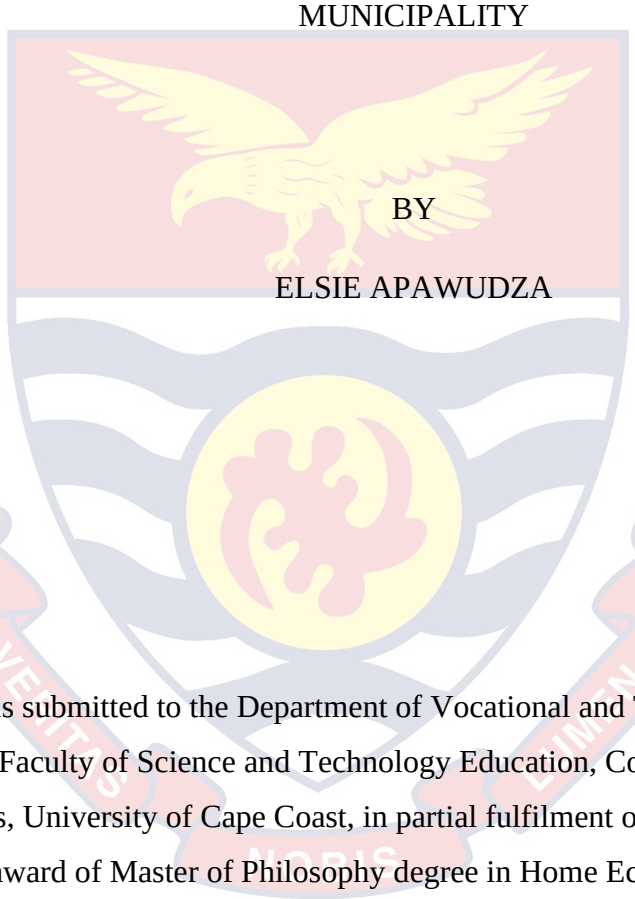
UNIVERSITY OF CAPE COAST

THE INFLUENCE OF BODY MEASUREMENT PRACTICES ON FEMALE GARMENT FIT AMONG DRESSMAKERS IN THE HO MUNICIPALITY



BY

ELSIE APAWUDZA

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DECLARATION

Candidate's Declaration

I hereby declare that this thesis is the result of my own original research and that no part of it has been presented for another degree in this university or elsewhere.

Candidate's Signature:..... Date:.....

Name: ……

Supervisors' Declaration

We hereby declare that the preparation and presentation of the thesis were supervised in accordance with the guidelines on supervision of thesis laid down by the University of Cape Coast.

Principal Supervisor's Signature:..... Date:.....

Name: Prof. Modesta Efua Gavor

Co-Supervisor's Signature: ..... Date:.....

Name: Dr. Christina Boateng

ABSTRACT

The study investigated the influence of body measurement practices on female garment fit among dressmakers in the Ho municipality. Mixed method research approach was applied for this study. Exploratory research design was used to achieve the objectives of the study. Through purposive sampling, data was collected from 15 selected dressmakers. Designed observation checklist, semi-structured interview guide and a fit evaluation index were the instruments used to collect data. Statistics such as percentage and frequency, mean and standard deviation, Pearson Moment correlation coefficient as well as thematic analysis were used to analyse the data collected. Results from the study revealed that, dressmakers did not effectively apply anthropometric practices to achieve good fit of garment. Also, dressmakers applied one measurement procedure for all the garment fits. The study further showed that, the dressmakers did not add the appropriate ease to the garments which affected the fit of the garments. More so, the dressmakers were not consistent with the correct identification landmarks during body measurement. Form the study, dressmakers acknowledged that shaping of armhole and shaping of fitted garments are the problems they mostly experience in garment construction. It was recommended that; proper and accurate measurement procedures must be emphasized during dressmakers' workshops and seminars. Dressmakers must be trained by their associations and any other clothing institutions to take body measurement according to garment design. Likewise, master craftsmen must train their apprentices to identify the appropriate measurement procedures to achieve good fit of garments.

KEYWORDS

Body Measurements

Close Fitted Garment

Dressmakers

Fitted Garment

Garment Fit

Loose Fitted Garment

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DEDICATION

To my husband, Gabriel Kuma.

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CHAPTER ONE

INTRODUCTION

Background to the Study

Body measurement standards based on anthropometric data, also known as size charts in the clothing industry, are what is used throughout the process of apparel design and production to obtain a good fit. Designing garments with the right fit is related with taking accurate anthropometric data. The lack of updated anthropometric data is one of the major issues associated with ill fitted garments (Spahiu, Shehi, & Piperi, 2015). According to Bari, Salleh, Sulaiman and Othman (2015), anthropometric measurements used in the creation of clothing can give an accurate picture of the measurement of the human form so that apparel can be developed to fit the body.

Clothes can be acquired either by buying from stores, which is known as ready-to-wear or mass production, or by custom-made by dressmakers (Sindicich & Black, 2011). In the traditional sense, customizing means to make or alter to individual or personal specifications. The term, derived from the word customer, is a way for designers to create products or services according to individual and personal taste. To personalize means to endowp with personal or individual qualities or characteristics and especially in clothing to mark with a person's design and the person's body measurements (Tseng & Piller, 2003).

Quartey (2007), noted that in Ghana, roadside dressmakers have their main production based on custom-made items. Individuals in Ghana are noted to dress in traditional styles of their ancestors despite an abundance of Western

influence. Mostly, clothes are sewn by machine and by hand by professional dressmakers and tailors. As a result, many people wear clothing that is custom-made to fit their unique shape and lifestyle.

Hamon (2007), in her research on dressmaker's experiences, practices and contribution to fashion ability defined dressmaker as a person, usually a woman, who made clothes to the order of, and to fit the measurements of individual clients. The dressmaker worked from her own home or from small business premises. The design of the garments that she made is heavily influenced by existing designs, in the form of examples in magazines or shops, or in dress patterns, and is frequently developed as a result of collaboration between dressmaker and client. Hamon (2007) further described her as a follower of current fashion rather than a design innovator; and she uses her own method of constructing garment to meet the desired design.

Obinnim and Pongo (2015) emphasized that as a rule, a dressmaker is professionally trained to sew to fit an individual figure. In designing the garment, the dressmaker can employ the use of paper patterns obtained through a manual or electronic (CAD) means or direct plotting on fabric (freehand cutting). The kind of method a dressmaker chooses to work with is informed by the level of knowledge, skills, and competence the dressmaker has obtained as a result of the training received for dressmaking (Forster & Ampong, 2012). Many of them learn their trade as apprentices, usually under the tutelage of an established dressmaker. Some also learn the trade in formal school setting where patterns are mostly used

in training of students. Patterns are usually made of thin paper but sometimes sturdier materials such as paperboard or card board, plastics and fabrics are used.

According to Armstrong (2010), the method of pattern making starts with measurement taken from a form or model to create basic foundation or design patterns. He added that usually, flat patterning begins with the creation of a sloper or block pattern; and the making of a simple fitted garment made to the wearer's measurements consisting of five-piece pattern set, which are; a) the front bodice b) back bodice c) back skirt d) front skirt and d) long sleeve that represent the dimension of a specific form or figure. Several fittings are then done to perfect the garment (Obinnim & Pongo 2015). The skill of pattern drafting, according to Aldrich (2008) is traced back to the middle of the nineteenth century and as the craft developed, the basic drafting rules and techniques also developed.

In Ghana, the main method for cutting out garment by dressmakers is the freehand method. Forster (2009), defined free hand cutting method, as using an individual's body measurements to cut garments directly from a fabric. Dressmakers who employ this method use different methods to cut the same design. Thus, every dressmaker generates a method which is convenient for her to cut out a style. This also implies that, there are no laid down rules that govern the use of this method. Even though majority of the dressmakers use the free hand cutting methods in construction of garment design for their client, some dressmakers in the industry also resort to the use of patterns in cutting out garments for their customers. Any of the methods applied by the dressmaker in cutting and construction employs the use of body measurements and it is how the

measurements are taken and utilised that will determine the fit of the garment constructed. This study is conducted among dressmakers in Ho to investigate how the body measurement taken by dressmakers influence the fit of garment of their clients.

Statement of the Problem

Most fashion designers or dressmakers in Ghana do customized sewing. They mark out the garment pieces directly on the cloth using white chalk and the individual body measurement. This is termed in Ghana as free hand cutting (Obinnim & Pongo, 2015). This is an indication that majority of dressmakers in Ghana use the free hand method and make use of the individual measurements to produce garment which is known as custom-made. It is a well-documented fact that the starting point of a well fitted garment is based on correct and proper measurements, followed by the application of these measurements in either making patterns or in cutting out the fabric pieces as in free hand cutting. Considering the fact that in freehand cutting, there are no test copies made to correct errors of fit before the actual garment is constructed; measurement and cutting out errors greatly affect the fit of the garment. Fit ranks first in consumer evaluation of clothing therefore if there is a problem with fit due to poor measurements taking and poor application of measurements in cutting then there will be a lot of customer dissatisfaction. Measurement taking involves not only the correct way of wrapping a tape measure around a body location but also identifying the proper locations where measurements should be taken. These locations on the body include bust, waist, hip, across back, across chest, back

length, shoulder to waist, waist to hip among others. According to Tsakalidou (2017), landmarks enable finding the correct locations when measuring, that is, the beginning and end of a measurement (usually around a bony structure) so that one can concentrate more on all other aspects of measuring. Such landmarks are used as guidelines to indicate where specific measurements should be taken. Features such as the left/right angles of shoulder slopes, bust prominence and back curvature are very important features to consider. Tsakalidou (2017) further asserted that measurements be taken vertically and horizontally in relation to the garment style. However, personal observation has revealed that some dressmakers take the measurements without knowing the garment design.

Again, for accurate body measurement, body posture of the client and standing position of the dressmaker are important measurement practices. Simmons and Istook (2015) stated that to get accurate measurement, most measurements taken of the customer are taken while standing and looking straight ahead. Literature also suggests that for classic anthropometrical measurement, it is preferable to have the subject completely unclothed or with as little clothing as possible. However, with our cultural setting in Ghana, it would be almost impossible for dressmakers to request customers to unclothe. One therefore wonders how the dressmakers go about getting correct body measurements.

In a study conducted by Obinnim and Pongo (2015) on the significance of flat pattern making in fashion design amongst dressmakers in the Ho municipality, they found that learning how to take body measurement and taking body measurement was a challenge among several professionals. Probably, that

might be the cause of dressmakers having issues with fit, and fabric wasting which had implications for efficient and effective productivity. Additionally, they found that, by means of the free hand strategy, dressmakers tend to decrease their productivity resulting in lowered income levels. Regardless of the challenges of deploying the free hand strategy in garment production, identified by the researchers, no study has been conducted on anthropometric practices among dressmakers in the context of where the study was situated. Therefore, the researcher is motivated to conduct a research on the influence of body measurement practices and fit of garment among dressmakers within the Ho municipality in the Volta Region.

However, Foster and Ampong (2012) and also personal observation indicates that dressmakers in Ghana use fewer measurements than indicated in professional pattern making books.

Purpose of the Study

The purpose of this study is to investigate garment fit and body measurement practices used among dressmakers in the Ho municipality in the Volta region.

Objectives of the Study

Specifically, the study sought to;

1. determine the body measurement procedures of dressmakers in the Ho municipality.
2. assess dressmakers' methods of applying measurements in garment construction.

3. assess dressmakers' knowledge on garment fit.
4. evaluate fit of garment on a live model.
5. investigate fit problems with body measurement taken by dressmakers

Research Questions

The following research questions guided the study:

1. What are the body measurement procedures of dressmakers in the Ho municipality?
2. What are the dressmakers' methods of applying measurements in garment construction?
3. What are the dressmakers' criteria of a good garment fit?
4. How do the garments sewn by the dressmakers fit?
5. What are the problems identified with the fit of garments in research question four?

Research Hypothesis

The following hypotheses guided the study:

1. Ho: there is no statistically significant relationship between the measurement procedures and close fitted, fitted and loosely fitted garments designed for females.
2. Ho: there is statistically significant relationship between the measurement procedures and close fitted, fitted and loosely fitted garments designed for females.

Significance of the Study

It is anticipated that findings of this study will broaden the knowledge of dressmakers in Ho on the various practices used in body measurements. Also, it will enlighten the dressmakers on the differences in the body measurement practices.

Furthermore, the results of the study will be made available to the leaders of the Ghana Dressmakers and Tailors Association of Ho which will help in training of their members in the area on taking body measurements and this will shape their professional approach when it comes to body measurement and garment fit. Finally, the findings of this study will add to literature and to other researchers who are conducting similar studies.

Delimitation of the Study

In terms of content, the study was delimited to body measurement practices for garment fit among females. Also the evaluating of fit of garment for the study was based on the physical fit only and the level of fit was based on one garment designed each for close fitted, fitted and loose fitted garment designs for females.

Geographically, the study was delimited to dressmakers in the Ghana national Dressmakers and Tailors Association in Ho municipality in the Volta region. The Municipality and the region was selected due to the prevalence of customers' dissatisfaction of garment fit (Obinnim & Pongo, 2015).

Limitation

As much as the methodology used for the study was appropriate, its application generated some limitation for the study. The major limitation encountered was that, the data collection process was time consuming. That is observations made during the cutting and sewing of the garment. In order to ensure that the processes involved in garment production does not affect the outcome of the study, the researcher requested each dressmaker to produce the garments in a period of two weeks but did not apportion any time limit to the dressmakers during the cutting and sewing process. The cutting and sewing process was time involving because, all the dressmakers did the cutting and sewing at their own pace and comfort.

Also, the interview was lengthy and time consuming. Furthermore, the live model and the expert judges got tired at a point during the fit evaluation, even after break. Therefore, this could affect their evaluation of some of the garments.

Definition of Terms

Garment fit: is the relationship between the human body, size and contour of garment.

Close fitted garment: it is a garment that lies closely to the contours of the human body.

Loose fitted garment: a clothing or garment which do not follow the contours of the body closely.

Fitted garment: is an article of clothing that tightly follows the contours or shape of the part of the body being covered.

Ease: is the amount of room a garment allows the wearer beyond the measurements of their body.

Live model: is a person or model with a role to display garment designs before judges in the form of fashion show for fit evaluation.

Fit evaluation: judging the fit of a garment on a live model.

Anthropometric practices: these are appropriate measurement practices and procedures to achieve garment fit.

Landmarks: are anatomical points on the human body used for garment pattern development.

Organization of the Study

The study is arranged in the following order Chapter one: Introduction. This chapter includes the purpose for the study, the problem statement, the objectives, significance of the study, and delimitations of the study as well as the definitions of key concepts. Chapter two consists of literature review. Chapter three which is the methodology deals with the description of methodology used in the study and data gathering from the population of interest. Chapter four is results and discussion which focuses on the analysis and discussion of the results obtained from the study. Chapter five is the summary, conclusions and recommendations. In this chapter the study is sum up, conclusions and implications of the study are discussed, and recommendations for future studies are proposed.

CHAPTER TWO

LITERATURE REVIEW

The aim of this study is to investigate the influence of body measurements on garment fit among dressmakers in the Ho municipality in the Volta Region of Ghana. This chapter reviews related literature on body measurement, concept of garment fit and the conceptual framework of the study. The review is done based on the following headings:

Conceptual Review

Garment Fit

Garment fit refers to the relationship between the body measurement and contours of the garment to that of the body (Chen, 2007). Good fit of garment is not easy to define because garment comes in varies of designs and, so, it is difficult to give a general definition of what a good fit is (Ashdown & O'Connell, 2006; Pisut & Connell, 2007). According to Yu (2004), the definition of a well-fitting garment, and thus what good fit represents in custom-made clothing, depends on the current fashion in fit, the existing industrial norm such as styles or function of the garment as well as the fit preferences of individuals. Fit preferences may include levels of comfort, appearance, fashion trends, body shape, age, lifestyle and the cultural norms an individual is accustomed to (Pisut & Connell, 2007) that may be considered important to the wearer at that particular moment. Nevertheless, a well-fitting garment is achieved when the wearer feels comfortable and is able to move freely without any restraint (Laitala, Klepp, & Hauge, 2011).

Equally a good fit is supposed to enhance the appearance of the wearer by making the body look well proportioned, smart and more flattering (Rasband & Liechty, 2006). Ashdown and DeLong (1995) went further to point out that female consumers mainly judge garment fit based on both visual and tangible information they are able to obtain from the garment. Visual judgment is based on the appearance of the garment on the body. A well-fitting garment should have all the requirements or elements of good fit to enable a garment to look presentable and attractive (Stamper, Sharp, & Donnell, 2005).

Knowledge of these elements will help both dressmakers and customers to address garment fit, resulting in consumers' satisfaction with custom-made garments. Furthermore, both visual and tactile information are used to determine the comfort level which may affect the individual's perception of the garment fit (Das & Alagirusamy, 2010). Comfort in garment fit includes several dimensions such as physical comfort; which includes the mechanical properties such as elasticity, flexibility and the weight of the garment. The psychological comfort includes good feelings and well-being experiences when wearing the garment such as either femininity or sophistication of the garment and social comfort which includes appropriateness of the garment to the occasion, or satisfaction with the impression made on others (Otieno, Harrow, & Greenwood, 2005).

In addition, garment fit and the subsequent appearance of the wearer are considered to be one of the most important aspects that a female consumer will use to evaluate the appropriateness of the garment in terms of personal values to be achieved through clothing (Kaiser, 1998). Hence, garment fit is regarded as the

primary complaint among female consumers in relation to custom-made garments. It is also used as an important factor in the acceptance or rejection of the garment (Ashdown & O'Connell, 2006). Regardless of the definition of a well-fitting garment, Simmons, Istook and Devarajan (2004) state that garment fit must always start with an understanding of the human body shape and proportions.

Female body shapes are expressed in various types and proportions (Rasband & Liechy, 2006), which can be studied and classified using manual measurements, from 3-diamensional (3D) body scanners as well as through visual observational assessments. It is, therefore, important to pay attention to female figure shape when taking body measurement because of issues in variations in female figure shapes. Incorrect application of body measurement during garment construction to suit a particular figure type can affect the fit of garment. To be able to judge a good fit of a garment there are elements such as fabric grain, garment ease, line, garment set, and balance present in a garment that the consumer can use to evaluate a good fit in a garment (Ashdown & Loker, 2010)

The Elements Used to Evaluate Garment Fit

According to Ashdown, Loker, Schoenfelder, and Lyman-Clarke (2004), evaluating garment fit can be a complex process. This is because the relationship between the human body and garment is assessed on how well the garment conforms to the elements for a good fit. A well-fitting garment, therefore, depends on more than the relationship between the garment dimensions to the body dimension. Ashdown et al. (2004) further mentions that the garment during wear,

that hangs smoothly and evenly on the body, with no wrinkles, no pulls or distortion of the fabric, has straight seams, pleasing proportions, and adequate ease for movement with the hems parallel to the floor unless otherwise intended, has a good fit. Stamper et al. (2005) mention that the fabric grain, garment ease, line, set and balance, are some important elements that are present in a garment that can be used to describe well-fitting garments.

These elements will determine the way the body fits into the garment and more importantly will assist consumers in understanding, analysing and hopefully get solutions to garment fit problems (Stamper et al., 2005). An understanding of these elements may, therefore, be used to empower female clients in making the correct decision in terms of garment fit when garments are made for them. In the following section, the elements of fabric grain, garment ease, line, set and balance will be discussed.

Fabric Grain

The fabric grain, according to Stamper et al. (2005), is the first of the five elements that affect garment fit and is the key element in recognizing and understanding garment fit. Basically, there are three grains in a fabric, these are; the lengthwise, the crosswise and bias grains (Rasband & Liechty, 2006). Rasband and Liechty (2006) further explain that the lengthwise grains of the fabric are the threads that run parallel to the finished selvage edge of the fabric and they are perpendicular to the floor. The crosswise grains of the fabric are the threads that lie between, or at right angles to the selvages and they are parallel to

the floor, across the chest and hip. Bias grain runs diagonally across the lengthwise and crosswise threads (Rasband & Liechty, 2006).

Branson and Nam (2007) state that when the lengthwise and crosswise threads lie at right angle to each other the garment hangs evenly on both sides of the body with even seams. Rasband and Liechty (2006) further point out that when the grain of the fabric is out of line the garment will usually show ripples at the hemline, pulling or gaping at the seams, and in some instances puckering or twisting may be noticed. As a result, the garment will hang "crookedly" and will not fit well. Fabric with a balanced grain will make for a balanced garment that is a signal of a good fit. Therefore, a garment that is cut on the correct grain will appear smart and presentable when worn.

Garment Ease

Garment ease, according to Petrova (2007), is defined as the difference between the body measurement of the person wearing the garment and the garment measurements. The ease is the amount of fabric which is added beyond the body dimension when making garments and is decided by the garment designers. Therefore, the amount of garment ease which is required for comfort, movement and attractive appearance will depend on the following aspects: The garment design or style, the fabric used, the body shapes and proportions of the individuals the garment is intended to fit and the occasion for which the garment will be worn, as well as personal needs and preference of the consumer (Rasband & Liechty, 2006).

Garment ease includes, *wearing ease* and *design ease*. *Wearing ease:* is the amount of extra fabric which is allowed for body movement and comfort in a garment (Chen, 2007). Wearing ease allows the wearer to breathe easily, bend over or raise the arms without stretching the seams. It also allows sitting, walking and achieving other movements with ease, giving a comfortable feeling which determines a good fit in garments (Daanen & Reffeltrath, 2007). Without enough wearing ease, the garment strains, wrinkles, pulls and binds uncomfortably against the body, emphasizing body contours which may not look attractive (Branson & Nam, 2007) signaling a garment fit problem. Hence, the wearing ease should be comfortable to the wearer, not only selected for the sake of fashion. Fashion trends, consumer preferences as well as body proportions can bring about changes in generally accepted amount of wearing ease, and that leads to design ease.

Design ease: is the amount of fabric needed to make the design or style of the garment (Chen, 2007). Design ease is used to create a desired look of the garment such as determining whether the garment will be loose fitting, close fitting or fitting (Branson & Nam, 2007) As consumers have different fit preferences (Alexander, Connell, & Presley, 2005). Design ease can be considered as one of the many attributes that assist consumers in determining which garment fits best. Design ease also helps to improve the freedom of movement, comfort and allowing the wearer keep up with the prevailing fashion trends (Stamper et al., 2005). For instance, if the fashion trends suggest 'lengthy loose fitting tops', then the garment designer may add more design ease when

designing these tops. Given that some consumers go for what is in fashion, this may be a comfortable wear for them as opposed to the consumers who prefer semi-fitting or tight-fitting garments. There are key points where the amount of ease directly affects fit: bust, waist, hip, arm circumferences and armscye. The sizing system suggests ease allowances for tops based on the garment silhouette. A close-fitting silhouette requires 0- 2 7/8 in; a fitted silhouette requires 3 - 4 in.; a semi-fitted silhouette requires 4 1/8 - 5in.; a loose-fitting silhouette is 5 1/8 - 8in. Myers-McDevitt (2004) specifically suggested ease allowances for the garment silhouette (see Table 1).

Table 1: Ease Allowances for the Garment Silhouette Suggested By Myers-Mcdevitt (2004)

	Close-Fitting	Fitted	Semi-fitted	Loose-Fitting	Oversized
Bust	½-2 in	2-4 in	4-5 in	5-8 in	Over 8 in
Waist/ Hip	½ -2 in	2-3 in	3-4	4-6 in	Over 6 in
Waistband	¼ -1/2 in	½ -3/4 in	¾ - 1in	1-2 in	Over 2 in
Armhole	1-2 in	2-3 in	3-4 in	4-5 in	Over 5 in
Upper Arm/ Sleeve	1-2 in	2-3 in	3-4 in	4-5 in	Over 5 in
Elbow	½-1 in	1-2 in	2-3 in	3-4 in	Over 4 in
Wrist	½ in	½ -1 in	1-2 in	2-3 in	Over 3 in
Shoulder seam	0-1/4 in	¼ - ½ in	½ - 1 in	1-11/2 in	Over 1 1/2 in
Across Back	½-3/4 in	¾- 11/4 in	11/4 2 ½ in	2 ½ -31/2 in	Over 3 1/2 in

Myers-McDevitt (2004)

Line

Stamper et al., (2005) mention that "line" is composed of structural and decorative seams, darts, hems and fabric folds made by pleats and tucks. These garment lines help define the shape of the silhouette, creating a visual impression by shaping the flat fabric to conform to the body contours of the wearer. Garment lines that are intended to add fullness or simply be decorative should appear smooth and symmetrical (Stamper et al., 2005). When the lines are, therefore, in the right place and follow body contour, the total appearance and the fit of the garment will appear appropriate.

Garment Set

Stamper et al. (2005) define garment set as the absence of undesirable wrinkles when the garment is on the body. Rasband and Liechty (2006) point out that wrinkles are to be expected when walking, bending and reaching. When standing still, the garment should settle smoothly over the body. The authors further state that wrinkles that are part of the design should not be confused with wrinkles caused by fabric straining, and that the direction of the wrinkle provides an important clue when analysing the garment fit.

According to Rasband and Liechty (2006); Stamper et al. (2005) horizontal wrinkles indicate that the garment is too tight above or below the bulge; the protruding part or an outward curve of the body (Oxford Dictionary, 2008). Vertical wrinkles indicate a garment that is too large, these wrinkles are common in jackets and dresses. Diagonal wrinkles indicate that the garment is too small (either too narrow or too short, or both) for the body bulge. Tight wrinkles

may form when the fabric is strained because of little wearing ease. Hence the garment set may be affected by other elements such as fabric grain, garment ease, line and balance.

Garment Balance

Garment balance refers to the degree to which the garment hangs evenly from the body in every direction (Ashdown et al., 2004). Balance in relation to garment fit is achieved when the garment exhibits the qualities of being able to stay away or hug the body in the same way on both sides of a symmetrical design (Stamper et al., 2005). A design is said to be symmetrical when each side is the same (Rasband & Liechty, 2006), when the garment is proportional, and the design details agree to one another, with no aspects of the design overpowering the other.

A common example of an unbalanced garment is when a jacket or skirt does not extend evenly from the body to the hemline. Areas that are out of balance may be said to be lopsided (Rasband & Liechty, 2006). Therefore, poor balance of the garment will cause the garment to shift or sag on the body which may affect the fit of the garment. On the whole, the grain of the fabric should be considered during the manufacturing of a garment. The garment ease is comfortable and functional to the wearer, with the lines in the right places. If the garment looks smooth without wrinkles (unless part of the design), and looks proportional and well balanced, then a good fit is achieved. This means that all these elements contribute positively to how a garment will finally fit and appear on the female consumer's figure. Therefore, poor garment fit problems arise when

there is an incongruent relationship between the garment and the human body (Chen, 2007).

Body Measurement

The most crucial and essential step in garment construction is taking body measurements as stated by (Singh & Nijhar, 2015). According to Pandarum and Yu (2015), the fit of a garment depends on the accuracy of body measurements. A well fitted garment enhances the look of the person and adds to the personality of the wearer. The measurements needed for garment making depends not only on the style and type of the garment but also on the age and sex of the user (Pandarum & Yu, 2015). The only tool required for measurements is a measuring tape. Use a good quality, pliable tape for measurements. A torn/damaged or stretchy tape will give incorrect measurements. (Rudd, 2001). According to Rudd (2001), the following pointers for taking body measurements, measuring technique and procedure for taking measurements must be put into consideration for a good fit of garment.

Pointers for Taking Body Measurements

1. The person to be measured should stand erect; in a relaxed pose with feet 15 cm apart.
2. Measurements should be taken over foundation garments that fit the body well.
3. Avoid taking measurements over heavy garments like a coat or a sweater.

4. Before taking measurements tie a cord around the waist and armhole. This will help in locating the natural waist and in measuring shoulder width, armscye depth etc. It also acts as a reference point for other measurements.
5. Measurements will be more accurate if one person takes them on another.
6. Use a good quality tape that is sturdy and pliable. It should neither stretch nor be stiff.
7. Hold the tape parallel to the floor for horizontal measurements and perpendicular for vertical measurements.
8. The metal end of the tape is used for vertical measurements while the other end is to be used for horizontal measurements.
9. Take snug measurements, do not pull the tape either too tight or leave it too loose.
10. The measurements required will depend on the style of the garment and personal preference of the wearer. So always ask the wearer about their preferences.
11. Measurements should be taken systematically, in a proper order and a certain sequence.

Measuring Technique

1. The person measuring should stand to one side of the person being measured.
2. Hold the tape snugly, not too tight thereby making the person uncomfortable and conscious.
3. Do not let the person look down at the measurements being taken.

4. Be discreet about the measurements and note down carefully in the chart.
5. Do not add any ease to the measurements taken. Ease can be added while drafting patterns.
6. It is easier to take all crosswise measurements first followed by lengthwise measurements.
7. Do not allow the tape to sag while taking horizontal measurements.

Procedure for Taking Measurements

Bodice Measurements

1. **Neck**: This is a round measurement taken around the base or the largest part of the neck. Pass the tape around the neck over the collar bone in the front and the base of the neck at the back. This measurement gives the neck width and is needed for a close fitting collar.

2. **Shoulder:** This point can be located by feeling for the end of the flat bone at the end of the shoulder, or by raising the arm until a dimple appears at the end of the shoulder and feeling for the shoulder bone in this depression. The distance between the base of the neck and the end of the shoulder gives this measurement.

3. **Shoulder width/back width:** Measure from one end of the shoulder bone to the other at about 4 inches below the back neck.

4. **High chest measurement:** This measurement will help in getting a close fit under the armpit, eliminating the wrinkles. Place the tape straight under the armpits in the front and across back to get this measurement. Take care to keep the tape parallel to the floor both at the front and at the back.

5. **Bust:** Measure around the fullest part of the bust with the tape held parallel to the floor. Do not let the tape sag at the back. The tape should be tight enough so that it does not slip and loose enough for one finger to pass through.

6. **Waist:** It is essential to locate the natural waist first, in order to take this measurement. The natural waistline is located above the hip bone in the narrowest part of the body. A cord tied at the waist will facilitate in taking this measurement. Measure around the cord with the tape held parallel to the floor.

7. **High Hip:** At around 3 inches below the waistline, hold the tape around the hip to get this measurement.

8. **Hip:** Measure around the fullest part of the hip (7 inches from the waistline) with the tape held parallel to the floor.

9. **Armscye/Armhole:** Measure by passing the tape under the armpit and around the armhole.

10. **Front waist length:** Measure down from the highest part of the neck over the fullest part of bust to the waist.

11. **Shoulder to bust:** Measure down from the highest part of the neck to the tip of the bust. This is also called bust point height. This is useful in locating the bust point while drafting a blouse.

12. **Distance between bust points:** A horizontal measurement that measures the distance between the bust points, useful for dart placement in blouse drafting. This is also called bust point width.

13. **Back waist length:** Measure down from the highest part of the neck over the centre back to the waistline.

14. **Front neck depth:** Measure across from the highest part of the neck diagonally towards the centre front.

15. **Back neck depth:** Measure across from the highest part of the neck diagonally towards the centre back.

Sleeve Measurements

16. Upper arm: Measure around the fullest part of the biceps with one finger underneath the tape.

17. Lower arm: Measure around the bottom or at the lower edge of the sleeve.

18. Elbow: Measure around at the elbow of the arm.

19. Wrist: Take a round measurement at the wrist level of the arm.

20. Sleeve length: The length of the sleeve varies from one style to another. For short sleeves, measure down the arm, from the tip of the shoulder to the desired level. For full length sleeve, bend the arm slightly at a 90^{o} angle and measure from the tip of the shoulder down to the elbow and then on to the wrist.

Skirt Measurements

21. Waist to hip: Measure from waist down to the fullest part of the hip.

22. Skirt length: Measure from waistline down to the desired length as per the garment design.

Pant Measurements

23. Pant length: Measure from waistline down to the desired length of the pant.

24. Inseam: Distance from the innermost part of the thigh to the ankle or the length of the pant.

25. Leg Circumference

a. Thigh: Measure around the fullest part of the thigh.

b. Knee: Measure from the waist to the knee.

c. Calf: Measure around the calf muscle

d. Ankle: Measure around the ankle

26. Crotch depth: After sitting on a hard flat surface, measure down from the waist to the flat surface along the side seam.

27. Crotch length: Measure from front waistline to the back waistline by passing the tape in between the legs.

Landmarks

Landmarks are located by anatomical points and grouped according to their positions on the body. This provides a predetermined order to permit greater speed in body measuring. Consistent body landmarks are critical to secure accurate measurements for basic garment construction development (Bye et al, 2006). Anatomical points are typically used as landmarks for garment pattern development. According to Yu (2004), there are 19 to 21 key landmarks corresponding to the anatomical points. Structured methods of landmarking and recording will help to make the measuring process more efficient, effective and improve the fit of garment. Yu (2004) explained further that fit is directly related to the anatomy of the human body and most of the fitting problems are created by the human body.

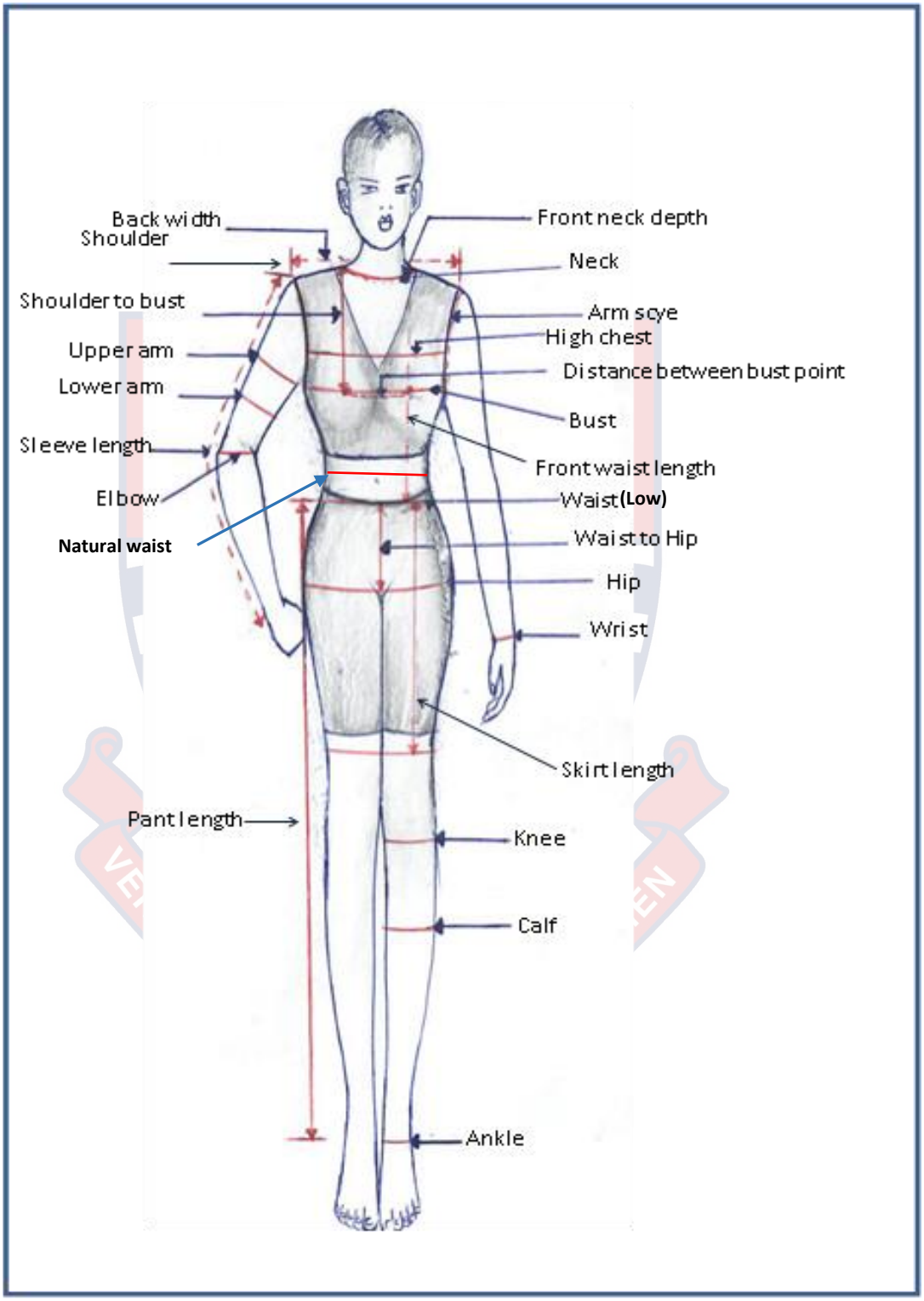

Figure 1: Body Measurement Landmarks

(Source: Rudd, 2001).

Body Measurement Methods

Linear Method

Traditionally, garment production in the apparel industry involves the process of obtaining the linear measurements over the body surface with a tape measure, and then applying these measurements to obtain the cut out patterns on a mathematical foundation and approximation (Meunier & Yin, 2000). The linear measurements are taken between two points on the body. Olaru, Spanachi, Filipescu, and Salistean (2014) further explained that the traditional measuring devices are tape measures, calipers, and anthropometers; and are used to record the essential two-dimensional data related to a three-dimensional form. There are two types of linear measurements: length and circumference. For example, the length measurement is a point-to-point measurement from the shoulder to the elbow or the shoulder to the wrist bone. This measurement is simple and pure, and is applied to the pattern exactly as taken from the body, without any addition or subtraction. (Olaru et al., 2014). Bye, Labat, and Delong (2006) emphasized that to provide well fitted garment, all the lengths, widths and depths of the body must be related, problems arise, such as locating body landmarks, and mismatch occur when measuring individual lengths and then trying to negotiate it to fit a two – dimensional surfaces of clothing to the body. Bye et al. (2006) maintained the circumference measurements encircle the body, for example, the bust, waist, hips, or knee. These measurements require added tolerance for ease. Although the ease allowance for circumference is made in all garment design systems, it varies with the type of garment. For convenience, the linear method has been widely used by

many designers (Bye et al., 2006).

3 Dimensional (3D) Body Scanning Technology

According to Lin and Wang (2012) a body scanner is an instrument designed to create a dimensionally accurate computer image of the body. Cameras use a white light or laser to capture the body from a 360-degree view resulting in a cloud of data points. Bye et al., (2006) added that the scan is a Non-contact method of obtaining body measurements and provides a permanent record that can be accessed for future reference and analysis. A variety of software has been developed to extract linear measurements from the data including length, width, circumference, and a variety of angles for use in pattern making and grading (Bye et al., 2006). The visual image can be rotated on the computer screen, providing the ability to observe body shape. The data are in the most complete form of any method and include point, line, surface, shape and volume of the body (Zhang, Innami, Kim, & Takatera, 2015) New methods of using and analysing the data are being developed including sectioning the body to take measurements or calculating body angles that are difficult to obtain on the human body (Winter, 2002).

Fitting Problems

The primary factors affecting fit are: the body measurements of the subject, the construction of the garment, the quality of fit management, and the labelling of sizing information (Alexander, Connell, & Presley, 2005). Outdated body measurements and inconsistent sizing measurements across or within different fashion designers result in various fit problems (Alexander et al., 2005;

Kinley, 2010; Mason et al., 2008; Pisut & Connell, 2007). Ashdown (2014) also added that traditional methods of taking body measurements to be used in the clothing industry have resulted in several major problems, apart from being complex and difficult to learn. The most important problem is that of poor fit, which leads to returned goods and consumers' dissatisfaction. When body measurements, taking by dressmakers are inconsistent and wrongly taking it makes it difficult to identify the body proportion. Clothing is associated with body satisfaction. Ashdown, (2014) mentions that clothing has the potential to improve an individual's body satisfaction, because females evaluate their body higher when clothed than when unclothed. Good fit of clothing is vital to an individual's psychological and social well-being.

Consumer feedback is also instrumental in contributing to garment fit problems (Ashdown, 2014). Ideally, garments should be designed according to the participant's body dimensions in order to fit well (Daanen & Reffeltrath, 2007). Although some fashion designers have carried out trainings to take body measurements of their customers, this is not a common practice among designers (Ashdown, 2014). The majority of garment designers may still be using different measuring method which may lead to fit issues and in many cases it is assumed that the methods used to collect the body measurement data were flawed (Pisut & Connell, 2007).

Conceptual Frame Work for the Study

Taking into consideration the background of the study discussed in the previous areas, the following conceptual framework is a proposed structure that will guide the study on garment fit and the factors that influence fit in terms of garment construction among dressmaker in Ho. The conceptual framework highlights the most important concepts of the study and it also shows how each concept may ultimately be linked or influence each other. Additionally, the conceptual framework includes all aspects that the study intends to bring forth, considered and highlighted when drawing up the conclusions and making recommendations at the end of the study. This conceptual framework was developed with research objectives and the literature background of the study.

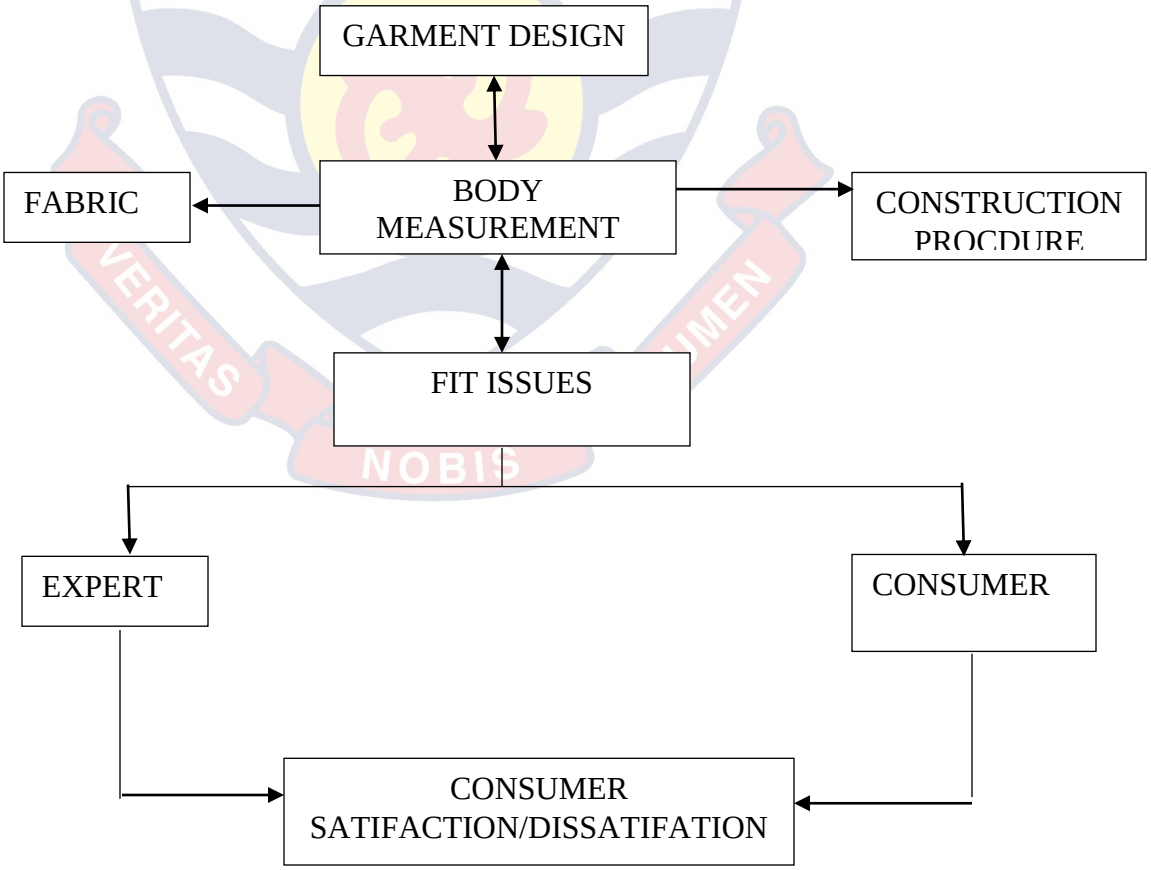

Figure 2: Garment Fit Model
Source: Ashdow (2002)

The Figure 2 above indicates that body measurements are the central focus of the conceptual framework because most crucial and essential step in garment construction is taking body measurements as stated by (Singh & Nijhar, 2015) without body measurements garments cannot be made to fit the individual. As shown in the diagram garment design has a direct relationship with taking body measurement because the garment design will influence the dressmaker's procedures and the identification of the appropriate landmarks in taking the measurement of the client to suit the style of the garment. Dressmaker's measurements are influenced by the choice of fabric and construction procedure in the sense that if the fabric is elastic and the correct amount of measurement is not applied during pattern construction and cutting process, it affects the fit of the garment. Meanwhile fabric is an important intrinsic factor that, according to Kadolph and Marcketti (2016), can influence the aesthetic appearance as well as the physical fit of a garment. Body measurements and fit issues are directly related; to ensure a well-fitting garment it is necessary that the garment will be of the correct measurement for the specific person. Some garment producers are not knowledgeable about taking measurements of their consumers to enable them to decide on the appropriate fit of garment to reduce fit issues. The Figure 2 indicates that fit issues are identified by experts and consumers. According to Ashdown (2002), fit affects comfort, as well as wear life or durability of a garment. How well a garment fits is based on individual perceptions of comfort, fit and fashion. To complicate matters, the designer, the pattern maker and the consumer each has a very different concept of fit. This makes it necessary to

evaluate fit of a garment using experts and consumers. It is important to get subject and expert response to the fit of garments to assess the success of the garment sewn. Such responses can however help correct mistakes done by designers, improve the production in the garment industry, increase productivity which will bring income and it will also help to identify consumer satisfaction and dissatisfaction of garment sewn.

Empirical Review

The empirical review is devoted to reviewing the works done by others which are related to or have bearing on this study. This will give room for comparison to be made between the findings that would emerge from this study and the earlier findings from previous studies. In addition, the researcher reviewed works of other previous researchers on the basis of their purpose of the study, methodology, findings, conclusions and recommendations as well as summary.

Body measurements procedures used in the clothing industry

Workman (2016) conducted a study on body measurement specifications for fit models a factor in clothing size variation. The objectives of the study were to determine current standards for size 8 and size 10 fit models, to compare body measurement specifications for size 8 with 10 and compare current standards with those of 10 years ago to see if specifications have been revised. The sample size of the study consists of size 8 and size 10 fit models from 72 garment manufacturers. Data for the study were collected from 1976 and 1986 trade journal advertisements for sizes 8 and 10 fit models. Data was analysed using a t-test.

The results of the study revealed that size 10 in 1986 had significantly larger hips measurement specifications than a 1976 size 8. Also the comparison of 1986 and 1976 specifications revealed only one difference hip measurement specifications for the 1986 size10 were significantly larger than for the size 10. The comparison of the range of measurements specifications between 1976 and 1986 revealed that a wider range existed in 1986 for both sizes 8 and 10 than it existed in1976.

Based on the findings of the study the following recommendations were made: consumers should be helped to realize that they are not any one particular size but clothes from one manufacturer may fit them differently than the same size from another manufacturer. Workman (2016), also recommended that salespeople can provide information about how different manufacturers garment fit. Finally, it was recommended that training programme that will educate salespeople about sizes and styles maybe done. In spite of the above, the researcher failed to state the research design that was employed to achieve the objectives of the study.

In the research of Xia and Istook (2017), the purpose of the study was to design a sizing system creation method, which can be applied on body measurement data to improve the overall fit of garments. The USA size data was used for the study consisting of 6308 female subjects, based on 64 body measurements which were the key dimensions for creating sizing system. The data were analysed in SPSS using descriptive analysis for all the 64 body measurements. In order to verify the accuracy of the sizing results, the data set of

6,308 subjects was randomly divided into two groups. Approximately 50% of the subjects were placed in each group. Group one was the training group, and group two was the testing group. The result found that the ankle height and the wrist girth measurements had many missing values. The study concluded that a method of generating a sizing system based on human body measurements was designed and then tested on the Size USA data set. The method involves a process of selecting key measurements based on published standards, normalizing measurements using natural log transformations, generating control variables using PCA, estimating secondary measurements using MLRs, and determining size intervals and ranges using SDs. For recommendations, it was suggested that while the size USA data set was used in this research, the method can also be used to analyze any other anthropometric data sets and help in creating sizing systems so as to improve the fit of apparel products. For example, the sizing creation method can be used to study the difference between populations of various countries and help set an international sizing system. All of the 64 measurements used in the PCA were weighted evenly, while they were not necessarily of the same importance in patternmaking. In a future study, fewer key measurements could be used to generate the PCs. A combination of different measurements could be applied and compared to see which combination works best. It is important to include shape information in size design. An additional aspect to study would be to determine the best way to apply the sizing system. Because sizes were divided based on measurements and body shapes, how size information can be explained to consumers clearly and easily is important. Also, because

RTW cannot achieve the perfect fit, solving the problem of how a sizing system can be used in mass customization is beneficial.

In the research of Simmons and Istook (2015), the purpose of the study was to compare body scanning measurements extraction methods and terminology with traditional anthropometric methods and the specific objectives were to discuss traditional anthropometry with regard to landmarks and body dimension data, provide an overview of body-scanning technology, give a brief description of three major body scanners and present a comparison of traditional anthropometry with the measurement techniques for each of the three scanners.

Twenty-one (21) measurements were chosen as being critical to the design of a well-fitting garment. The findings of the study of Simmons and Istook, 2015 reveal that with global production, practices in the apparel industry, standardization of the measurement procedures and communication among the scanning systems will need to be realized for maximum benefit of 3D body scanning within the apparel industry. Additional finding of the study was that it is a significant problem for scanners to identify land marking and manually identifying landmarks is time consuming and usually, full of error.

These were the recommendations of Xia and Istook (2017). They stated that current standards needed to be revised to include three-dimensional body scanning, or a new set of standards should be created specifically for body scanning. Secondly, terminology for individual measures between the scanners needs to be standardized. Finally, the research only compared three of the major scanners available, other research should be targeted on other scanning system.

Bye et.al. (2006), researched on analysis of body measurements systems for apparel. The purpose of the paper was to evaluate historic and current methods of capturing body measurements, such as linear methods, multiple probe methods and body form methods that use one or more of the following elements points: length, surface, shape and volume.

The findings of the study revealed that they have been considerable advances in the variety and accuracy of methods to take body measurements, but manufacturers continue to struggle with the relationships and applications to garments. One problem with all current measuring methods used to construct garment patterns is abstracting the garment shape to provide fit and comfort. The findings again show that it is possible to create an accurate representation of the body, it is necessary to go beyond the body measurements and determine the ideal relationship between the body and the garment. Bye et.al. (2006), made the following recommendation from the study, apparel researchers must continue to address the problem of developing methods of measuring the body that take advantage of the new data from points to volume and its translation to apparel. They further recommended that consumer satisfaction with fit will depend upon the ability to combine the knowledge and skills of the 19th century tailor or dressmaker with the strengths of manufacturing and information technology. The authors did not make any reference to a detailed methodology. This was due to the fact that the authors decided to write a position paper on the topic under discussion.

Shapiu, Shehi, and Piperi (2015) conducted a research on Advanced 3D Method for taking anthropometric Data. The purpose of the study was to show a method of extracting anthropometric data the implementation of advanced 3D technology. A small target group of 16 students was used for the study, 14 females and 2 males aged 20-25 years. The body dimensions used for the garment construction were taken according to the ISO 8559:1989. The finding of the research showed that implementation of the 3D laser scanning system and advanced software for 3D data manipulation is a fast, accurate and repeatable methodology for taking anthropometric data.

In the study of Bari et al. (2015), the purpose of the study is to examine anthropometric measurements among pre-school children for developing garment sizes. The study was carried out in 11 kindergartens in Kota, Tinggi, Johor. The total population of the study was 220 respondents consisting of 107 boys and 113 girls. Background and respondent measurements were obtained using questionnaire. The data was analysed using SPSS programme with independent sample t-test used to identify differences between sexes and descriptive statistics for the body size of the children.

The findings for Bari et al. (2015), revealed that, the respondents had moderate body size, also the clothing size developed is greater than the size in the previous survey. The study recommended that designers should take note of some measurements like height, weight, chest circumference, and waist circumference. The measurements are also known as a control dimension. Therefore, these control measurements should be taken accurately to produce the correct dress

size. Because of the differences in some anthropometric measurements used to make clothing sizes, there is a difference in size between the sexes and age groups. Therefore, tailors and clothing manufacturers have to take into account the age and gender before making a custom-made dress. Additionally, designers need to know the exact size before producing their clothes. This is because the shape of the human body is unique and has its own size. The development of sizes should be according to their procedure in order to produce an accurate size that fits the consumer's body.

In the study of Mbhenyane (2004), the purpose of the study was to determine whether significant differences exist between the measurements used by the clothing industry and the body measurements of the young black children aged between 10 and 14 years. The objectives of the study were to obtain the sizing charts used by the clothing industry in South Africa, to take the relevant body measurements of black children in the age groups 10 to 14 years in the North West province of South Africa and to compare the measurements of black adolescent children of North West province and those used by the industry. The sample of the study was 44 schools in the rural and urban areas using random sampling technique and within each school, a sample of each age group was randomly selected between the ages of 10 to 14 years. A total of 718 children were used which 293 were boys and 425 were girls.

Mbhenyane's research found that the boys' measurements were smaller than those used by the South African clothing industry. Base on the findings Mbhenyane's the following recommendations were made. More researches

should be done to include all provinces and all ethnic groups. A comprehensive national survey across all age groups and sizes is required. There can be a study field for further investigation by academics in collaboration with the industry. Measurement charts also need to be revised at least every ten years because of changes in lifestyle, dietary habits and physical activities. For further research the body measurements of the different population groups e.g. black children versus white children can be compared to see if, and how big the differences are.

In the research study of Agbo (2006), the purpose of the study was to establish average body measurements and to draft basic block patterns for male pre-school children. The specific objectives were taking the body measurements of pre-school children in Enugu state, establishing average body measurements for male pre-school children in Enugu state and drafting standard basic block pattern for male pre-school children. 300 pre-school children and 38 dressmakers/ tailors were used for the study. Self-developed assessment criteria charts were developed to judge the fit of garment and descriptive statistics was used in analysing the data.

Findings of the research revealed that variations in the mean body measurements of the subjects were highest in the chest, waist and hips measurements but the lowest in shoulder length and wrist measurements. Based on the findings of the study the following recommendations were made: Students in the clothing and textile institutions should be provided with the mean body measurements obtained from the study to help them in their pattern drafting courses. Lecturers of clothing and Textiles in the tertiary institutions should

utilize the master pattern developed in the study in teaching their students pattern development and alterations. Data obtained from the study should serve as a basis for further research in pattern making and development for the Nigerian figure. The block patterns developed is recommended for use by professional tailors involved in mass production and also to obtain better garment fit.

Method of Applying Measurements in Garment Construction

Research conducted by Podbevsek (2014); the aim of the study was to compare wrist-to-hip distances from contemporary construction system with the measured waist-to-hip of Slovenian young female to establish which waist-to-hip distance is present in different contemporary construction systems that best fits the body dimension of a specific market target group. The total population of the study was 156 female students.

The findings of the results showed that the measured waist-to-hip distance differed significantly from those obtained from the tables of the contemporary construction system. Podbevsek (2014) suggested that the waist-to-hip distance be included as a directly measured parameter and not as secondary, one taken from the tables or calculated from other measured distances or girths as now is the case.

In Obinnim and Pongo (2015) study, the purpose of their study was to investigate reasons why dressmakers in Ho Municipality do not use patterns for cutting out garment, it also assessed the importance and challenges associated with the use of flat pattern making and developed strategies to assist dressmakers to overcome the challenges of using flat pattern making in constructing garments. Descriptive survey was the research design. Questionnaires, semi-structured

interviews and observation were the instruments used in collecting data. 140 dressmakers were the sample for the study.

Findings from the results indicated that, most dressmakers in the Ho Municipality had little or no knowledge about flat pattern use in the fashion trade. Hence its use for cutting out was not common. The few who had an idea about it perceived it as difficult and time consuming. There was a clear indication from the findings that, dressmakers lack the skill of taking standard and accurate measurements for drafting. This consequently led to the use of free hand or the direct method of cutting out.

In the study of Forster and Ampong (2012), the purpose of the study was to compare pattern cutting skills taught in Teacher Education Universities in Ghana with what were used in local small-scale garment industries. Fifty small-scale industries were used for the study. The findings revealed that the measurement and pattern cutting procedures used in constructing garments by dressmakers were different from the ones used in teaching and training teachers in the universities. The study also revealed dressmakers use fewer measurements during garment construction.

Forster and Ampong (2012), made the following recommendations, there is need for a review of the clothing construction curricula in the two Teaching Universities in Ghana to meet the needs of the industry. The Universities therefore have to link with the Garment Industry and come out with definite step-by-step cutting instructions for different designs of garments, for different categories of people, as well as other necessary occupational skills that are not

taught in school. The pattern development methods of the demonstrators who made patterns with the freehand cutting method should be documented and studied in the University for variety. Finally, in order to standardize measurements and improve the garment sector, the government should invest in scanners to create a data base of measurements for Ghanaians; invest in serious research to establish a sizing system for Ghanaians; train teachers and entrepreneurs to facilitate reasonable regulation and standardization of measurements and sizing in the Ghanaian Garment Industry.

Adu-Boakye (2012) conducted a study on the topic development of a conceptual framework relating to read-to-wear clothing for Ghanaian women for manufacturing strategies. The purpose of the study was to develop a conceptual framework to facilitate the understanding of clothing sizes, body shapes and manufacturing strategies for the production of ready-to-wear garment for Ghanaian women aged 16-35 years.

The specific objectives were to analyse the current sizing systems used for the production of ready-to-wear in the clothing industry in Ghana, to evaluate consumer perception of the body shape, size and body cathexis and their effect on the clothing choice, to develop a size chart based on anthropometric body measurement of Ghanaian women aged 16-35 years, and to develop a conceptual framework that offers a better understanding of clothing sizes, body shape and facilities manufacturing strategies for the Ghanaian clothing industry.

Data form the study was obtained from clothing manufacturers, stakeholders and consumers in Ghana using non-probability purposive sampling

methods. Correlations and one-way ANOVA was used as the statistical tool. They showed there were no official size charts to compare the developed sized charts with the anthropometric research-based size chart. Again the study revealed that clothing manufacturers were producing clothing without conforming to any clothing standard instituted by the Ghana Standards Board. This has resulted in substandard products ending up in the market.

The study therefore recommends that the Standard Board should make clothing standards accessible to all clothing manufacturers and ensure that all clothing items produced are based on these standards. The study further recommend that further anthropometric studies should be conducted to cover all age categories of women in Ghana. The study also recommends that more samples should be examined and compared to establish the differences between body shapes of the younger and older populations. It is recommended that further research methodology such as the body scanning technology and the developed software for Female Figure identification Technique (FFIT) for Apparel could be used in conjunction with questionnaire in order to verify body shape, strengthen the relationship between body shape, and clothing choice. Finally, this study recommend that the framework should be expanded and helped in improving the production of clothing in the Ghanaian clothing industry as well as in other African countries.

Lim and Cassidy (2017) conducted a comparative study of trouser pattern making methods. The purpose of the study was to evaluate four trouser pattern making methods known as Aldrich, Armstrong, Bunka and Esmod methods

focusing on fit consideration by application onto human subject's evaluation. The fundamental body dimension data were measured by 3D body scanning system, and four trousers according to the four different methods were produced by manual methods and an apparel CAD programme. The instrument used for the study were questionnaires and in-depth interviews.

The results were analysed by statistical and qualitative analysis. The findings of the study of Lim and Cassidy (2017) showed that the subject body measurement size were greater than the average body size. Additionally, the construction methods of the trouser were not significantly different. The study therefore suggested that the time may be right for a new pattern making method to be developed. Moreover, a deeper understanding of body shape and size in different ages and ethnicity should be gained to develop an optimum pattern without wasting time to modify and to satisfy the majority of customers.

Knowledge on garment fit

In the research study of Anderson, Brannon, Ulrich, Jenkins, Early, Grasso and Gray (2000), the objectives of the study were to understand the nuances of fit as defined from the consumer's perspective, develop instruments and methodologies to capture personal fit demands of the consumer and to translate consumer fit preference data into an expert system to be used in decision making involving fit. Probing and projective techniques was used to elicit responses from the female consumer.

Buckner (2011) conducted a study on fit satisfaction of crocheted apparel. The objectives of the study were to identify fit satisfaction and dissatisfaction

among garment crocheters, identify crocheter background variables that may affect fit and fit satisfaction such as experience level and knowledge of related fields; identify crocheter behaviour that affects fit, such as garment construction and finishing techniques; and analyse reported behaviour and feedback to suggest exploratory theories and hypotheses that can provide a basis for research.

The research design was a mixed method. Online questionnaire with both quantitative and qualitative questions were used to evaluate the data of the study. Convenience sampling technique was used to select participants. Descriptive statistics were calculated to determine basic characteristics of sample and of the data set. The findings of Buckner (2011) revealed that on the average, consumers are satisfied with the fit of their crocheted garments and significantly more so than they are with the fit of ready-to-wear garments. The study also revealed that dissatisfaction can be a result of poor planning of garment design. Furthermore, it revealed experience level is an important contributor to fit satisfaction.

The researcher made the following recommendations base on the findings. Future research should aim to increase generalizability by using alternative research and recruitment methods to reach a wider segment of the crocheting population. Additionally, the body of knowledge would benefit from a deeper understanding of the variables discussed in this study, which could be done via more focused quantitative research, focusing on a few variables, or more focused qualitative research, using narrative or case-study methodology to gain a deep understanding of the experience of individuals at different skill levels. A broader understanding of the crochet and needle arts industry is needed. The number of

studies of handcrafted garments in general is small, and research on fit satisfaction for home sewing, knitting, and other garment construction methods would also reinforce the body of knowledge.

In the research conducted by Kasambala, Kempen, and Pandarum (2015) on the topic, determining female consumer's perceptions of garment fit, personal values and emotions when considering garment sizing. The purpose of the study was to explore the areas of concern of garment sizing to establish the emotional impact garment sizing and the resulting fit have on the female consumer purchasing behaviour when evaluated against their personal value system. Interview techniques was the means of data collection. The data was collected using purposeful and convenient sampling technique to sample 62 female consumers.

The findings of the study showed that the majority of the participants in the study failed to attain their personal values through the fit of a garment due to inconsistent, unreliable and inaccurate sizing, garment sizing which is unsuitable for various body shapes and the unavailability of certain clothing sizes in ready-to-wear garments. The researcher made the following recommendation from the findings of the Kasambala et al. (2015) that a national sizing study be conducted, as very little is known about female body shapes in South Africa. Such knowledge may reduce imports into the country as these garments may not be manufactured for the South African female figure type. The study should be expanded to incorporate a bigger sample size so as to get feedback from manufacturers and retailers on the challenges of garment sizing and fit currently in South Africa. A

study that quantifies and relates garment sizing to personal values and the resulting emotions will allow a more precise understanding of the problems that are particular to South Africa and the personal values that drive the purchasing of garments in Gauteng, South Africa.

Coury (2015) conducted a study on consumer perceptions of apparel fit satisfaction and sizing based on 3D body scanning and block garment assessment. The objectives of the study were to, determine whether Walmart Incorporated Company customers were purchasing the correct size garments for their body measurements, and their perceptions of the fit of Walmart Incorporated Company clothing prior to trying on the current block garments. The second objective was to determine which factors influence fit satisfaction after the participants have tried on the current block garments. There was a total of 55 responses they were all females and all participants were Walmart Inc. consumers.

Based on the results of the study, the participants were found to purchase the incorrect size garments more often than the correct size garments. Also, the results show that age, garment type and size were all statistically significant influencing factors on fit satisfaction for shirts. Only garment type was found to be a statistically significant influencing factor on fit satisfaction for pants. Based on the findings, the researcher made these recommendations; consumers need to be better educated on sizing and fit in order to have a higher fit satisfaction, and better perception of quality. This study should be viewed as a preliminary study for future research. Further research needs to be conducted with an increased sample size, and a more geographically diverse population. A larger sample could

provide more statistically significant results, or different results. The results suggest that there are different factors influencing fit satisfaction, which should be investigated further. Other major retailers should be included in future studies, based on the type of retailer. Additionally, future research is needed to include men's and junior's sizing and fit perceptions.

In the study of Shin (2013), was to explore consumer's fit perceptions and satisfaction with apparel fit in general. The purposes of the study were to develop an understanding of young consumers' overall apparel fit satisfaction, to explore the meaning of garment fit in general from the perspective and to quantitatively investigate the factors that may affect clothing fit satisfaction when consumers evaluate their apparel fit. The study used a qualitative-dominant mixed methods design, which consisted mainly of qualitative, focus group phase and a collection of qualitative data prior to group interviews. For both quantitative and qualitative phases, a convenience sample of 94 respondents were used for the study.

The results of the study of Shin (2013) revealed the young female and male consumers were somewhat satisfied with fit in general. The research also found that other possible factors that affect fit satisfaction were inconsistent size, fit alteration, price, physical comfort related to fit and psychological comfort related to fit. The following recommendations were made for the study; further research should investigate fit strategies for the older population based on their previous shopping experience. Identifying effective fit strategies would enable merchants and retailers to help consumers get a better fit by suggesting possible fit strategies. Future research should investigate fit strategies for online shopping

and its effect on fit satisfaction and future intention to buy garments through a website.

Garment Fit Evaluation

Jevšnik, Kalaoğlu, Eryuruk, and Bizjak (2015) conducted a study on evaluation of a garment fit model using Analytical Hierarchy Process (AHP). The aim of the research was to examine the fit of a skirt on a live model and on virtual models such as parametric and scanned body models in order to produce which virtual human body is the most suitable where garment fit is concerned. The study also discussed the fit of a skirt on an individual part of the body with respect to predefined areas.

A numerical study with a questionnaire survey database was used in selecting the best model to assess the fit of skirt to the human body, and the AHP was used to evaluate the questionnaire results. The results obtained from the study confirmed that the design is most important factor when evaluating a skirt's fit to the body. The results further confirmed that the hips and abdomen areas were the most important for evaluators when assessing a skirt's fit to the body.

In the research of Chin (2007), the study was on fit evaluation within the made-to-measure process. The purpose of the study was to evaluate fit of the basic garments made for Taiwanese female students with various figure characteristics. The study consisted ten female student subjects who represented various figure characteristics. T-test and one-way ANOVA were employed to investigate the statistically significant differences between figure characteristics of the subjects.

The findings of the study showed that the percentage of tolerance allowed by the system in preventing incorrect measurements has to be revised and more measurements have to be included into the APDS-3D system. The result again showed that female students who exhibit multiple figure variations complicate fitting problems. Furthermore, the research revealed that fit problems become complicated when one figure variation combines with another and when the physical characteristics are not all ideal.

The researcher suggested the following software designers need to add measurements such as: across back, across chest, and front centre length that will enhance well fitting. Also, the tolerance for neck circumference in the APDS-3D system has to be decreased in order to ensure accurate measurements. Meanwhile, the intake of the waist darts has to be adjustable, depending on the difference between the females' waist circumferences with additional ease and block patterns' waist dimensions. Future research can focus on investigating commonly occurring figure variations among females and combination of figure variations.

Lin (2014) conducted a study on the determination of distance ease at crotch curve for customized jeans. The purposes of the study were to systematically review and analyse the state-of-art methods of automatic customized pattern development and to determine the relationship between crotch length ease allowance and the distance ease distribution. Size 8 mannequin was selected as a model for customized fit jeans for the study. The results of the

research provided essential ease distribution information for the jeans pattern alterations and jeans construction on a 3D model.

Based on the findings of Lin (2014) the following recommendations were made Male or children's jeans block patterns should be studied using the proposed method. A software which incorporates all the processes of the study should be developed to speed up the 3D jeans design and patternmaking. A large scale and comprehensive investigation which covers different age groups, body shapes and sizes should be conducted for establishing more robust models between crotch ease allowances and distance eases. Subjective and objective fitting evaluations should be conducted on human bodies to test the comfort of the crotch curves on real humans. The ease distribution in the cross sections of hipline, high hip line, waistline, knee line, and crotch curve should be fully considered in designing customized jeans.

Cheruiyot (2008) conducted a study on assessment of size and fit of ready-made formal clothing among male consumers: A case of Kenyatta University. The purposes of the study were to explore the size and fit issues of ready-made formal clothes among men with regard to: origin of imported clothes, satisfaction based on availability of appropriately fitting clothes, fit problems experienced at critical fit points, fit preferences, knowledge on key body measurements and body shapes and knowledge on the communication of size by size labels.

The research design was a descriptive survey. The population of the study was men between the ages of 25 to 75 years. The sample was stratified as the teaching staff was 192 and non-teaching staff was 294. Questionnaire and observation checklist were employed to collect data. Descriptive statistics was used to analyze data obtained from the study.

The findings of Cheruiyot (2008) indicated that men in Kenyatta University buy clothes that are made in China, Kenya, Britain and America. The study further indicated that formal ready-made, imported new, custom made, and local ready-made clothes have a better fit than second hand clothes for men. The study also found that men experience fit problems with ready-made clothes.

The researcher recommended that apparel manufacturing industries in Kenya and abroad should ensure that their sizing systems are a representative of their target market. There is need to educate consumers on size labels presented on their clothes and how they relate to their body measurements and shapes. Clothing manufacturers should communicate with consumers through labelling that contains sizing information that is clear, informative and understandable. Size labels could include size symbols such as pictograms, which communicate to the consumer's key body dimensions that garments are designed to fit. Male garment consumers should be sensitized to know which body dimensions are used to size garments, and how to determine their own body dimensions, in order to make appropriate size choices.

McRoberts (2005) assessed petite women: fit and body shape analysis. The purpose of the study was to investigate fit and design with figure type variations for petite women, five feet four inches, and between the ages of 20-49 years. The sample for the study was 52 petite females from a metropolitan area in the South-eastern United States using non-probability sampling technique.

The findings of the study of McRoberts (2005) suggested that the prototypical petite pattern resulted in improved fit as compared to the pattern

based on the voluntary product standard. Figure type analysis of the sample indicated that most subjects were outside the industry silhouette definitions. None had the industry standard hourglass silhouette, indicative of a lack of accommodation for the petite silhouette and figure type variation by the voluntary product standard PS 42-70. The researcher recommended that other groups of subjects could be measured and investigated. Of particular interest would be subjects in other regions of the country or samples with ethnic diversity with figure type variations. Subjects could be both measured and scanned during the same time period for comparison of accuracy in data collection. It would enable immediate pattern production, three-dimensional body shape analysis, and quicker classification of body figure types. In addition, the subjects could benefit from receipt of copies of their personal pattern work.

Garment fit problems

Nkambule (2010) researched on apparel sizing and fit preferences and problems of plus-size Swazi working women. The purpose of the research was to investigate apparel sizing and fit preferences and problems of the plus-size Swazi working women. The study concentrated specifically on the functional, aesthetic and economic fit preferences as well as on determining size labelling preferences, knowledge and clothing styles preferences and problems. The study was a descriptive study using a quantitative approach. Purposive sampling was used to select 249 women between the ages of 25 and 60 years. A self-administered questionnaire was used to answer the objectives of the study.

The result of the study of Nkambule (2010) indicated that the plus-size Swazi working women preferred clothes that were functionally comfortable, fitted well and were made in comfortable fabric. They also indicated that they preferred clothes that were well sized, had a fit that was functional, sensually and emotionally pleasing in respect of styles, the fabric use and comfort. The study also reflected that plus-size working women experienced sizing and fit problems in most of the apparel they bought from local retail outlets. A high number of respondents also indicated that they experienced a lot of fit problems on several areas of the bodies such as waist, hips, buttocks, abdomen and upper arms. These seemed to be the most problematic body areas with fit problems.

Strydom and Klerk (2006), the study investigated the South African clothing industry: problems experienced with body measurements. The purposes of the study were to compare international descriptions of all identified body measurements needed by the South African respondents' descriptions of the identified body measurements; and to also describe the problems that the South African clothing industry experience with body measurements.

Quantitative data collection techniques were employed in the study to adequately address the research problem and objectives. The population for the study was South African apparel and footwear manufacturers and retailers. Data was analysed using descriptive statistics in the form of frequency tables. The findings of Strydom and Klerk (2006) indicated that the lack of consensus concerning body measurements is probably the cause of most of the problems that are being experienced. The study also revealed that land marking was identified

as a problem with a number of measurements and this problem needs to be addressed, not only by the local industry but also internationally.

Strydom and Klerk (2006), recommended that in order to ensure well-fitting garments and good fit in general, it is of the utmost importance that manufacturers and retailers should have a sound knowledge on exactly how and where on the body the various measurements should be taken, and should have and use the equipment that will enable them to consistently take accurate measurements. It is also important that the industry address the problem of consensus with regard to land marking and measuring method, and that they reach consensus on which landmarks are to be used, describe in detail how these landmarks can be identified consistently, and agree on the method for taking body measurements.

Based on the findings of Nkambule (2010) the following recommendations were made: Extensive educational workshops on consumer sizing needs could be run by clothing specialists and Home Economics specialists to help develop consumers' awareness on sizing and fit issues. With more education, consumers are likely to be made aware of the importance of sizing and fit in clothes. Consumers should be made aware that they need to know their body measurements to assist them in choosing clothes with body measurements similar to those on the labels. They should also continuously take and know their body measurements so as to change the sizes in the event of weight gain, weight loss or age effects, so that finding clothes that fit will be an easy task. In schools, the teachers, especially Home Economics teachers, can help in providing information

on apparel sizing needs and the body to young and teenage girls, so as to help them develop skills in dressing and in choosing clothes. Apparel retailers can play a pivotal role in educating their clients on selecting and choosing clothes for the plus-size. This can help consumers to make a better-informed decision when selecting clothes for work. Shop assistants working in most of the clothing outlets should also be trained and be knowledgeable about fabric, sizing and fit of clothing components.

CHAPTER THREE

RESEARCH METHODS

The aim of this study is to investigate the body measurements practices of dressmakers in the Ho Municipality in the Volta Region of Ghana and how it influences the fit of garment they produce. This chapter describes the methodology used in the study, including the research design, population, sample size and sampling techniques, research instruments, reliability and validity of the instruments, data collection techniques and ethical considerations.

Research Design

Research design is the scheme outline or plan that is used to generate answers to research problems (Orodho, 2003). The researcher adopted mixed method research approach. The research design used for the study was descriptive research design. According to Saunders, Lewis and Thornhill, (2003) descriptive research aims at casting light on current issues or problems through a process of data collection that enables researcher to describe the situation more completely. Exploratory research design was used for this study. The exploratory research design is research used to investigate a problem that is not clearly defined (Check & Schutt, 2012). This type of design allows for a variety of methods to recruit participants, collect data, and utilize various methods of instrumentation. In relation to this study, measurement practices are not clearly defined hence, its effect on garment fit. Therefore, exploratory design was appropriate for the study since it helped the researcher to clearly define the body measurement practices needed to achieve garment fit. Relatively the method is appropriate to this study

since it aims to explore the present condition of how body measurement taken by dressmakers influence the fit of garment sewn. The choice of exploratory design helped the researcher because this design is closely associated with observational studies. Also, it gave the opportunity to the researcher to integrate the qualitative and quantitative methods of data collection.

Study Area

The study was conducted at the Ho Municipality to examine the influence of body measurement practices on garment fit among dressmakers. Ho Municipality is one of the twenty-five (25) districts in the Volta Region of Ghana. Its capital and administrative centre is Ho, which makes it the largest urban centre in the region. About 62 percent of the population resides in urban localities. Although an urban area, agriculture is the mainstay of the Ho Municipality. It employs about 70 percent of the economically active labour force. Almost every household in the Municipality is engaged in an agricultural related activity. The Municipality has a huge open market that attracts people from all over the Volta Region and migrants from Togo. The Ho Municipality lies between latitudes 6° 207N and 6° 55N and longitudes 0° 127E and 0° 53E and covers an area of 2,660 sq. km. The Municipality shares boundaries with the Adaklu-Anyigbe District to the South, Hohoe Municipality to the North, South-Dayi District to the West and the Republic of Togo to the East (www.ghanadistrict.com; accessed 2019 July 02).

Population

Polit and Beck (2004) defined population as the entire aggregation of cases that meet a designated set of criteria. According to Neuman (2007), population is the unit being sampled, the geographical location, and the temporary boundaries. It can be a person, organization, a written document or a social action. The population for the study is dressmakers in the Ho municipality. There are 132 registered dressmakers in the Ghana National Dressmakers and Tailors in the Association in Ho municipality. Hence, the population for the study comprise of all 132 registered members of the Ghana National Dressmakers and Tailors in the Association in Ho municipality. Ghana National Dressmakers and Tailors in the Association as the name implies is made of tailors and dressmakers in both the formal and informal sectors who have decided to come together to improve and advance their occupation. The Association was established in October 1979. Some of the activities organized by the association includes, training of apprentices, organizing workshops and seminars for members to upgrade their skills. Also, they meet occasionally to share ideas about their work and educate members on government policies concerning garment production industry in Ghana.

Sample and Sampling Procedure

The study adopted a multistage sampling technique. At the first stage those who sew only female clothes were sampled through purposive sampling and the second stage involved using random sampling to select the sample to be used to collect data from the purposively selected female only garment producers.

According to Babbie and Mouton (2007), purposive sampling is based entirely on the judgment of the researcher regarding the predetermined characteristics or inclusion criteria of the sample which will be suitable for the purpose of the study. The researcher purposively selected all dressmakers who sew female clothes only because the designs being used by the researcher were all for female. It was therefore thought that those who sew for only females would have a good experience in their specialization. The researcher did not include female dressmakers who sew both male and female garments because, some of the dressmakers may be perfect in one garment than the other and it may affect the outcome of the study.

The association consists of dressmakers who sew both male and female clothes, female clothes only and only male clothes. Since the researcher was interested in female dressmakers who sew female clothes only, the researcher visited the office of the association and requested for the names and the phone numbers of dressmakers who sew female clothes only. This was done by the help of the secretary who gave the researcher the register. Fifty-two (52) dressmakers were the only ones who sew female clothes. Out of the 52 female dressmakers, 15 were randomly sampled through the lottery simple random method. According to Henn, Weinstein, and Foard (2009), there is no optimum sample size, often the sample size depends on the resources available to the researcher and the level of precision required in the study. In the light of the statement made by Henn, Weinstein, and Foard (2009), the researcher selected 15 dressmakers because the

procedures and activities involved in the study were very involving, time consuming and resource demanding.

Data Collection Instruments

The data collection instruments used in this study were fit evaluation index, semi-structured interview guide and observation checklist/guide. The fit evaluation index was used to evaluate the physical fit of the garment constructed by the dressmakers. The Judges' Fit Evaluation Index was based on the fit criteria in the work of Amaden-Crawford, (1996); Betzina (2001). It was divided into three areas: general principles of fit, appropriate amounts of ease, and proper placement of waistline, bust line, hipline, neckline and capline. It was designed to facilitate assessment of the fit of garment sewn by dressmakers on a live fit model. The development of Fit Evaluation Index for the live fit models was also based on the fit criteria in the work of Amaden-Crawford, (1996); Betzina (2001). It was divided into 4 sections. These sections are fit of the garment when moving, circumferential fit of the garment, longitudinal fit of the garment, and satisfaction fit of the garment. An observation check list was used to assess body measurement procedures employed by dressmakers, construction process and problems with fit of the garments. Observation was a valuable data collection method because it allowed the researcher to see the dressmaker in their natural setting and to observe how various activities were performed during the making of garments. Furthermore, observational research provides insights that stimulate more controlled research or supplemented more controlled research by seeing what events mean to actors.

The observation guide used to obtain data during body measurement procedures and construction processes were adapted from Forster and Ampong (2012) with few additions made by the researcher. It contained information on measurement practices such as body measurement format used, tools and materials, attire for measurement taking, interactions with clients while taking measurement, standing position of clients and dressmaker among others.

In addition to the observation guide, semi-structured interview guide was also used to gather information from the dressmakers. According to Leedy and Ormrod (2010), semi-structured interview guide is to allow the researcher to ask participant about the why and how questions in addition to a set of standard questions and get more clarification about answers given by respondent. The interview helped the researcher to ask the dressmakers about their background information such as age, educational level, working experience and reasons for procedures being used during the production of the garments.

Reliability of the Instrument

Reliability as the measure of the degree to which research yields consistent results or data after repeated trials. It refers to the degree of consistency of scores or answers from administration of an instrument to another, and from one set of items to another (Fraenkel & Wallen 2009). It is qualified by taking several measurements on the same subjects. Poor reliability degrades the precision of a single measurement and reduces the ability to track changes in measurement in a study (Mislery, 2004). The reliability of data collection instruments was determined from the pilot study. The piloting was carried out in

Kpando among 10 dressmakers who sew for females only since they are not part of the study but they have similar characteristic as participants of the study. The interrater reliability coefficient was applied to the fit evaluation while Cronbach's coefficient alpha was used check the reliability of the observation check-lists. The Cronbach's coefficient alpha obtained for the observation checklist was a = 0.82 and the interrater coefficient (Kappa statistic) for the fit evaluation index was K= 0.87 for the fit evaluation index.

Validity of the Instrument

Validity is the appropriateness, correctness, meaningfulness, and usefulness of data analysis of results obtained from a study (Fraenkel & Wallen, 2009). In order to ensure that the research instruments accurately reflected the concepts they are intended to measure, the interview guide and observation checklist were given to my supervisors, experts in the area of study. Their corrections and suggestions were used as a basis to adjust the research items and make them more suitable to the study.

Data Collection Procedure

The data collection procedure was preceded by a letter of introduction from the Department of Vocational and Technical Education and was given to the president of the Ghana National Dressmakers and Tailors Association, Ho branch. This enabled the researcher to obtain permission to collect data from the dressmakers. The researcher collected data as a non-participant observer. In order to avoid bias judgment, the researcher employed the help of a trained dressmaker to help with observation during the observation process.

The researcher first called the participants and booked appointment with them. On the day of appointment, the researcher together with the live model went to the dressmakers to take the body measurement of the live model after which the researcher gave them the fabrics and the garment designs. The body measurement of the live model took two days. After the measurement, the researcher scheduled another appointment with each of the dressmakers to observe cutting of the fabric. During the cutting of fabrics, the researcher spent a period of 3 to 4 hours with each dressmaker within two weeks. Observations were made during the measurement and cutting procedures in the dressmaker's shops between the hours of 9am to 2pm with the help of observation check list/guide. The researcher scheduled time for the interview with the participants ahead of time after the cutting of fabric in order for participants to prepare well before data collection started.

The researcher provided three garment designs according to the types of fit namely fitted, close fitted and loose fitted garments. The designs were fitted dress to the knee, close fitted blouse and a loose blouse with inverted pleat in front (see Appendix D, E and F). The choice of styles was based on the fact that these are common fits used by females; and they cover crucial points of garment fit like bust, across shoulder, armhole, waist and hips.

Three judges comprising of a fashion design and textile lecturer from Ho Technical University, the Head of clothing and textile department from Mawuko Girls SHS, and a member from the dressmakers' association were used in evaluating fit of garment. These three judges are fit experts and were oriented on

fit evaluation index. The judges evaluated the fit of garment sewn by dressmakers on the live fit models. One live fit model wore all the garments sewn by the dressmakers, one after the other and stood in front of the panel of judges who responded to Fit Evaluation Index. The live fit model also evaluated all the garments she wore one after the other.

The dressmakers were interviewed using semi-structured interview guide to gather information about their knowledge on garment fit. The interviews were recorded and later transcribed and analysed through thematic analysis. The interview guide contained four objectives on dressmakers' knowledge on garment fit

Data Analysis

Data analysis is the categorizing, ordering and summarizing of data to obtain answers to the research question (Kruger, De Vos, Fouche & Venter, 2007). Mouton (2002), explained further that data analysis involves two steps. First is to reduce the volume of collected or available data. Second is to identify patterns and themes in the data. In order to address the research questions that were formulated to guide the study, the data obtained from observation checklist was coded. Research question 1, 2 and 5 were analysed using frequencies and percentages. Research question 4 was analysed using mean and standard deviation. Thematic analysis was used to analyse research question 5. The research hypothesis was analysed using Pearson Product Moment Correlation Coefficient because the research wants to establish the relationship between

measurement procedures and garment designs. The hypothesis was tested at 0.05 level of significance.

Ethical Considerations

The study deals with people as respondents of the study (dressmakers in the Ho municipality). As noted by Kombo and Tromp (2006) the researchers whose subjects are people or animals must consider the conduct of their research, and give attention to the ethical issues associated with carrying out their research. To ensure ethical practice the researcher obtained consent from respondents and permission to record the interview, take photograph and as well as the time the researcher spent with them at their shops for the observations. Phone calls were also made before every visit to their shops so that the researcher will not interfere in their busy schedules. The researcher ensured confidentiality of their responses, informed them about the purpose of the research and the procedures involved.

CHAPTER FOUR

RESULTS AND DISCUSSIONS

The purpose of this study was to investigate garment fit and body measurement practices used among dressmakers in the Ho municipality in the Volta region. The data gathered from the study is analysed and discussed in this chapter. Responses on participants' demographics, observations made on participants' body measurement procedures, method of applying measurements in garment construction and fit evaluation were analysed with the Frequencies and percentages. Thematic analysis was used to analyse dressmakers' (participants) knowledge on garment fit. The data is presented and analysed based on the research questions of the study.

Demographics

Table 2: Age and Level of Education Distribution of Participants

Age	**Frequency**	**Percent**
20-30	2	13.3
31-40	5	33.3
41-50	7	46.7
51-60	1	6.7
Total	**15**	**100.0**
Level of Education	**Frequency**	**Percent**
Middle school	4	26.7
Commercial	1	6.7
JSS/ JHS	6	40.0
NVTI	3	20.0
SSS/ SHS	1	6.7
Total	**15**	**100.0**

Source: field data (2019)

This study comprised of 15 female dressmakers (participants) and from the table, 46.7% of the participants are between the ages of 41-50 years, and the

least 6.7% within 51-60 years. The table indicates that, all the participants had formal education irrespective of the level. Moreover, most participants who completed JSS formed 40%, while those with Commercial and SSS educational level formed 6.7% respectively.

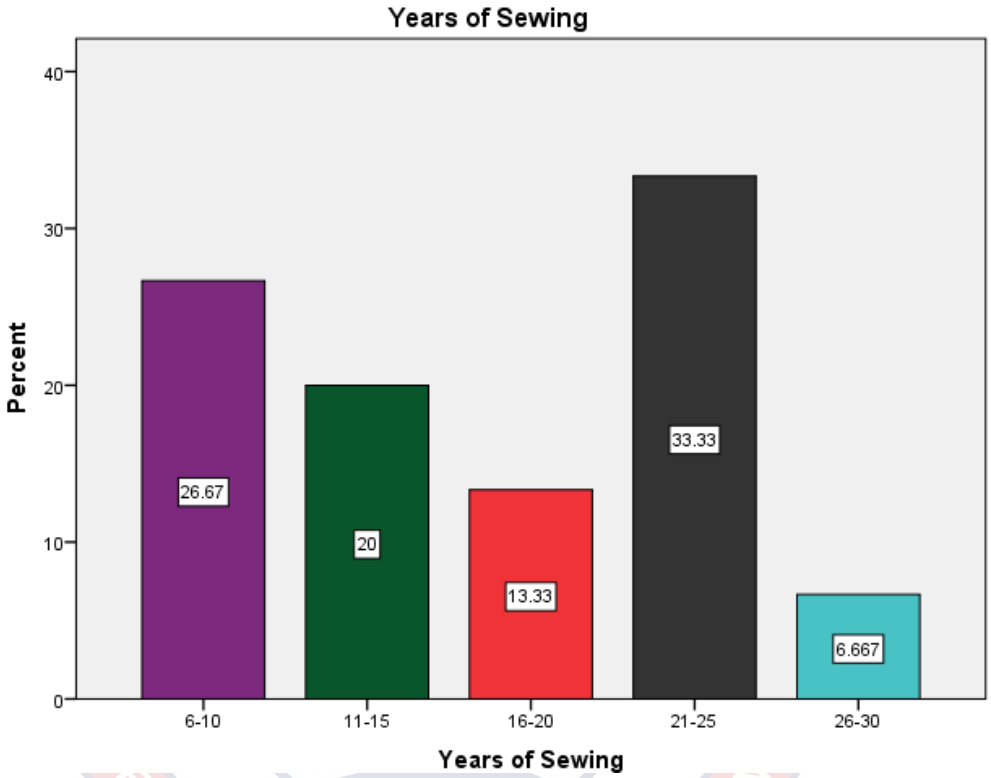

Figure 3: Number of years in sewing

Source: Field data (2019)

Among all the participants, 33.33% of them are having 21-25 number of years in sewing, while 6.6% are having between 26-30 years of sewing. This implies that, the participants of the study possess the working experience to provide the data needed for the study.

Table 3: Skill training, method of cutting learnt and method of cutting used

Type of skill training	**Frequency**	**Percent**
Apprenticeship only	12	80.0
School	1	6.7
Both	2	13.3
Total	*15*	*100*
Method of cutting learnt	**Frequency**	**Percent**
Freehand	10	66.7
Pattern	0	0
Both	5	33.3
Total	**15**	**100**
Method of cutting used	**Frequency**	**Percent**
Freehand	11	73.3
Pattern	0	0
Both	4	26.7
Total	*15*	*100*

Source: Field data (2019)

Results from Table 3 indicate that, majority 80% of them received their skill training through apprenticeship, while 6.7% received their skill training from school. The table also showed that, 66.7% of the participants learnt freehand method of cutting. Hence 73.3% of the participant used freehand method of cutting.

Research Question 1

What are the body measurement procedures of dressmakers in the Ho municipality?

The purpose of this research question was to determine the kinds of measurements taken and the procedures dressmakers in the Ho municipality use in body measurement. Frequencies and percentages were used to analyse this research question.

Table 4: Procedures for Body Measurements

Measurement Format	**Frequency**	**Percent**
Standard measurement book	7	46.7
Paper	3	20
Notebook	5	33.3
Total	*15*	*100*
Tools and materials	**Frequency**	**Percent**
Tape measure and pen	15	100
Total	*15*	*100*
Interaction with clients	**Frequency**	**Percent**
Yes	11	73.3
No	4	26.7
Total	*15*	*100*
Standing position of designer	**Frequency**	**Percent**
Facing the client	11	73.3
Standing beside the client	4	26.7
Total	*15*	*100*
Body measurement according to garment design	**Frequency**	**Percent**
Correct sequence	2	13.3
Wrong sequence	10	66.7
Partially done	3	20
Total	*15*	*100*
Correct identification of landmarks	**Frequency**	**Percent**
Correct identification	1	6.7
Wrong identification	1	6.7
Partially done	13	86.7
Total	**15**	**100**

Source: Field data, (2019)

Results from Table 4 show the body measurement procedures used by dressmakers from Ho. It was revealed from the table that, with measurement format, 46.7% (7) of the dressmakers used standard measurement book, 33.3% (5) used notebook and 20% (3) used paper. The researcher observed that, irrespective of the fact that, most of the dressmakers used standard book measurement, they could not apply all the measurements listed in the measurement book, thus they

did not use the book for its intended purpose. More so all the dressmakers used tape measure and pen. However, the researcher observed that, two of the dressmakers used old, torn and rigid tape measures.

From the table, most of the dressmakers 73.3% interacted with their clients while taking their clients' body measurement, 26.7% of the dressmakers did not interact with their clients. Moreover, results from the table indicates that, most of the dressmakers 73.3% stood in front of their clients which is not the right way while taking measurement while 26.7% stood beside their clients which is the right way.

However, with body measurement according to garment design, majority 66.7% of the dressmakers did not take the body measurement according to garment design, 13.3% took the measurement in correct sequence while 20% partially took the body measurement according to garment design. The results also showed that, 86.7% (13) of the dressmakers partially identified the correct identification of landmarks with only 1 (6.7%) dressmaker who identified the correct landmarks.

Table 5: Landmarks Measured

Parts of the body	Standard measurement for all body type	Measurement of dressmakers				Common comments
		No measurement F (%)	Below F (%)	Within F (%)	Above F (%)	
Neck	15	15 (100%)	0	0	0	Not taught during training or apprenticeship
Shoulder length	4½	14 (93.3%)	0	0	1 (6.7%)	Not taught during training or apprenticeship
Back length	14½	14 (93.3%)	0	0	1 (6.7%)	Depending on the figure of the clients
Bust	36	0	11 (73.3%)	3 (20%)	1 (6.7%)	
Under bust	13	10 (66.7%)	2 (13.3%)	1 (6.7%)	2 (13.3%)	Not taught during training or apprenticeship
Waist	27	1 (6.7%)	0	8 (53.3%)	6 (40%)	
Hip	38	0	3 (20%)	10 (66.7%)	2 (13.3%)	
Waist to hip	8	15 (100%)	0	0	0	Not necessary unless slit and Kaba
Shoulder to shoulder	15	13 (86.7%)	1 (6.7%)	1 (6.7%)	0	Failed to identify the landmark
Shoulder to waist	16	0	1 (6.7%)	9 (60%)	5 (33.3%)	
Across front	12	8 (53.3%)	1 (6.7%)	0	6 (40%)	
Across back	13	2 (13.3%)	1 (6.7%)	1 (6.7%)	11 (73.3%)	
Shoulder to bust	6	8 (53.3%)	0	0	7 (46.7%)	
Nipple to nipple	6	12 (80%)	0	0	3 (20%)	Standard measurement already exist based on the body size
Blouse length	21	1 (6.7%)	0	1 (6.7%)	13 (86.7%)	
Dress length	38	0	2 (13.3%)	1 (6.7%)	12 (80%)	
Sleeve measurements						
Upper arm	11	3 (20%)	0	11(73.3%)	1 (6.7%)	
Lower arm	10½	7 (46.7%)	0	6 (40%)	2 (13.3%)	
Sleeve length	7, 13	3 (20%)	7 (46.7%)	2 (13.3%)	3 (20%)	

Source: (Field data, 2019)

Results from Table 5 shows the number of landmarks identified and measured by dressmakers when taking body measurement of clients. From the table, almost all of the dressmakers were unable to identify or measure seven (7) of the landmarks (*neck, shoulder length, back length, under bust, waist to hip, shoulder to shoulder and nipple to nipple*). Among these seven landmarks, the dressmakers who were able to identify and measure them did not take the right measurement as compared to the standard measurement in the table. However, majority of the dressmakers exclaimed that, they had no knowledge on how to identify and measure these landmarks because they were not taught during training or apprenticeship. With the *waist to hip* landmark, most of the dressmakers mentioned that it was not necessary taking the measurement because *waist to hip* measurement was only appropriate for *slit and Kaba* design and not the design for this study.

Moreover, from the table, all the other landmarks that were identified and measured by majority of the dressmakers were either above or below the standard measurement. All the dressmakers identified and measured the *bust* landmark but majority of them 11 (73.3%) measured below the standard measurement which is *36*. Likewise, the across back landmark, of which most of the dressmakers 11 (73.3%) measured above the standard measure of *13*.

Research Question 2

What are the dressmakers' method of applying measurements in garment construction?

The purpose of this research question was to identify dressmakers' method of applying measurement in cutting out the garment and putting the cut pieces together into a garment. The results are presented in the Table 6.

Table 6: Dressmakers' Method of Applying Measurements in Garment Construction

Units of measurement	**Frequency**	**Percent**
Inches	15	100
Marking of landmarks on Fabric		
Nothing on fabric	4	26.7
Something marked on fabric	11	73.3
Total	*15*	*100*
Adding of ease	**Frequency**	**Percent**
Added when taking body measurement	5	33.3
Added when cutting fabric	6	40
Before marking it on the fabric	3	20
Included during sewing	1	6.7
Total	*15*	*100*

Source: (Field, 2019)

Table 6 indicates methods dressmakers use in applying measurements in garment construction. The results indicate that all the dressmakers took the measurements in inches and out of the sample of fifteen (15), eleven (11) did not

mark out anything on the fabric before cutting out. In terms of adding ease to the garment all of them added ease for comfort at one stage.

Table 7: Method of Applying Measurements in Garment Construction

Method of applying vertical, horizontal and circumference measurement	**Frequency**	**Percent**
Seam allowance added to the actual measurement before applying to the fabric	13	86.7
Direct application of body measurement before seam allowance	2	13.3
Total	*15*	*100*
Marking of style line and dart position	**Frequency**	**Percent**
Marked before cutting	11	73.3
Did not mark before cutting	4	26.7
Total	*15*	*100*
Shoulder seam	**Frequency**	**Percent**
½ inches	9	60
1 inches	2	13.3
1½inches	3	20
2 inches	1	6.7
Total	*15*	*100*
Side seam	**Frequency**	**Percent**
3 inches	4	26.7
2 inches	8	53.3
1½inches	1	6.7
4 inches	1	6.7
2½inches	1	6.7
Total	*15*	*100*
Zipper	**Frequency**	**Percent**
1½inches	6	40
2 inches	9	60
Total	*15*	*100*
Hem	**Frequency**	**Percent**
2 inches	12	80
1½inches	2	13.3
2½inches	1	6.7
Total	*15*	*100*

Table 7 continued

Ease Addition	Frequency	Percent
Close fitted		
Bust		
2 inches	2	13.3
1½inches	5	33.3
3 inches	8	53.3
Waist		
1½inches	6	40
2 inches	1	6.7
3 inches	8	53.3
Hip		
2 inches	4	26.7
1½inches	2	13.3
3 inches	9	60
Loose fitted		
Bust		
4 inches	4	26.7
2 inches	7	46.7
6 inches	4	26.7
Waist		
4 inches	4	26.7
2 inches	8	53.3
6 inches	3	20
Hip		
4 inches	8	53.3
2 inches	4	26.7
6 inches	3	20
Fitted Garment		
Bust		
2 inches	4	26.7
1½inches	5	33.3
3 inches	6	40
Waist		
1½inches	7	46.7
2 inches	4	26.7
3 inches	4	26.7
Hip		
2 inches	2	13.3
1½inches	7	46.7
3 inches	6	40
Total	*15*	*100*

Source: (Field data, 2019)

Results from Table 7 shows that, with respect to dressmakers' method of applying vertical, horizontal and circumference measurement, 86.7%

(13) of the dressmakers added seam allowance to the actual measurement before applying to the fabric while 13.3% (2) directly applied body measurement before seam allowance. In addition, with marking of style line dart position; 73.3% (11) marked before cutting and 26.7% (4) did not mark before cutting. Moreover, with shoulder seam, 60% (9) of the dressmakers measured in ½inches, 53.3% (8) measured side seam in 2inches, 60% (9) measured zipper in 2 inches and 80% (12) measured hem in 2 inches. Eleven out of the 15 respondents marked out the darts in the garment before cutting out. With the usage of seam allowances they varied for each area. For the shoulder it ranged between ½ to 2 inches with only one respondent using 2 inches and 9 using ½inch. The side seam had seam allowances between 1½ to 4inches with 8 using 2 inches and 4 using 3 inches. The zipper allowance ranged from 1½ to 2 inches with 9 using 2 inches and 6 using 1½ inches. For the hem, 12 measured in 2 inches with only 1 using 2½ inches.

Research Question 3

What are dressmakers' knowledge on garment fit?

The purpose of this research question was to assess dressmakers' knowledge on garment fit in relation to;

Bust, waist, hips, armhole and sleeve

It emerged that dressmakers' knowledge on garment fit depended on the wearer's figure type. In relation to bust, the clients must put on good brassiere before taking body measurement. The bust is not supposed to be too tight to flatten the breast or too loose. For the waist the client is supposed to eat before

body measurement is taken so as not to decrease or increase the measurement. For the hips clients' body type makes it easy to adjust for appropriate fitting. For the armhole, a client should be able to raise the arms freely, and with the sleeve it should not be too tight or too loose. In all there must be enough ease around the bust, waist, hips, armhole and the sleeve to allow easy movement. A respondent view is shown below.

> *...it depends on the shape of the customer. The bust is not supposed to be too tight to flatten the breast or too loose. With the waist, hips and the armhole and sleeve are not supposed to be too loose not too tight.*

Dressmakers experience with apparel fit.

The results experience with an apparel showed that dressmakers fit depended on the figure type of the wearer. According to the dressmakers, a figure type of small, medium and large depended on how the body measurement was taken and sewn to fit appropriately. Dressmakers also revealed that first time clients had problems with their fitting but subsequent apparel sewn fits appropriately. Dressmakers experience with apparel fit is also determined by the design of the fabric sewn to fit the waist, bust and hips.

> *...With my experience with fit, I look at the figure before taking the measurement. If the person is smallish I know how to sew for her, if the person is fat, I know how to fit the armhole well, and likewise a medium person too I have a way of doing it. So if the person has a low hip, you should know how to take the measurement and*

normal hip as well, so that you can work on it if there is any problem.

Problems during fitting

From the responses, dressmakers admitted they were confronted with the challenge of shaping to fit the figure type. They normally had problems with clients with broad hips due to the training they had on taking measurement at the hips. The bust of clients also posed a challenge during fitting. Clients with large bust size made it difficult to shape the armhole and were mostly held flat with an underarm dart.

...Mostly when the person is busty, I have problem with the armhole. When it happens like that, I have to hold armpit dart…I also have problem with the upper hips after shaping especially if the person is having a lot of hips; you will see that there will be a lot of excess around the hip.

Fit as an important factor in sewing

Dressmakers admitted fit was an important factor in sewing because it brings satisfaction to both client and the dressmaker.

...Yes, the reason is that, when the fit is good the client becomes happy and I also become happy.

Research Question 4

How do the garments sew by the dressmakers' fit?

The purpose of this research question was to evaluate the garment fit of garments sewn by the dressmakers. The garments sewn by the dressmakers were evaluated by three clothing expert judges in fit on a live model. One fit model wore the garments of all dressmakers one at a time and stood in front of the judges, who responded to the Evaluation Fit Index Form. The live model also evaluated the garment fit of the garments sewn by the dressmakers. Results for this research question are present in Table 8, 9 and 10.

The three judges performed visual inspections of the garments sewed by the dressmakers on a live fit models and evaluated fit of the garments according to the garment designs (fitted garment, close fitted and loose fitted).

Table 8: Fitted Garment Evaluation on Live Model

	D1	**D2**	**D3**	**D4**	**D5**
Judges' score	26	53	35	46	49
Percent	46%	93%	61%	81%	86%
	D6	**D7**	**D8**	**D9**	**D10**
Judges' score	57	46	32	37	38
Percent	100%	81%	56%	65%	66.7%
	D11	**D12**	**D13**	**D14**	**D15**
Judges' score	29	46	33	30	14
Percent	51%	81%	58%	53%	25%
Mean	38.2				
Std	11.7				
Minimum	14				
Maximum	57				

NO=0, YES=1; Range 0 -57, the range for each judge was from 1- 19.

Source: (Field data, 2019). *'D' refers to dressmaker and they were 15 in number*

Results from Table 8 show the scores each dressmaker obtained from the *Fitted Garment* evaluation. As indicated earlier, the possible maximum score and percent is 57 and 100% respectively. That is, the closer the score is to 57 (100%) the better the performance. From the table, one dressmaker *D6* had the maximum score 57 (100). Likewise, one dressmaker *D15* had the minimum score of 14 (25%). The result shows that, majority of fitted garments sewed by the dressmakers were okay even though they could have done better.

Table 9: Close Fitted Garment Evaluation on Live Model

	D1	**D2**	**D3**	**D4**	**D5**
Judges' score	38	47	34	42	21
Percent	67%	82%	60%	74%	37%
	D6	**D7**	**D8**	**D9**	**D10**
Judges' score	32	51	22	25	55
Percent	56%	89%	39%	44%	96%
	D11	**D12**	**D13**	**D14**	**D15**
Judges' score	17	39	34	0	6
Percent	30%	68%	60%	0	11%
Mean	30.8				
Std	15.7				
Minimum	0				
Maximum	55				

NO= 0,YES=1; Range 0 -57, the range for each judge was from 1- 19

Source: (Field data, 2019) '*D' refers to dressmaker and they were 15 in number*

Results from Table 9 indicate the scores each dressmaker obtained from the *Close Fitted Garment* evaluation. As indicated earlier, the possible high score and percent is 57 and 100% respectively. That is, the closer the score is to 57 (100%) the better the performance. From the table, one dressmaker *D10* had the

maximum score 55 (96%). Likewise, one dressmaker *D14* had the minimum score of 0. However, comparing the mean score of 30.8 (std.=15.7) to the standard high score of 57, shows that, majority of fitted garments sewed by the dressmakers were okay even though they could have done better.

Table 10: Loose Fitted Garment Evaluation on Live Model

	D1	**D2**	**D3**	**D4**	**D5**
Judges' score	54	42	29	48	39
Percent	95%	74%	51%	84%	68%
	D6	**D7**	**D8**	**D9**	**D10**
Judges' score	57	46	57	0	55
Percent	100	81%	100	0	96%
	D11	**D12**	**D13**	**D14**	**D15**
Judges' score	33	12	31	53	0
Percent	58%	21%	54%	93%	0
Mean	37.0				
Std	19.6				
Minimum	0				
Maximum	57				

NO=0,YES=1;Range 0 -57, the range for each judge was from 1- 19

Source: (Field data, 2019). *'D' refers to dressmaker and they were 15 in number*

Table 10 shows the scores each dressmaker obtained from the *Loose Fitted Garment* evaluation. As indicated earlier, the possible maximum score and percent is 57 and 100% respectively. From the table, two dressmakers *D6* and *D8* had the maximum score 57 (100%). Likewise two dressmakers *D9* and *D15* had the minimum score of 0. However, comparing the mean score of 37.0 (std.=19.6) to the possible high score of 57, shows that, majority of fitted garments sewed by the dressmakers were good even though they could have done better.

Table 11: Overall Performance of Each Designer

S/N	Fitted Garment	Close Fitted	Loose Fitted	Mean	Rank
D6	57	32	57	49	1st
D10	38	55	55	49	1st
D7	46	51	46	48	2nd
D2	53	47	42	47	3rd
D4	46	42	48	45	4th
D1	26	38	54	39	5th
D8	32	22	57	37	6th
D5	49	21	39	36	7th
D3	35	34	29	33	8th
D13	33	34	31	33	8th
D12	46	39	12	32	9th
D14	30	0	53	28	10th
D11	29	17	33	26	11th
D9	37	25	0	21	12th
D15	14	6	0	7	13th
Grand mean	38.2	30.8	37.0	**M= 35.29(Sd=11.91)**	

Source: (Field data, 2019) '*D' refers to dressmaker and they were 15 in number*

Results from Table 11, comparing the grand mean (M=35.29) to means of each dressmaker, it indicates that, 7 dressmakers did not perform well with the fit of garments because their mean was below the grand mean. On the other 8 of the dressmakers performed well with the fit of their garment.

Table 12: Model Fit Evaluation for Close Fitted Garment

Description	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	D11	D12	D13	D14	D15
Sitting	3	3	3	3	3	3	3	3	3	3	2	3	3	3	3
Bending	3	3	3	3	3	3	3	3	2	3	1	2	3	3	3
Walking	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Raising arms above the head	3	3	3	3	3	3	3	3	3	3	1	3	3	3	3
Bust Area	3	3	1	3	5	5	3	4	2	3	1	1	4	2	3
Waist Area	3	3	1	3	5	5	3	4	3	3	5	3	4	5	3
Hip Area	3	3	3	3	5	5	3	3	3	3	3	3	3	5	3
Neck and Waist	3	3	3	3	4	4	3	4	4	3	2	2	2	2	2
Bust and Waist	3	2	1	3	5	5	2	4	4	3	2	2	4	5	2

Questions 1-9 Scale
1= Extremely Tight 2= Somewhat Tight 3= Neutral 4= Mostly Loose 5= Extremely Loose

Source: (Field data, 2019)

Results from Table 12 shows that, with sitting, bending, walking, raising arms above head, waist area and hip area, the live model took a neutral stand which indicates that, the garment is neither tight nor loose. But with D3, D11 and D 12 the bust area of their garment was extremely tight for close fitted garment. Likewise, with D 5, D6, D11 and D14 the waist area of their garment was extremely loose for close fitted garment.

Table 13: Model Fit Evaluation for Loose Fitted Garment

Description	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	D11	D12	D13	D14	D15
Sitting	3	3	3	3	3	3	3	3	1	3	3	3	3	3	2
Bending	3	3	3	3	3	3	3	3	1	3	3	3	3	1	1
Walking	4	3	3	3	3	3	3	3	1	3	3	3	3	3	2
Raising arms above the head	2	3	3	1	3	3	3	2	1	2	2	3	3	2	2
Bust Area	3	3	3	4	4	3	4	3	1	2	4	2	3	3	1
Waist Area	4	3	2	3	3	3	2	3	1	3	4	3	3	3	2
Hip Area	4	3	3	3	3	3	3	3	1	3	3	3	3	3	3
Neck and Waist	3	3	3	3	3	3	3	3	1	2	4	2	3	3	2
Bust and Waist	3	3	3	4	4	3	2	3	1	2	4	2	2	3	2

Questions 1-9 Scale
1= Extremely Tight 2= Somewhat Tight 3= Neutral 4= Mostly Loose 5= Extremely Loose

Source: (Field data, 2019)

The fit evaluation in Table 13 indicates that, regarding all the descriptions, the loose fitted garments were neither extremely tight nor loose. However, garment of D9 was extremely tight for a loose fitted garment. Likewise, with bending and bust area for D14 and D15 was neutral for loose fitted garment.

Table 14: Model Fit Evaluation for Fitted Garment

Description	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	D11	D12	D13	D14	D15
Sitting	2	3	1	1	3	3	1	3	1	2	1	2	2	3	2
Bending	2	3	1	1	3	3	1	2	2	1	1	2	1	1	1
Walking	3	3	3	3	3	3	2	3	3	3	2	3	3	3	3
Raising arms above the head	2	3	1	1	2	3	1	2	1	1	1	2	1	1	3
Bust Area	3	3	1	1	4	3	4	2	1	2	2	2	2	4	1
Waist Area	4	3	2	2	5	4	3	3	4	3	4	3	4	4	3
Hip Area	2	4	1	3	4	4	1	4	4	2	4	2	5	4	4
Neck and Waist	3	3	3	2	4	3	2	2	2	2	2	2	4	2	2
Bust and Waist	1	3	1	2	4	4	2	3	2	2	4	2	5	4	2

Questions 1-9 Scale
1= Extremely Tight 2= Somewhat Tight 3= Neutral 4= Mostly Loose 5= Extremely Loose

Source: (Field data, 2019) '*D' refers to dressmaker and they were 15 in number*

The results in Table 14 reveals that, with sitting, the garment of D1, D10, D12 and D13 was somewhat tight, but was extremely tight for D3, D4, D7, D9 and D11. Regarding Bending, the garments of D3, D4, D7, D10, D11, D13, D14 and D15 were extremely tight for fitted garment. Under walking, most of the dressmakers' garments were neither tight nor loose. With raising arms above the head, majority of the dressmakers' garments were extremely tight. Also under bust area, most of the garments were somewhat tight. More so with waist area, hip area, neck and waist, bust and waist, most of the garments were somewhat tight.

Table 15: Overall Fit Garment Evaluation

	Close Fitted Garment		Loose Fitted Garment		Fitted Garment	
	Mean	Std.	Mean	Std.	Mean	Std.
Overall Fit Evaluation	3.73	1.33	3.33	1.34	4.47	1.06

1= Extremely Satisfied 2= Somewhat Satisfied 3= Neutral 4= Somewhat Dissatisfied 5= Extremely Dissatisfied

Source: (Field data, 2019)

Results from Table 15 revealed the overall fit garment evaluation of garments by the live model. The model was asked to judge the fit of each garment she wore. The evaluation revealed that, with *Close Fitted Garment* $\bar{x}$ **= 3.73** and *Loose Fitted Garments* $\bar{x}$ **= 3.33**, the model made a *Neutral* stand. That is, she was neither satisfied nor dissatisfied with both garments. However, with *Fitted Garment* $\bar{x}$ **= 4.47**, the model was dissatisfied with the garments.

Table 16: Overall Performance of Model Fit Evaluation for Each Designer

S/N	Fitted Garment	Close Fitted	Loose Fitted	Mean	Rank
D5	37	41	31	36	1st
D6	34	41	28	34	2nd
D13	32	33	31	32	3rd
D14	31	36	26	31	4th
D2	30	31	31	31	4th
D1	28	30	31	30	5th
D8	28	35	28	30	5th
D11	26	25	34	28	6th
D10	23	30	28	27	7th
D4	21	29	29	26	8th
D12	25	26	28	26	8th
D7	19	30	30	26	8th
D15	26	26	22	25	9th
D3	14	26	30	23	10th
D9	25	31	10	22	11th
Grand mean				**M= 28.58 (Sd=3.99)**	

Source: (Field data, 2019) '*D' refers to dressmaker and they were 15 in number*

Results from table 16, comparing the grand mean (M=28.58) to means of each dressmaker, it indicates that, 7 dressmakers did not perform well with the fit of garments because their mean was below the grand mean. On the other 8 of the dressmakers performed well with the fit of their garment.

Research Question 5

What are the problems identified with the fit of garment in research question four?

The purpose of this research question was to identify problems with fit of garments (close fitted, loose fitted and fitted garments) during the fit evaluation. That is, during the fit evaluation of the garments by the judges and the live model, some problems were identified with the fit of the garments. The fit evaluation of all the judges and especially the live model on all the garments revealed that, on the average, there were problems identified with the fit of most of the garments sewed by the dressmakers.

The problems identified with the fit of garments are presented in tables and pictures of the garment designs (close fitted, loose fitted and fitted garments).

Table 17: Problems Identified with Close Fitted Garments

Imbalance Strap	**Frequency**	**Percent**
Yes	8	53.3%
No	7	46.7%
Total	*15*	*100*
High Neck	**Frequency**	**Percent**
Yes	5	33.3%
No	10	66.7%
Total	*15*	*100*
Bust is Tight	**Frequency**	**Percent**
Yes	9	60%
No	6	40%
Total	*15*	*100*
Folds at the waist line	**Frequency**	**Percent**
Yes	12	80%
No	3	20%
Total	*15*	*100*
Shoulder to waist is long	**Frequency**	**Percent**
Yes	5	33.3%
No	10	66.7%
Total	*15*	*100*

Source: Field Survey, (2019)

Table 17 shows the problems identified with the close fitted garments sewed by the dressmakers. With the close fitted garment, 53% garments had *imbalance strap*, 33% had *high neck*, 60% having *tight bust*, with 80% recording *folds at the waist line.*

The images below indicate the problems identified with close fitted garments

Problems Identified with Close Fitted Garments

Figure 4: close fitted garment image 1

Source: (Field data, 2019)

The image in Figure 4 shows that, the strap fixed on the garment is not balanced and the neck line is too high.

Figure 5: Close fitted garment image 2

Source: (Field data, 2019)

The image in Figure 5 indicates that, the bust and waist is too tight. That is why the model could not close the zip.

Figure 6: Close fitted garment image 3

Source: (Field data, 2019)

From the image, folds are clearly seen at the waist line.

Table 18: Problems Identified with Loose Fitted Garments

Armhole is small	**Frequency**	**Percent**
Yes	12	80
No	3	20
Total	*15*	*100*
Tight bust	**Frequency**	**Percent**
Yes	8	53.3%
No	7	46.7%
Total	*15*	*100*
Garment is too loose	**Frequency**	**Percent**
Yes	5	33.3%
No	10	66.7%
Total	*15*	*100*
Too big armhole	**Frequency**	**Percent**
Yes	14	93.3%
No	1	6.7%
Total	*15*	*100*
Shoulder Length too long	**Frequency**	**Percent**
Yes	12	80%
No	3	20%
Total	*15*	*100*

Source: Field Survey, (2019)

Under the *Loose Fitted Garments*, the problems identified in Table 18 showed that, 80% of the garments had small armhole, 67% of the garments were too loose, with 93% having excess armhole and 80% of the garments' shoulder length was too long.

The problems identified on the loose fitted garments sewed by the dressmakers are presented in the images below.

Figure 7: Loose fitted garment image 1 (too small and tight for loose fitted garment).

Source: (Field data, 2019)

The garment in figure 7 is supposed to be a loose fitted garment. The model could not wear it because the armhole and the dress were too small.

Figure 8: Loose fitted garment image 2

Source: (Field data, 2019)

The garment in figure 8 is too loose even though it supposed to be a loose fitted garment.

Figure 9: Loose fitted garment 3

Source: (Field data, 2019)

The problem identified in the image in figure 9 is that, it has small armhole.

Figure 10: loose fitted garment image 4

Source: (Field data, 2019)

With this image, the problem with the garment is that, the shoulder length is too long.

Table 19: Problems Identified with Fitted Garments

Shoulder to waist is long	**Frequency**	**Percent**
Yes	11	73%
No	4	27%
Total	*15*	*100*
Folds at the back	**Frequency**	**Percent**
Yes	14	93%
No	1	7%
Total	*15*	*100*
The bust is tight	**Frequency**	**Percent**
Yes	15	100%
Total	*15*	*100*
Folds in the sleeve	**Frequency**	**Percent**
Yes	10	67%
No	5	33%
Total	*15*	*100*
Shoulder to shoulder too long	**Frequency**	**Percent**
Yes	11	73%
No	4	27%
Total	*15*	*100*
Folds at the hip	**Frequency**	**Percent**
Yes	11	73%
No	4	27%
Total	*15*	*100*
Hip too tight	**Frequency**	**Percent**
Yes	8	53%
No	7	47%
Total	*15*	*100*

Source: Field Survey, (2019)

The results in Table 19 revealed the problems identified with fitted garments. From the Table, the shoulder to waist of most of the garments was long, 93% and 73% of the garment have folds at the back and hip respectively, with all the busts of the garments being tight. More so, 67% of the garments have folds at the sleeve, the shoulder to shoulder of most (73%) of the garments is too long, and the hip of most of the garments is tight.

Figure 11: Fitted Garments image 1

Source: (Field data, 2019)

The problems reported in Table 16 can be identified in the garment in Figure 11. With this garment, the shoulder to waist is long, there are folds at the back, sleeve and hip. More so, the shoulder to shoulder is too long, and the hip and bust are too tight.

Research Hypothesis

Ho: There is no statistically significant relationship between the measurement procedures and fitted garment, close fitted and loose fitted garment designs for females.

$H_{1:}$ There is a statistically significant relationship between the measurement procedures and fitted garment, close fitted and loose fitted garment designs for females.

The purpose of this hypothesis was to examine the relationship between measurement procedures and the fitted garments, close fitted garments and loose

fitted garments. The hypothesis was tested using the Pearson Product Moment correlation coefficient. The results are presented in the table below.

Table 20: Relationship between Measurement Procedures and the Garment Types

		Fitted Garment	Close Fitted Garments	Loose fitted Garment
Measurement Procedures	Pearson Correlation	.463	.319	-.061
	Sig. (2-tailed)	.082	.247	.830

*. Correlation is significant at the 0.05 level (2-tailed).

Source: Field Survey, (2019)

The results in the table shows the relationship between Measurement Procedures and Fitted garment r = .463 (p = .082) Close Fitted r = .319 (p = .247) and Loose Fitted r =.-0.61 (p = .830), but they are not statistically significant because the p> 0.05. Therefore, the researcher fails to reject the null hypothesis that, there is no significant relationship between Measurement Procedures and close fitted and loose fitted garments.

Discussion

The purpose of this study was to investigate garment fit and body measurement practices used among dressmakers in the Ho municipality in the Volta region. This section discusses the findings of this study. All the participants (dressmakers) have had some level of formal education. Also, 12 out of 15 of the dressmakers received their training through apprenticeship. It is evident from the result that, some level of formal education and apprenticeship is important for dressmakers in order to gain basic knowledge on how to take measurements and make appropriate calculations for good garment fit. The dressmakers have been

working as established dressmakers for varying number of years ranging from 1-10 years, 11-20 years and 21-30 years. The result proved that, most of the dressmakers learnt freehand method of cutting hence it is the most common method used in cutting among the dressmakers. This result agrees with Forster (2009), who mentioned that, in Ghana, the main method for cutting out garment by dressmakers is the freehand method and that dressmakers who apply this method of cutting use different methods to cut the same design. Therefore, most freehand cutting dressmakers generates a method which is convenient for them to cut out a style. Similarly, Obinnim and Pongo (2015) posit that, most dressmakers in the Ho Municipality had little or no knowledge about the use of pattern in the fashion trade hence, this consequently led to the use of free hand or the direct method of cutting out.

Measurement Taking

Good measurements form the basis of a well fitted garment. No matter how good you are at stitching, if your measurements are not taken correctly there will be a difficulty in getting your garment to fit properly since the measurement determine the dimensions of the body the garment is supposed to fit. Measurements taking in sewing garments involves, wearing of appropriate garments, locating the needed points for the measurement, standing in the correct position when taking a client's measurements and using the correct tools amongst others.

The results of this study showed that most of the dressmakers use standard notebooks which come with list of measurements for recording the measurements taken of the measurements recorded in this standard book.

Measurement Procedures

The results of this study indicate the common procedures dressmakers in Ho employ in body measurements. Dressmakers mostly use standard notebook, tape measure and pen as tools for measurement. However, the researcher observed that, some of the dressmakers used old, torn, stretchy and rigid tape measures. This may affect correct body measurement because, usually, a tape measure must be flexible to facilitate appropriate body measurement. When the researcher asked why the tool was that old, some of the dressmakers exclaimed that, the most tape measures in the market are not durable so they prefer using the old one than to get a new one.

I always get new tape measure, but it either get missing or it doesn't last because the tape measures are not quality. So I prefer using the old one (D2).

According to Rudd (2001), the only tools required for taking measurements are measuring tape, pencil and paper or standard notebook. Tape measures are generally 60cm long and marked with centimeters and inches together, to help in conversion from one system to another, at a glance. The tape should be flexible but not stretchy. Pencil and paper or standard notebook are required to note down the measurements taken. Also, it was revealed from the study that, most of the dressmakers interacted with their clients while taking their clients' body measurement. Rudd (2001), posits that, in the dressmaking

profession, dressmakers are not supposed to interact with clients when taking body measurement because they are supposed to be knowledgeable about the ease and appropriate fit of the garment. Moreover, results indicated that, the dressmakers were fond of standing in front of their clients which is not the right way while taking measurement. Rudd (2001), also mentioned that, during body measurement, the dressmaker should stand to one side of the person being measured not in front. Likewise Sew Guide (2018) posit that, when taking body measurement, the person measuring should stand on the right side of the customer.

Further, majority of the dressmakers did not take the measurement according to garment design. Body measurement must always move with the type of garment design to sew to enhance the fit of the garment on the wearer. This result is evident in *figure 3*, because most of the dressmakers failed to take the body measurement according garment design, most of the close fitted garments had imbalance strap. For instance, in taking body measurement for close fitted garments, the dressmaker must measure the strap position of the person to get a balance strap. However, the researcher observed that during the body measurement, dressmakers did not take the strap position measurement of their clients which is part of garment design hence, it resulted in imbalance strap. Likewise, the loose fitted garments in *figure 7* was too loose because the body measurement was not taken according to the garment designs. With the fitted garments the dressmakers had problem with the shape of the hip because they did not measure from the waist to the hip to get the correct shape of the hip. It affects

the hip measurement of the fitted garment. Pandarum and Yu (2015) stated that, the measurements needed for garment making depends on the style of garment or garment design as well as the age and sex of the user.

Consistent body landmarks are critical to secure accurate measurements for basic garment construction development (Bye et al., 2006). This provides a predetermined order to permit greater speed in body measuring. The study revealed that, the dressmakers partially identified correct landmarks of measurement. The dressmakers were able to identify just few of the landmarks and even those they were able to identify, they failed to take the right measurement as compared to the standard measurement (see Table 5). The dressmakers, when asked why they were unable to identify the landmarks mentioned that, they had no knowledge on how to identify and measure these landmarks because they were not taught during training or apprenticeship. The identification of landmarks in garment construction can be challenging to dressmakers. This result is consistent with the work of Xia and Istook (2017) who reported that, it is a significant problem for scanners to identify land markings and manually identifying landmarks is time consuming and usually, full of error. These findings are in consensus with the work of Strydom and Klerk (2006), who revealed that land marking was identified as a problem with a number of measurements and this problem needs to be addressed, not only by the local industry but also internationally. As noted by Forster and Ampong (2012) dressmakers who do freehand cutting use fewer measurements during sewing. This assertion shows that this is how they are trained so they are not used to

identifying all landmarks used in pattern making. Probably if the role of the different landmarks is explained to dressmakers, they may see their use in getting very well-fitting clothes. Bye et. al. (2006) opined that; consistent body landmarks are critical to secure accurate measurements for basic garment construction development. Therefore, the inconsistencies in identifying the landmarks resulted in some of the problems identified with some of the garments. According to Yu (2004), structured methods of land marking and recording will help to make the measuring process more efficient, effective and improve the fit of garment.

Method of Applying Measurement to Garment

After measurements are taken, they are applied on fabric for cutting out garment. This stage is very important since it is this point that actually brings out the style and fit of the garment. The results showed that, most dressmakers marked some landmarks on fabric and added ease to the actual body measurement. In garment construction, it is important to correctly mark all landmarks on fabric before cutting to achieve accuracy. Adding ease to measurement is important because Branson and Nam, (2007) agreed in their work that, without enough wearing ease, the garment strains, wrinkles, pulls and binds uncomfortably against the body, emphasizing body contours which may not look attractive and may lead to garment fit problem. Adding of ease is different among garment designs. That is the amount of ease added to close fitted garments is different from loose fitted and fitted garments. Myers-McDevitt (2004) suggested the amount of ease to be added to garments based on garment designs. For example, he suggested that with close fitted garments ½ to 2 inches of ease should

be added to the bust, with fitted garments, 2 to 4 inches of ease should be added to the bust while 5 to 8 inches of ease should be added to the bust with loose fitted garments. Likewise, with close fitted garments ½ to 2 inches of ease should be added to the waist/ hip, 2 to 3 inches of ease should be added with fitted garments and 4 to 6 inches of ease should be added to the waist/ hip with loose fitted garments. Similarly, under armhole, 1 to 2 inches of ease should be added with close fitted, 2 to 3 inches for fitted and 4 to 5 inches for loose fitted garments. Irrespective of the above, dressmakers added less or more ease to the garments without considering adding ease according to the various landmarks such as bust, waist and hip on the garments. That is in garment construction, ease is not added to the overall garment, but rather it is added separately and accurately according to the landmarks.

Dressmakers' Knowledge on Garment Fit

On garment fit the findings indicated that, dressmakers in Ho were of the view that, to assess a good fit on how the garment look on the client around the following body areas: bust, waist, hips, armhole and sleeve; one must make sure the bust, waist, hips, armhole and sleeve are not too tight or too loose. In garment construction, with the bust, there should be enough ease to accommodate the breast, likewise the waist and the hips. The shaping of the front armhole should be deeper than the back armhole because of the breast. The dressmakers had knowledge on how garment should look on clients, however, the problems identified with some of the garment fit, showed that, despite the dressmakers' knowledge on how garment should look on client, they could not apply the right

procedures for their garments to achieve appropriate fit. The findings further revealed, dressmakers were of the view that, to produce good fit, the figure type of the customer or clients must be considered. To construct a good garment, the figure of the wearer should be considered because there are different figure types which demands varying application of body measurement during garment construction. But the researcher observed that, irrespective of the dressmakers' knowledge on how to describe good fit, they still applied the same measurement during garment construction despite the variation in garment fit.

From the study, dressmakers in Ho acknowledged that, the aspect of clothing that gives them problem most is with the shaping of armhole and shaping of garments. The dressmakers are confronted with these problems because, they do not use the correct procedure in cutting the armhole and they do not use the correct tools in shaping the hip line. In cutting the armhole the correct procedure is that, the front armhole is shaped differently from the back armhole. But the dressmakers generally shaped the armhole with equal measurement which is not the correct procedure. They also do not take waist to hip measurement to locate true hip of the client.

The dressmakers strongly acknowledge that, garment fit is an important factor in sewing for customers. This is because the dressmakers believe that, the purpose of garment construction is to achieve good fit. Therefore, the achievement of good fit gives them confidence and sense of accomplishment and also makes their clients happy and comfortable. This result confirms the statement

of Branson and Nam (2007) in their study that a well-fitting garment contributes to the confidence, comfort, performance and even safety of the wearer.

In summary, dressmakers acknowledged that to assess good fit, garment sewn must be comfortable with ease to allow free movement. Dressmakers' fit also depended on the figure type and shaping to fit the wearer. Good fit was an important factor in sewing because it brings satisfaction to both client and the dressmaker. These results confirm findings of Jevsnik, Kalaoglu, Eryuruk, Bizjak, and Stjepanovic (2015) that, garment fit on a body model is an essential factor for designing comfortable, functional and well-fitting garment.

Fit Evaluation

A good measurement and good construction of a garment comes to naught if the garment does not fit properly. The fit evaluation of all the garments by the expert judges revealed that, among the garment designs, dressmakers were good with fitted garment, because probably, it is a common design and they are familiar with the cutting process and its construction. However, with loose fitted garments, the dressmakers were not too good with it, because, they did not know the right amount of ease to add. Since they see the garment as loose, they just add any amount of ease to the garment making too loose or less loose. Likewise, with close fitted garments, they had challenges with it. In the cutting process of close fitted garments, one must be skilful because the garment must be cut to fit the contours of the body using the darts. During the observation, the researcher identified that, dressmakers could not appropriately apply the dart to accommodate the bust to achieve good fit. This result is consistent with the

findings of Alexander (2000) who studied 223 American women on body sizes and garment fit and concluded that, after garment fit evaluation, about 50% of the women expressed dissatisfaction with fit at the bust, waist, hip, dress length, and pant length. This result is also supported by the study conducted by McRoberts (2005) who recorded that, the live fit model's evaluations of the voluntary product standard PS 42-70 petite pattern muslin proof and the corrected prototypical petite pattern muslin proof were inconclusive. However, she attributed the inconclusiveness to the limited number of fit models which may have contributed to a lack of conclusive data.

The relationship between measurement procedures and the garment designs was not statistically significant. In other words, there was no statistically significant relationship between measurement procedures and fitted garments, close fitted garments and loose fitted garments. The result is congruent with the statement of Evidhya (2019) that, garment fit is the relationship between the size and contour of garment and those of the human body. Therefore, body measurement is crucial in garment construction because no two bodies are similar, and sometimes even the left and right halves of the same body are not mirror images of each other, so the right measurement is the first step to achieving the right garment fit.

Problems Identified with Garment Fit

In the light of the judges and the live model's judgments on the garment sewed by the dressmakers, some common problems were identified on most of the garments. The common problems identified with the close fitted garments was

that; the strap fixed on the garments was not balanced because probably, the dressmakers were not careful when taking the measurement and fixing the strap. Also, some of the problems with close fitted garments were that, the neck line was too high, the bust and waist were too tight, and there were folds at the waist line of the garments. All these problems could be that, the dressmakers were not too skilful in cutting and constructing close fitted garment. Regarding the loose fitted garments, the common problems identified were that, the armhole and dress was too small for loose fitted garment, some were too loose, there was excess armhole and the shoulder length of the garments was too long. These problems could be attributed to the fact that, the dressmakers did not carefully apply the correct amount of ease to the garments and the shaping of armhole as well. With the fitted garments, the shoulder to waist was long, there were folds at the back, sleeve and hip. More so, the shoulder to shoulder was too long, and the hip and bust were too tight. Consequently, these problems identified with the fitted garments could probably be that, the dressmakers did not accurately identify the landmarks during the taking of body measurement. These findings confirm the argument of Strydom and Klerk (2006) that the lack of consensus concerning body measurements is probably the cause of most of the problems that are being experienced with the garment designs.

In conclusion, good fit is central to customer satisfaction. A well fitted garment is a garment that hangs smoothly and evenly on the body, with no pulls or distortion of the fabric, straight seams, pleasing proportions, no gaping, no constriction of the body, and adequate ease for movement (Evidhya, 2019).

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

Garment fit is one of the critical characteristics in garment production besides the design, quality of the fabric used and end-user evaluation. In garment production or design, dressmakers must be knowledgeable and skilful in anthropometric practices such as measurement procedures, identification of correct landmarks based on garment design, method of pattern drawing and method of cutting to achieve good fit of garment. However, studies conducted have revealed that, dressmakers experience challenges with the application of appropriate practices to achieve garment fit. According to Obinnim and Pongo (2015), learning how to take body measurement and taking body measurement is a challenge among dressmakers in the Ho Municipality. This might probably be the cause of dressmakers having issues with fit, and fabric wasting which has implications for efficient and effective productivity. However, regardless of the challenges experienced by dressmakers in garment production, probably anthropometric practices among dressmaker is rare in the context of where this current study is situated. Hence, the researcher was motivated to conduct a research on the influence of body measurement practices and fit of garment among dressmakers using the Ho municipality in the Volta region as a case study.

Summary of the Study

The purpose of this study was to investigate garment fit and body measurement practices used among dressmakers in the Ho municipality in the Volta region. Specifically, the study sought to; determine the body measurement

procedures of dressmakers, assess dressmaker's method of applying measurements in garment construction, assess dressmaker's knowledge on garment fit, evaluate fit of garment on a live model, to investigate fit problems with body measurement taken by dressmakers. It also sought to examine the relationship between measurement procedures and the garment designs (fitted, close fitted and loose fitted garments). Through purposive non-probability sampling technique, 15 female dressmakers who are registered members of the Ghana National Dressmakers and Tailors Association in the Ho municipality and sew only female garments were selected for the study. The study employed fit evaluation index, semi-structured interview guide and observation checklist/guide instruments to collect data. Descriptive statistics such as frequencies and percentage, mean and standard deviation, Pearson Product Correlation Coefficient and thematic analysis was employed to analyse the research data.

Key Findings

Based on the results of the study, the following findings were identified. It was revealed that, the dressmakers learnt freehand cutting other than pattern cutting hence freehand cutting is the common method the dressmakers use in cutting fabrics. Dressmakers mostly use standard notebook, tape measure and pen as tools for body measurement. However, it was revealed that, most of their tape measures were old, rigid and stretchy.

During body measurement, dressmakers interacted with their clients even though they were not supposed to. Similarly, the most of the dressmakers, were found standing in front of their client during body measurement instead of

standing beside. From the result, the dressmakers did not take body measurement according to garment design. Most of the dressmakers partially identified the correct landmarks but even with the correctly identified landmarks the measurements were either below or above the standard. The result also revealed that, dressmakers were not able to identify all the correct landmarks according to garment design because they were not taught or trained during apprenticeship.

In terms of dressmakers' method of applying measurement in garment construction, the dressmakers generally preferred marking some of the landmarks on the fabric and added ease to the actual body measurement. The study also indicated that, the dressmakers added seam allowance to the actual measurement before applying to the fabric and style line, dart position was marked before cutting.

Dressmakers reported that, to assess good fit, you must make sure the bust, waist, hips, armhole and sleeve are not too tight or too loose. Also they mentioned that, to describe good fit, the figure type of the customer or clients must be considered. The dressmakers stated that, they normally have problem with the shaping of the armhole and shaping of fitted dress. The findings further indicated that, dressmakers mentioned they strongly believe fit is an important factor in garment construction because when the garment fit the customer, it makes the dressmaker feel comfortable and happy, likewise the customer or client.

On the issue of fit evaluation, the result showed that, most of the garments sewed by the dressmakers based on the garment designs (close fitted, fitted and loose fitted garments) were neither good nor bad. In other words, the evaluation of the judges and the live model on the garments sewed by the dressmakers was inconclusive. This implies that, under normal condition, the client would have given the garment back to the dressmaker to effect some few changes to achieve appropriate fit.

In the light of the problems identified with the garments, the result revealed some common problems associated with the various garment designs. With close fitted garments, the result showed that the strap fixed on the garments was not balanced, the neck line was too high, the bust and waist were too tight, and there were folds at the waist line of the garments. The armhole and dress was too small for loose fitted garment, some were too loose, there was excess armhole and the shoulder length of the garments was too long. These were some of the common problems identified with loose fitted garments. With the fitted garments, the shoulder to waist was long, there were folds at the back, sleeve and hip. More so, the shoulder to shoulder was too long, and the hip and bust were too tight.

Conclusion

The study conducted is the first attempt to examine influence of anthropometric practices in garment production and how it influences garment fit in the Ho Municipality. Garment fit is the relationship between the human body, size and contour of garment. In garment construction, anthropometric practices must be well applied in order to achieve a well fitted garment. However, it is

evident in this study that, dressmakers did not effectively apply anthropometric practices to achieve good fit of garment, hence the inconclusive fit evaluation of the garments sewed. Dressmakers applied one measurement procedure for all the garment designs. In garment construction, measurement must be taken according to garment design; the measurement taken for close fitted garment cannot be applied for loose fitted garments. Dressmakers must be consistent in identifying and taking correct landmarks. Correct identification of landmarks is critical to secure accurate measurements for basic garment construction development to achieve garment fit. From the study, dressmakers acknowledged that shaping of armhole and shaping of fitted garments are the problems they mostly experience in garment construction. In the light of the problems dressmakers encounter in garment production to achieve good fit, they understand good fit is an important factor in garment construction because accomplishing garment fit makes both the dressmaker and the client comfortable and confident.

Recommendations

Based on the findings of the study the following recommendations were made;

1. In garment production, measurement procedures are the basic important elements that must be correctly done to enable good fit of garment. Therefore, proper and accurate measurement procedures must be emphasized during dressmakers' workshops and seminars. Dressmakers must be educated by their association and any other clothing institution to take body measurement according to garment design. Likewise, "madams

and masters" must train their apprentices to identify the appropriate measurement procedures.

2. Fit of garment, cannot be achieved without correct identification and measurement of landmarks. Land marking is directly connected to the parts of the human body, therefore if it is not well identified and measured, it may lead to problems associated with garment fit. Dressmakers must be trained on how to identify landmarks during workshops and training seminars by presenting a chart or a diagram of the anatomy of the human body with landmarks well labelled around the parts.
3. To address the problems dressmakers acknowledge they normally have with garment production which is shaping of armhole and shaping of fitted garments; it is recommended that, during garment production, the cutting of armhole must not be assumed as equal but rather must be cut separately. Thus, the front is deeper than the back because of the breast. Likewise with shaping of fitted garments, dressmakers must measure waist to hip and apply skirt curve to shape the waist to hip. In applying skirt curve, a quarter measurement should be folded and traced to get it even on both sides.

Suggestions for further Studies

The following further studies are suggested based on the outcome of the study.

1. A comparative study can be conducted to examine the influence of body measurement practices on garment fit among formal and informal sector dressmakers.
2. A study can be carried out to investigate the garment fit with male garments.
3. Fabric performance and garment fit can also be carried out.
4. A study can be conducted to examine fit satisfaction among clients with dresses made by dressmakers.

REFERENCES

Adu-Boakye, S. (2012). *Development of a conceptual framework relating to ready-to-wear clothing for Ghanaian women for manufacturing strategies*. Unpublished doctoral thesis, Manchester Metropolitan University.

Agbo, C. W. (2006). *Establishment of average body measurement and drafiting of basic block patterns for male pre-school children in Enugu State*. Unpublished master's thesis, University of Nigeria.

Aldrich, W. (2008). *Metric pattern cutting for women's wear*. London: Blackwell Science Ltd.

Alexander, M. (2000). *Understanding the fit preferences of young female consumers through body cathexis, clothing benefits sought and demographics based on different body shapes.* Auburn University: Thesis, Auburn University Libraries RBD, Interlibrary Loan, Louisiana State University Library.

Alexander, M., Connell, L. J., & Presley, A. B. (2005). Clothing fit preferences of young female adult consumers. *International Journal of Clothing Science and Technology, 17*(1), 52-64.

Amaden-Crawford, C. (1996). *The art of fashion draping* (2nd ed.). New York: Fairchild Publications.

Anderson, L. J., Brannon, E. L., Ulrich, A. B., Jenkins, Early, J., Grasso, M., & Gray, S. (2000). Understanding fitting preferences of female consumers: Development an expert system to enhance accurate sizing selection. *Clothing and Textiles Research Journal, 14*(2), 121-132.

Armstrong, J. H. (2010). *Patternmaking for fashion designers*. New Jersey: Pearson Education Inc.

Asare, D. A. (2015). *Assessment of dressmakers' knowledge base on darts and their application in garment designing in the Central Region (Doctoral dissertation, University of Cape Coast).* Retrieved from https://scholar.google.com/scholar_url?url=http://erl.ucc.edu.gh/dspace/handle/123456789/3082&hl=en&sa=T&oi=gsb&ct=res&cd=0&d=7966524486605358651&ei=WMxBXe6_FMK-mwG3uYewAg&scisig=AAGBfm2yY3gCqfXCvWgAPCvSKshDPR2DXg

Ashdown, S. P. (2014). Creation of ready-made clothing: the development and future of sizing systems. Editor (s): Marie-Eve Faust, Serge Carrier, *In Designing Apparel for Consumers* (pp. 17-34). Woodhead Publishing.

Ashdown, S. P., & E. O' connell. (2006). Comparison of test protocols for judging the fit of mature women's apparel. *Clothing and Textiles Research Journal, 24*(2) 137-146.

Ashdown, S. P., & M. Delong. (1995). Perception testing of apparel ease variation. *Applied Ergonomics, 26*(1),47-54.

Ashdown, S. P., S., Loker, K., Schoenfelder, S., & Lyman-Clarke, L. (2004). Using 3D scans for fit analysis. *Journal of Textile and Apparel, Technology and Management, 4*(1), 1-12.

Ashdown, S., & Loker, S. (2010). Mass-customized target market sizing: Extending the sizing paradigm for improved apparel fit. Fashion Practice, *2*(2), 147-173.

Ashdown, S.P. (2002). Sizing systems. Retrieved from http:// www.human.cornell.edu/txa/faculty/SizingSystems

Babbie, E., & Mouton, J. (2007). *The practice of social research* (7th ed.). Cape Town: Oxford University Press.

Bari, S. B., Salleh, N. M., Sulaiman, N., & Othman, M. (2015). Development of clothing size for pre-school children based on anthropometric measurements. *Australian Journal of Sustainable Business and Society*, *1*(2), 54-67.

Betzina, S. (2001). *Fast fit*: *Easy pattern alterations for every figure*. Newton, CT.: Jim Childs.

Branson, D., & Nam, J. (2007). *Materials and sizing in clothing: Developing effective sizing systems for ready-to-wear clothing.* England: Woodhead Publishing Limited.

Buckner, K. E. (2011). *Fit satisfaction of crocheted apparel*. Unpublished master's thesis, University of Minnesota.

Bye, E., Labat, K. L., & Delong, M, R. (2006). Analysis of body measurement systems for apparel. *Clothing and Textiles Research Journal*, 66-79.

Check J., Schutt R. K. (2012). *Survey research*. Thousand Oaks, C.A: Sage Publications.

Chen, C. M. (2007). Fit evaluation within the made-to-measure process. *International Journal of Clothing Science and Technology, 19*(2), 131-144.

Cheruiyot, M. (2008). *Assessment of size and fit of ready-made formal clothing among male consumers: A case of Kenyatta University*. Unpublished master's thesis, Kenyatta University.

Chin, C. M. (2007). Fit evaluation within the made-to-measure process. *International Journal of Clothing Science and Technology, 19*(2), 131-144.

Coury, N. L. (2015). *Consumer perceptions of apparel fit satisfaction and sizing based upon 3d body scanning and block garment assessment*. Unpublished master's thesis, University of Arkansas.

Daanen, H., & Reffeltrath, P. A. (2007). *Function, fit and sizing*. *Sizing in clothing: developing effective sizing systems for ready-to-wear clothing.* London: Woodhead Publishing Limited.

Das, A., & Alagirusamy, R. (2010). *Science in clothing comfort*. New Delhi: Woodhead Publishing Ltd.

Evidhya (2019). Garment fit. *White Pencil*. Retrieved from https://www.evidhya.com/tutorials/tutorials.php?qid=771

Forster, P. (2009). *Freehand cutting made easy* (2nd ed.). Accra: Midland Press Ltd.

Forster, P., & Ampong, I. (2012). Pattern cutting skills in small scale garment industries and teacher education universities in Ghana. *International Journal of Vocational and Technical Education, 4*(2), 14-24.

Fraenkel, J. R., & Wallen, N. E. (2009). *The nature of qualitative research: How to design and evaluate research in education* (7th ed.). Boston: McGraw-Hill.

Grove, S. K., Burns, N., & Gray, J. (2012). The practice of nursing research: Appraisal, synthesis, and generation of evidence. Elsevier Health Sciences.

Gupta, D., & Zakaria, N. (2014). *Anthropometry, apparel sizing and design*. New York: Woodhead Publishing.

Hamon, J. (2007) *The New Zealand dressmaker: Experiences, practices and contribution to fashionability, 1940 to 1980*. Unpublished doctoral thesis, RMIT University, Australia.

Henn, M., Weinstein, M., & Foard, N. (2009). *A critical introduction to social research* (2nd ed.). Los Angeles: Sage.

Hunter, L., & Fan, J. (2015). *Improving the comfort of garments*. In Textiles and Fashion (pp. 739-761). Woodhead Publishing.

Jevšnik, S., Kalaoğlu, F., Eryuruk, S. H., Bizjak, M., & Stjepanovič, Z. (2015). Evaluation of a garment fit model using AHP. *Fibres and Textiles in Eastern Europe, 2*(110), 116-122.

Kadolph, S. J., & Marcketti, S. M. (2016). *Textiles* (12th ed.). Boston: Pearson.

Kaiser, S. B. (1998). *The social psychology of clothing: symbolic appearances in context* (2nd ed.). New York: Fairchild.

Kasambala, J., Kempen, E., & Pandarum, R. (2015). *Determining female consumers' perceptions of garment fit, personal values and emotions when considering garment sizing*. Unpublished master's thesis, University of South Africa, Florida, South Africa.

Kinley, T. R. (2010). Fit and shopping preferences by clothing benefits sought. Journal of Fashion Marketing and Management: *An International Journal, 14*(3), 397-411.

Kombo, D. K., & Tromp, D. L. A. (2006). *Proposal and thesis writing*. Nairobi: Pauline Publications.

Kruger, D. J., De Vos, A. S., Fouchĕ, C. B., & Venter, L. (2007). *Quantitative data analysis and interpretation*. Pretoria: Van Schaik.

Laitala, K., I., Klepp, G., & Hauge, B. (2011). Materialized ideals: sizes and beauty. *Journal of Current Cultural Research, 3*(8), 19-41.

Leedy, P. D., & Ormrod, J. E. (2010). *Practical research: Planning and design*. New York: Prentice Hall.

Lim, H-W., & Cassidy, C. (2017). A comparative study of trouser pattern making methods. *Journal of Textile Engineering and Fashion Technology, 1*(5), 1-9.

Lin Y., & Wang, M. (2012). Constructing 3D human model from front and side images. *Expert Systems with Applications, 39*(5), 5012-5018.

Lin, W. (2014). Determination of distance ease at crotch curve for customized jeans. Unpublished master's thesis, University of Texas.

Mason, A. M., De Klerk, H. M., Sommervile, J., & Ashdown, S. P. (2008). Consumers' knowledge on sizing and fit issues: a solution to successful apparel selection in developing countries. *International journal of consumer studies, 32*(3), 276-284.

Mbhenyane, C. M. (2004). *Body measurements for use in pattern and apparel construction of black children in the North-West province aged 10-14 years: A comparison with the measurements used by the industry*. Unpublished master's thesis, North-West University.

McRoberts, L. B. (2005). *Petite women: Fit and body shape analysis*. Unpublished master's thesis, Louisiana State University.

Meunier P., & Yin S. (2000). Performance of a 2D image-based anthropometric measurement and clothing sizing system. *Applied Ergonomics, 31*(5), 445-451.

Mislery, R (2004). Can there be reliability without reliability*? Journal of Educational and Behavioural Statistics, 2*(9), 241-244.

Mouton, J. (2002). *Understanding social research* (3rd ed.). Pretoria: Van Schaik.

Myers-Mcdevitt, P. J. (2004). *Complete guide to size specification and technical design.* New York: Fairchild.

Neuman, W. L. (2007). *Social research methods: Qualitative and quantitative approaches* (7th ed.). England: Pearson Education Limited.

Nkambule, M. T. (2010). *Apparel sizing and fit preferences and problems of plus-size Swazi working women.* Unpublished master's thesis, University of Pretoria.

Obinnim, E., & Pongo, N. A. (2015). The significance of flat pattern making in fashion designing: A case study of dressmakers in the Ho Municipality of Ghana. *International Journal of Innovative Research in Science, Engineering and Technology*, *4*(5), 1850-1857.

Olaru S., Spânachi E., Filipescu E., & Salistean, A. (2014). Virtual fitting: Innovative technology for customize clothing design. *Procedia Engineering*, *69*(12), 555-564.

Orodho, A. J. (2003). *Essentials of education and social science research methods.* Nairobi: Masola Publishers.

Otieno, R., C., Harrow, K., & Lea-Greenwood, G. (2005). The unhappy shopper, a retail experience: Exploring fashion, fit and affordability. *International Journal of Retail and Distribution Management*, *33*(4), 298-309.

Oxford Dictionary (2008). London: Dorling Kindersley Limited and Oxford University Press.

Pandarum, R., & Yu, W. (2015). Garment sizing and fit. *Garment Manufacturing Technology*, *8*(2), 187-204.

Petrova, A. (2007). Creating sizing systems. Sizing in clothing: Developing effective sizing systems for ready-to-wear clothing, 57-87.

Pisut, G., & Connell, L. J. (2007). Fit preferences of female consumers in the USA. *Journal of Fashion Marketing and Management*, *11*(3),366-379.

Podbevsek, T. (2014). For a good fitted skirt, the waist-to-hip distance should be measured. *Anthropological Notebooks, 20*(2), 77–88.

Polit, D. F., & Beck, C. T. (2004). *Nursing research: Principles and methods*. Lippincott Williams & Wilkins.

Quartey, P. (2007). *Textiles and clothing industry in Ghana*. Retrieved from Library.fes.de/pdf-files/iez/03796/10ghana.pdf

Rasband, J. A., & Liechty, E. L. G. (2006). *Fabulous fit* (2nd ed.) New York: Fairchild Publications.

Rudd, D. (2001). The importance of good measurements on industrial manufacturing efficiency and profit. *Quality in Chemical Measurements, 2*(2), 11-22.

Sarpong, G. D., Howard, E. K., & Osei-Ntiri, K. (2011). Globalization of the fashion industry and its effects on Ghanaian independent fashion designers. *Journal of Science and Technology (Ghana), 31*(3), 97-106.

Saunders, M. N., Lewis, P., & Thornhill, A. (2003). *Research methods for business students* (3rd ed.). Harlow, England: Prentice Hall.

Shapiu, T., Shehi, E., & Piperi, E. (2005). Anthropometric studies: advanced 3d method for taking anthropometric data in Albania. *International Journal of Innovative Research in Science, Engineering and Technology, 4*(4), 2136- 2142.

Shin, E. (2013). *Exploring consumers' fit perceptions and satisfaction with apparel fit in general*. Unpublished master's thesis, Iowa State University.

Simmons, K., & Istook, C. L. (2015). Body measurement techniques comparing 3d body-scanning and anthropometric methods for apparel applications. *Journal of Fashion Marketing and Management, 7*(3), 306-332.

Simmons, K., Istook, C. L., & Devarajan, P. (2004). Female figure identification technique (FFIT) for apparel. Part I: Describing female shapes. Journal of Textile and Apparel, Technology and Management, *4*(1), 1-16.

Simmons., E. M., & Istook, K. (2015). A study of scan garment accuracy and reliability. *The Journal of the Textile Institute*, *106*(8), 853-861.

Sindicich, D., & Black, C. (2011). An assessment of fit and sizing of men's business clothing. *Journal of Fashion Marketing and Management: An International Journal*, *15*(4), 446-463.

Singh, A., & Nijhar, K. (2015). Garment costing. *Garment Manufacturing Technology*, *1*(7), 447-467.

Spahiu, T., Shehi, E., & Piperi, E. (2015). Anthropometric studies: Advanced 3D method for taking anthropometric data in Albania. *International Journal of Innovative Research in Science, Engineering and Technology*, *4*(4), 2136-2142.

Stamper, A. A., Sharp, S. H., & Donnell, L. B. (2005). *Evaluating apparel quality* (2nd ed.) New York: Fairchild Fashion Group.

Strydom, M., & de Klerk, H. M. (2006). The South African clothing industry: Problems experienced with body measurements. *Journal of Consumer Sciences*, *34*(1), 80-89.

Tsakalidou, M. (2017). Analysing anthropometric measurement and body shape data to incorporate body asymmetry, due to scoliosis, into improved clothing sizing systems fashion practice. *The Journal of Design, Creative Process & the Fashion Industry, 3*, 398-423.

Tseng, M. M., & Piller, T. F (2003). *The customer centric enterprise: Advances in mass customization and personalization*. New York: Springer-Verlag, Berlin Heidelberg.

Winter, M. (2002). Fitting research for undergraduates. *Cornell Human Ecology*, *30*(2), 12-15.

Workman, J. E. (2016). Body measurement specifications for fit models as a factor in clothing size variation. *International Journal of Innovative Research in Science, Engineering and Technology, 1*(4), 136-142.

Xia, S., & Istook, C. (2017). A method to create body sizing systems. *Clothing and Textiles Research Journal, 35*(4), 35-248.

Yu, W. (2004). *Subjective assessment of clothing fit*. *Clothing Appearance and Fit: Science and Technology*. London: Woodhead Publishing Limited.

Zhang J., Innami N., Kim, K., & Takatera M. (2015). Upper garment 3D modeling for pattern making. *International Journal of Clothing Science and Technology*, *27*(6), 852-869.

APPENDICES

APPENDIX A

UNIVERSITY OF CAPE COAST

COLLEGE OF EDUCATION STUDIES

DEPARTMENT OF VOCATIONAL AND TECHNICAL EDUCATION

This interview schedule is designed for academic purpose only as part of the requirements for the award of Master of Philosophy Degree in the University of Cape Coast. The research topic is "The Influence of Body Measurement Practices On Garment Fit Among Dressmakers in The Ho Municipality". Your candid and objective response is highly needed. I would like to assure you that any information provided would be treated with the strictest confidentiality and anonymity.

Interview schedule for Respondents' Demographic Data

1.Number of years in the sewing business……

2. Age…….

3. Educational level……

4. Type of skill training received……..

5. Method of cutting learnt……

6. Method of cutting used……

Objective One: Determine the body measurement procedures of dressmakers in the Ho municipality Observation Guide for Body Measurements

Measurement format used

……

Tools and materials

…….....

Attire for measurement taking

……

Interactions with clients' whiletaking body measurement

……

Standing position of clients and designer

……

Taking body measurement according to the garment design

……

Correct identification of landmarks

……

Observation Checklist for Number of Landmarks Measured

NUMBER OF LANDMARKS MEASURED

Parts of the body	**Measurement (inches)**
Bodice Measurements	
Neck	
Shoulder	
Shoulder width/back width	
High Chest Measurement	
Bust	
Waist	
High Hip	
Armscye/Armhole	
Front waist length	
Shoulder to bust	
Distance between bust points	
Back waist length	
Front neck depth	
Front neck depth	
Sleeve Measurements	
Upper arm	
Lower arm	
Elbow	
Wrist	
Sleeve length	

Skirt Measurements	
Waist to hip	
Skirt length	
Pant Measurements	
Pant length	
Inseam	
Leg circumference a. Thigh b. Knee c. Calf d. Ankle	
Crotch depth	
Crotch length	

APPENDIX B

UNIVERSITY OF CAPE COAST

COLLEGE OF EDUCATION STUDIES

DEPARTMENT OF VOCATIONAL AND TECHNICAL EDUCATION

This observation guide is designed for academic purpose only as part of the requirements for the award of Master of Philosophy Degree in the University of Cape Coast. The research topic is "The Influence of Body Measurement Practices on Garment Fit among Dressmakers in The Ho Municipality". Your candid and objective response is highly needed. I would like to assure you that any information provided would be treated with the strictest confidentiality and anonymity.

Objective Two: Assess dressmaker's method of applying measurements in garment construction

Observation guide for application of body measurement for garment construction.

Cutting method and tools

……

Units of measures

……

Marking of landmarks on fabric

……

Adding of ease

……

Method of applying vertical, horizontal and circumference measurement

……

Marking of design and dart position

……

Shoulder, seam, Side seam, Zipper and opening

……

Hem allowance

……

INTERVIEW GUIDE

Objective Three: Assess dressmakers' knowledge on garment based on their criteria of fit

1. What is good fit in clothing to you?

What kind of criteria tell you that fit is good in garment?

2. What is bad fit in clothing to you?

What kind of criteria tell you that fit is bad in apparel?

3. In general, what are your experiences with apparel fit?

Bad or good? Please give some examples as to why?

4. When you sew, what aspects of clothing give you the most problem with fit?

5. Is fit an important factor to you when sewing for a client?

Why or why not?

APPENDIX C

UNIVERSITY OF CAPE COAST

COLLEGE OF EDUCATION STUDIES

DEPARTMENT OF VOCATIONAL AND TECHNICAL EDUCATION

QUESTIONNAIRE FOR JUDGES

This questionnaire is designed for academic purpose only as part of the requirements for the award of Master of Philosophy Degree in the University of Cape Coast. The research topic is "The Influence of Body Measurement Practices On Garment Fit Among Dressmakers in The Ho Municipality". Your candid and objective response is highly needed. I would like to assure you that any information provided would be treated with the strictest confidentiality and anonymity.

Objective Four: Evaluate fit of garment on live model

JUDGE FIT EVALUATION

A. Prototype A B C D E F (circle the prototype label)	Yes	No
1. Vertical grainlines hang straight and perpendicular to the floor	1	2
2. Side seams hang straight and perpendicular to the floor.	1	2
3. Cross grains are parallel to the ground	1	2
4. The garment hemline is even and parallel to the floor.	1	2
5. The garment hangs freely without any pulling or twisting.	1	2
6. The overall look of the garment is neat and pressed	1	2
7. Darts point to and end one inch before fullest part of the bust	1	2
8. The garment has no vertical or horizontal wrinkles.	1	2
9. The center back closure meets without any pulling or gapping.	1	2
10. Appropriate length between the neckline and waistline	1	2
11. Appropriate length between the waistline and hipline	1	2
B. Appropriate amount of ease across the		
12. Bustline	1	2

13. Waistline	1	2
14. Hipline	1	2
C. Appropriate placement of the:		
15. Bustline	1	2
16. Waistline	1	2
17. Hipline	1	2
18. Neckline	1	2
19. Capline	1	2

MODEL FIT EVALUATION INDEX

Prototype: A B C D E F (circle the prototype label)

Please circle the most appropriate response based on the corresponding scale.

1	2	3	4	5
Extremely Tight	Somewhat Tight	Neutral	Mostly Loose	Extremely Loose

A. Describe the fit of the garment while:

1. Sitting	1	2	3	4	5
2. Bending	1	2	3	4	5
3. Walking	1	2	3	4	5
4. Arms are raised above the head	1	2	3	4	5
B. Describe the fit of the garment across the:					
5. Bust area	1	2	3	4	5
6. Waist area	1	2	3	4	5
7. Hip area	1	2	3	4	5
C. Describe the fit of the garment in the area between:					
8. The neck and the waist	1	2	3	4	5
9. The waist and the hip	1	2	3	4	5

1 Extremely Satisfied	2 Somewhat Satisfied	3 Neutral	4 Somewhat Dissatisfied	5 Extremely Dissatisfied

D. Garment fit satisfied and dissatisfied

10. Overall, how satisfied are you with the fit of the garment?	1	2	3	4	5