of regulations R962 of 2012. The results show a consistency in a similar study conducted by Assefa et al. (2015) in Ethiopia whereby 80.4% of food handlers’ fingernails were trimmed. Failure by food handlers to adhere to trim and clean nails leads to outbreak of food borne diseases. Griffith (2000) study in the United Kingdom shows that micro-organisms are particularly likely to accumulate under long dirty fingernails. In addition food handlers with poor personal hygiene could be the source of food borne pathogens (WHO, 1984). The consequence of food contamination varies among countries and regions of the world depending on climate, geography and degree of social and economic development. Shojaei et al. (2006) cited several studies confirming that poor personal hygiene by food handlers has caused outbreaks of food-borne illness caused by various pathogens, including Staphylococcus aureus, gram-negative bacilli Salmonella spp., Shigella spp., Campylobacter jejuni; enter toxigenic Escherichia colias well as viral agents, Hepatitis A and Norovirus. In a survey of the hands of Iranian food handlers, the most common potentially pathogenic bacteria isolated were Bacillus spp., E. coli, Enterobacter spp., Klebsiella spp. and S. aureus (Shojaei et al., 2006).

With regard to hand washing, the present study found 71% food handlers washed hands with soap. Failure to wash hands can be attributed to ignorance by some of the food handlers and low level of inspection by inspectors during busy times such as the festive seasons. Several food-borne disease outbreaks are associated with poor personal hygiene of people handling foodstuffs. Centre for Disease Control (1999) reported that approximately 20% of food-related infections are due to food handlers. The hands of ready-to-eat food service employees have been shown to be vectors in the spread of foodborne disease, mainly because of poor personal hygiene. Howes et al. (1999) state that improper food handler practices contributed to approximately 97% of foodborne illnesses in food service establishments and homes. Statistical evidence indicates that food poisoning caused by the catering industry is 70% higher than that caused by any other sector (Wilson et al., 1997). Food workers may transmit pathogens to food coming from a contaminated surface of another food, or from hands contaminated with organisms from their gastrointestinal tract. This is also supported by report in which about 89% of outbreaks caused by food contamination by food workers, pathogens were transferred to food by workers’ hands (Michaels et al., 2004).
Food handlers are the most important sources for the transfer of microbial pathogens to food either from their hair, skin, hand, digestive systems, respiratory tracts, or from contaminated food prepared and served by them (Guzevich et al., 1999). The hands are the last line of defence against exposure to pathogens which can occur either directly from the hand to the mouth, eye, nose, or other area of the skin, or indirectly by “handling” of food or water (Gun et al., 2007). A study conducted by Assefa et al. (2015) among Jimma university canteen food handlers revealed that 49.6% participants’ hands were contaminated with one or more potentially food borne bacterial contaminants. Staphylococcus aureus (23.5%), Klebsiella species (16.1%), E. coli (0.9%), Enterobacter species (9.1%), Citrobacter species (4.3%), are among the most commonly isolated bacterial hand contaminants. The overall hand contamination rate of enteric bacterial contaminants was 31.7% among the participants. Toxin-producing strains of Staphylococcus aureus are the leading cause of gastroenteritis following handling of food by persons who carry this bacterium in their noses and skin (Do Carmo, 2004).

According to regulation 962 of 2012, promulgated under the Foodstuffs, Cosmetics and Disinfectants Act, No. 54 of 1972 of Republic of South Africa, no person shall be allowed to handle food without wearing suitable protective clothing. Such clothing should be 1) clean and neat before any food is handled, 2) in a clean condition at all times during the handling of food, 3) of such design and material that it would not contaminate the food, and 4) designed not to come into direct contact with any part of the food. The observation revealed that all the 122(100%) food handlers were observed wearing clean uniforms, make use of aprons or hair nets to cover head when preparing and serving food. The results show that management in fast food outlets provided their food handlers with the required protective clothing as the regulations prescribe. All the food handlers in the fast food outlets sampled use protective clothing prescribed by the health regulations. Section 9 of Regulations R962 of 23 November 2012 prohibits any food handler from handling food without the use of the required protective clothing. This study is line with a study conducted among fast food outlets in the delicatessen industry in South Africa in which all food handlers were observed wearing plastic or material apron, gloves and hairnets (Tonder et al., 2007). All food handlers in fast food outlets have a basic responsibility to maintain a high degree of personal cleanliness and observe hygienic and safe food handling practices; otherwise they can contaminate food sources with pathogenic microorganisms. It is compulsory that food handlers maintain good personal hygiene to ensure food safety in food preparation. During food handling they should remove all jewelry and makeup. Behaviors that could result in food contamination such as smoking, spitting, chewing or eating, sneezing or coughing directly over should be avoided. Personal effects such as jewelry, watches, pins or other such items should not be worn or brought into food handling areas. In this study, only 2(1.6%) of the respondents were observed
shaking hands whilst preparing food, whilst 1(0.8%) were found chewing whilst preparing food and 5(4%) of respondents were observed collecting money at the same time serving or dishing food. These findings are a concern since the hands are vectors for pathogens such as \textit{S.aureus}. Consequently, it is advised that food handlers avoid handling food with bare hands.

\textit{Health surveillance practices}

According to Government Regulation 962 of 2012, promulgated under the Foodstuffs, Cosmetics and Disinfectants Act, No. 54 of 1972 of Republic of South Africa, medical examination of a food handler should be carried out if clinically or epidemiologically indicated. Conditions which should be reported to management so that any need for medical examination and/or possible exclusion from food handling can be considered, include, jaundice, diarrhea, vomiting, fever, sore throat with fever, visibly infected skin lesions (boils, cuts and discharges from the ear, eye or nose) (Alimentarius, 2003). This requirement is supported by guidelines from the South Africa Department of Health, regarding the management and health surveillance of food handlers.

There was 36% compliance in terms of having medical examinations at the time of visiting. Failure by food handlers to undergo medical examination is a threat to the consumers who patronize these fast food outlets. It has been reported in literature that infected food handlers are a threat to the health of the consumers; for example a study conducted in Lagos, South-West, Nigeria reported that the prevalence of Salmonellosis commonly known as typhoid fever among food handlers and the general public in developing country such as Nigeria, and the increasing menace of multi-drug resistance (MDR) by Salmonella spp is indeed a public health problem. The resultant effect on the health of food consumers would affect productivity, social and other aspect of life. This study showed high incidence of Salmonella infection among food handlers studied (Ogah et al., 2015). Furthermore, it has been shown that the source of most reported foodborne hepatitis A outbreaks has been infected food handlers present at the point of sale such as in a fast food outlet or who prepare food for social events such as a wedding. A single infected food handler can transmit Hepatitis virus to dozens or even hundreds of persons and cause a substantial economic burden to public health (Centre for Disease Control, 1999). The societal cost of a single foodborne outbreak of hepatitis A in Denver involving 43 cases was estimated to be more than $800,000, with 190% of these costs borne by the public health department and attributed to immunoglobulin administration (Dalton et al., 2004).

The reason for few food handlers with routine medical checkup routine is because of the position of South African Department of Health on medical checkups. According to the Department of Health South Africa, routine medical
examinations of food handlers may lead to a false sense of safety which can cause negligence with regard to general hygienic practices and personal hygiene. A much more effective preventative measure, the education of food handlers in hygienic practices, is often also neglected. For these reasons, the Department considers pre-employment and routine medical examinations of food handlers as not being cost-effective and unreliable in the prevention of food borne disease and recommends that it should therefore not be required by health authorities. Regular monitoring and surveillance by health authorities and management of the food handling process are, however, crucial elements in the prevention of food borne diseases (Department of Health Guidelines for the Management and Health Surveillance of Food Handlers, 2000). There was 89% compliance in terms of reporting illness to management. This was based on evidence for sick leaves and illness reports which were seen by the researcher. In terms of the regulation food handlers should report illness or sickness to management and managers should encourage employees to report to their supervisors whenever they have diarrhea, sore throat, fever, a cold or open skin lesions, or are jaundiced. Discretion should then be used as to whether or not these persons should be subjected to certain restrictions or suspended from food handling duties. The guidelines issued by the Department of Health in South Africa do not support pre-employment medical examinations but rather the establishment and implementation of procedures to ensure that illness is reported to management (Department of Health Guidelines for the Management and Health Surveillance of Food Handlers, 2000).

The consequences of non-adherence to this regulation, is the prevalence of diseases such as intestinal parasitic infections resulting in malnutrition, morbidity, mortality and socioeconomic impact owing to treatment cost and hospitalization. Intestinal parasites, which have direct life cycle, are transmitted by faecal oral route to human through poor personal hygiene. S. typhi is one of the major causes of food and water borne gastroenteritis in human and remains an important health problem worldwide. The World Health Organization estimates 16 million new cases and 600,000 deaths of typhoid fever were estimated each year (WHO, 2007). According to Government Regulation 962 of 2012, promulgated under the Foodstuffs, Cosmetics and Disinfectants Act, No. 54 of 1972 of Republic of South Africa Sub regulation 11(ii) it stipulates that food or facility shall not be handled by any ill person people known, or suspected, to be suffering from, or to be a carrier of a disease or illness likely to be transmitted through food, should not be allowed to enter any food handling area if there is a likelihood of their contaminating food. Any person so affected should immediately report illness or symptoms of illness to the management. The Codex Alimentarius (2003) determines that persons, who are known or suspected of having any disease that might be transmitted by food, are forbidden to handle food items. In this survey there was 21.3% non-compliance of people.
who prepared food with cough and 24.5% non-compliance of food handlers who continued to prepared food with exposed cuts or wounds.

**Conclusion**

A significant number of food handlers observed food hygiene and safety practices, thus complying with food hygiene and safety government Regulation 962 of 2012, promulgated under the Foodstuffs, Cosmetics and Disinfectants Act, No. 54 of 1972 of Republic of South Africa. Most of the food handlers observed personal hygiene: nails were cut, wore clean protective clothing and wore hairnets. However, of concern is that, some food handlers were observed not washing hands with soap and were carrying out unhygienic behaviours such as chewing, shaking hands and exchanging money whilst preparing food. In order to improve the hygiene practices of food handlers in fast food outlets the municipality should educate the food handlers about food safety regulations through health education and health promotion. Furthermore, the municipality should ensure enforcement of compliance by its Environmental Health Practitioners and relevant law enforcement agents. The fast food outlets owners should provide protective clothing to food handlers, employ food handlers who are trained in food hygiene and hold regular meetings with food handlers on food hygiene.

**References**


Food handler’s compliance to personal hygiene practices in fast food outlets


