

Study to Analyze the Need Assessment of Scanning Laser
Polarimetry for Glaucoma Prevention and Management and
Its Marketing Need Through E-Commerce in The Medical
Device Industry of India

By

Sushweta Guha Dey

*Dissertation submitted for the partial fulfillment of the
MBA Hospital and Health Management*

Academic year, 2016-2018



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TO WHOMSOEVER MAY CONCERN

This is to certify that **Ms. Sushweta Guha Dey** student of MBA Hospital and Health Management from The IIHMR University, Jaipur has undergone dissertation at **Boston Ivy Healthcare Solutions Pvt. Ltd. (Medikabazaar), Kolkata** from **5th Feb 2018 to 4th May 2018**.

The Candidate has successfully carried out the study designated to her during dissertation training and her approach to the study has been sincere, scientific and analytical.

The dissertation is in fulfillment of the course requirements.

I wish her all success in all her future endeavors.



Dr (Col) Ashok Kaushik

Dean, Academics and Student Affairs

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Dr. Sameer Phadnis

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To Whomsoever It May Concern:

This is to certify that Ms. Sushweta Guha Dey, the student of Institute of Health Management Research (IIHMR), Jaipur has undergone Dissertation at BOSTON IVY HEALTHCARE SOLUTIONS Pvt Ltd (Medikabazaar) from 5th February 2018 to 4th May 2018. Her dissertation work involved "A Study to analyse the need assessment of scanning laser Polarimetry for Glaucoma prevention and management and its marketing need through e-commerce in the medical device industry of India".

The candidate has successfully carried out the study assigned to her while working as "Intern" for the period of 3 months. Her approach to the study has been sincere, scientific & analytical.

This work is partial fulfilment towards the course requirements and is recommended for MBA in Health and Hospital Management. This letter, is being provided at the express request of the Trainee for her Dissertation, this in no way confers any direct or indirect liability on Boston Ivy Healthcare Solutions Pvt. Ltd

We wish her all the success in all her future endeavors.

Thanking you,
For Boston Ivy Healthcare Solutions Pvt. Ltd.

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CERTIFICATE BY SCHOLAR

This is to certify that the dissertation, "A STUDY TO ANALYSE THE NEED ASSESMENT OF SCANNING LASER POLARIMETRY FOR GLAUCOMA PREVENTION AND MANAGEMENT AND ITS MARKETING NEED THROUGH E-COMMERCE IN THE MEDICAL DEVICE INDUSTRY OF INDIA" at BOSTON IVY HEALTHCARE SOLUTIONS PVT. LTD.(MEDIKABAZAAR), Kolkata, submitted by Ms.Sushweta Guha Dey Enrollment No- IIHMR-U/01/2016-18/0508 under the supervision of Dr. Sameer Phadnis for award of MBA in Health and hospital management of the IIHMR University carried out during the period from 5th FEBRUARY 2018 to 4th MAY 2018 embodies my original work and has not formed the basis for the award of any degree, diploma associate ship, fellowship, titles in this or any other institute or other similar institution of higher learning.



Signature



In the attainment of this assignment successfully many people have bestowed upon me their blessings and heart pledged support, so this time I am utilizing to acknowledge all the people who have been concerned with the project.

I am grateful to almighty for bequeathing me the fortitude to successfully conduct my proposition and for sustaining my efforts which many a times did oscillate.

With immense pleasure I express my heartfelt gratitude to my Mentor **Dr. Sameer Phadnis**, Associate Professor, **Col. Dr. Ashok Kaushik**, Dean(Academics) & Professor cum Proctor, **Dr.S.D.Gupta**, the Chairman of IIHMR Board Of Governors , **Dr. Arindam Das**, Associate Professor and Associate Dean Research, **Dr. Piyusha Majumdar**, Assistant Professor, for their able guidance and useful suggestions , for their belief, faith and trust they have shown upon on me and having given me this opportunity to undergo training in this particular chosen field of mine.

I am deeply indebted to **Mr. Vivek Tiwari**, Founder & CEO - Medikabazaar , **Mr. Devashish Chowdhury** Vice President Operations, **Mr. Aravind Chattopadhyay**, Regional Manager – East(BD) as well as my mentor in the organization, **Ms. Rupali Rane** , HR Manager, **Mr. Shyam Sanat Das**, Deputy Manager HR, **Mr. Dipankar Chatterjee**, Assistant General Manager Marketing & all other staffs of Kolkata branch without whose constructive retaliation this project would not have been a triumph. The prized consultation & recommendations for amendment, modifications & improvement did enhance the perfection in the project.

I would like to include a special note of thanks to **Dr Anil K Mandal**, MD, Glaucoma Consultant , L.V.Prasad Eye Hospital, Hyderabad, **Dr. Maneesh Singh**, Glaucoma Consultant , B.B.Eye Foundation, Kolkata, for encouraging me in my Clinical Experience Tenure and developing Special interest in the research analysis of Ophthalmology Field .Finally, and most notably, I would like to thank my respected parents for their blessings, my lifepartner for his constant support and my friends for their help and wishes for the outstanding finalization of this training.



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Medical Abbreviation

SLP = Scanning Laser Polarimetry

POAG = Primary Open Angle Glaucoma

PACG = Primary Angle closure Glaucoma

GBD = Global Burden of Disease

VCC= Variable Corneal Compensation

FDT = Frequency Doubling Technique

VFA= Visual Field Analyzer

ECC = Enhanced Corneal Compensation

HRT = Heidelberg's Retinal Tomography

CSLO = Confocal Scanning Laser Ophthalmoscopy

OCT = Ocular Coherence Tomography

SWAP = Short Wavelength Automated Perimetry

SAP = Standard Automated Perimetry

ABP = Atypical Birefringence Pattern

HRQoL = Health Related Quality Of Life

VFL = Visual Field Loss

ADVS = Activities of Daily Vision Scale

CDR = Cup Disc Ratio

NPG = Normal Pressure Glaucoma

NFA = Nerve Fibre Analyzer

DME = Disc Macular Edema

ARP = Atypical Retardation Pattern

NFI = Nerve Fibre Indicator

OPERATIONAL DEFINITIONS

- 1) **GLAUCOMA** : Glaucoma is a disease that damages your eye's optic nerve. It usually happens when fluid builds up in the front part of your eye. That extra fluid increases the pressure in your eye, damaging the optic nerve. Glaucoma is a leading cause of blindness for people over 60 years old. But blindness from glaucoma can often be prevented with early treatment.
- 2) **RETINAL NERVE FIBRE LAYER** : The retinal nerve fiber layer (nerve fiber layer RNFL) is formed by the expansion of the fibers of the Optic Nerve. RNFL is a sensitive structure. Harmful situation can make some damage on RNFL such as high intraocular pressure, high fluctuation on phase of intraocular pressure, inflammation, vascular disease and any kind of hypoxia.
- 3) **SCANNING LASER POLARIMETRY** : Scanning laser polarimetry is the use Of Polarised Light to measure the thickness of the Retinal nerve fiber layer as part of a Glaucoma workup. The GDx-VCC is one example.
- 4) **BUSINESS 2 BUSINESS (B2B) SALES**: Is a sales model that involves one business selling products or services to another business. B2B sales differ from B2C sales in that B2B offerings usually have a higher price point, a longer sales cycle, require multiple touchpoints to close deals. Due to the price points, B2B deals often require buy-in from multiple decision makers within an organization. As such, B2B sales tends to be more strategic than B2C sales. While B2C selling tactics tend to appeal buyers' emotions, B2B selling tactics often appeal buyer's rationality.
- 5) **E-COMMERCE**: Is the buying and selling of goods and services, or the transmitting of funds or data over an electronic network primarily, the internet. These business transactions occur either as business-to-business, business-to-consumer, consumer-to-consumer or consumer-to-business. The terms e-commerce and e-business are often used interchangeably.
- 6) **PROCUREMENT**: The act of obtaining or buying goods and services. The process includes preparation and processing of a demand as well as the end receipt and approval of payment.

Introduction

Glaucoma is an optic neuropathy characterized by a loss of of retinal ganglion cells and their axons, the Retinal Nerve Fiber Layer (RNFL). It is one of the leading causes of blindness in the world. Prevalence of glaucoma is on the increase as the world population ages. The loss of Retinal ganglion cells in glaucoma is irreversible, therefore early detection is critical to prevent progression of the disease. A quote from Professor Robert N. Weinreb, former President of the Association for Research in Vision and Ophthalmology (ARVO) and Director of the Hamilton Glaucoma Center at the University of California San Diego, succinctly states this point, "If you diagnose glaucoma early, you can treat it early. If you treat glaucoma early, you can slow the rate of progression. If you slow the rate of progression, you prevent blindness." Major risk factors for glaucoma include intraocular pressure (IOP), age, race, family history, myopia, and corneal thickness. These risk factors provide important information for the clinician when making a diagnosis. India is a large country with approximately 11.2 million persons aged 40 years and older with glaucoma. The majority of those with glaucoma are undetected, and there exist major challenges in detecting and treating these. It has been demonstrated that structural damage to the optic nerve head (ONH) and peripapillary retinal nerve fiber layer (RNFL) might occur before any detectable functional visual loss. Accurate methods for detecting glaucoma progression are essential in order to monitor patients and evaluate the efficacy of therapy. Although standard automated achromatic perimetry (SAP) has been the most commonly used method to assess progression, several studies have shown that deterioration of the optic nerve head (ONH) and retinal nerve fiber layer (RNFL) may often precede visual field loss detected by perimetry. In fact, changes in the RNFL have been reported to be the earliest and even the only sign of glaucoma development and progression in many patients. Clinical examination at the slit lamp or by red-free photographs offers suboptimal evaluation of the RNFL that is dependent on subjective assessment and is impaired in eyes with lightly pigmented fundus, small pupils or media opacities. Optical imaging instruments have added quantitative and objective information to the RNFL examination. Compared to subjective assessment, automated analysis potentially increases the ability to detect deviations from normality and change over time. Scanning Laser Polarimetry (SLP) was developed with the purpose of evaluating the thickness of the RNFL. White-on-white perimetry is the gold standard for the diagnosis of glaucoma. However, it can detect defects in the visual field only after the loss of as many as 40% of the ganglion cells. Hence, the measurement of RNFL thickness has come up. Optical coherence tomography and scanning laser polarimetry (SLP) are the techniques that utilize the evaluation of RNFL for the evaluation of glaucoma. SLP provides RNFL thickness measurements based upon the birefringence of the retinal ganglion cell axons. Review of published literature is done on the use of SLP in glaucoma. This review elucidates the technological principles, recent developments and the role of SLP in the diagnosis and monitoring of glaucoma, in the light of scientific evidence .

- **AIM OF STUDY:**

The aim of the study is to understand the importance of Scanning Laser Polarimetry and its significance specifically in early detection of Glaucoma , one of the important causes of avoidable blindness and simultaneously understand its need through e-commerce in the Indian Medical Device Industry.

- **OBJECTIVES:**

- To map the importance of Scanning Laser Polarimetry
- To determine its significance in early detection of Glaucoma

- To develop the market need of Scanning Laser Polarimetry through e-commerce in Indian Medical Device Industry

- **REVIEW OF LITERATURE:**

- **Scanning laser polarimetry in glaucoma by Tanuj Dada & et al.(1)**

This study depicted the technological principles, recent developments that are happening, and the role of SLP in the diagnosis and monitoring of glaucomatous optic neuropathy, in the light of that scientific evidence which are relevant still so far.

- **Correlation between Stratus OCT and GDx VCC in early glaucoma, ocular hypertension and glaucoma suspect eyes by Hsin-Yi Chen & et al.(2)**

The result of this study suggests that the RNFL thickness measured by OCT and GDx VCC was correlated in a good manner in both Early glaucomatous eyes and Healthy Eyes but poorly correlated in Ocular Hypertensive(OH) and Glaucoma Suspect(GS) eyes. Further they stated that when managing the case with OH or GS eye, one should be cautious in interpreting different imaging data.

- **Agreement for Detecting Glaucoma Progression with the GDx Guided Progression Analysis, Automated Perimetry and Optic Disc Photography by Luciana M. Alencar & et al.(3)**

The study highlighted that The GDx-GPA was able to detect glaucoma progression in a noteworthy number of cases showing progression by conventional methods, with a very high specificity and high positive likelihood ratios. Estimates of the accuracy for detecting progression propose that the GDx-GPA could be used to adjunct clinical evaluation in the detection of longitudinal change in glaucoma.

- **Prevalent practice patterns in glaucoma: Poll of Indian ophthalmologists at a national conference by Nikhil Shreeram Choudhari & et al.(4)**

The study stated the prevailing practice patterns in the diagnosis and management of glaucoma among subspecialists and general ophthalmologists by using interactive audience response system (ARS) based poll for the first time in India wherein we have seen that in case of Suspicious optic discs with normal visual fields majority indicates or rather orders for optic disc or RNFL imaging .

- **RESEARCH QUESTION:**

After reviewing the above literatures, the **Research Questions** being formulated for this study are :

- What is the importance of SLP ?
- What is the significance of SLP in case of early detection of Glaucoma ?
- What is the market need of SLP in the Medical Device Industry ?



- **STUDY DESIGN:** Systematic Review and Meta -Analysis of Secondary data based on relevant data sources eg: Pubmed, Google Scholar for population-based studies of glaucoma prevalence, diagnostic modalities of glaucoma, on SLP, its marketing need, and quality life of Glaucoma patients published from 1996 up to 2017.

The steps followed in this Systematic Review are

STEP 1: FRAMING THE QUESTION



STEP 2: IDENTIFYING RELEVANT PUBLICATIONS



STEP 3: ASSESSING STUDY QUALITY



STEP 4: SUMMARIZING THE EVIDENCE



STEP 5: INTERPRETING THE FINDINGS

(Ref: Khalid S Khan : Five steps to conducting a systematic review---JOURNAL OF THE ROYAL SOCIETY OF MEDICINE Volume 96 March 2003, J R Soc Med 2003;96:118–121)

- **DURATION OF THE STUDY:** Three months. (5thFebruary 2018 – 4th May 2018)
- **DATA ANALYSIS PLAN** : Structured in terms to achieve the objectives

Data Research & Analysis



Table 1: Summary of Studies on Glaucoma Burden of India & Asia

NAME OF THE AUTHOR OF THE STUDY	YEAR OF STUDY CONDUCTED	STUDY AREA	STUDY DESIGN	NO. OF PARTICIPANTS/ STUDIES	TYPE OF STUDY SUBJECTS / PARTICIPANTS	FINDINGS OF THE STUDY
Chandrima Paul & et al.(6)	2016	Dhobarpur, Bakulia, Howrah, West Bengal	Cross-Sectional study	14,092	Glaucoma diagnosed	1) Higher prevalence of glaucoma in men in both urban and rural areas 2) Trend of prevalence of glaucoma with increasing age (prevalence more than 4% among those aged ≥ 70 years) in both the rural and urban areas. 3) Prevalence of POAG found to be higher in the urban population 4) The rural ACG prevalence was significantly higher 5) Ninety-five percent of the subjects of the urban population and 98% of the rural population were absolutely unaware of the fact of suffering from glaucoma
Vinay Nangia & et al.(7)	2013	Kalmeshwar Tehsil, Eastern Maharashtra	Population-based cross-sectional study	4711 subjects	People aged 30+ years	1) Factors associated for Glaucoma prevalence were depicted as older age, lower body mass index, lower blood concentration of hemoglobin, lower level of education, higher intraocular pressure, disc hemorrhage, myopic retinopathy, and longer axial length. 2) The ratio of open-angle glaucoma to angle-closure

						glaucoma were found to be 8:1
Arun Narayanaswamy & et al.(8)	2013	Southwestern part of Singapore	Population-based, cross-sectional study	3400 Indians	Adults aged between 40 to 80 years conducted between the years 2007 and 2009.	1) The prevalence of glaucoma increased with age and was higher found in participants aged 60 to 69 years and 70 to 80+ compared with those aged 40 to 49 years. 2) Significant increase in glaucoma prevalence with age, and higher among females mainly. 3) POAG, is the most predominant form of Glaucoma accounting for 58.9% of disease
G Venkata S Murthy & et al.(9)	2005	Fifteen states which accounted for 88% of the country's population	Cluster sampling methodology	72 044	Individuals aged 50+	1) Glaucoma and posterior segment causes were important reasons for bilateral blindness.
R.Ramakrishnan & et al.(10)	2003	Three southern Districts of Tamil Nadu, South India	Population-based, cross-sectional study	5150	Aged 40 and older	1) Prevalence of any glaucoma 2.6%, accounting for POAG 1.7% and PACG 0.5% 2) Increasing age, Male gender, Myopia of more than one Dioptre, and Pseudoexfoliation are the most important associated factors of POAG 3) Out of the identified POAG cases 95% were not diagnosed previously with POAG
Jayachandran Das & et al.(11)	2001	North India	Retrospective analysis	2425	Glaucoma Suspect	1) PACG is the most commonly encountered glaucoma wherein NTG and exfoliative glaucoma

						are relatively rare in presentation 2) Primary ACG was the most common subtype of Glaucoma with the POAG to PACG ratio as 37:63 3) Among the established cases, mean age of presentation for POAG of 60.54 years and a mean age of presentation for PACG as 55.13 years
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Summary of the Table 1: Ninety-five percent of the subjects of the urban population and 98% of the rural population were absolutely unaware of the fact of suffering from glaucoma. POAG is the most predominant form of glaucoma, followed by PACG wherein NTG and exfoliative glaucoma are relatively rare. Increasing age, Male gender, Myopia of more than one Dioptre, and Pseudoexfoliation are the most important associated factors of POAG. Factors associated for Glaucoma prevalence were depicted as older age, lower body mass index, lower blood concentration of hemoglobin, lower level of education, higher intraocular pressure, disc hemorrhage, myopic retinopathy, and longer axial length.

Table 2: Summary of Studies on Quality of Life and Economic Burden of Glaucoma Patients

NAME OF THE AUTHOR OF THE STUDY	YEAR OF STUDY CONDUCTED	STUDY AREA	STUDY DESIGN	NO. & TYPE OF PARTICIPANTS/ STUDIES	FINDINGS OF THE STUDY
V Gupta, G Srinivasan & et al.(12)	2005	India	Cross sectional study.	105 POAG Cases	1) The patients with POAG and PACG did not show a significant difference in the utility values, which is an indication that the patient is primarily concerned with his/her own visual disability rather than the diagnosis 2) The study depicted that the utility values (quality of life) among glaucoma patients are lower than those reported from developed countries

					3) Lower socioeconomic states and lower literacy levels have attributed to the lack of knowledge regarding the disease which is a matter of greater concern 4) Economic burden of lifelong therapy proves an important determinant for the quality of life in developing nations 5)The study significantly stated that the utility value is directly dependent on the degree of visual acuity loss associated with the disease and educational status but clearly not on the duration of disease, the number of medications, or the visual field indicators.
Rohit Varma & et al.(13)	2011	USA	Interpretive essay	Selected literature published from 1991 through December 2010	1) Vision loss due to glaucoma has a significant impact on HRQoL even in the early stages of this disease 2) Impact is evident both for undiagnosed as well as diagnosed patients 3) Ongoing visual field loss impair patients' abilities for the performance regarding common daily activities which also impose an increasing psychological burden on patients as well as their families. 4) The study clearly demonstrates that Early identification alongwith treatment for glaucoma patients and those with ocular hypertension at high risk of developing vision loss will definitely reduce an individual's loss of HRQoL as well as the personal and societal economic burdens
Parikshit Gogate & et al.(14)	2011	Pune and Solapur districts of Western Maharashtra	case–control study	200 POAG and PACG cases	1) The study delineates that Glaucoma was an incidental findings among the majority of the cases due to gradual painless diminishing vision being the most common symptom for presentation 2) Socioeconomic status, Lack of education and awareness of glaucoma

					among patients were the major risk factors for late presentation wherein prevalence of POAG was higher than that of PACG 3) PACG was more common in women than men
McKean Cowdin & et al.(15)	2008	Los Angeles, California	Population based Cross-Sectional Study	3034	1)Higher severity of VFL among OAG impacts vision related QOL 2)Prevention of VFL in those patients will significantly reduce loss of vision related QOL
Freemann EE & et al.(16)	2008	Salisbury ,UK	Population based Cross-Sectional Study	1160	1)Bilaterral Glaucoma individuals reported more difficulty on ADVS than those without Glaucoma

Summary of Table 2: Higher severity of VFL among OAG impacts vision related QOL. Vision loss due to glaucoma has a significant impact on HRQoL even in the early stages of this disease. Vision loss due to glaucoma has a significant impact on HRQoL even in the early stages of this disease.

Table 3: Summary of Studies on Current Diagnostic Modalities of Glaucoma

NAME OF THE AUTHOR OF THE STUDY	YEAR OF STUDY CONDUCTED	STUDY AREA	STUDY DESIGN	NO. & TYPE OF PARTICIPANTS/ STUDIES	MODALITY USED	FINDINGS OF THE STUDY
Nikhil Shreeram Choudhari & et al.(17)	2016	Annual conference of the Glaucoma Society of India , 2013	ARS based poll	379 Ophthalmologists	Perimetry and RNFL Imaging	1)Though affordability act as a significant determinant for imaging where general ophthalmologists were concerned,but relatively greater number of subspecialists were inclined toward imaging for patients with glaucoma (P < 0.01).
Sabina Andersson Geimer .(18)	2013	Sweden	Population-based cross-sectional study	45 Physicians	SLP using GDX with VCC,FD T, Humphrey	1) GDx ECC offers better diagnostic accuracy compared with that of VCC 2) OCT measurement of RNFLT was extremely superior to all other diagnostic methods being tested 3) Both OCT & HRT identified

					VFA, OCT	all eyes with severe to advanced glaucoma and done with good or acceptable specificity
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Summary of Table 3: Greater number of subspecialists were inclined toward retinal imaging for patients with glaucoma. GDx ECC offers better diagnostic accuracy compared with that of VCC .

Table 4: Summary of Studies on Efficacy & Utility of Scanning Laser Polarimetry

NAME OF THE AUTHOR OF THE STUDY	YEAR OF STUDY CONDUCTED	STUDY DESIGN	NO. & TYPE OF PARTICIPANTS/ STUDIES	MODALITY USED	FINDINGS OF THE STUDY
Marc f. Lieberman & et al.(19)	2011	Perspective		Tonometer, Slit Lamp, Gonio, HRT, OCT,SLP,HVF	1)Tonometry, slit-lamp gonioscopy, and optic disc evaluation always remain the foundation of choice for clinic-based case finding, whether it is in areas of more or less abundant resources. 2) In resource-abundant areas, the wider spectrum of glaucoma is addressed where there is emphasis on early detection of structural changes of Nerve Fibre Layer
Saad Ahmed & et al.(20)	2016	Meta - Analysis	2474 articles	OCT,GDX,HRT,SAP,SWAP	1) The greatest accuracy was found with FDT followed by blue on yellow perimetry ,OCT, GDx and HRT 2)The study depicted that GDx VCC performed much better than the GDx FCC 3)The synthesis of the study resulted in showing that amongst all the newer glaucoma diagnostic Technologies available now-a-days, OCT is the most accurate followed by GDx and then HRT.
Kourosh Mohammadi & et al.(21)	2004	Cohort study.	160 glaucoma suspects	SAP,SLP, IOP, Vertical CDR,	1) SLP RNFL measurements Were absolutely independently predictive of future visual loss even

				Stereophotograph assessment	When the age, IOP, CCT, vertical CDR, and SAP were there in the model
Poinosowmy D & et al.(22)	2000	Cross sectional study	110	GDX, HVF	1)Initial better VF of NPG patient had a greater reduction in RNFL than those who had initial advance VFD 2)The study clearly depicts RNFL change should be observed when the disease is at an earlier stage 3)Direct relationship of RNFL thinning with VF deterioration is established
Weinreb RN & et al.(23)	1995	Cross-sectional Study	233	CSLO, SLP	1)SLP provides quantitative measurements which correspond to the known properties of RNFL in normal & glaucomatous eyes
Weinreb RN & et al.(24)	1998	Cross-sectional Study	167	SLP	1)Combination of RNFL measures using SLP improves the ability between healthy eyes and with those eyes with early to moderate glaucomatous VFL
Choplin LT & et al.(25)	1996	Case Series	494	SLP	1)Assessment of RNFL can be done by SLP differentiating healthy eyes and Glaucomatous eyes. 2)Undetected damages of glaucoma suspects can also be determined
Poinosowmy D & et al.(26)	2001	Cross-sectional Study	308	SLP	1)GDX can well differentiate between Normal, OH and NTG subjects
Sinai MJ & et al.(287)	2000	Cross-sectional Study	102	SLP	1)NFL analysis targeting specific pattern of loss is extremely beneficial for differentiating normal NFL patterns from diseased NFL patterns and can identify patients at higher risk

Summary of Table 4: In resource-abundant areas, the wider spectrum of glaucoma is addressed where there is emphasis on early detection of structural changes of Nerve Fibre Layer. SLP RNFL measurements were absolutely independently predictive of future visual loss even when the age, IOP, CCT, vertical CDR, and SAP were there in the model. NFL analysis targeting specific pattern of loss is extremely beneficial for differentiating normal NFL patterns from diseased NFL patterns. GDX can well differentiate between Normal, OH and NTG subjects.

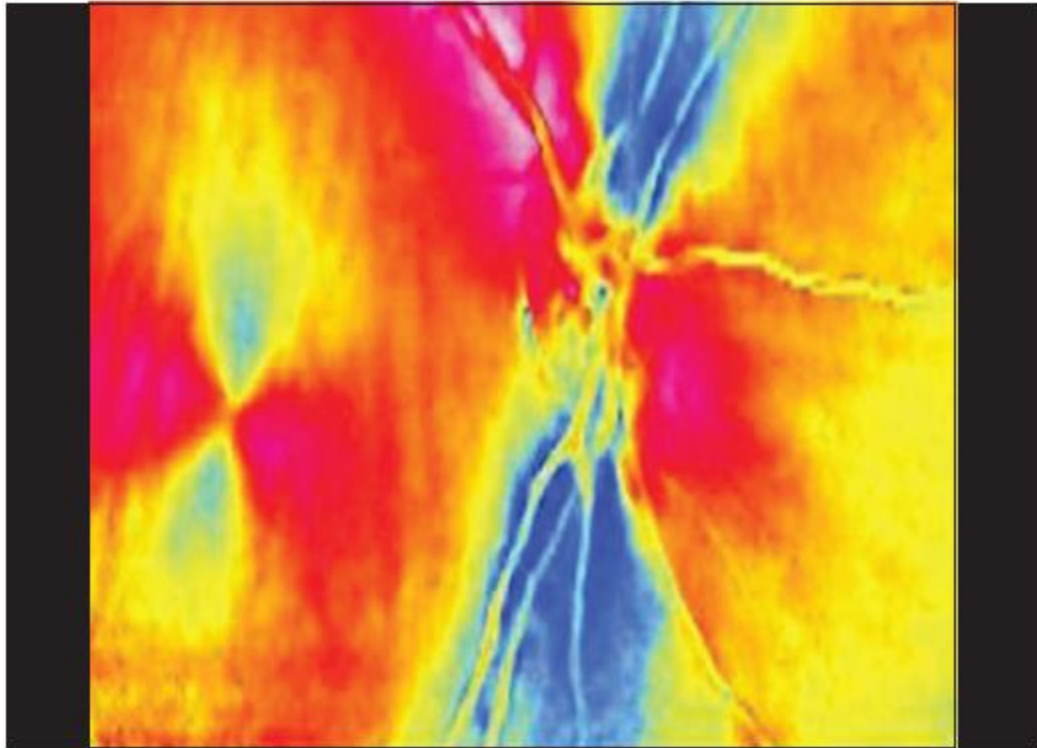


Figure 1: "Bow-tie pattern" (arrow) seen in the macula in an uncompensated scan

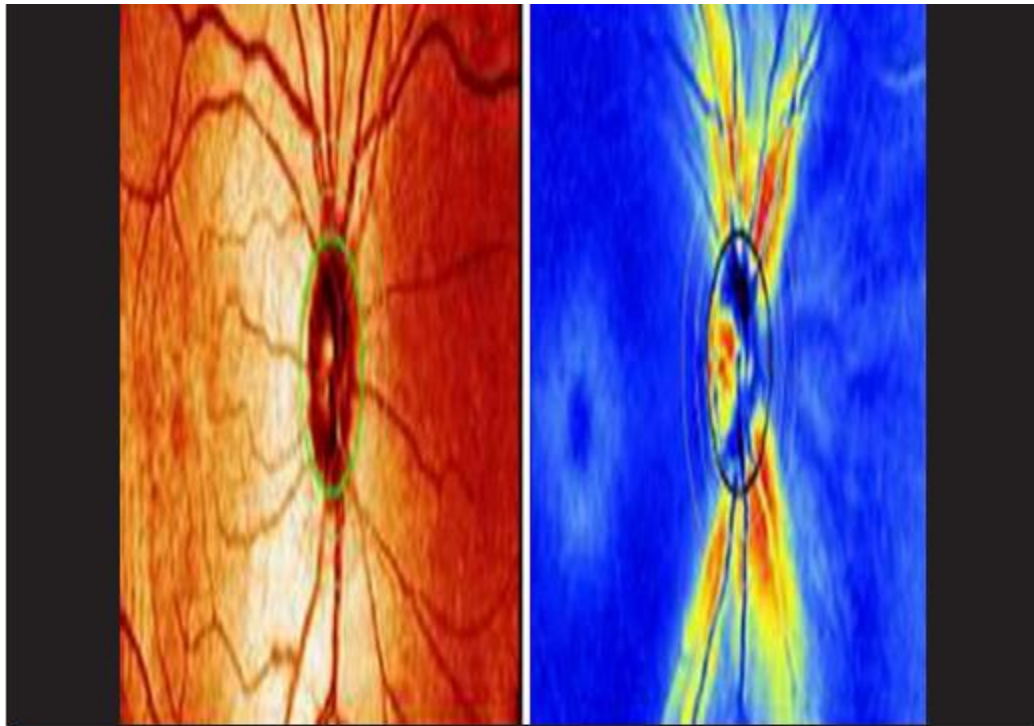


Figure 2: Images generated by the GDx-variable corneal compensation: Left image is the reflectance image displayed as a colored intensity map. The right image is the retardation map converted to retinal nerve fiber layer thickness, color coded based on the color spectrum

Quantitative RNFL evaluation is generally provided by the four key elements of the printout [Fig. 3]:

- Thickness map
- Deviation map
- TSNIT graph [Fig. 4a and b]
- Parameter table [Fig. 5].

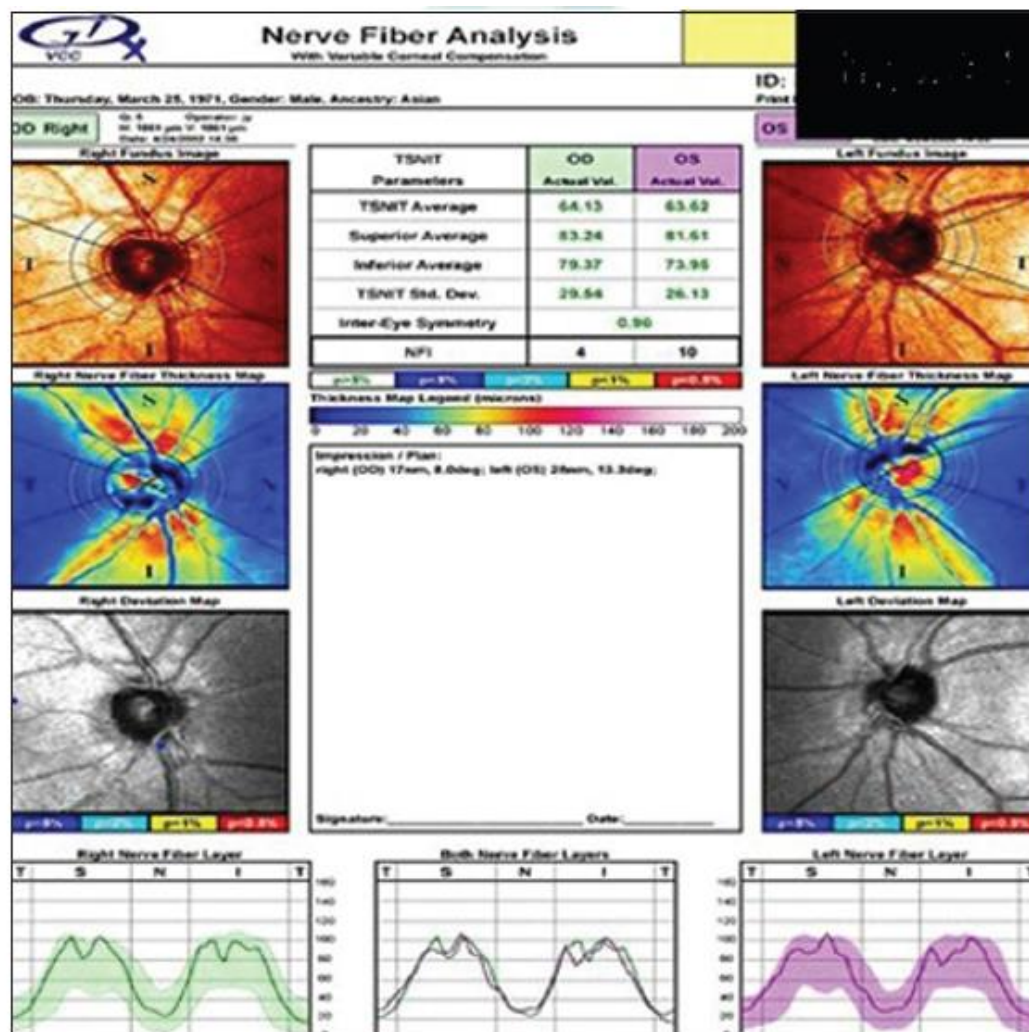


Figure 3: Print out showing various parameters for quantitative retinal nerve fiber layer evaluation

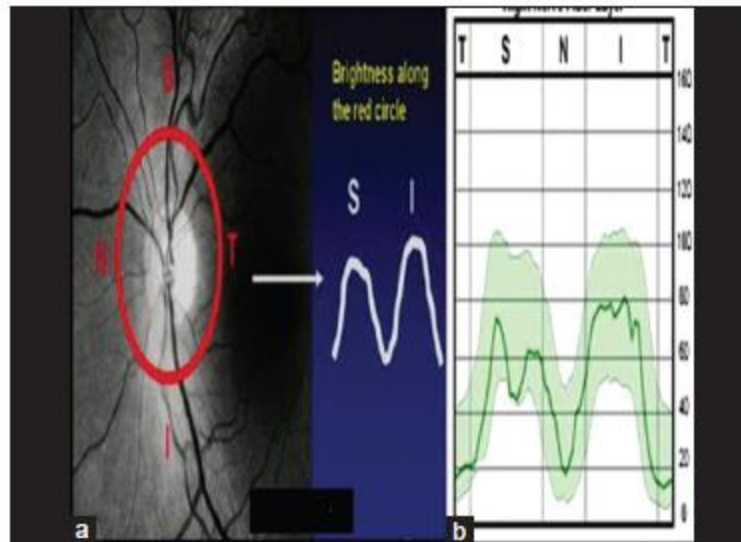


Figure 4: (a and b) Calculation circle, characteristic double hump pattern

TSNIT Parameters	OD	
	Actual Val.	Actual Val.
TSNIT Average	48.08	33.27
Superior Average	54.39	46.23
Inferior Average	62.33	28.06
TSNIT Std. Dev.	22.36	14.83
Inter-Eye Symmetry	0.50	
NFI	25	63
p>5% p<5% p<2% p<1% p<0.5%		

Figure 5: Temporal-superior-nasal-inferior-temporal parameters

Detection of Progression

The New software used in GDX helps in investigating Progression known as GPATM (progression analysis for GDX) [Fig. 6].

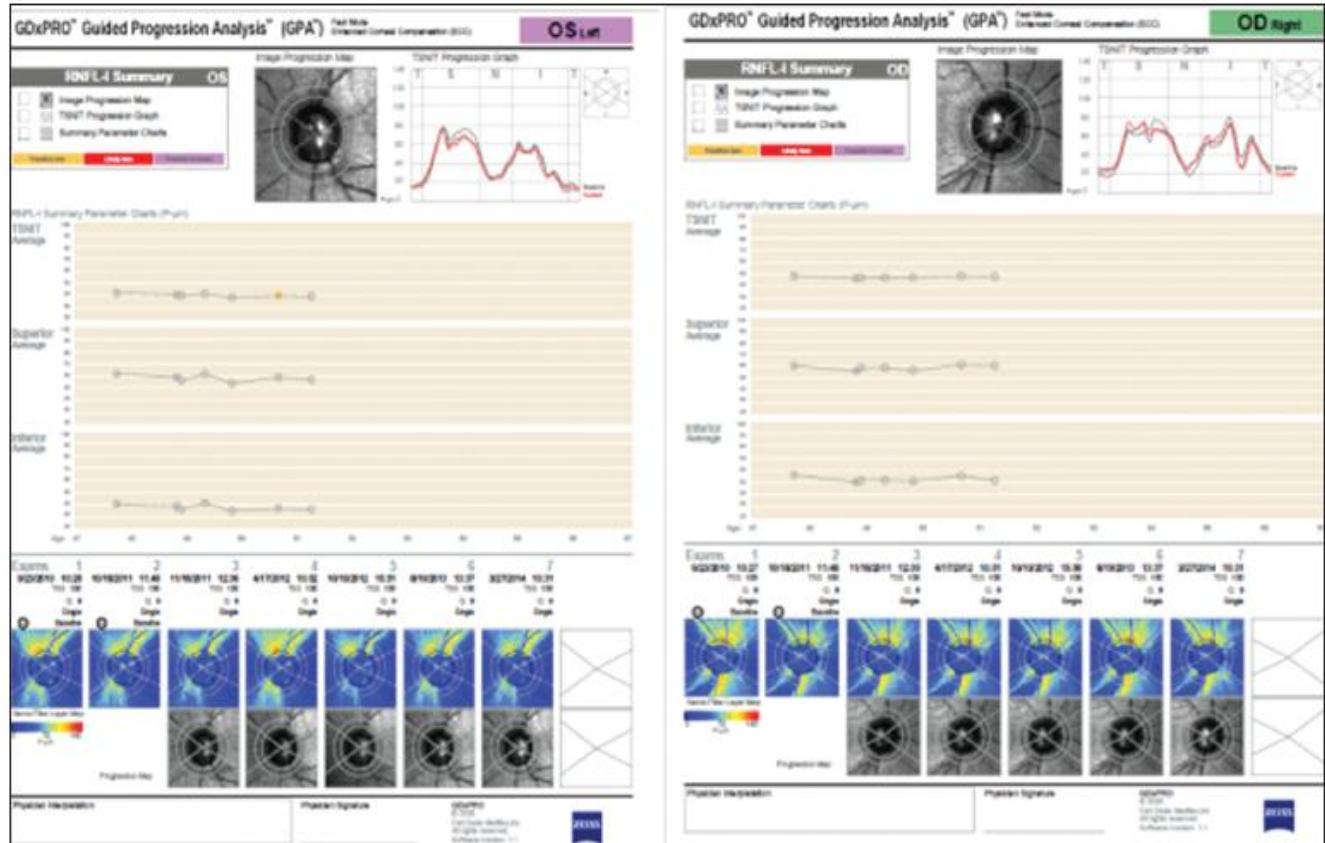


Figure 6: Overview of progression analysis using GPA software

Conclusions DRAWN



- Global number of people affected with glaucoma will increase by 74% from 2013 to 2040 disproportionately affecting people residing in Asia and Africa.
- Higher PACG risk in Individuals who are residing in East Asia, and higher POAG risk are among urban when compared with rural habitations.
- With increased urbanisation in Asia which are being projected for the future, glaucoma prevalence could continue increase in definite proportion, particularly in countries where there are higher rates of urbanisation, for example, China and India
- GDx-VCC has emerged in the Recent Clinical field as a valuable, objective tool of clinical value for the management of glaucoma
- GDx-ECC has even overcome the presence of ARPs and improved the diagnostic accuracy and the relationship between functional and structural measurements in glaucoma patients and is capable of neutralizing any residual anterior segment birefringence which are completely not compensated by VCC.
- Its exceptionally helpful for early detection of structural damage to RNFL and to a great extent useful for Longitudinal follow-up for detecting progression.
- GDx test report should be judiciously used by the clinicians in conjunction with clinical evaluation of the optic nerve head and functional testing for starting or adjusting glaucoma therapy
- The best-performing parameter is the NFI in GDx-VCC
- GDX is easy to operate, which does not require any pupillary dilatation, simultaneously it is highly reproducible, does not employ a reference plane, even does not require correction for ocular magnification and incorporates an easy age-matched normative database.
- Scanning laser polarimetry's major contribution lies in providing RNFL thickness information, which is an important indicator of early glaucoma.
- The FDA, glaucoma experts, researchers and clinicians described OCT, stereophotography, SLP, and CSLO for identifying clinically significant structural change which are related to glaucoma progression and treatment that is greater than that expected from normal aging and is associated with future visual function changes in the Medical Device industry.

- At every levels structural imaging technologies provide clinicians ,the ability to assess the ONH and RNFL in a standardized, objective and quantitative fashion like the level of an expert observer
- Evaluation of progression is most mature functionally as measured by SAP and structurally as assessed by CSLO.



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