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The Tactile Sense as a Correlate to Effective Mobility of Persons with Visual Impairment in the North West South West and West Regions of Cameroon

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Background

Visual impairment is a condition where the retina or the visual centre in the inner brain does not function normally and therefore cannot transmit light stimuli to the brain (Avoke 2004). The Centers for Disease Control and Prevention (CDC) (2014), postulated that; visual impairment is the functional limitation of the eyes or the vision system which could be manifested through: loss of visual acuity and inability of the person to see objects as clearly as a healthy person; loss of visual field - inability of an individual to see as wide as possible an area like the average person without moving the eyes or turning the head. From an educational perspective , , visual impairment is a condition whereby the vision of one is limited to such an extent that his/her effectiveness in coping maximally with normal classroom teaching and learning is adversely affected. This therefore, calls for accommodation or adaptation and modification for optimal community and classroom functioning (Jurmang, 2016; Pierangelo and Giuliani, 2007).

Persons with visual impairments depend largely on their tactile sense amongst other senses which Bledsoe (1980) referred to as Compensatory Sensorial Channels which are used as an alternative to gather information from the environment. When vision loss goes undetected, children are at risk of delay in developing a wide range of skills. While sighted children can do virtually all the activities and tasks that people take for granted, children with visual impairments often need to learn to do them in a different way or using different tools or Materials (Stone and McCall, 1980).

Without efficient skills in orientation and mobility, an individual with visual impairment's access to and interaction with the world can be limited to an arm's length (Ozoji, 2007). Orientation of persons with visual impairments has traditionally been defined as the process of using the remaining senses to establish one's position and relationship to other objects in the environment, whereas their mobility refers to the capacity, readiness, and ability to move about in the environment (Ozoji, 2007). However, their mobility from one place to another had remain a burden to them and many people whom they depend on for safe movement in the community. It is clear at this juncture that person with visual impairments in Cameroon need proper skills and knowledge on orientation using their tactile sense for effective mobility in order to contribute efficiently to country's emergence by 2035. This emergence philosophy is the concern of all citizens irrespective of their disabilities. Following the justification of the paper, the statement of the problem and objective, the concept of tactile sense and related theories were reviewed with relevant data collected and analysed.

Regardless of setting, persons with visual impairments share one common characteristic of a visual restriction of sufficient severity that it interferes with normal movement progress either in a regular educational environment or in the community (Nsagha,2018). The level of severity has important implications for the degree of adaptation or modification a student requires. In general, a child with

low vision can usually be educated to some extent through his or her visual sense, whereas a child who is completely blind must be educated exclusively through tactile and other sensory channels, thus children and youth with visual impairments may receive a range of special education services, including training in orientation and mobility (Jaekle,1993).

Orientation and Mobility (O&M) training helps a person with visual impairment to know where he or she is in space and where he or she wants to go and how to carry out a plan to get there. It is among the related services provided to eligible students as part of their individual education programmes(IEP), with their focus being determined on the basis of an evaluation of the child by an orientation and mobility specialist (Menssa, 1993). Since children exhibit a range of visual functioning, orientation and mobility instruction encompass a range of content. Wall-Emerson and Corn (2006) found that experts differed regarding essential orientation and mobility skills for students with low vision compared with those for students who are blind but the truth is that all have mobility difficulties.

The key feature of orientation and mobility training is that it involves human beings of all ages with visual impairments. Also, it takes place in natural environments, both inside and outside the school context (Allison and Sanspree, 2006; Pierangelo and Giuliani 2004; Smith and Levack, 1996). Mobility specialists typically place students in a real-world context and give them practical and age-appropriate problems to solve. For example younger students with visual impairments may be asked to find their way to and around their school building, whereas older students may be taught to access community services, shop, arrange for and use public transportation, and find their way around their neighborhoods and business areas. Acquiring these fundamental and enabling life skills like the acquisition of academic and social skills, is of great importance to the social and economic independence of visually impaired persons (U.S. Department of Education, 2000).

Blindness, referring to the absence of usable vision, is often used to describe individuals who may be able to perceive light or images, but are not able to use residual vision for functional purposes (Maberley et al, 2006). Although a universally accepted definition does not exist, the term blindness is used for complete or nearly complete vision loss. Visual impairment or blindness may cause people difficulties with normal daily activities such as driving, reading, socializing, schooling and walking (Jeakle, 1993). Hazekamp and Huebner (1989), opined that the ability to understand, interact with, and move within one's physical and spatial environment is a fundamental developmental skill that impacts the development of all other learning domains. In the same manner, Landsberg (2005) postulated that visual impairment could influence not only learners' learning but also their physical and motor development, perceptual, language and cognitive development, and social and emotional development. The child with visual impairment must, throughout infancy and childhood, learn to interpret that which is viewed and to organize it in relation to itself and other objects in the environment. Therefore, the child's psychosomatic maturity influences all visual phenomena, because the visual cues do not automatically report to the child the position he occupies in space, but the visual mechanism undergoes changes which serve to reorient the ever changing and growing individual hence, difficulty understanding the relationship between orientation and mobility (Gesell, Ilg, and Bullis, 1949).

In similar thought, Gray in 2005 held that there exist a correlation between visual impairment and child development. He then believed that in order to access the environments and to acquire the skills necessary for efficient and safe movement, persons with visual impairments often require specific competencies such as knowledge of basic body concepts, orientation and safety, independent travel within and to various familiar and unfamiliar environments both indoors and outdoors. Orientation and mobility specialists in the United States of America for example, either state-endorsed or nationally certified, are permitted to provide orientation and mobility services to PWVI (Jeakle, 1993). The question on how useful and related the tactile sense is to effective mobility of persons with visual impairments is a call for an answer.

Mobility according to Wiener, Welsh and Blasch (2010), is a general term, which refers to the act of moving through space in a safe and efficient manner. Orientation is therefore the awareness of the

visually impaired person in his/her environment. Orientation and Mobility (O&M) are closely related through conscious effort Wiener, et al. (2010). Orientation and mobility to an extent complement vision loss for effective movement. A person with visual impairment therefore, requires orientation and mobility aids, techniques or approaches to navigate his or her environment employing the tactile sense.

The attainment of mandatory skills must be measured. Fazzi and Petersmey (2001) stated that the Orientation and Mobility services acquired only in school is insufficient for persons with visual impairments for integration into the society. In this light, it therefore shows the importance and role of orientation and mobility in the functioning of persons with visual impairments which cannot be overemphasized. The idea of comprehensive and practical learning based on orientation and mobility aid for students with visual impairments according to Fatema (2013), is new in most developing countries of the World with Cameroon inclusive. Training on The use of tactile sense for orientation and mobility to person with visual impairments at the suitable time can enhance the probability that they can take part evocatively in a range of sectors and practices. It therefore, enhances their capabilities in getting jobs, retaining their professions, and taking part more completely in community and family life (Ahmed, Khan, & Nasem, 2011; as cited in Malik, and Manaf, 2018).

Theoretically, this study was anchored on the information processing theory by Atkinson and Shiffrin (1968). This theory equates learning with encoding, or storing knowledge in memory in an organized, meaningful fashion. The information is received via the sensorial channels before storing. It is then retrieved from memory in response to relevant cues that activate the appropriate memory structures. Atkinson postulated that forgetting is possible. This is the inability to retrieve information from memory caused by interference, memory loss, or inadequate cues to access information. He believed that the memory is critical for learning, and how information is learned determines how it is stored in and retrieved from memory. Persons with visual impairments need to receive and process the information about the environment concern using the sense of touch, store in the short and long term memories. Landmarks, clues, compass direction, shorelines and so on could be used to improve the retrieving process and awareness of obstacles in the environment. The knowledge therefore, will help them to walk or move effectively from one place to another.

The second theory was Jean Piaget (1896-1980) cognitive development. Piaget's theory of cognitive development which outlines a series of distinct developmental stages that children progress through as they acquire the skills of learning and thinking, has been hugely influential within the field of early childhood education. Piaget (1948) argued that in order to understand the environment, learners should be able to act or manipulate the environment on their own using their senses to understand it.

Kammii (1992) explains that Piaget's approach has a focus on how children interact with the world, suggesting children learn through action and a process of trial and error. To a PWVI, learning about the hazards or obstacles in the environment is a discovery. The role of the educator is to guide the child through the learning process and through the utilization of questioning and discussion.

The sense of touch will therefore, according to this theory help learners with visual impairments to perceive information and be aware of their environment cognitively. This will help them to move around freely and efficiently using their cognition.

The third theory deemed relevant for this study was the normalization theory postulated by Wolf

Wolfensberger (1980) underpinning the concept of visual impairment and the consequences. The theory salutes the acceptance of people with disabilities, offering them the same conditions as are offered to other citizens. It involves an awareness of the normal rhythm of life- including the normal rhythm of a day, a week, a year, and the life-cycle itself. It involves the normal conditions of life such as housing, schooling, employment, exercise or orientation and mobility, recreation and freedom of choice. This includes "the dignity of risk", rather than emphasis on "protection".

Unfortunately, many people think protecting the person with visual impairment means confining them on one spot to avoid the risk of tripping or falling while walking.

Wolfensberger (1980) opined that, a significant obstacle in developing community support has been ignorance and resistance on the part of atypically developed community members who have been taught by our culture that "those people" are somehow fundamentally different and flawed and it is in everyone's best interest if they are removed from society. The theory of normalization was found relevant because for a long time due to the difficulties in orientation and mobility and other challenges, people with visual impairments have been segregated from the sighted when it comes to education and integration in to the society, but through education their life or functioning in the community can be normalized just like that of any sighted child (Nsagha, 2019).

Tactile (Haptic) Sense

While it is arguably true that the individuals who are congenitally or adventitiously blind learn to rely on audition to compensate for their lack of vision in O & M skill acquisition, studies have it that travel skills for one with visual impairment, as Watson (2010) puts it, is not exclusively based on echoes, nor is it all auditory in many normal settings. To augment, Kohler (2006) attest that the auditory sense is not the only compensatory sense to be used by individuals with visual impairments to acquire the much-needed O & M skills. This is so since auditory cues deteriorate markedly when smaller targets are used to define a given path, as also observed by Basset and Eastmond (2006). This therefore shows that apart from the sense of hearing, persons with blindness also rely on Tactile sense (Haptic), for the development of their O & M techniques skills.

Since sight seems to be highly integral in cognitive development, as cognitive therapists, the likes of Ungar, Espinosa, Blades, Ochaita and Spencer (1996) put it, it should then, stand to reason that total blindness occurring prior the development of different cognitive patterns, would adversely impact on an individual's cognitive development. Through the teacher's stimulation of one's tactile sense, the child with visual impairment comes to know about places in the environment. Like hearing, touch has been known to be a powerful information supplier of known as well as unknown environments. To children with CB, haptic information appears to be essential for appropriate spatial performance.

The sense of touch or haptic, is described by Fritz, Way and Barner (1996), as the skin sense or haptic information, which commonly relates to include recognition of objects by any part of the legs, palms and fingers. This is the sense used for fine recognition of objects form, texture, location, and any surface information. While the sense of touch is often associated with the hands, as Davidson and Simmons (1984) put it, the sensory receptors are under the skin of the whole body, that is why it is also known as the Skin Sense, as Fritz, Way and Barner (1996) explain.

It may be observed that the skin that has not acquired a hardened layer, is the one most receptive. For this reason, a child should be able to use the most convenient part of the body for „touch purposes in the O&M process. Such parts include: the back of his heels for squaring off, the back of his hand as one walks parallel to a wall ETC (Everett and Ponder, (1976). Through the tactile (haptic) sense, the child's environment can be revealed through tactile discrimination (Cratty & Sams, 2009).

Since the tactual (haptic) sense is an important source of information to one with visual impairment, studies have shown that many individuals with visual impairments can orient themselves, most appropriately, when they perceive a tactile map that shows the unknown environment before walking in the natural environment (Brambring and Weber, 1981; Ungar et al, 1996). With visual impairment, one has to perceive relationship, between, say two objects represented on a tactile map. Such an activity has to be repeatedly done for several times, for conceptualisation. For proper conceptualisation, as Hollyfield and Foulke (1983) suggests, one has to verbalize the routes that take them from one point to the other, and then combine the routes later. One with visual impairment has to continuously repeat and over learn such an activity. This has to be done over and over until one feels comfortable with his/ her understanding of the environment, in theory, before

practically walking through it. Verbalization helps one to mentally retrace tracks from the very beginning to the end.

Peripatologists (orientors or mobility teachers) have understood that routes become subconscious after one travel them a lot. To consolidate on the mental tracking, one with CB has to try to infer the necessary mobility actions from their crude tactile map. Literature has it that the use of tactile mapping to one with early blindness makes him/her develop superior abilities to navigate new routes on their own (Ungar et al 1996). When this is achieved, they would have known to orient themselves independently, especially starting with those routes with few directional changes.

While teaching cane skills is important in the curriculum for learners with CB, teaching experience has shown that it is not the most important task of the paripatologist. With good spatial orientation skills, children with CB can travel independently, even with those sloppy cane skills, as long as they perfectly develop mental tactile mapping first. On this note, Ungar et al (1996) further attest that children with CB or ADV must first and foremost build mental maps of layouts and routes. Such will help these children wake future projections of routes in any given environment, making them become efficient travellers.

Further commenting on mental mapping, as initiated by the tactile sense, one with CB develops frames of reference, important components for orientation and navigation. To consolidate, Bassett et al (2006) further explain that for one with total blindness, these reference points are simply non-visual, but are used in the same manner to anchor the body for spatial coordination. Knowledge of reference points, which are also known as landmarks, or cues, if they are intermittent (occurring at irregular intervals), consolidate the spatial relationships into a permanent memory store that may be expanded to include more complex routes. This can be achieved by making children with visual impairment walking tactually presented routes or shapes in virtual environment. Before one gets involved into actual/ practical navigation of the environment, tactual understanding of these landmarks is both significant and critical to one with blindness. For this reason, teaching of tactual mapping can never be left to chance for O & M skill acquisition.

Probably one question that may need attention is: How do children with visual impairments create mental map and movement patterns? To create these mental maps, as Ungar *et al.,* (1996) explain, children need a territory or environment that is staked out with boundaries, which children with CB have to physically explore. Since small differences of the ground surface are easily perceived when one works barefoot, peripatologists should encourage children to walk barefooted, in order to become aware of those small, but important differences found in the environment. During the training sessions, the child with CB has to be encouraged to walk bare footed in the house, the garden and/or other surfaces. Such an exercise helps children with CB to effectively identify clues and landmarks, during O & M training (Rosaland, 2010). By tactually feeling the artificial boundaries first, these children can further relate to other unfamiliar areas.

Keywords: Tactile Sense, Effective Mobility,Persons with Visual Impairment Cameroon

Statement of the Problem

When vision is lost, the persons with visual impairments depend on the remaining senses to gather information from the environment for effective mobility. Using the sense of touch, it helps in distinguishing objects, obstacles allocation and shapes which are important for safe movement. People have doubted the relationship between O & M because PWVI hardly coordinate their own movement successfully. The researcher observed that many PWVI truly depend largely on their friends, colleagues and relations to move from one place to another. Meaning that, their movements solely depend on the time and convenience of their helpers or sighted guides. Technically, a person with visual impairment can walk independently using the mobility cane if a proper orientation of the environment concerned is understood.

From experience, the researcher who is also a person with visual impairment, has encountered disappointment from friends and colleagues whom he depends on for movements. Looking for solution for an independent and effective mobility, veering and movement without purpose still occur causing him to question the relationship between the sense of touch and effective mobility. This very problem has costed many PWVI to drop out of school, involved in fatal accidents, amounting to wastage of time and resources, damage self-image, self-efficacy, poor quality of services, frustration and feelings of vulnerability. Thus, attracting the researcher to investigate whether the tactile sense actually correlates with effective mobility of PWVI in North West, South West and West Regions of Cameroon.

Objective of the Study

This study intended to find out the relationship between the use of Tactile sense and effective mobility of PWVI in North West, West and South West Regions of Cameroon.

Research Question

How does the use of Tactile sense relate to the effective mobility of PWVI in North West, West and South West Regions of Cameroon?

Hypotheses

Ho_1: There is no significant relationship between the use of Tactile sense and the effective mobility of PWVI in North West, West and South West Regions of Cameroon.

Ha_1: There is a significant relationship between the use of Tactile sense and the effective mobility of PWVI in North West, West and South West Regions of Cameroon.

METHODOLOGY

The mixed method approach with the sequential explanatory design was adopted for this study.

Mixed method constitutes an approach in which quantitative and qualitative data are collected simultaneously or one type of data either quantitative or qualitative maybe collected first followed by the other (Creswell, 2013). Although one type of data might be emphasized more than the other, both types were essential in the present study. In this study, sequential explanatory was deemed favourable because quantitative data obtained from PWVI dominated the qualitative data obtained from chiefs of service in charge of PWDs and the elderly at the regional delegations of social affairs. Also, the qualitative data was meant to augment the quantitative data for more views and clarification on the relationship between the tactile sense and effective mobility of PWVI. Quantitative data was obtained with the use of a questionnaire while qualitative data was obtained with the use of the interview guide to answer the research questions.

The study was carried out in the North West, South West and West regions of Cameroon. These regions make up about 27% of the total population of the ten regions of Cameroon. The population of the study consisted of all persons with visual impairment in the Republic of Cameroon. According to the Association of Young Persons with Visually impairment of Cameroon, the Cameroon National Association of the Blind (CNAB) and the African Union of the Blind

(AFUB) (2015), the Republic of Cameroon has an estimated population of 23250 registered persons with visual impairments.

The target population of the study was made up of the entire population of persons with visual impairments in the North West, South West and West Regions of Cameroon who largely depend on their remaining senses to move about. According to the statistics from North West, West regional delegations of social affairs (2019) and the CBCHS - CBR Program Reports (2019), the South West Regional delegation of social affairs and the Coordination Unit of the Associations of PWDS South West (2020), the number of PWVI population in these regions is estimated at 1195 males and females as shown on the different tables below.

Table 2: Distribution of the number of PWVI in North West Region per division

Division	Male	Female	Age Range	Total
Donga Mantung	17	23	7 and Above	40
Bui	17	19	7 and Above	36
Mezam	38	19	7 and Above	57
Ngokontunjia	19	10	7 and Above	29
Momo	0	0	7 and Above	0
Menchum	32	19	7 and Above	51
Boyo	34	19	7 and Above	53
TSBC Kumbo	164	155	7 and Above	319
Grand Total	321	264		585

Source: Regional Delegation of Social affair North West/CBCHS-CBR Program report, (2019).

Table 3: Distribution of the number of PWVI in the West Region per division

Division	Male	Female	Age Range	Total
Bamboutus	30	48	6 and Above	78
Haut-Nkam	40	24	6 and Above	64
Hauts-Plateaux	57	42	6 and Above	89
Koung-Khi	28	29	6 and Above	57
Menoua	35	26	6 and Above	61
Mifi	32	35	6 and Above	67
Nde	34	15	6 and Above	49
Noun	18	21	6 and Above	39
Grand Total	274	240		514

SOURCE: West Regional Delegation of Social Affairs/CBCHS-CBR programme report, (2019).

Table 3: Distribution of the number of PWVI in South West Region per division

Division	Male	Female	Age Range	Total
FAKO	54	45	7 and Above	99
MANYU	29	20	7 and Above	49
MEME	41	32	7 and Above	73
NDIAN	28	20	7 and Above	48
KUPE MUANIGUBA	26	15	7 and Above	41
LEBIALEM	30	22	7 and Above	52
Grand TOTAL	208	154		362

SOURCE: The Regional deligation of Social Affairs/Coordination Unit of Association for Persons with Disabilities South West Region (CUAPWD-SW), 2020.

In total in the three accessible divisions and subdivisions of the three (03) regions chosen for thestudy, there are 1461 PWVI and out of this number, 305 of them made up the sample size of the study. The sample size of the study was estimated using the formula stated below. This formula was preferred over the Kyce and Morgan table of sample size distribution because it gives the precise estimation with a known population (N) while that for Kyce and Morgan is in ranges.

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Where:

N=Total number of participants =1461

Z= Z value corresponding to the confidence level, =95%

d= absolute precision =5% (It should be noted that the smaller the precision, the higher the sample size and the more reliable the findings). A precision value of 5% was them considered acceptable for a good statistical significance.

P=expected proportion in the population =50% for optimal sample size estimation.

The sampling procedures were the purposive and snowball sampling techniques. The form of purposive sampling technique choosen was the purposive homogeneous sampling. This form was adopted because the study population comprised of specific group of individuals with peculiar characteristics: regional chiefs of service in charge of PWDS and the elderly and persons with visual impairments who possess the necessary information required for the study. The researcher thus needed to purposively select only these persons particularly living with visual impairments and the chiefs of service in charge of PWDS and the elderly in the three (03) regions.

The Snowball sampling technique was also employed to get the sample. Snowball sampling also known as (chain-referral sampling) is a non-probability (non-random) sampling method used when characteristics to be possessed by samples are rare and difficult to find. It involves primary data sources nominating another potential primary data sources to be used in the research. In other words, snowball sampling method is based on referrals from initial subjects to generate additional subjects.

Therefore, when applying this sampling method members of the sample group are recruited via chain referral. The three patterns of snowball sampling procedure were all useful.

These included the linear snowball sampling, exponential on-discriminative snowball sampling and the exponential discriminative snowball sampling. From the Regional Delegations for Social Affairs of the North West, South West and the West, the researcher contacted organizations such as CBCHSCBR Program, CARITAS and the coordination units of associations of persons living with disabilities in North West, South West and West Regions. At this level, names, contacts of special centres and Associations of Persons Living with Visual Impairments in the regions were obtain and contacted to make up sample of the study. The instruments adopted for data collection were a closed ended questionnaire and semi structured interview guide titled “Tactile sense and Effective Mobility Survey Questionnaire”.

The data were collected by the researcher with the support of a research assistant. The data was collected within a period of three weeks. Copies of the questionnaire were taken to some of the associations of PWVI in the regions during their weekly and monthly meetings. After presenting a letter of introduction from the Head of Department of Educational Psychology, introducing the researcher and requesting for assistance from the authorities; the researcher was then allowed to go ahead to administer copies of the questionnaire to the PWVI. Each respondent was given enough time to complete the questionnaire read to him or her. They later handed to the coordinating presidents of each group where the researcher then passed by to collect. However, many of the questionnaire were administered or conducted over the telephone given the socio-political crisis in the two English regions.

The qualitative and quantitative methods were used in analyzing the data for the study. Analysis of Quantitative Data

Before the quantitative data were analysed, a pre-designed EpiData Version 3.1 (EpiData Association, Odense Denmark, 2008) database which has an in-built consistency and validation checks was used to enter the data with both the demographic information and the test items coded with numbers. Questionnaires were also assigned with serial numbers. The reason for coding and assigning each questionnaire a serial number was to ensure that on the data base, one should easily

trace the individual responses of participants and to ease verification in areas of uncertainty if they

arise. Further consistency, data range and validation checks were also performed in SPSS version 25.0 (IBM Inc., 2017) to identify invalid codes (data cleaning) with the aid of exploratory statistics.

After the data were thoroughly checked for possible errors, the quantitative data were analyzed using the descriptive and inferential statistical tools. The descriptive statistical tools used were frequency count, percentages and multiple responses set which aimed at calculating the summary of findings for each variable where applicable. The hypotheses of study were tested using a non-parametric Spearman's Rho test. This test was used because the data for the variables were not approximately normally distributed as revealed by the Komogorov test of significance with P-values all less than 0.05. Also, statistics from the composite variables showed that the data were either skewed more to the right giving that they were all negative, indicating that the data were not normally distributed.

Furthermore, the negative value for the kurtosis also justify that the distribution of the data were peak but relatively flat.

Further justification for using the Komogorov test which is an advanced statistical test to test for the normality assumption of the data is because the sample size is above 50. Using this test of normality, for a data which is normally distributed, the P-values will be greater than 0.05 and in that case; the Pearson Product Moment Correlation Coefficient test which is a parametric test will be used.

Checking for normality assumption is very important to know the exact test(s) that is/are more suitable for the verification of hypotheses and to avoid faulty generalizations which could lead to committing the type 1 or type 2 hypothesis errors.

Analysis of Qualitative Data

On the other, the qualitative data derived from semi-structured interview guide were analyzed using the direct reporting technique (narrative) because the number of respondents was very few. Thus, using the thematic analysis approach with the aid of themes, groundings/frequency and quotations in the study was not appropriate. Finally, findings were presented using frequency distribution tables and thematic tables with all inferential statistics presented at 95% level of confidence interval with alpha set at 0.05 levels, accepting 5% margin of error.

FINDINGS

The findings are presented according to the research objective and hypothesis that guided the study.

The relationship between the use of tactile sense and effective mobility of PWVI.

Table 4. Respondents Opinion on Tactile/Haptic Sense

Items	Stretched				Collapsed	
	Strongly Agree	Agree	Disagree	Strongly Disagree	SA/A	D/SD
I use the sense of touch in squaring off especially in unfamiliar environment.	77 (28.8%)	133 (49.8%)	37 (13.9%)	20 (7.5%)	210 (78.7%)	57 (21.3%)
Through the haptic sense, the environment is discovered through tactile discrimination using braille maps and other devices available.	63 (23.6%)	151 (56.6%)	32 (12.0%)	21 (7.9%)	214 (80.1%)	53 (19.9%)
The use of tactile mapping makes me develop superior ability to understand new roads independently.	54 (20.2%)	151 (56.6%)	24 (9.0%)	38 (14.2%)	205 (76.8%)	62 (23.2%)
I orient myself most appropriately when I perceive a tactile map repeatedly which shows the unknown environment.	57 (21.3%)	122 (45.7%)	50 (18.7%)	38 (14.2%)	179 (67.0%)	88 (33.0%)

Trailing with a cane on the floor or hand on the wall gives me protection and understanding of space and obstacles.	72 (27.0%)	122 (45.7%)	49 (18.4%)	24 (9.0%)	194 (72.7%)	73 (27.3%)
The use of haptic sense enables me to understand obstacles, potholes and possible space and path.	70 (26.4%)	127 (47.9%)	39 (14.7%)	29 (10.9%)	197 (74.3%)	68 (25.7%)
I easily developed reference points for orientation using land marks and clues to understand the presence and absence of obstacles for efficient movement.	64 (24.1%)	149 (56.0%)	23 (8.6%)	30 (11.3%)	213 (80.1%)	53 (19.9%)
The physical temperature I feel in the environment sometime helps me understand my position in space.	48 (18.0%)	138 (51.7%)	48 (18.0%)	33 (12.4%)	186 (69.7%)	81 (30.3%)
The use of haptic sense enables me understand the texture and height of objects independently in the environment.	51 (19.1%)	108 (40.4%)	77 (28.8%)	31 (11.6%)	159 (59.6%)	108 (40.4%)
In my environment, the sense of touch is always at use for detail understanding and carrying out activities.	43 (16.1%)	139 (52.1%)	55 (20.6%)	30 (11.2%)	182 (68.2%)	85 (31.8%)
Multiple Response Set (MRS)	**599 (22.5%)**	**1340 (50.2%)**	**434 (16.3%)**	**294 (11.0%)**	**1939 (72.7%)**	**728 (27.3%)**

Concon

In aggregate, findings from the multiple response set showed that a majority of the PWVI 72.7% are effectively using their tactile/haptic sense for effective mobility while 27.3% of them do not. To be explicit, findings showed that a majority of them 210 (78.7%) strongly agreed and agreed that they use the sense of touch in squaring off especially in unfamiliar environment. Discovering the environment through tactile discrimination by using Braille maps and other devices was proven true as strongly agreed and agreed by 214 (80.1%) of PWVI. Meanwhile,205 (76.8%) PWVI strongly agreed and agreed that they develop superior ability to understand new roads independently through the use of tactile sense. More still, the results also revealed that the PWVI orientate themselves most appropriately when they perceived a tactile map repeatedly which shows the unknown environment as agreed by 179 (67.0%) of them.

Findings also showed that a majority of the PWVI numbering 194 (72.7%) strongly agreed and agreed that trailing with a cane on the floor or hand on the wall give them protection, understanding of the space and obstacles detection. Furthermore, 197 (74.3%) of PWVI according to the findings also strongly agreed and agreed that the use of haptic sense enables them to understand obstacles, potholes and possible space and pathway. Findings also showed that a majority of them 213 (80.1%) strongly agreed and agreed that they easily developed reference points for orientation using land marks and clues to understand the presence and absence of obstacles for efficient movement. Finally, findings showed that 182 (68.2%) of them also strongly agreed and agreed that they always use their sense of touch for detail understanding and carrying out different activities.

Cross Tabulation between Usage of Tactile/Haptic Sense and Effective Mobility

			Mobility		Total
			Effective	Ineffective	
Usage of tactile/haptic sense	Use tactile/haptic sense effectively	n	133	59	192
		%	69.3%	30.7%	
	Do not use tactile/haptic sense effectively	n	40	33	73
		%	54.8%	45.2%	
Total		n	173	92	265

Findings showed more of those PWVI that effectively used their tactile/haptic sense for effective mobility making a proportion of 69.3% while for those who do not effectively use their tactile/haptic sense, findings showed that they are 44.8% of them.

In addition to this, another official at the regional delegation for social affairs said "PWVI discover their environment through tactile discrimination using braille map although others do not use braille". He also added that "repeated tactile mapping orient PWVI appropriately to develop superior abilities if they understand braille and can read maps effectively". To add, another official said "some PWVI understand their environment using their legs". However, the officials maintain that "the attitude of denial of the impairment has led many PWVI to refuse using mobility cane". One of these officials added by saying that "some PWVI refuse using the white cane proving that they master the environment which is not true". Although these officials acknowledged the importance of tactile/haptic sense to effective mobility of PWVI, one of them again said that "the rocky and unfriendly environments sometimes prevent effective movement". Finally, the officials interviewed said that they do exist government policy on the effective movement of PWVI with regards to haptic sense and they cited "The 13th April law 2010 on the protection and welfare of persons with disability".

Testing of the hypothesis

There is a significant relationship between the use of tactile/haptic sense and the effective mobility of PWVI.

Table 5. Relationship Between the use of Tactile Sense and the Effective Mobility of PWVI

Test	Statistical parameters	Usage of tactile/ haptic sense	Effective mobility	Explanatory power of the relationship in terms of percentage (Cox and Snell statistics)
Spearman's rho	R-value	1.000	.250**	68.7%
	P-value	.	.001	
	N	267	267	

****. Correlation is significant at the 0.01 level (2-tailed).**

Statistically, findings showed that there is a very significant and positive relationship between the use of tactile/haptic sense and the effective mobility of PWVI (R value= 0.250**, P= 0.000, far < 0. 05). The positive sign of this relationship showed that PWVI are more likely to be effective in their mobility when they are effectively using their tactile/haptic sense and this relationship is supported with an explanatory effect of 68.7% which is relatively high. In addition to the hypothesis statistics, that from the cross-tabulation table showed that more of the PWVI with effective mobility are mostly those that are effectively using their tactile/haptic sense. Therefore, the null hypothesis was rejected and the alternative that states that there is a significant relationship between the use of tactile/haptic sense and the effective mobility of PWVI was accepted.

The findings showed that there is a very significant and positive strong relationship between the use of tactile sense and the effective mobility of PWVI and positivity of the relationship showed that PWVI are more likely to be effective in their mobility when they are effectively using their tactile/haptic sense. This is to say the mobility cane together with flexible fingers and legs, persons with visual impairments can move around safely and independently. In addition to the hypothesis statistics, that from the cross-tabulation table showed that more of the PWVI with effective mobility are mostly those that are effectively using their tactile/haptic sense and, the findings showed that a majority of the PWVI are effectively using their tactile/haptic sense for effective mobility while a few of them are not.

This finding tied with that of Kohal, Tahfreshi and Aghasi (2015) who carried out a study entitled, the influence of the olfaction, audition and tactile senses in mobility and orientation of the blinds and the findings revealed that there is a close relationship between the senses and their movement. In the same trend, the finding of the present study also corroborate with that of Dhemba (2015) who

carried out a study on the use of auditory, tactual, kinaesthetic senses and mobility of PWVI in New Whales Australia. His findings showed that the use of tactile sense has a significant effect on the mobility of PWVI. Furthermore, in the study of Sen Jean (2014) which investigated the problems and prospects using haptic sense in the assessment of orientation and movement of people with visual impairments in Cameroon, findings showed that 100 percent of children with visual impairment depend on haptic sense to carry out gross and fine motor skills.

Therefore, findings in our study and that from other studies reviewed revealed that tactile sense has a significant effect on the mobility of PWVI. That is to say that for persons with visual impairment to be effective in their mobility, they are expected to make sufficient use of the tactile sense. To emphasize the importance of tactile sense to PWVI, one of the officials at regional delegation of social affairs again said " PWVI discover their environment through tactile discrimination using braille map although others do not use braille". He also added that "repeated tactile mapping orient PWVI appropriately to develop superior abilities if they understand braille and can read maps effectively". To add, another official said "some PWVI understand their environment using their legs".

Eastmond (2006) reiterated that since auditory cues deteriorate markedly when smaller targets are used to define a given path, PWVI turn to rely on tactile sense (Haptic), for the development of their O &M techniques skills. Through the stimulation of one's tactile sense, the persons with visual impairment come to know about places in the environment. Like hearing, touch has been known to be a powerful information supplier of known as well as unknown environments. To children with congenital blindness, haptic information appears to be essential for appropriate spatial performance.

The sense of touch or haptic, has described by Fritz, Way and Barner (1996), commonly relates to include recognition of objects by any part of the legs, palms and fingers. This is the sense used for fine recognition of objects form, texture, location, and any surface information. While the sense of touch is often associated with the hands, as Davidson and Simmons (1984) put it, the sensory receptors are under the skin of the whole body. That is why it is also known as the Skin Sense, as Fritz, Way and Barner (1996) explain.

Since the tactual (haptic) sense has been depicted in the findings of the study as an important source of information to those with visual impairment, it implies that individuals with visual impairments can orient themselves most appropriately when they perceive a tactile map that shows the unknown environment. This is so because peripatologists (mobility teachers) have understood that routes become subconscious after one travel on them a lot. To consolidate on the mental tracking, PWVI has to try to infer the necessary mobility actions from their crude,,tactile map. The literature has it that the use of tactile mapping to those with early blindness makes them develop superior abilities to navigate new routes on their own (Ungar et al 1996). That is effective mobility and this may account for the reason why findings showed that those PWVI who are effective in their mobility are mostly those who are effectively using their tactile sense.

In all, for effective mobility to take place, this group of people are expected to make sufficient use of their tactile sense, for failure to make effective use of this, effective mobility might become difficult for many of them. According to the information processing theory by Shiffrin and Atkinson (1968), we understood that human senses such as audition, touch, smell and kinaesthetic which constituted a significant role in orientation and effective mobility. Hoisington (2015) stated that while humans have a multisensory brain and children with visual impairments suffer from memory stress and even deficit, , more of them become vulnerable to distracting noises and find it difficult to filter out background noise, and as a result receive faulty or incomplete information in their short-term memory limited in usage. As a remedy, the usage of tactile/haptic sense for effective orientation and mobility training is crucial to persons with visual impairment. The absence of vision does not imply the inability to function equally in the society. A proper sensory training can turn many things around positively for persons with visual impairments. The knowledge therefore, will help them to walk or move effectively from one place to another using their tactile sense both at home and out of home.

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