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Message

Two decades ago, Dr. Joven R. Cuanang heeded the call of St. Luke's Medical Center and together with Dr Edmundo G. Saniel, Dr. Bienvenido S. Aldanese and Dr. Lourdes V. Lapuz established the Institute for Neurosciences. Trainees love him most as a neurologist at a patient's bedside teaching neurology "stroke by stroke". We take this training a step further and find better ways to take care of not just individual patients but entire communities as well. Towards this end, we aim to promote research in neuroscience to advance neurologic care in our country through collaboration and publication here in Philippine Neuroscience.

The best is yet to come.

Deborah A. Bernardo, MD
Executive Editor

Philippine Neuroscience publishes researches on neuroscience in the Philippines by medical, social and allied health scientists, as well as researches on neuroscience by Filipinos abroad. It is owned and published by the Institute for Neurosciences, St. Luke's Medical Center. Address correspondence to The Editor, Dr. Jacqueline C. Dominguez, Memory Center, Institute for Neurosciences Ground Floor Annex II Building St. Luke's Medical Center 279 E. Rodriguez Ave. Quezon City 1102. E-mail: memory@stluke.com.ph. For advertising opportunities, contact: dabernardo@stluke.com.ph. Tel: (632) 730 0101 loc. 4302.

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Editorial
Welcome Philippine Neuroscience

In 2012, the Memory Center of the Institute for Neurosciences organized the First Joven R. Cuanang Symposium. The symposium was unique on two points: the topics were specifically chosen to be original studies or perspectives about Filipinos by Filipino researchers, and it was a good blend of both biomedical and social sciences. *Philippine Neuroscience* advocates this idea of trans-disciplinary exploration in Neurosciences that transcends the old unhelpful divide between natural and social sciences. It is time each one reaches out and accept each other, particularly for those in biomedicine. When science fails us in the therapy of metastatic brain cancer, in Alzheimer's Disease, in autism and many other neurologic diseases that are without cure today, we recoil and take refuge in practices like prayer, our own brand of Filipino devoted caregiving and other non-pharmacologic intervention all of which are a product of culture. *Philippine Neuroscience* also aims to promote to a broader audience the works of Filipino researchers around the world who labor on their research without being heard in the Philippines. Their works shall be read, recognized and be made accessible by other Filipino researchers elsewhere through Philippine Neuroscience. This kind of knowledge creation and knowledge exchange will promote collaboration among Filipino researchers globally.

Philippine Neuroscience is published by the Institute for Neurosciences of St. Luke's Medical Center. We look forward to working with authors, reviewers and Filipino readers as we take inspiration from this seminal issue to face the task of propagating *Philippine Neuroscience*. Philippine Neuroscience will publish anything neuroscience by Filipino researchers including original articles, opinions, reviews even on neuroscience films or books, personal views, comments, perspectives and meeting reports. Welcome.

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The Neurosciences and Anthropology

Tan ML

Social scientists, anthropologists in particular, have been involved in health care for several decades now. That is because anthropology is a biocultural science, one of its subfields being biological anthropology, which deals with evolution and adaptation. In the 19th century, when anthropology first emerged as a distinct discipline in western Europe, there was tremendous interest in anthropometrics or the measurement of humans. The cranium and the brain were, in particular, the focus of many studies, in the search for racial differences and to "explain" the superiority of one race over the other.

Such studies were of course unscientific and were later abandoned but the interest in biological evolution continued, as well as in more applied fields such as medical anthropology, which seeks to improve health care systems through greater sensitivity to cultures. Right now, there is only one degree program, at the masteral level, in medical anthropology, offered at the UP College of Medicine.

The advances in the neurosciences have also attracted collaboration between anthropologists and physicians. I am intentionally using the term "neurosciences", leaving "neurology" – the study of neurological function and dysfunction – mainly to the medical people, while the neurosciences are more transdisciplinary, involving the natural and social sciences, engineering, even the arts and humanities.

Let me name some of the areas where anthropologists and social scientists have entered the neurosciences:

Anthropologists have contributed to an understanding of the genetic aspects of neurological health, and illness, by pointing out human kinship and mating patterns. Cultures with strong endogamy – marriage among close relatives – increase the chances of neurological diseases with a genetic component. Tracing the genetics of neurological conditions, including identifying risks for the descendants of patients, involves meticulous genealogies or family trees, an area again where anthropologists come in.

The anthropologists do not stop with family trees. We are all too aware of how certain genetic diseases can be stigmatizing, so we participate in helping to remove the shame and stigma associated with these conditions. A genetic counseling degree program offered at UP's College of Medicine includes inputs from our medical anthropologists.

We know, too, that mobile populations take genetic conditions with them. An example is the emergence of XDP dystonia, formerly confined mainly to the island of Panay, in other parts of the world. Given the Filipino diaspora, much more work needs to be done on how illness patterns are shaped by both genetics and population movements.

But even if a neurological condition does not have a genetic component, we know

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that patients will suffer from discrimination if the condition causes very dramatic differences in behavior. XDP dystonia is an example, where the flexed muscles and contractions make the patients look contorted, creating fear among relatives, friends and neighbors, and leading to such labels as *aswang*.

There are other cultural aspects – both beliefs and practices – that need to be studied as part of the neurosciences. Diet is a particularly important cultural practice, and there are some studies emerging looking at how some foods might increase or decrease risks for Alzheimer's and other neurological disorders.

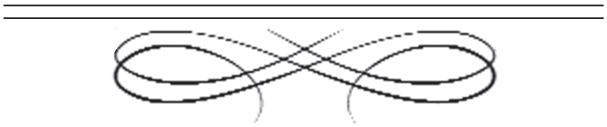
We badly need cohort and longitudinal studies to follow populations over several years, looking not just at diet but also physical and mental activities, and social networks, to bring out risk factors. We know that our extended family system provides an advantage in terms of constant mental stimulation and social support even for the elderly but we should also be aware that some of our caregiving practices for the elderly can also be counter-productive, such as the tendency to keep them indoors, with limited physical activity because we think they are too frail.

We need a good inventory of attitudes toward the elderly, and how these impact on caregiving. Words like *ulyanin* continue to have very negative connotations. There is, too, the practice of asking the elderly, "Do you remember me?" and teasing them if they don't, which can be very stressful.

We need to identify the sources of social support that enhance neurological function, from mahjong to ballroom dancing to karaoke. Senior citizens are entitled to discounts if they go back to school, but this benefit is rarely used because the elderly think they are too old and will lag behind the young, not realizing that returning to school gives them benefits in terms of mental stimulation, as well as new opportunities for social interactions.

The fact is that public awareness of neurological conditions is growing, but often with misinterpretations of medical facts. "Alzheimer's" is being used too loosely, even by trained physicians, and this can be dangerous because the stigma remains, and families may choose to sequester elderly relatives who they think have "Alzheimer's" or other dementias. The fear of an Alzheimer's diagnosis may prevent the elderly from seeking professional help when they do have neurological deficits.

Given our growing knowledge of how the brain shapes us as human beings, it becomes important that social scientists – with our interest in humans and in society – should become more actively engaged with the neurosciences.



Family History, *Apolipoprotein E* and the Risk of Alzheimer's Disease among Filipinos

Dominguez JC, Casingal CR, Daroy ML, Solis WM, Soriano JR, Magpantay CD, Natividad BP, Cruz PS, Lorca LL and Reandelar MF

ABSTRACT

Apolipoprotein E (*APOE*) is a susceptibility gene strongly associated with Alzheimer's Disease (AD). We studied this association among Filipino participants in the St. Luke's Memory Center-led community-based Memory and Aging Project and clinical samples at the Memory Center. Four hundred eleven participants agreed to undergo *APOE* genotyping after thorough clinical assessment for the presence or absence of dementia and elicitation of family history of dementia. The mean age of the participants was 71 ± 7.41 years old, 73% were females and 26.3% had AD. At least one relative affected with dementia was present in 16.3% and the mother was most commonly affected (61.2%). The most common *APOE* allele in the whole cohort was ε3/ε3, the least was ε4/ε4. Univariate logistic regression analysis showed there was significantly increased risk of AD among those who have positive family history and are *APOE* ε4 carriers. Multivariate regression analysis showed positive family history, older age and female gender to be independent risks for AD but not *APOE* ε4 carrier status.

INTRODUCTION

The public awareness on the increasing prevalence of Alzheimer's disease (AD) have made people more interested in learning about their chances of developing this condition. After AD diagnosis is disclosed, clinicians are often asked by family members regarding their chances of developing the disease in the future. This is a valid cause for worry particularly because early genetic epidemiology research validated family history to be a prominent risk factor for the disease. Having an affected biological parent or sibling is associated with a lifetime risk of sporadic or late onset AD (LOAD) of 30–40% versus the general population with only 10–15%. When both parents are affected, the cumulative risk is increased by almost 5 times greater when compared to having parents with no AD.[1] The risk is different in familial AD which develops early in people at ages 30 to 60 and hence also referred to as early onset AD (EOAD). Familial AD is associated with mutations in three genes: amyloid precursor protein (APP), presenilin 1 (PSEN1) and presenilin 2 (PSEN2). It follows an autosomal dominant pattern and because of penetrance close to 100%, mutation in any of these genes almost inevitably leads to AD in carriers.[2] Familial cases are rare in the general population and accounts for 2% of all AD cases.[3] On the other hand, the genetics of LOAD is complex and despite showing significant heritability,

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it does not follow Mendelian inheritance. The risk for LOAD is influenced by an array of common risk alleles distributed across different genes affecting a variety of biochemical pathways involved in the etiology and pathogenesis of AD.[4] To date, apolipoprotein E (*APOE*) is the most established susceptibility gene for LOAD. Apolipoprotein E (APOE) is a polymorphic glycoprotein that plays a critical role in cholesterol homeostasis. Within the central nervous system, APOE is synthesized and secreted primarily by astrocytes and microglia and is believed to play a role in the redistribution of lipid and cholesterol during membrane repair and synaptic plasticity as well as in the transport of APOE-containing lipoproteins in the cerebrospinal fluid.[5] The 3 major isoforms of human APOE are APOE2, -E3 and -E4. The isoforms E2, E3 and E4 differ in amino acid sequence at 2 sites, residue 112 and residue 158 (E2: Cysteine112 Cysteine 158; E3: Cysteine 112 Arginine 158; E4: Arginine112 Arginine158). These isoforms are encoded by *APOE* alleles, ε2, ε3 and ε4 respectively. There are six genotypes – ε2/ε2, ε2/ε3, ε3/ε3, ε3/ε4, ε4/ε4 and ε 2/ε4. The ε3 allele is the most common in the general population. *APOE* ε2 allele decreases the risk and delays AD onset while *APOE* ε4 confers a dose-dependent increased in risk for LOAD and a decreased in age-of-onset. A study of 42 LOAD families demonstrated a hazard ratio of 2.84 for carriers of a single *APOE* ε4 allele (heterozygous) and 8.07 for those with double *APOE* ε4 (homozygous).[6] We conducted this study to determine the frequency of family history of dementia, the different *APOE* genotype and their association with AD among Filipino subjects.

METHODS

Study Population Participants of the community-based St. Luke's Memory and Aging Project (MAP) and clinical samples at the Memory Center whose data are part of the Memory Center Aging and Dementia Database. The community samples were randomly selected members of the senior citizen registry of Marikina, Metro Manila, with a listing of 17, 690 elderly.

Procedure For the community participants, two community health workers provided by the city government visited the prospective participants at home, informed them about this study and coordinated their scheduled visit to the community research site together with a reliable collateral informant. On the scheduled visit, the subject's demographic information and medical history were collected by two nurses. An abridged Unified Data Set (UDS) was administered. The neuropsychological tests – Montreal Cognitive Assessment – Philippines (MoCA-P)[8], Geriatric Depression Scale (GDS)[9], Neuropsychiatric Inventory (NPI),[10] Disability Assessment for Dementia (DAD)[11] and Alzhiemer's Disease 8 (AD8)[12] were administered by trained psychologists. A neurologist administered the Clinical Dementia Rating (CDR),[13] performed neurologic examination, and made the diagnosis of probable AD based on the National Institute of Non-Communicative Disorders and Stroke - Alzheimer's Disease and Related Disorders Association (NINCDS-ADRDA) criteria.[14] Family history of dementia was verified for each first degree relative (father, mother, siblings and children), second degree relative (grandparents, half-sibling, aunt and uncle). For each relative the question was asked; "*Nagkaroon ba ng simtomas ng pag-uulyanin ang inyong kamag-anak kagaya ng pagkalimut, pag-iba ng ugali, paghina ng hwisyo at di na niya kayang manatiling independente?*" [Did any of your relatives – of the first and second degrees – had/have symptoms of dementia like forgetfulness, change in personality, decline in judgment such that he was/is unable to remain independent?] The clinical sample recruited from the Memory Center followed the same stated procedure. Participants without family history were subjects whose relatives were known to be free of dementia. Those with family history included participants with at least one relative known to have dementia. All participants were invited to participate in genotyping by having 15 cc of their blood extracted by a study staff from the Research and Biotechnology Division. Blood was processed and sent to the

lab for banking and analysis. All data obtained were carefully recorded in data collection forms which were completed on the day of the testing. Data protocols were organized according to the subject number, verified for completion and accuracy by the research associate present on site. The data collection forms were reviewed as necessary for case ascertainment. Data were encoded independently by the research associate and inconsistencies were reconciled with the data source to ensure data accuracy.

Genetic Testing Whole blood in BD Vacutainer® tubes with EDTA was drawn from each participant. The sample was centrifuged and the plasma fraction was collected into 2-mL cryogenic vials and stored in the -800C. DNA was extracted from the buffy coat using Qiagen QIAamp® DNA Extraction Kit Manual. DNA concentration was checked using the NanoDrop© ND-1000 Spectrophotometer. The working DNA concentration was adjusted to 20ng/µl and stored at -200C. The APOE gene was amplified using the primers, F4:5'-ACAGAATTCGCCCCGGCCTGGTACAC-3' and F6: 5'-TAAGCTTGGCACGGCTGTCCAAGGA-3' (Hixson et. al., 1990). Polymerase chain reaction was performed using the following program with termocycler (G-Storm GS1):94ºC for 3 minutes for initial denaturation and 35 cycles of denaturation (94ºC for 1 minutes), annealing (60ºC for 1 minute) and extension (72ºC for 1 minute). A final extension (72ºC for 10 minute) was also added. The 244-bp PCR product was cleaved using the 5U of HhaI (New England Biolabs) for at least 4 hours at 37°C. DNA bands were visualized 3% Agarose gel with Gel Red Nucleic Dye. Each genotype possesses a unique combination of HhaI fragment sizes. The ε2/ε2 genotype showed a 91- and 83bp HhaI fragments indicating the presence of cysteine residues at 112 and 158 positions. The ε3/ε3 genotype showed the 91bp fragment as well as 48- and 35bp fragments indicating the presence of cysteine at position 112 and arginine at 158. The ε 4/ε4 genotype showed 48-, 35-, 72- and an undetectable 19bp fragments indicating the presence of arginine at positions 112 and 158.

Statistics Frequency, mean, and standard deviation were used to describe demographic and clinical characteristics. Association between *APOE* genotype, family history and AD was determined initially using chi-square test in the univariate analysis. Multiple logistic regression was done in the multivariate analysis using backward LR. Level of significance was set at alpha =0.05. All statistical analyses were done using SPSS version 17.

The study protocol was reviewed and approved by the St. Luke's Medical Center Institutional Ethics Review Committee.

RESULTS

Four hundred eleven subjects provided their blood for genotyping. Their mean age was 71 ± 7.41 years old and 73% were females. AD was found in 26.3% of the participants. At least one relative affected with dementia was seen in 16.3% and the most common first degree relative affected was the mother (61.2%). Fifteen participants or 22.4% among those with family history had two affected relatives and 2 or 1.2% had three affected relatives. The most common *APOE* allele in the cohort was ε3/ε3, the least was ε 4/ ε4. (Table 1) Univariate logistic regression analysis showed there was significantly increased risk for AD among those with positive family history (odds ratio=5.7 [3.16–13.16], p=<0.001) compared to those without and the risk higher in those with more than one family member (odds ratio=10.8 [5.61–20.91], p=<0.001) over those with only one family member affected (odds ratio=3.2 [1.65–6.23], p=<0.001) when compared to having no relative at all. The risk for AD was also significantly increased with being an *APOE* ε4 carrier (odds ratio=2.28 [1.36–3.80], p=<0.002). In the multivariate regression analysis, positive family history, older age and female gender were shown to be independent risks for AD but not *APOE* ε4 carrier status. (Table 2).

DISCUSSION

The *APOE* genotype distribution in this Filipino population is similar to those with other East Asian ethnicity as well as with European ancestry, African Americans, Hispanics showing ε3/ε3 to be the most common followed by ε3/ε4.[15,16] *APOE* gene is widely studied and remains number one in the list of hundreds of susceptibility genes in AD. Numerous positive association studies on *APOE* ε4 and AD with large genetic and epidemiological data make *APOE* ε4 a universally accepted risk gene for LOAD. The result of the multivariate analysis in this study showing negative or insignificant association of *APOE* ε4 and AD is not surprising. Discrepancies between the *APOE* ε4 and AD have been reported in populations of African ancestry living in different regions of the globe[17] and between African and Caucasian Americans[18] with lack of association among the African Americans. In a large sample of 2,245 Yoruba in Nigeria, *APOE* ε4 was not significantly associated with AD or dementia.[19] This lack of association supports insights from other studies that there are other genetic or environmental factors that modify the risk posed by *APOE*. There are hundreds of candidate genes undergoing association studies in AD.[20] Genetic susceptibility in LOAD cannot be explained by *APOE* alone and presence of one or both copies of the ε4 allele does not confer an absolute predisposition to develop AD.[21] A review of evidence from whole genome linkage and association studies strongly implicates multiple candidate genes in different genetic loci that are responsible for susceptibility to AD.[2]

Table 1: Demographic, clinical, family history and genetic profile of the participants.

	N = 411	%
Age (years, mean ±SD)	71 ± 7.41	
Gender (Female)	302	73.5
APOE genotype		
ε4/ ε4	3	0.7
ε3/ ε4	74	18.0
ε2/ ε4	5	1.2
ε3/ ε3	261	63.5
ε2/ ε3	60	14.6
ε2/ ε2	8	1.9
Clinical Diagnosis		
AD	108	26.3
No Dementia	303	73.7
Family History		
Positive	67	16.3%
Negative	344	83.7%

Table 2: Association of age, gender, family history and *APOE* ε4 genetic status and AD: Multivariate regression analysis.

Risk	OR (95% CI)*	p value
Age	1.13 (1.092-1.178)	0.001
Gender (Female)	1.87 (1.038-3.341)	0.037
One relative	3.95 (1.870-8.360)	0.001
More than one relative	11.66 (6.560-24.340)	0.001
APOE ε4 carrier	1.82 (0.978-3.388)	0.059

*Odds ratio (95% confidence interval)

When confronted with patients and their families who want to know their risk for AD, physicians must clearly distinguish between familial or early onset AD and its causative deterministic genes (APP, PSEN 1 and PSEN2) from sporadic or late-onset AD and its susceptibility gene (*APOE*). The findings in this study will help physicians to make patients and families understand the quantified risk and significance of the association between *APOE* ε4 and AD, the infrequency of *APOE* ε4 and the more important effect of the presence of a positive family history. *APOE* can be a very sensitive information and potentially destructive. When Dr. James Watson's sequenced genome was made public, he requested anonymity particularly for his *APOE* risk status citing concerns about having a positive family history and the association of *APOE* with LOAD which has no cure.[22] While carefully balancing respect for people's right to know and the risk of misinterpretation of

genetic information, *APOE* genotyping is made commercially accessible at St. Luke's Medical Center through the Memory Center closely working with the Research and Biotechnology. It is not accessible by direct to consumer testing. A protocol for disclosure and genetic counseling is underway.

APOE genotyping is certainly not advocated by the Memory Center as part of the diagnostic work-up for AD. There are individuals who do not carry the *APOE* ε4 allele yet have pathologically confirmed AD, while those with *APOE* ε4 and cognitive impairment may have non-AD pathology. Although *APOE* genotyping increases the specificity for AD diagnosis based on pathological studies,[23] AD remains to be clinical diagnosis based on sound medical history. The sample in this study is 411 which is a sample size more than required for testing single-nucleotide polymorphism (SNP) but has case-control ratio of 1:3 below the ideal 1:4. The project is continuing and future analysis will be done to verify if the results will remain consistent.

CONCLUSION

The most common *APOE* genotype among Filipinos in this study is ε3/ε3, followed by ε 3/ε4 and ε4/ε4 is rare at 0.7%. This is consistent with *APOE* genotype distribution among other ethnic groups. *APOE* ε4 carrier status is not a significant independent risk factor for AD in this population. This lack of association might reflect genetic variation in our population. Despite the widely accepted role of *APOE* ε4 as a susceptibility gene in AD, this finding nevertheless implicates factors other than *APOE* for risk of developing AD such as other susceptibility genes and non-genetic factors that increase the likelihood of disease and facilitate its expression at an earlier age. Although having the *APOE* ε4 allele is the strongest genetic risk factor for LOAD, it is not significant in our study sample. How ever, having a relative with AD can more than double an individual's risk of developing the disease.

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AUTHORS' CONTRIBUTIONS

Dominguez, JC drafted the final manuscript and reviewed the literature for this manuscript. MLD participated in the design of the study. *CRC, MLD, WMS, JRS, CDM, BPN, PSC, LLL* contributed to subject tracking, scheduling, and collection of data. MGR performed the statistical analysis. CRC performed the molecular genetic studies and contributed to the initial draft of the manuscript.

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Validation of Magnetic Resonance Imaging-Automated Hippocampal Volumetry as a Biomarker for Alzheimer's Disease

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ABSTRACT

Introduction With the increasing incidence of Alzheimer's Disease (AD) and the advent of treatment to delay the progression of disease with the use of anticholinesterase, improving the methods for early diagnosis is the current objective. Biomarkers, both biologic and imaging, are indicators of specific changes of AD progression in vivo. Petersen and Jack et al have stated that disease progression is essentially biphasic, with biomarkers of deposition beta amyloid first to become abnormal in the cerebrospinal fluid, followed by neurodegeneration biomarkers (CSF phosphorylated tau); fluorodeoxyglucose uptake on positron emission tomography (FDG-PET); structural magnetic resonance imaging. Objectives General Objectives: To determine the validity of Magnetic Resonance Imaging-Automated Hippocampal Volumetry (MRI-AHV) in the diagnosis of AD. Specific Objectives: To determine the sensitivity, specificity and likelihood ratios of (MRI-AHV) in the diagnosis of AD. Methods This is a case control study, including adult subjects more than 50 years old, evaluated for memory complaints and underwent automated hippocampal volumetry. Frequency, mean, and standard deviation were used to describe demographic and clinical characteristics. Sensitivity, specificity, area under the curve (AUC) in the receiver–operator curves (ROC) as a measure of predictive value of MRI-AHV, positive likelihood and negative likelihood ratios were then calculated as well as pre- and post-test odds. All statistical analyses were done using SPSS version 17. Results The sensitivity of MRI-AHV was 75% and specificity was 96.3%. A small hippocampus therefore has twenty times likelihood of having AD while a normal hippocampus has a 0.25 times negative likelihood of having AD. Likewise, at the cut-off of hippocampal volume <5th percentile, and with the above sensitivity (0.75) and specificity (0.963), the area under the curve (AUC) is 0.922 with a significance of $p < 0.001$ indicating a test of very good validity. Conclusion The MRI-AHV is a valid biomarker for the diagnosis of AD and can be recommended to be used to detect the disease in its early stage. In clinical settings, memory complaints are very common in the elderly even among those without the disease since it can be part of normal aging in the very mildest stage. Such memory symptoms may put physicians at a dilemma and therefore the MRI-AHV is most valuable in their evaluation.

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INTRODUCTION

Alzheimer's Disease (AD) is diagnosed in people over 65 years of age, although the less-prevalent early-onset Alzheimer's can occur much earlier. The incidence of AD is increasing. In 2006, there were 26.6 million sufferers worldwide and is predicted to affect 1 in 85 people globally by 2050. The prevalence of the disease per 100,000 population is nearly 300 in the group aged 60 to 69 years and increases with age up to 3,200 among 70-79 years old and 10,800 in > 80. For this reason, improved methods for early diagnosis and clinical assessment of AD have become more imperative. AD diagnosis based on clinical grounds is quite accurate in patients who manifest clear-cut, fairly advanced symptoms.

Early diagnosis of individuals with mild dementia who are at risk of developing AD is far more problematic. The clinically definable syndrome of mild cognitive impairment (MCI, or more specifically amnestic MCI) was established in order to identify on clinical grounds, individuals who are at increased risk of progressing to AD. Clinically, MCI resides between normal aging and AD along the cognitive continuum. MCI is characterized by mild cognitive deficits not sufficient for a diagnosis of dementia. MCI patients have an increased risk of progression to AD with 37% converting in 2 + 1 years.[1]

Aside from the clinical diagnosis of AD, diagnostic tools have been used to support diagnosis. Biomarkers, both biological and imaging, are used as indicators of change that characterize AD in vivo.[2] In Magnetic Resonance Imaging (MRI) studies, atrophy of the hippocampus is the most prominent finding visible mainly in the coronal images, and is diagnostic of AD in the proper clinical circumstances. MRI volumetry can distinguish normal subjects from patients with AD; with the hippocampi of patients with AD and MCI smaller than the hippocampi of normal elderly.[3] Diffusion weighted imaging (DWI) has revealed that the diffusivity of water is higher in the hippocampi of patients with AD and MCI compared to normal elderly people, suggesting an expansion of extracellular space due to volume loss in the hippocampi of AD and MCI patients.[4]

Various concerns have been brought out already regarding the use of manual volumetry due to observer-dependence and mapping variability among raters. A study comparing manual versus automated method showed that the latter is equivalent to the direct approach and offers the advantages of observer independency, time reduction and thus usefulness for clinical routine.[5] Automatic calculations are faster and less susceptible to rater bias than manual tracing, and therefore expected to be more reliable and useful for analyzing hippocampal change longitudinal studies of aging and dementia.[6]

The St. Luke's Medical Center - Memory Center has been using the automated volumetry since 2010 as ancillary to AD diagnosis. We conducted this study to determine the validity of MRI-AHV in the diagnosis of AD and specifically to determine the sensitivity, specificity and likelihood ratios of automated hippocampal volumetry in the diagnosis of AD.

METHODS

This is a case control study of Filipino patients more than 50 years old who came to the Memory Center for memory complaints and underwent automated hippocampal volumetry.

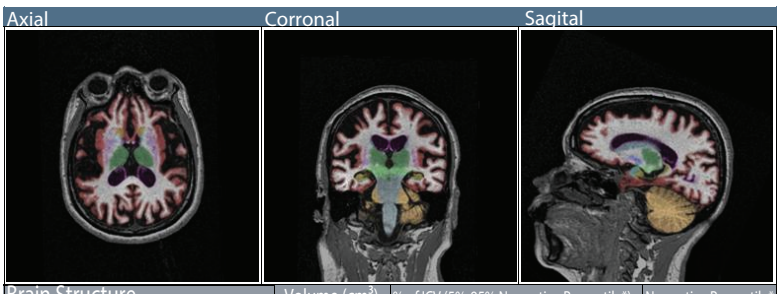
Procedure and Case Ascertainment All participants underwent clinical assessment by a physician. AD was diagnosed by the National Institute of Non-Communicative Disorders and Stroke- Alzheimer's Disease and Related Disorders Association (NINCDS-ADRDA) criteria. The diagnosis was then categorized as AD, Non-AD dementia such as vascular dementia, pseudodementia, frontotemporal dementia and other causes of dementia, and normal subjects.

All participants underwent neuroimaging following the Alzheimer's Disease Neuroimaging Initiative (ADNI) protocol and the automated hippocampal volumetry protocol using either a 1.5T or 3T GE or Phillips MRI scanner. The images were processed for automated volumetric studies using NQSTP Status Neuroquant software. The volumetry data were encoded as follows: actual hippocampal volume (left, right and total), hippocampal volume as a percent of intracranial volume, and the normative percentile represented in Fig 1. The hippocampal volume were classified into small or normal. Small hippocampal volume was coded when the hippocampal volume of less than 5% of the normative value which standard deviation of -2; a hippocampal volume of more than 5% of the normative value was considered normal. The clinicians and neuroradiologists were blinded to each other's assessments, and rated the subjects independently. All data obtained were carefully recorded in data collection forms which were completed on the day of the testing. Data protocols were organized according to the subject number, verified for completion and accuracy by the primary investigator. The data collection forms were reviewed as necessary for case ascertainment. Data were encoded independently by a nurse research associate and inconsistencies were reconciled with data source to ensure the data accuracy. The participants were coded by numbers to protect their identity.

Data Analysis Frequency, mean, and standard deviation were used to describe demographic and clinical characteristics. Sensitivity and specificity of the cut-off for small and big hippocampus, that is <5 percentile of total hippocampal volume as a percentage of intracranial volume, was calculated. The area under the curve (AUC) in the receiver–operator curves (ROC) as a measure of predictive value of MRI-AHV was calculated. The AUC can vary between 0.5 and 1, and a larger AUC indicated better diagnostic performance. The ideal test has an AUC of 1, meaning 100% sensitivity and 100% specificity. Positive likelihood and negative likelihood ratios were then calculated as well as pre- and post-test odds. All statistical analyses were done using SPSS version 17. A $p < 0.05$ was considered statistically significant in all analyses in this study.

RESULTS

Fifty-five subjects were included in the study, 28 of whom had AD while 27 were normal. AD subjects were older than controls with a mean age of 78.25+ 9.793 vs. 70.41+ 8.795. Ninety-five percent (95%) of those with AD had small hippocampus and 96.3% of controls had normal hippocampal volume. The sensitivity of automated hippocampal volumetry was 75% and specificity was 96.3% at a cut-off of < 5th percentile of the normative value. (Table 1) This value was chosen because it is that which is below two standard



Brain Structure	Volume (cm^3)	% of ICV (5%-95% Normative Percentile*)	Normative Percentile*
Hippocampi	6.27	0.52 (0.43-0.60)	52
Lateral Ventricles	35.76	2.95 (-0.10-2.98)	95
Inferior Lateral Ventricles	3.27	0.27 (0.05-0.23)	98

Figure 1a. Axial, Coronal, and Sagittal Magnetic Resonance Images of the brain and absolute volumes of the hippocampi and lateral venticles with their corresponding percentile.

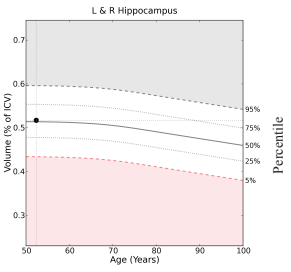


Figure 1b.

Total hippocampal volume ((THV) expressed as percent of total intracranial volume and plotted vs age. This subject is 52 years old and within 52 percentile.

deviation in the norms. Using this cut-off value, the positive likelihood ratio and negative likelihood ratio obtained for this cut-off were 20.00 and 0.25 respectively. A small hippocampus therefore has twenty times likelihood of having AD while a normal hippocampus has a 0.25 times negative likelihood of having AD. At the cut-off of hippocampal volume <5th percentile, and with the above sensitivity (0.75) and specificity (0.963), the area under the curve (AUC) is 0.922 with a significance of p <0.001 indicating a test of very good validity. (Figure 2).

DISCUSSION

Aging is a multidimensional process of change. As people age, there is an acceptable physiologic and anatomic decrease in the brain weight. There is also a decline in the cognitive function as aging process takes place. How much this cognitive decline is, differs with each individual. This can be affected by the co-morbidities that each subject has. In patients diagnosed with dementia syndrome, cranial MRI or Computerized Tomography (CT) scan is requested. Considering that patients who present with dementia are elderly, it is expected that the MRI or CT scan will show some atrophy. A study has shown that a smaller baseline hippocampal volume was associated with greater decline on MMSE ($\beta = 0.14$, $p = 0.04$) and CDR SB ($\beta = -0.19$, $p = 0.005$), smaller baseline amygdala volume was associated with greater decline on MMSE ($\beta = 0.18$, $p = 0.004$) and CDR SB ($\beta = -0.12$, $p = 0.06$, trend), and larger baseline temporal horn volume was associated with greater decline on MMSE ($\beta = -0.20$, $p = 0.003$) and CDR SB ($\beta = 0.20$, $p = 0.005$).[4]

Our dilemma now is whether this atrophy is secondary to the normal aging process or the disease itself. A multidimensional classification of hippocampal shape discriminates AD and mild cognitive impairment from normal aging. Twenty three patients with amnestic MCI (10 males, 13 females, age±SD=74±8 years, MMS=27.3±1.4) and 25 elderly healthy controls (13 males,12 females, age±SD=64±8 years), the classification rate of MCI versus control was 83%, with a sensitivity of 83%, and a specificity of 84%. While among the 23 patients with AD (10 males, 13 females, age ±standard-deviation (SD)=73±6 years, mini-mental score (MMS)=24.4±2.8), the classification rate of AD versus control was 94% with a sensitivity of 96%, and a specificity of 92%.[4] In difficult cases where there are several potentially dementing conditions in one single patient, in very mild disease where symptoms can be interpreted as part of MCI or normal aging, automated hippocampal volumetric studies can be helpful. At our center, it has 75% sensitivity and 95.2% specificity. The positive likelihood ratio and negative likelihood ratio obtained for this cut-off

Table 1. Sensitivity and Specificity of Automated Volumetry and diagnosis of Alzheimer's Dementia

			Diagnosis		
			AD	Normal	Total
Hippocampus	Small	Count	21	1	22
		% within Hippocampus	95.5	4.5	100
		% within Diagnosis	75.0	3.7	40
	Normal	Count	7	26	33
		% within Hippocampus	21.2	78.8	100
		% within Diagnosis	25.0	96.3	60
Total		Count	28	27	55
		% within Hippocampus	50.9	49.1	100
		% within Diagnosis	100	100	100

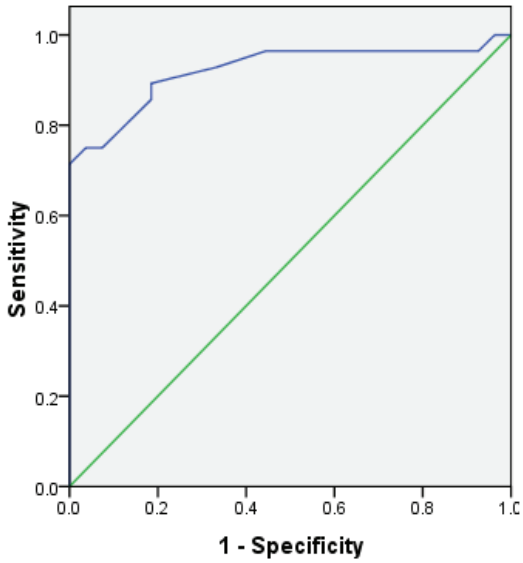


Fig. 1. The Receiver Operator Characteristic of MRI-AHV.

score were 3.01 and 0.23 respectively. If the hippocampi were small, there's a twenty times risk of having AD but having a normal sized hippocampi has 0.25:1 negative likelihood ratio of having the disease.

CONCLUSION

The MRI-AHV is a valid biomarker for the diagnosis of AD and can be recommended to be used to detect the disease in its early stage. It has good sensitivity and high specificity. In clinical settings, memory complaints are very common in the elderly even among those without the disease since it can be part of normal aging in the very mildest stage. Such memory symptoms may put physicians at a dilemma and therefore the MRI-AHV is a valuable ancillary in their evaluation

ACKNOWLEDGEMENT

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DECLARATION

The authors declared no conflict of interest.

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Quality of Life among the Filipino Elderly: Glimpses from a Community

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ABSTRACT

Objective The study aimed to determine and describe the themes of quality of life (QoL) from the perspectives of the Filipino elderly. Methods Thirty elderly chosen from the Memory and Aging Project of the Memory Center of the Institute for Neurosciences in Marikina were interviwed for the study in 2012. They were community dwelling, screened negatively for dementia, mostly women, and their age ranged from 60 to 84 years old. The transcripts of the interviews were coded for the themes of QoL that the elderly considered important. Results The themes are social relationships, health, resources, autonomy, psychological state, and belief. Conclusion QoL, as description, is a culturally sensitive construct for the understanding of what constitutes a meaningful and happy life in old age in the minds of the elderly.

INTRODUCTION

Aging, the process of growing old, can be viewed from several perspectives, two of which need mention, demographic aging and individual aging. Demographic aging is a population process characterized by low birth and mortality rates, whose effects manifest in the increasing number of the elderly in society.[1,2] Individual aging is the movement towards old age on the life course/span.[1]

But is aging new or old? Evidences show that it may be as old as humanity in that human survival, which hinges on culture, would not have been possible without the elderly who passed on to the next generation selective behavior for advantage.[3,4] However, aging, as a global phenomenon, is entirely new, an effect of the demographic transition. The transition was a consequence of low birth and mortality rates that, in turn, improved living conditions, public health, and laboratory science catalyzed since the Industrial Revolution.[5] It was/is an uneven process. Europe achieved the transition in the 1850s, the United States in 1900,[6] Japan in the post WW II period,[7] and the Philippines in the 1970s.[8,9] In effect, countries like Japan, France, Italy, and Spain are 'old,' while many in the developing world, including the Philippines, are among the fastest aging societies.[1]

The effects of aging on the individual, family, society, and state are still unknown, and experts differ in their opinions about them. Those with social and/or humanistic orientations consider aging a human achievement as important as the Agricultural and Industrial Revolutions.[10] The 'economistic' among them regard aging with alarm because of its purported adverse effects on the provisioning of health care services for the elderly without compromising the needs of other age-based

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sectors of society.[14,15,16] How it stresses and strains pension systems,[12,13,14] how it demands higher budgetary appropriations for the health-care of the elderly, and how it raising revenues to meet such demands (Fuchs 1984) are olso among their concerns.

All the same, specialists, policy makers, and advocates seem to agree that, fundamentally, aging is a longevity and/or quality of life (QoL) issue.[10] The longevity camp try to explain the finitude of life in social species like man,[17] find ways to compress morbidity,[18] and explore the prospects for life extension,[19] to mention only a few of their curiosities. They are also excited about the potentials of stem cell technology for longevity and, maybe, immortality.[20] The QoL camp argue that since longevity is a given reality of modernity, then what should concern us is what constitutes QoL for the elderly and why.[21]

Quality of life is an interdisciplinary 'object', something that does not belong to any system of knowledge,[22] so anyone may engage it freely. The concept originated in geography and economics where it refers to 'well-being' as an objective and measurable condition of contemporarity society.[23,24,25,26] In biomedicine, it refers to health, which, like geography and economics, also elides on the subjective nature of QoL. This raises questions about what composes QoL, which seems to be resolved by considering the objective and subjective aspects equally important.[27] Not with standing this, the query whether QoL is about evaluation or description sums up the dilemma in QoL studies.[28]

In the medical field, QoL is a self-rating instrument that tries to measure the effects of intervention or the psychosocial status of the patient.[29] Some experts find this inadequate and call for a 'new' QoL research that tries to measure causality between psychological indicators and morbidity.[30] In this way QoL can help in the analysis of treatment outcomes and in decision-making[31] based on the preferences of the patient in regard treatment and cost,[32] including palliative care.[33]

Like in medicine, QoL in psychology is also a measurable quality based on a self-report of status in life. Conservatively, the indicators could be placed under such broad categories as physical status and activity, psychological state and well-being, economics status, or social interactions.[34] A more recent view suggests splitting the categories into its components to account for the multidimensionality of QoL, such as the 62-point instrument that Kreitler and Kreitler developed.[35] No matter their differences, psychologists, at most, try to model QoL based on the indicators.[36]

In sociology, the interest centers on the indicators of QoL.[37] Two indicators, seem more important than the others do, resource (property, pention, income) and health,[38,39] are important in relation to policy.[40] Some QoL instruments claim applicability in global contexts,[41] which is contentious, and, quite expectedly, the challenge comes from anthropology.

The claim is impossible since there is no confluence between cultures, only divergences. Western concepts, standards, and measures are inapplicable in 'other' settings.[42] (Hofstede 1984). Instead, anthropology endorses the relativity of QoL by offering different cultural perspectives drawn from cross-cultural fields of engagements. QoL, as evaluation and description, needs to be sensitive to culture, as 'national patterns',[42] and how it frames, influences, and defines what the individual finds important in old age. As an evaluation, it needs to be culture-bound and individualized.[43] As a description, it must deal with meanings that individual's attach to feelings, thoughts, and experiences.[44]

There seems to be bewilderment about QoL because of the ambiguity of the concept. Bergner says, "Quality of life as it is used in clinical research is a vague term without

conceptual clarity. It is what the investigations mean it to be".[29] The bewilderment is partly due to approach. The etic approach argues for the researcher's agenda; it is, rhetorically, is "what our chosen measure measures." In contrast, the emic approach argues for what the elderly consider important in their world and in their own idiom.

The WHO (World Health Organization) Quality of Life Group (1993) defines QoL as a self-report of one's status in the context of one's culture, values systems, and aspirations in life.[44] Despite this, no QoL instrument that maybe applied globally exists. Instead, what exists is the World Health Organization Quality of Life Spirituality, Religiousness and Personal Beliefs (WHOQL-SRBPB), which is composed of the WHOQOL-100 questions plus 32 SRPB questions.[45] It aims for a QoL measure that is sensitive to cultural difference. Interestingly, though, the shorter version, WHOQOL-BREF, does not include belief. At most, the WHO encourages the use of the WHOQOL-BREF in the language that suits the country. It is against this background that the idea of developing a QoL measure for the Filipino elderly becomes necessary. The aim is to identify and discuss the themes of QoL from the perspectives of the Filipino elderly and in their own 'language.'

METHODS

Thirty elderly chosen from the Memory and Aging Project of the Memory Center of the Institute for Neurosciences in Marikina were interviwed for the study in 2012. They were community dwelling, screened negatively for dementia, mostly women, and their age ranged from 60 to 84 years old. The transcripts of the interviews were coded for the themes of QoL that the elderly considered important.[46] Their ages ranged from 60 to 84 and most were females (86%). The result presented here is a version of the qualitative part of a larger QoL study and written in the ethnographic present.

RESULTS AND DISCUSSION

The themes are social relationships, health, resource, autonomy, belief, and psychological state. Social relationships refer to interpersonal interactions and connections that play out in the realm of kinship and friendship. Kinship is based on shared blood or substance because of common ancestry.[47] It is experienced in the intergenerational family than in the sense of 'super-family.' It is attributed to limited resource, urbanization, the presence of children, and migration.[48,49] I would like to add, though, that aging is also a factor to the intergenerational family, especially as an effect of co-residence.

The elderly has two options, independence or co-residence. Independence has two modes, living away from children or living near them. Co-residence has also two modes, living with children or living with grandchildren, also called the "skipped generation household".[48] One *lola* lives with a caregiver and away from her children, and another lives with a grandchild and olso away from her children. Co-residence appears to be the preferred option regardless of gender and marital status.

Co-residence is critical to QoL. The elderly rationalize it as signifying *sama-sama* (togetherness), which affirms close family ties and kinship. It is a source of peace of mind, contentment, and happiness. It also answers to the need for relevance, especially among mothers as it enables them to continue performing parenting roles by giving advice and providing support to needy children. Since most of them are poor, it implies a need for security and acceptance of dependency on the young, healthy, and productive members of the family.

Co-residence implicates reciprocity, though the actors rationalize it differently. The children regard it as an act of gratitude,

of compassion, as well as the ideal mode for the distribution of scarce resources. It is in exchange for being the *taumbahay* (as somebody always at home) and *yaya* (baby sitter). Because of the presence of an able *lola* (grandmother) at home, the young parents, now free from childrearing and caring roles, are able to continue working or find work and support the family.

The healthy and active elderly do chores, such as cooking, cleaning the house, do errands, and so forth. In return, they are cared for like everyone else, eating the same food, sharing bed with other family members, and being brought to the doctor for consult when sick. In a sense, co-residence is cost efficient. However, the elderly see the exchange in a different light. They see it as responsibility, therefore, they do not expect something in return.

Co-residence can be a less than ideal set-up because the presence of an elderly in the family can be an irritant to an in-law. As happens, the elderly provides support by taking in at home a poor child. When earning a living usually as peddlers, the elderly contributes significantly to the income of the family. Is co-residence new and as such a consequence of urbanization, economic dependence, diaspora, and aging combined? Historical and ethnographic sources, though, seem to show that the Filipino family was/is intergenerational and co-residential. Aging then only helps to reinforce it.

Beyond kinship, social relationships are rationalized on friendships, as social networks, forged between neighbors, co-members of organizations, and senior citizens. It probably preceded the family, [48] and aims for egalitarian reciprocity. It involves supporting one another in everyday life and in times of need, especially during the death of a spouse. Those who are sad at home and/or the neighborhood consider the center for senior citizens a happy place for friends. One *lola*, who is frustrated with her son, a drunk, leaves home after breakfast and spends the rest of the day at the center with friends. She helps in preparing lunch and shares food with her friends in the spirit of commensality, *araw-araw* (everyday).

Kalusugan (health) is a physical condition that refers to absence of *sakit* (pain, illness, disease). Perceived as *karamdaman* (sensation), it is referenced back to the past, as *di tulad ng dati* (not like before). The notion of 'past' recoils back to *kabataan* (youth), when the body was *malakas* (strong), *maliksi* (spritely), *malusog* (healthy), and *kumikita* (earning, productive). *Sakit* is illness, an undiagnosed condition, a culture-bound description of feelings that accompany changes in the body due to age, such as arthritis, rheumatism, cough. *Sakit* is also disease, a diagnosed condition, a medicalized judgment about one's bodily condition. *Sakitin* (sickly) describes poor and a negative QoL.

Decrements in health and the prevalence of chronic diseases, some of them painful (e.g., arthritis) and others painless (cataract), accompany aging. In western biomedicine, a condition, painless or not, would be disease. In Philippine culture, though, *sakit* may limit the idea of illness/disease to feelings of pain. Nonetheless, *matamlay* or *walang sigla* (listless) is symptomatic of *sakit* if there is no known cause and if it affects functioning. However, a limiting condition, such as cataract, is not *sakit* because it is painless, and it is not a known cause of *katamlayan*.

The observation that decrements in health accompany aging makes *kalusugan* an elusive aspect of QoL. Because *kalusugan*, as *tulad ng dati*, is illusory, what is desired is *ginhawa* (ease, relief) from *sakit* or 'quality' health care. A *sakitin* can have a positive QoL because he has accepted his condition and/or because of the quality

health care that he receives from loved ones. It is usual that a sick *lolo* (grandfather) avers to a positive QoL because he can consult with a doctor and afford medicines with help from his children.

Sakit suggest a consciousness of the body and losses due to aging. Health, though, is more than the absence of *sakit*. It is also about an attitude toward life, health, and care. From the perspectives of anthropology in use,[50] it suggests that health care for the elderly is an important concern for advice, advocacy, and lobby toward an elderly friendly society, such as advocated by the National Council on Ageing and Older People.[51]

Resource or economic means is *pera* (money) from pension, savings, income, and support from children. Only few of the elderly, usually males, have pensions, and many of them are retirees from the shoe industry for which Marikina used to be famous in the country. Their small pensions do not suffice for their food and health needs and the power and water bills. Very few have savings, and only the females continue earning or are interested with income-generating activity. The poor do not have savings, and some of the women peddle on the sidewalks, selling news papers, cigarettes, and candies, or hawk *kakanin* (rice sweets). The income is never big but it augments the meager resources of the family.

Most widows are poorer than widowers because they neither have pension nor savings. However, women are more likely to continue working even at the age of 60 or older, usually as peddlers, as volunteers in the center for the elderly, and as beaders, making bags and nurses for sale to visitors at the center. Some contribute significantly to the limited resources of the family. It is common in families where the children are jobless and/or earn so little because of little education.

Generally, children do not care to support their poor elderly parents, and, when they do, it usually comes from an intergenerational living arrangement set-up. In such set-ups, support is *inaabutan ng pera, paminsan-minsan* (given money, sometimes), after appropriations for food, school, house rent, and power and water bills have been made. Money comes from the successful children, as nurses working overseas or as seafarers, rather than the desired effect of investment on the education of the children in general. Regardless of gender, children give more to their mothers than to their fathers. Perhaps it is an effect of filiation between mothers and children, an evolved bonding since the rise of the human species.[52] Maybe it is because the fathers are pensioners, while the mothers are not and are more in need of cash. It is also possible that the act is consistent with the stereotype of women as pursers, who are responsible with the money for the good of everyone in the family.

Autonomy is synonymous with independence. It is about doing something without somebody's help, *tulad ng dati*, whose reiterations only confirm its importance to QoL. It manifest concerns with as health, activity, mobility, productivity, residence, and decision-making. There is a physicality to it that obtains only from health. A healthy elderly is capable of activities of daily life, such as eating, bathing, toileting, and so forth. He is also capable of instrumental functions, such as driving, and/or executive ones, such as computing and paying bills. He, of course, is capable of mobility, going to and from places, such as watching free movies on Mondays, visiting relatives and friends, and/or doing errands, such as going to the nearby *sari-sari*.

Work for cash is critical to autonomy. For example, a *lola* wants to work in the center for senior citizens in Marikina because she is still healthy and strong. *Kaya ko pa ang*

ginanawa ng iba (I can still do what others can), she says. Autonomy is not only a capacity for independent physical activity: it is also about *pera* for one's needs and those of loved ones. It is a counterpoint to dependence on support from children and/or spouse and the kindness of others, including strangers.

Autonomy is also about independent decision-making in regard resource, residence, preferred treatment, and other choices. Decision-making is partly a result of resource; that is, an elderly who retains control over his wealth has 'voice' in and outside any residence arrangements. Keeping control over one's resources until death, though, can be a difficult decision and a source of conflict with interested children.

The children of a rich widow consider her incapable of living alone and making decisions without consulting them. After deeming her 'frail' and 'feeble', they divest her of all her wealth, which she calls *laruan*, such as apartments and restaurants. During the interview, she was 84 years old, she was negatively screened for dementia, and she gave sharp answers to the questions, without the help of the caregiver that her children hire for her. Calling her properties *laruan* is her kind of rhetoric, of communicating in metaphors as non-dementing humans do. The caregiver describes *lola* as *mabait* (kind), *malusog* (healthy), and *walang deperensya* (normal, non-dementing). *Lola's* children, all married now and with children, do not live with her and are not as affluent as her.

This contrasts with the case of a *lolo*. A widower, who used to be a taxi driver, sent his children to school, successfully, and never married again. He lives with one of his sons in his own house so that the family may care for him. He is free to do what he wants – cleaning the yard and doing some carpentry to keep himself busy, active, and healthy. Little is imposed on him that limits his autonomy, such as driving and going out of the yard alone, because of frailty.

Some aspects of autonomy, as propounded in the west, may not apply in Philippine contexts. In the west, the elderly may retain his rights over his body by executing a will, an advance directive, stating, for example, that his preference for a kind of treatment or objection to it be honored.[53,54] In the absence of such will, those close to him, those who care for him, or those who know him can decide in his behalf based on his values, beliefs, wishes, and past life.[55] The situation can be entirely different in the Philippines, where the spouse and children try everything that they can do to keep a gravely ill elderly alive. The option for life extension through medical technology is may be due to compassion for the sufferer and/or belief that only God can take away life from all his creations.

Religion refers to belief in the supernatural,[56] in God, who alone makes all things possible. Experts, however, cannot seem to agree about the religious indicators in QoL.[57,58,59] The fact that Westerners do not give religion as much importance as the Muslims all over the world or the Catholics in Latin American and in the Philippines do may explain it. However, the way religion is reiterated points up to another possible reason: it is inebriated in ontological issues. It is concerned with the nature and relations of being or, more specifically, the nature of being and existence. It is only when discussed as such that religion acquires relevance as an aspect of QoL.

Sa awa ng Dios (by God's grace) acknowledges an omnipotent, omnipresent, and omniscient God. Only God can take away what He creates. Why humans can grow old frail and sickly and suffer and die in the end are ontological questions. Aging is 'natural', a phase in human ontogeny that encompasses a continuous movement from birth to maturity to senescence and death

on a single lifeline that is the same for all humankind.

Humans fall ill, they may be poor, they may be suffering from chronic disease, or dying from nephritis and waiting for death, but all these are *sa awa ng Dios*. It is a logical rationalization because QoL, no matter what it is, is also God's will. The elderly may describe his life as one of misery, being low born, and poor,[58] but still consider his QoL positive because of *sa awa ng Dios*. If one owes his life to God, then one can only thank and praise God for it.

Leaving everything to *sa awa ng Dios* has had the effect of making life better, no matter how wretched it may be. The belief that one's condition is God's will eases away anxiety, including dread of death, pain from disease, and grief for the dear departed.[58,60] It smoothens emotions that would have only caused pain and grieving, loss of interest in life, distrust in others, and despair. Religion is a resource for the positive psychological condition that it helps create.[58] The function that it performs in the psyche is well known since the rise of psychology,[61] sociology,[62] and more so in anthropology in cross-cultural perspectives.

Psychological state is a result of satisfaction in regard sleep, appearance, emotions, and relationships, including sex, where relevant. Either the elderly suffer from loss of sleep because of aging, problems, or not at all. They may sleep soundly, *tulad ng dati*, because nothing has changed. Those who suffer from loss of sleep complain of sleepiness during the day and fatigue. In general, they are particular with their appearance, hygiene, and grooming in and outside the home. An exception to this is a poor, widowed, who is living with a granddaughter in her old house and trying to survive on the small amount that she collects every month from a family that rents one of the rooms.

The elderly have sunny dispositions, *masaya* (happy), rather than *malungkot* (sad, depressed). It is a consequence of a positive attitude toward life and aging as well as an optimistic belief in the future. Money as a source of *saya* (happiness) may be an exaggeration because the elderly tend to give more emphasis to being *masaya dahil sa mga kaibigan* (happy because of friends). Happiness/sadness, then, is relational; it partly obtains from the family and friendships. The family, though, can be a cause of sadness. The elderly feel frustrated about the poverty of their children and blame themselves for it, for failing to invest on their education.[48] In regard friendship, they can always avoid those that they disdain and seek out those that they like.

There is a sociality to happiness. The elderly make it happen in agentic, creative, and productive ways. They meet at the center, if possible, everyday. Depending on their circle of friends, they strand plastic beads into bags and purses for sale to visitors at the center, play cards when not occupied with work, join in the aerobic and/or ballroom dance sessions, or help prepare food for lunch. Even the rich frequent the center because of friendship. The owner of one of the few profitable shoe factories in the city visits the center almost every day to meet his friends there. There is also some activity for the males, including ground bowling, exercising on a machine, aerobics and ballroom dancing, and lunching with others too.

Depression due to the death of spouse becomes bearable because of friendship. When one of then dies, friends help the living by soliciting financial and material help and providing solace and comfort. The way the elderly form friendships and how such associations play out in and outside the center challenge stereotypes about the elderly as withdrawn, asocial,

and grumpy old men and women. The social withdrawal theory,[4] which presupposes that the elderly, upon retirement, withdraw from usual activity, associations, and public places, may be a thing for bourgeois retirees in affluent societies. It may not be the situation in the poor neighborhoods in the developing world like Marikina and perhaps in similar circumstances all over the world. Here the center for senior citizens assumes a double function: first, as physical meeting ground, where friend meet and where strangers seek out friends and succeed in doing so; and, second, as 'a space in the mind', where lives maybe shared, shaped, and reshaped by encounters with others. This is evidence for a kind of advocacy that pushes for aging friendly communities that endeavor to create spaces and provide facilities and amenities that address the specific needs of the elderly.

CONCLUSION

Quality of life is an ambiguous concept. Its various applications, as evaluation and/or description, in geography, economics, medicine, psychology, sociology, and anthropology constitute an argument for a culturally sensitive QoL. The themes of QoL for the elderly should differ, according to national cultures, as patters of beliefs and practices, because they are as diverse and dynamic as the other age-based groups. They may be lumped or split into their component parts depending on the goals and the theoretical and methodological orientations of the expert. Neither is superior to the other. What is important is giving 'voice' to the elderly by surfacing from the data what they consider important in life, toward fidelity and research based theorizing and advocacy. The invitation, then, is for a QoL that tries to capture the individual's vision of himself and how he tries to make that vision real in his world.

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AUTHORS' CONTRIBUTIONS

Esteban RC prepared the final manuscript. JCD, JRS, BPN, CDM, JTY and MSO contributed to this study either in protocol development, data collection or qualitative analysis.

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Effectiveness of St. Luke's Memory Center-Cognitive and Behavioral Rehabilitation Therapy for Patients with Early-Stage Vascular Cognitive Impairment

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ABSTRACT

Purpose The purpose of this study was to examine the effectiveness of St. Luke's Memory Center-Cognitive and Behavioral Rehabilitation Therapy (SLMC-CBRT) with an individual with early-stage vascular cognitive impairment. Methods SLMC-CBRT provides a holistic cognitive rehabilitation program. The effectiveness of the interventions was assessed by neuropsychological evaluation performed at baseline and at the end of the interventions. Results The participant demonstrated improved general cognitive performance as evaluated by several post-treatment measures of memory, language, attention and executive function. Conclusion This case illustrates that non-pharmacological therapy of the holistic approach can improve VCI patients' cognitive and functional performances. These data suggest that further controlled studies for treating this population are warranted.

INTRODUCTION

Vascular cognitive impairment (VCI) is defined as cognitive impairment that is caused by cerebrovascular disease and forms a spectrum that includes not only Vascular Dementia (VaD) but also milder forms of cognitive impairment such as Vascular Mild Cognitive Impairment (VaMCI).[1] Although VaD is said to be the second most common cause of dementia, VaMCI is actually much more common.[2] Considering how nearly half of individuals with VaMCI progress to dementia after a period of five years,[3] there is an urgency to provide early interventions. This is especially true since vascular cognitive disorders are viewed as the "silent epidemic of the 21st century" and are said to significantly contribute to disability, decreased quality of life, and disability.[4]

The growing number of studies on approaches that target not only cognitive deficits but also the associated challenges with activities of daily living underlies the need for effective interventions.[5] Clare and her colleagues[6] (2003) identified three approaches to cognitive ventions: interventions:(1) cognitive training, (2) cognitive rehabilitation, and (3) cognitive stimulation.

In the literature, the terms cognitive training and cognitive rehabilitation were applied somewhat interchangeably. In an attempt to clarify the nature of the two related but distinct forms of interventions, Clare et al.[7,8] offered the following broad definitions and descriptions. Cognitive training typically consists of guided practice on a set of standardized tasks intended to reflect certain cognitive functions, which include memory, attention or problem solving. These tasks are

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presented either in paper-and-pencil[9,10,11] or computerized form[12,13,14] or may entail analogs of activities of daily living.[15,16,17]

Cognitive training rests on an assumption that rehearsal has the potential to improve or at least maintain functioning in the given domain[5] that reflects the principles of neuroplasticity or brain plasticity. Comparative studies showed that individuals who received cognitive training to active (e.g., social or computer contact) and no-contact control groups reported gains only in the cognitive intervention group.[18]

Meanwhile, the World Alzheimer Report 2011 by the Alzheimer Disease International (ADI) defined cognitive rehabilitation as a more individualized approach to assisting individuals with cognitive impairments and their caregivers wherein enhancing residual cognitive skills and coping with deficits is emphasized.[19] ADI described cognitive stimulation as an approach that targets cognitive and social function, through reality orientation, activities, games and discussions, prioritizing information-processing rather than knowledge.

Rationale for St. Luke's Memory Center-Cognitive and Behavioral Rehabilitation Therapy (SLMC-CBRT)

SLMC-CBRT is a hospital based, out-patient program designed to provide a holistic approach including cognitive training and rehabilitation, cognitive stimulation therapy, and psychotherapeutic techniques to individuals with memory and cognitive difficulties. The program aims to restore, improve or compensate for a person's memory and cognitive abilities.

This approach has multidisciplinary sources of expertise consisting of neurologists, psychologists, nurse clinicians, speech and/or occupational therapist and a data manager. It offers individualized treatment modules to enable the patient to learn specific strategies to reduce memory failures and enhance specific memory function that will allow the patients to function at an optimum level in their daily environment.

In particular, those who will benefit from the abovementioned intervention are individuals with mild cognitive impairment (MCI) and post-traumatic brain injury. Also included are patients with dementia, post stroke patients and post surgery patients with memory complaints.

The SLMC-CBRT involves clinical and functional assessments, brief psychotherapy and CST. It also involves neuropsychological re-assessment to determine the changes and gains from the interventions.

The aim of this study was to evaluate the efficacy of SLMC-CBRT as a non-pharmacological intervention. Specifically, it aims to answer the following research questions: Will SLMC-CBRT measurably improve a patient's cognitive functions as evaluated via standardized neuropsychological tests? Will treatment effects be maintained over a 6-month follow up period?

METHODS

Study Design

This was an exploratory single-subject study using an A-B design with multiple target measures and follow up.[20]

Pre and Post-intervention Assessment

The effectiveness of the SLMC-CBRT was evaluated with neuropsychological assessment performed at baseline and after a period of 6 months. Psychometric tools included Repeated Battery for the Assessment of Neuropsychological Status (RBANS), Montreal Cognitive Assessment (MoCA), Mini-Mental State Examination (MMSE), and Beck Depression Inventory-II (BDI-II). Likewise, Clinical Dementia Rating (CDR) protocol was done and in addition to the abovemen-

tioned psychometric tools, her other intellectual functioning was measured using the Wechsler Adult Intelligence Scale IV (WAIS IV).

Intervention Protocol

Cognitive and behavioral rehabilitation therapy for 60 minutes was given twice-weekly sessions over a period of 24 weeks in order to target the following goals: (1) address the subject's identified problems in orientation, memory deficits, language expression, attention-span, and executive functioning through a series of activities relative to cognitive-training; (2) help preserve other cognitive facility/s that are found least or not impaired, and (3) assist the immediate family members/caregivers in appropriate management of her condition through psycho-education.

In the actual therapy sessions, the subject was given cognitive stimulation activities which included the following: orientation-check activity, visual and auditory-memory training, story-recall listening activity, attention-training tasks, verbal fluency and constructional praxis exercises, attention-span and executive functioning, and progressive muscle relaxation for debriefing and anxiety. In addition, she was given home practice sessions that mimicked treatment sessions and compliance with homework was monitored via a written log.

RESULTS

MJ (initials changed) is a case of a 52-year old Filipino female with 15 years of formal education. She suffered from a cardiac arrest in 2012 and estimated time to revival was 9 minutes. A repeat arrest of shorter duration happened the next day. Thereafter, cognitive impairment was suddenly observed. She was subsequently diagnosed with: MCI wherein the onset and course of symptoms are consistent with VCI secondary to global cerebral hypoperfusion s/p cardiorespiratory arrest; cardiac dysrhythmia, s/p pacemaker placement, and valvular heart disease. MJ was referred for cognitive and behavioral rehabilitation therapy (CBRT), given cholinesterase inhibitor treatment, and instructed to undergo longitudinal assessment with follow-up after CBRT and drug therapy to monitor cognitive change. Table 1 shows MJ's extremely low baseline performance.

DISCUSSION

There is limited literature on the effectiveness of cognitive and behavioral interventions for individuals with early-stage vascular cognitive impairment (VCI). The results of the study add to confirm findings that these interventions work as revealed by MJ's adequate improvement in various cognitive domains. In the pre-treatment assessment, majority of MJ's test results were in the extremely low range. In the post-treatment assessment, MJ's scores showed marked improvement indicating 2 to 3 standard deviations gain (i.e., extremely low to average range). It was noted that as MJ continued to improve in various cognitive domains, she also became more aware of the mental functions lost. This contributed to her feelings of inadequacy, self-pity, and anxiety. From being a top executive with Type A personality, she despised the fact that she is no longer in a position to carry out her previous role as decision maker, problem solver, troubleshooter, and critic. Her BDI-II score showed a drastic increase from 13/63 (mild depression) to a high 39/63 (severe depression). In order to address her clinical depression, the therapist suggested to MJ's family that she be allowed to return to work for therapy and rehabilitation purposes.

The promising findings resonate with the principles of neuroplasticity or brain plasticity, which can be maximized even in patients with progressive neuronal or white matter degeneration (e.g., Louis et al., 2001).[21]

Panza et al.[22] asserted that epidemiological research suggest that environmental and lifestyle-related factors play an essential role

Table 1: Pre-treatment Assessment

Domain	Index Scores	Qualitative Descriptions
I. Immediate Memory	61	Extremely Low
II. Visuospatial/Constructional	69	Extremely Low
III. Language	47	Extremely Low
IV. Attention	88	Low Average
V. Delayed Memory	40	Extremely Low
RBANS Total Score	53	Extremely Low
MMSE	25/30	Mild Cognitive Impairment
MoCA	20/30	Mild Cognitive Impairment
BDI-II	13/63	Mild Depression
Clinical Dementia Rating	1	Mild Cognitive Impairment
Diagnosis		Vascular Cognitive Impairment (VCI) secondary to global cerebral hypoperfusion, s/p cardio respiratory arrest

After a 6-month period of intervention, MJ's re-assessment showed improved cognitive performance in almost all domains from extremely low to low average (Table 2) and her IQ scores were the average (Table 3).

Table 2: Post treatment Assessment

Domain	Index Scores	Qualitative Descriptions
I. Immediate Memory	83	Low Average
II. Visuospatial/Constructional	96	Average
III. Language	87	Low Average
IV. Attention	91	Low Average
V. Delayed Memory	84	Low Average
RBANS Total Score	84	Low Average
MMSE	27/30	Within normal limits
MoCA	25/30	Within normal limits

Table 3: MJ's intelligence test results

IQ scale	IQ score	Percentile rank	Qualitative Description
Verbal IQ	**96**	**39%**	***Average***
Performance IQ	**106**	**66%**	***Average***
Full scale IQ	***100***	***50%***	***Average***

along a continuum of brain function from age-related cognitive changes, to predementia syndromes (MCI), to dementia of either degenerative (dementia of the Alzheimer's type) or vascular (VaD) origin.

A single-subject study design limits the generalizability of the CBRT results. A randomized controlled trial (RCT) is ideal to test the effectiveness of the CBRT as a non-pharmacological intervention among individuals with various cognitive impairments.

CONCLUSION

This study provided information that CBRT improved cognitive performance in almost all domains in early stage VCI.

Plans for Future Work

Current research on cognitive–behavioral interventions with older adults is of limited quantity. Future research and analyses should (1) continue to evaluate the effects of CBRT as applied to an even wider, more specific spectrum of disorders in the older adults; (2) continue to evaluate the long-term effects of CBRT, and (3) continue to evaluate the effects of CBRT combined with alternative treatments. For instance, therapists may also integrate spirituality and meaning making with CBRT as older adults frequently have spiritual and existential concerns.

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Positive Psychology in Aging

Solis WM

ABSTRACT

Purpose The purpose of this paper was to review and discuss major themes of existing studies in relation to positive psychology and successful aging so as to specify recommendations for future research and application in the Philippine setting. Methods A review of literature was conducted. Relevant journals in the fields of psychology and gerontology were scoured for integration of current studies on the aforesaid topic. Results Aging brings about numerous positive consequences, such as emotional stability, character development, self-love, self-acceptance, and better relationships. Engagement in cognitive and physical training and continuous socialization greatly contribute to older individuals' psychological and physical well-being as well. Conclusion Deterioration is far from the only option aging poses. Capacity for psychological growth is much more probable and individuals must concentrate on honing this aspect. Positive psychology is important in understanding successful aging, and this knowledge possesses great potential for the better construction of elderly care programs and general aims to improve the quality of life of older individuals.

INTRODUCTION

Aging is an inevitable reality. Not surprisingly, most of us are afraid of getting old as we relate aging with ill health, cognitive deterioration, and social seclusion. Aging is also associated with the loss of capabilities to carry out what we want to do or enjoy doing in life. In the bell curve of aging, a tendency to concentrate on the negative side is common. A natural predisposition to think that things will just get progressively worse as one gets older is likewise typical. Few people, however, concentrate on the other side of the curve; that is, the positive and exciting aspects of aging. In fact, the field of Positive Psychology demonstrates that this desolate depiction of aging is quite misrepresentative.

Positive psychology is "the use of psychological theory, research, and intervention to understand the positive, the adaptive, the creative, and the emotionally fulfilling elements of human behaviour".[1] Positive psychology in aging has been widely researched and more encouraging aspects of aging are revealed throughout the years.[2] Study after study affirms that aging causes rather noteworthy developments, such as increased knowledge, expertise, and emotional maturity, among others.[3,4] The more we learn about aging, the more we see that the notion of complete degeneration is clearly erroneous. Positive psychology encourages a paradigm shift when it comes to aging by means of sound, empirical research. This article will review existing studies in the emerging field of positive psychology in relation to successful aging so as to provide recommendations for future research and application particularly in the Philippine setting.

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METHODS

A review of literature was conducted. Relevant journals in the fields of psychology and gerontology were scoured for integration of current studies on the aforesaid topic.

RESULTS AND DISCUSSION

Generally, perspectives on how aging is viewed have considerably changed in the recent decades.[5] An influx of favorable findings has affirmed the many positive aspects of growing older. Rather than focusing only on decline, positive psychologists note that we should focus instead on vibrant and successful aging.[2,6]

As we age, we grow towards becoming more emotionally stable.[7] Older people state that they experience more positive emotions (and conversely, less negative emotions) compared to when they were younger. Furthermore, the elderly are better able to solve and handle highly emotional situations and are generally happier compared to middle-aged and younger individuals.[8,9] In a study by Stone and colleagues in 2010, older people are reported to experience less stress, worry, and anger than younger people.[10] This is generally attributed to the fact that they face less doubt and insecurity about how their lives would turn out, and have typically learned to accept themselves: their decisions, successes, and failures. Additionally, a study by Charles and colleagues discovered that when older individuals are shown an assortment of images, older people tend to recall more positive than negative pictures as compared to younger adults.[11] They also tend to be drawn to images that depict cheerful, jovial, and/or smiling faces and tend to look away from scowling, sulking, and/or angry faces. Although older people can process negative emotions along with positive emotions, they deliberately decide to focus on things that give them greater delight, happiness, and contentment.

Older people tend to be aware of the fact that time is no longer vague and lengthy. As they recognize that time is limited, they tend to invest in things that really matter, prioritize better, ignore unimportant aspects, and generally become more appreciative of life.[4] Character development also continues to improve; in fact, several important characteristics become better enhanced as one ages. These qualities are curiosity, greater interest and passion for learning, objectivity, self-control, and forgiveness.[3]

As individuals get older, the gap between their real self and ideal self becomes narrower, causing them to be more content with who they are.[12] It is during these years that self-love and self-acceptance become amplified. Because of older people's willingness to forgive, openness to reconciliation, awareness of a shorter time horizon, a higher sense of respect for others, and increased patience, relationships become better in one's golden years.[13] Particularly, marriages are seen to improve and become more enjoyable. Willis and colleagues reported that older people who continuously engage in cognitive and physical training manifest significant improvement in these areas.[14] Ability to do these activities boosts older people's feelings that they are able to cope with everyday life, and this is associated with greater psychological well-being. Moreover, socialization and engaging in communal/volunteer/civic activities greatly contribute to emotional and physical health.[15]

A local unpublished qualitative study on selected patients of the Memory Center at St. Luke's Medical Center discovered that Filipino elderly with Mild Alzheimer's disease employ positive coping styles such as reframing (positive thinking), engagement in physical activities as well as memory enhancement techniques, health-seeking behaviors, a realistic understanding of dementia, acceptance, and spending time with family/friends/relatives.[16] Additionally, they were found to greatly benefit from positive coping resources such as support from loved ones, positive thoughts

and emotions, as well as an optimistic outlook in life.

CONCLUSION

Given this breadth of data, it is evident that deterioration is far from the only option ageing poses. Capacity for psychological growth is much more probable and that individuals must concentrate on honing this aspect. Positive psychology is important in understanding successful aging, and this knowledge possesses great potential for the better construction of elderly care programs and general aims to improve the quality of life of older individuals.

PLANS FOR FUTURE WORK

Future research directions must concentrate on the landscape of positive psychology among the Filipino elderly, as local research is scarce. Identification of traits and qualities that continue to improve among the Filipino elderly as well as a more comprehensive and systematic review of positive coping styles and resources among the dementia population are only a few research topics that could be investigated in the local setting. Formulation of elderly care programs based on positive psychology principles is also warranted and recommended, both for the normal population (e.g., Senior Citizen groups in various barangays) and the dementia population (e.g., in the hospital/clinic setting).

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Aphasia Screening in Alzheimer's Disease

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ABSTRACT

The past years have seen a shift in the theoretical view regarding aphasia: that language impairments following a neurological insult are caused by deficits in the cognitive system. This article will review the reader on the relationship of language to the overseer—cognition—whose main domains are infamously compromised in individuals with Alzheimer's disease. While aphasia has been defined as a selective impairment of the cognitive system, other cognitive domains can influence language and vice versa. The presence of aphasia may be screened in individuals with Alzheimer's disease by gaining an insight regarding the integrity of their language skills from the cognitive viewpoint. The results of the screening process helps the health professional determine the assessment procedures that can enable a deeper investigation of the client's language breakdowns. By doing so, an individualized care plan may be designed, the focus of intervention be identified, and a multidisciplinary approach be utilized. Current studies and local research directions will be presented.

Introduction

Communication is life. Living things communicate in one form or another in order to survive. Human beings can communicate with one's eyes, body posture, the rise and fall of one's voice pitch, the tonicity in the mouth area, via written means, the words used or held back, and even how one interprets what was verbally or nonverbally expressed.

Communication, whether intentional or not, are acts that are governed by cognition. Cognitive processes make it possible for us to gather and manipulate information. Speaking and listening to spoken word (even reading or writing, or interpreting nonverbal gestural acts) requires the conversion of abstract thought into tangible words, phrases and sentences whose structure, meaning and usage are shared with the target recipient. This systematic means of communicating is otherwise known as language.

Language as a method of human communication

Artificial intelligence appears to have not come any nearer to being equal to a human brain's processing speed. In fact, in order for computers to contain the amount of information held in a human brain and still have sufficient capacity to process information fast, roomfuls of physical storage may be required. The typical human brain is said to be able to process five to nine thoughts per second [1]. Research has it that we speak and understand approximately 150-160 words per minute [2], read and understand written word 250-300 words per minute [3], and write by copying words 22 words per minute [4]. Oftentimes, these language-based skills occur all at the same time in the same brain: speaking while encoding what needs to be said two sentences ahead, listening and matching heard words to one's own storage of word meanings while planning what to say in relation to a memory triggered by the other party's story, etc. These are language processing acts that occur every

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second in every day of a human being's life.

Language per se is one of the domains of cognition. Expand language in order to explore its more basic levels and one reveals skills that are just as susceptible to numerous disturbances. The ability to use language to communicate on a day-to-day basis using various mediums is often taken for granted because the process itself appears simple. The simplicity behind relatively-intact communication skills is largely governed by cognitive skills that run on automaticity, drawing from established concepts long learned, executed on processing systems that run simultaneously and are fueled by an efficient resource allocation system [5] that tolerates the constant shifting and timely deployment of the right amount of processing resources needed for each occasion. These cognitive skills enable the storage and retrieval of concepts in the semantic system—otherwise known as the central storage of conceptual knowledge—that is responsible for all meaning. The analysis and construction of word forms and structures are taken up by one's morphological skills, and these exist separately (but works in tandem) with one's own semantic and syntactical skills in order to produce words, phrases and sentences arranged in a manner that its intended meaning is clear. Phonological rules dictate how speech sounds are to be produced in relation to surrounding speech sounds and enables one to manipulate spoken word. Pragmatics enables one to use and comprehend language appropriately basing on societal rules and acceptable behavior, paving the way for one to fit in and be considered as part of a group.

Cognitive disturbances and its impact on language

But what happens when specific cognitive disturbances occur? Such is the problem of clients with Alzheimer's disease. Individuals with Alzheimer's disease face more than personality changes. Their failing cognitive systems compromise attention, memory, and executive functions: three of the main cognitive domains that are prerequisite to language processing. Consider that attention primes one to be ready to accept incoming stimuli and is the base of language comprehension [6]. Attention must be sustained long enough and its resources efficiently allocated [5] in order to allow stimuli to be perceived, discriminated, matched to stored knowledge, processed, recognized and understood. Memory allows the storage of learned concepts such that previously learned material need not be rehashed. Utilizing one's capacity for remembering enables everything from recalling words and events, to recognizing faces and even enumerating from a recent visual of one's kitchen pantry what needs to be purchased at the grocery store. Memory exists largely because words—again, language—are used to label abstract concepts, which in turn are used to retrieve stored ideas. A compromised language system impairs the retention of concepts. Encoding becomes laborious, little is retained, thus little is retrieved.

Difficulties understanding and utilizing nonverbal cues, graphic information, physical objects and one's relation to these objects leads one to question the integrity of a person's visuospatial skills. While following a mental map back to the point of origin requires enough attention to take note of different landmarks, the number of turns, and an intact memory to retrieve these, visuospatial skills are in charge of judging how fast an approaching car is or how safe a knife blade's distance is from the fingers holding the food being diced. Finally, executive functions function as the seat of all goal-oriented behavior that allows the simplest to the most complex problem solving [7]. How is one to repair saying *kutsilyo* when he meant to say *kutsinta* if it weren't for executive functions? That reading the word studied implies a finished event vs. studies, that environmental noise outside the room can

be ignored as you speak in front of an audience and, by the looks of the listeners' faces, they did not seem to understand your point, prompting you to rephrase your sentence and expound on your topic.

It is clear that even the subtlest cognitive difficulties can present barriers against efficient language comprehension and expression. When these are coupled with personality and behavioral changes, an individual's ability to pay attention, understand concepts, extract meaning from basic words, make inferences from other people's words, and even consolidate one's thoughts and recognize these as personal needs that must be expressed is degraded. Breakdowns in the one or more of these domains may hamper understanding and using language. Communicative functionality is eventually lost.

Suffice to say, language abilities are always pulled by cognition. Cognition is weakened without language supporting it, and can further exacerbate existing language problems [8, 9] . Difficulties in allocating attentional resources—or having a lack thereof—results in a domino effect where other cognitive domains are compromised [10], contributing to the language impairment known as aphasia. Aphasia may thus be considered as a selective impairment of the cognitive system [11].

While it is clear that aphasia is a breakdown in one's ability to comprehend and/or use language for communication, several studies have found that numerous subtle cognitive issues answer for the difficulties experienced by a person with aphasia. Having aphasia following an acute neurological insult (a stroke, head injury, a bacterial infection) or because of a progressive neurological condition such as Alzheimer's disease, is overwhelming to the client's family and is many times more devastating to the client himself.

Screening for language breakdowns in clients with Alzheimer's disease

Speech-language pathologists work with people with aphasia. Managing a language disorder requires careful work that enables the patient to communicate using his intact skills and the clinician's ability to facilitate language comprehension and expression in order to rehabilitate weaker language areas. As with the management of any condition, screening for the presence of a condition and determining the general difficulties it presents is done first. Standardized screening tools, while available in many parts of the world, are not always accessible to every health professional, and nor is the majority of these suitable for local use. Simple yet carefully-selected questions may yield crucial information regarding the client's communicative difficulties.

Major aphasia screening and assessment tools were designed to evaluate the integrity of the language system's four main areas: fluency, comprehension, naming, and the use of nonverbal language. It is necessary to look into all these four main areas in order for one to sufficiently say that language impairment exists.

When a client comes into your clinic, it is always crucial to determine what the family dynamics are: Several questions come to mind, questions that should form at the onset of the screening process:

• is the patient with his/her spouse, or is surrounded by an army of family members and caregivers?

•is the spouse someone who answers for the patient constantly?

- does the patient gesture for the spouse to answer for him/her? How?

- does the patient attempt to answer questions at all? How does he/she attempt? What does he/she do?

• is the patient left to fend for himself?

• does the patient establish and maintain eye contact?

• does the patient manifest communicative intent?

Even before the client has entered the assessment room, one is given an idea of how his executive functions are. A client's tendency to look around may mean many things, though what does matter is if he does so because he seeks information and/or for help. A client who seems to have very little interest in his surroundings and does not show communicative intent is a cause for concern. When the family tends to answer for the client himself and the client appears to allow them, it either means that the client is unable to respond to the questions asked, or that the family tends to be eager to help. Both are causes for concern as well, with the latter as a possible reason for the patient to 'not need' to communicate at all.

Greeting the patient and asking him/her conversational questions in order to build rapport may yield even more valuable information:

• when the client is asked "How are you doing?" how does he respond?
- gestural, facial expression, verbal?
- contingent to the question?
- if verbal, did he respond in one word or in a sentence?

• did he show any difficulties in word retrieval?
- if gestural, what gestures did he make?

• were the gestures specific or not?
- did he look at his spouse and/or caregiver for assistance?

• when asked with questions about demographic data
- how did the client respond?
- gestural, written, facial expressions, verbal?

•if verbal, what was he able to say (a isolated syllable? nonspecific syllables? a word? a short sentence?)

•did he show any signs of word retrieval difficulties?

• did he persist in looking for the correct word, or did he look to his companion for assistance?
- if gestural or written

• did he write with his finger on the table or manifest any similar attempt at nonverbal means of communication?

• were his gestures understandable and clear?

• did his gestures manifest any difficulties in motor limb planning?

• which hand did he use: the right or the left?

All main cognitive domains are being screened at this stage. A client who readily responds in any manner suggests that he is alert. Answering objective questions about one's self requires drawing from memory and engaging one's word retrieval skills. If the client has difficulties with verbal communication, executive functions are to come into play when he seeks to solve his own dilemma and requests for a pen and paper, or uses a finger to write on the table. Even persisting with writing with a weak, hemiparetic hand vs. a stronger, non-dominant hand suggests that the client is motivated and/or engages problem solving. Visuospatial skills may be screened depending on how he manages the writing tool, how he turns to seek for assistance from his caregivers, or how he uses his gestures vs. his own body.

By the time the client is asked the open-ended question of "Why are you here? What seems to be the problem?" one must be ready to harvest even more information. Should the client be able to answer this question either in full or partially, it suggests that awareness and perhaps an understanding of issues regarding one's own illness is functional. Depending on how he is able to describe it (or to be unable to at all), one is given an idea of his word retrieval and sentence formulation issues. Managing several language processes simultaneously (retrieving terms, recalling events, expressing emotions, formulating sentences, fixing syntactical errors, adjusting mispronunciations, sequencing events, and suppressing related but nonspecific competing concepts) tasks one's executive functions to the point of producing anything from a relatively

well-composed illness narrative to a one-word response of **"**…eto." This is when one is led to suspect that the client may have fluent or nonfluent aphasia.

Screening for auditory comprehension is typically done in a stepwise fashion. One must ascertain that the client is paying attention to you and the tasks at hand else results will be compromised. Without using gestures, ask the client to:

• to call his spouse to come inside (or leave the room)
• sit up straight, place his hands on the table
• get the paper and pen and write his name and address
• tell you where his caregiver is
• write his name then call his spouse over

Further variety can be introduced by asking concrete and abstract questions:

• What day was it yesterday? When are you going back to the provice?
• After his appointment at the hospital, where is he headed next?
• Is his medication for his high blood pressure or for his asthma?

If the client is attentive but has difficulty following commands and understanding single words as well as phrases, one can ask himself if the client has auditory attention, auditory memory and auditory processing issues. Observe to what extent can the client understand: can he handle long or short questions? Concrete or abstract questions? With executive functions being susceptible to issues following a neurological condition, one may note that the client will struggle as task demands and complexity is increased 7. When a client is unable to handle the processing demands exacted on him, language comprehension difficulties become apparent. [6]

Ask the client to repeat words, phrases and sentences: short to long ones, single to multi-syllable ones, high to low frequency ones. How a person fares in repetition tasks provides one a quick overview on how much he can store in his auditory memory, how much comprehension he can employ to support auditory memory, and how his word retrieval is functioning. Difficulties in repetition and auditory memory makes understanding complex commands, processing narratives, and simultaneously processing long sentences and matching words to one's semantic storage near impossible for a client with aphasia.

Point to different, everyday objects around you and have the client name these. These can be your eyeglasses, car keys, the door, the clock, his chair, his watch, his left shoulder. Ask him to enumerate three to five animals or local cities, even past Presidents. Naming and word retrieval difficulty is the major hallmark of aphasia. Word recall issues require more working memory resources where disorganized and overworked processing can render word retrieval strategies inefficient.

There are several aphasia types ranging from the severely nonfluent with poor language comprehension (global aphasia) to fluent with good comprehension but poor yet specific word retrieval issues (anomia). While the results of the screening process provides a bird's eye view of the client's difficulties, a formal assessment tool splits these language domains and assesses the degree of impairment in each, including issues in other areas such as written word, drawing, praxis, arithmetic, and nonverbal language. Should the screening suggest that the client's problem is largely due to cognitive issues, a more comprehensive cognitive assessment may determine the degree at which attentional, memory, visuospatial or executive function factors complicate language processing and use.

With the growing population of Filipino elderly comes the rapidly increasing demand for specialized intervention for cognitive-communication disorders. The gap between this demand and the availability of normed and locally-applicable testing tools is fast widening. Western-normed **a**ssessment tools are often used in the clinical arena, a

practice that enhances the need for culturally appropriate tests. There is a lot of ground to cover in adult cognitive-communication disorders research, and much of this ground requires extensive research on the language abilities of Filipino adults and elderly including one inherent characteristic common among them: multilingualism. The research-related challenge of managing a multilingual population is one matter that requires careful consideration. As research in the said areas grow, any health professional may need to consider using well-selected screening questions and bring light to the cognitive barriers that prevent the Alzheimer's client with aphasia from utilizing functional communication skills.

Understanding to what extent cognitive limitations influence language will enable the speech-language pathologist to create an individualized therapy plan that can work out problem areas bottom up. An appreciation of the impact of cognitive deficits on aphasia aligns the efforts of every healthcare professional towards a collective management approach. With the active involvement of the client's family and the other members of the healthcare team, aphasia in clients with Alzheimer's disease is manageable, communication can guided towards a more functional state, and the goal of providing the patient a better quality of life is made more attainable..

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