Disclosure of the Outcome in 2014 Nine Province Study on the Blindness and Visual Impairment in China

Jialiang Zhao, M.D.

Peking Union Medical College Hospital
Chinese Academy of Medical Science

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Commercial Relationships Disclose

The author has no commercial interests or financial relationships to disclose

Background (1)

- **“WHO Universal Eye Health--- a Global Action Plan, 2014-2019” pointed out：Undertake population-based surveys on prevalence of visual impairment and its cause.**
- **China has undertook population-based surveys on prevalence of blindness and visual impairment in 1980s, 1990s in some counties, and Nine-province survey in 2006. These periodical surveys provided the information of the trend of blindness and VI and promote the activities of blindness prevention.**

Background (2)

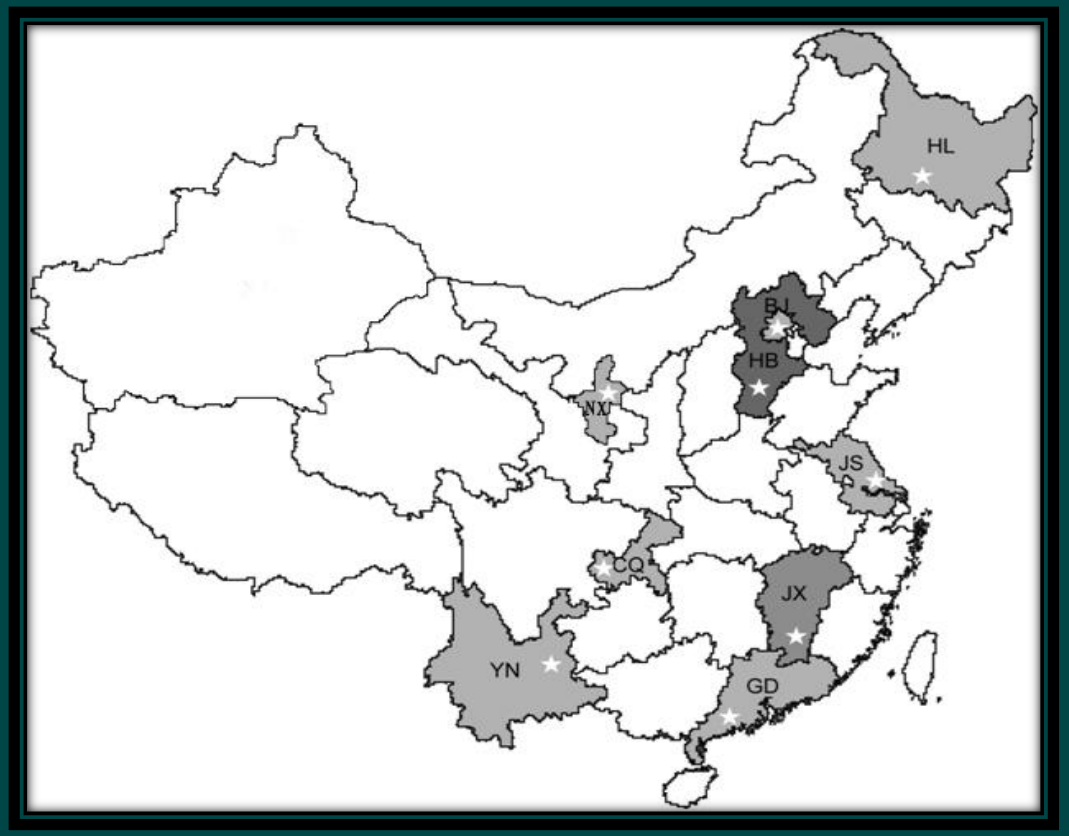
- It is already 8 year since 2006 Nine-Province Survey. There is a big change in socio-economic, living level and eye health service during these years. Thus, we conducted the New Nine-Provicne Survey on the prevalence of VI in 2014.
- This study was established by the National Health and Family Planning Commission with administrative oversight by the National Institute of Hospital Administration and technical oversight provided by the Peking University Medical College Hospital.
- The survey has got fully supported and sponsored by Orbis International in China

Objectives

- Overall objective is assessment of the burden and causes of adult VI and blindness in China. Five specific aims are addressed:
- Aim 1: Estimation of the prevalence of VI/blindness in counties previously surveyed in 2006.
- Aim 2: Estimation of the incidence of VI/blindness in counties previously surveyed in 2006.
- Aim 3: Assessment of the principal causes of VI/blindness.
- Aim 4: Investigation of risk factors associated with the main causes of VI and blindness
- Aim 5: Evaluation of cataract surgical services and outcome.

Study Sites (1)

- This survey was carried out in nine provinces representative of the different levels of socio-economic development within the 4 municipalities and 27 provinces in China.
- East Coast: Beijing, Jiangsu, Guangdong.
- Inland Middle region: Heilongjiang, Hebei, Jiangxi.
- West region: Ningxia, Chongqing, Yunnan



Study Sites (2)

- A rural county/district within each province was identified as the study area.
- The selected counties were socio-economically representative of the rural areas of the province, engaged in prevention of blindness activities, and geographically accessible.
- The village register census data were used as the study sampling frame within each selected county/district.

Methods (1)

- Field work was carried out over a six to eight month period.
- The sample frame was constructed using geographically defined clusters based on village register data. Cluster boundaries were defined such that each cluster would have a population of approximately 1000 individuals(all ages).
- Listing of households with the names of residents ≥50 years of age were obtained from the village registers, followed by door-to-door visits conducted by the enumeration team.
- Those ≥50 years of age were enumerated by name, gender, age, education (using graduation levels), and spectacle usage.
- Individuals temporarily absent at the time of the household visit were included in the enumeration.

Methods (2)

- Study participants were examined at local community facilities according to a pre-scheduled date.
- Those who did not appear at the examination site were revisited, repeatedly if necessary, by a member of the enumeration team to encourage participation.
- The physically disabled and those failing to come to the examination site after repeated contact were offered an ocular examination using portable equipment in their home.
- Written informed consent using a scripted consent form was obtained at the time of the examination, which included visual acuity measurements, refraction and a basic eye exam.

Methods (3)

- Distance VA was measured using a retro-illuminated LogMAR tumbling E chart at a 4-meter distance, and at 1 meter for those failing to read the top line (20/200).
- Each eye was measured separately, with glasses if worn for distance correction.
- Those PVA ≤ 20/40 in either eye were refracted to achieve BCVA. The refraction was subjective and carried out without cycloplegia.
- Ophthalmic examination of the eyelid, globe, pulillary reflex, and lens was carried out by ophthalmologist.

Methods (4)

- For those with aphakia/pseudophakia, surgical history was obtained, with clinical details pertaining to surgery type, and surgical complication noted during the examination.
- Participants with BCVA≤ 20/40 had their pupils dilated for direct ophthalmoscopy, slit lamp examination and fundus photography.
- Eyes presenting with VA ≤ 20/40 were assigned a principle cause of VI/Blindness by examining ophthalmologist.
- RE was assigned as the cause for eyes that improved to ≥ 20/40 with refractive correction. The classification of refractive error was according to the spheriacal equivalent degree.

Study Population and Response Rate by Province

province	Enumerated No. (%)	Examined No. (%)	% Examination Response Rate
Beijing	5,974 (10.6)	5,310 (10.4)	88.9
Jiangsu	6,251 (11.0)	5,823 (11.4)	93.2
Guangdong	6,425 (11.4)	5,638 (11.0)	87.8
Heilongjiang	6,257(11.1)	5,381(10.5)	86.0
Jiangxi	6,425(11.4)	5,511(10.7)	91.2
Hebei	6,991(12.4)	6,282(12.2)	89.9
Ningxia	5,494(9.7)	4,982(9.7)	90.7
Chongqing	7,197(12.7)	6,791(13.2)	94.6
Yunnan	5,999(10.6)	5,592(10.9)	93.2
All	56,630(100.0)	51,310(100.0)	90.6

Prevalence of VI and Blindness in the Better Eye with PVA: 2006 versus 2014 Study Samples

Province	Prevalence (%)							
	Moderate & Severe VI (PVA: <20/63 to ≥20/400)				Blindness (PVA: <20/400)			
	2006	2014	Change%	*P*	2006	2014	Change %	*P*
Beijing	8.31	6.05	-27.2%	<0.001	1.25	0.66	-47.2%	<0.001
Jiangsu	6.84	9.92	+45.0%	<0.001	2.18	1.27	-41.7%	0.001
Guangdong	17.4	13.8	-20.7%	<0.001	2.58	2.70	+4.7%	0.352
Heilongjiang	7.21	7.80	+8.2%	0.126	1.90	1.40	-26.3%	0.021
Jiangxi	14.4	11.6	-19.4%	<0.001	1.87	1.23	-34.2%	0.004
Hebei	7.88	8.29	+5.2%	0.212	1.47	0.70	-52.4%	<0.001
Ningxia	8.02	9.01	+12.3%	0.037	1.33	1.15	-13.5%	0.205
Chongqing	10.6	9.91	-6.5%	0.102	2.46	1.46	-40.7%	<0.001
Yunnan	15.8	14.6	-7.6%	0.040	5.40	5.39	-0.2%	0.491
All	10.5	10.2	-2.9%	0.125	2.29	1.77	-22.7%	<0.001

BCVA VI and blindness in the Better-seeing Eye by Age, Gender and Education

	Best Corrected VI		Best Corrected Blindness	
	Prevalence No. (%)	Adjusted Odds Ratio (95%CI)	Prevalence No. (%)	Adjusted Odds Ratio (95%CI)
Age (yrs)				
50-59	670 (3.68)	reference	99 (0.48)	reference
60-69	1333 (6.86)	1.84 (1.66-2.03)**	212 (1.09)	2.19 (1.64-2.93)**
70-79	1946 (19.0)	5.47 (4.83-6.20)**	273 (2.67)	4.85(3.68-6.38)**
80+	1283 (37.4)	12.8 (11.3-14.5)**	339 (9.87)	16.7 (12.5-22.2)**
Gender				
Male	2013 (9.05)	Reference	340 (1.53)	reference
Female	3,219 (11.1)	1.29 (1.20-1.38)**	572 (1.97)	1.33 (1.15-1.53)**
Education				
None	2855 (16.4)	reference	601 (3.45)	reference
< primary	939 (9.54)	0.80 (0.73-0.88)**	134 (1.36)	0.76 (0.62-0.94)*
Primary	946 (7.52)	0.71 (0.64-0.80)**	129 (1.02)	0.72 (0.54-0.96)*
≥ secondary	492 (4.29)	0.53 (0.45-0.61)**	48 (0.42)	0. 43 (0.31-0.60)**

Principal Cause of PVA<20/63 in Eyes

Principal Cause	<20/400		20/400-<20/200		0.20/200-<20/63		All	
	No.	%	No.	%	No.	%	No.	%
Cataract	2243	46.44	708	48.86	6437	51.32	9388	49.88
RE	37	0.77	54	3.73	3306	26.36	3397	18.05
Ret/choroid dis.	851	17.62	368	25.41	1273	10.16	2492	13.25
Cornea opacity	362	7.49	47	3.24	174	1.39	583	3.10
Amblyopia	103	2.13	81	5.59	289	2.3	473	2.51
PCO	81	1.68	30	2.07	218	1.74	329	1.75
Glaucoma	170	3.52	9	0.62	81	0.65	260	1.38
Phtis/globe disorg	248	5.13	0	0.00	0	0.00	248	1.32
Other optic atrophy	154	3.19	18	1.24	72	0.57	244	1.30
Other cause	418	8.65	103	7.11	376	3.00	897	4.77
Undetermined	163	3.37	31	2.14	317	2.53	511	2.71
Total	4830	100.00	1449	100.00	12543	100.00	18822	100.00

Principal Cause of PVA<20/63 in Eyes with Ret/choroid Diseases

Principal Cause	<20/400		20/400-<20/200		0.20/200-<20/63		All	
	No.	%	No.	%	No.	%	No.	%
Ret/choroid dis.	851	17.62	368	25.41	1273	10.16	2492	13.25
High myopia	422	8.74	176	12.15	298	2.38	896	4.76
AMD	116	2.40	67	4.62	515	4.11	698	3.71
DR	67	1.39	25	1.73	145	1.16	237	1.26
RD	28	0.58	4	0.28	3	0.02	35	0.19
Other Maculopathy	58	1.20	35	2.42	106	0.85	199	1.06
Other ret/choroid	160	3.31	61	4.21	206	1.64	427	2.27

Cataract Surgical Coverage Rate

- Surgical coverage was calculated as the ratio of the already-operated visually impaired/ blind to the un-operated visually impaired/blind plus the already-operated visually impaired/blind -- the already-operated visually impaired/blind divided by the total cataract impairment/blindness burden.
- Ningxia province data from the 2014 New Nine-Province Study were compared to Xinjiang province data from the 2006 Nine-Province Study.
- Crude surgical coverage rates without adjustment for differences in the age and gender distributions between the site-specific 2006 and 2014 populations.

Cataract Surgical Coverage Rate (VA <20/200): 2006 versus 2014

	Surgical Coverage (%)		
	2006 Study Sample	2014 Study Sample	*P* Value
Beijing	62.2	83.6	<0.001
Jiangsu	38.0	58.2	<0.001
Guangdong	45.5	64.4	<0.001
Heilongjiang	24.4	59.4	<0.001
Jiangxi	32.3	77.9	<0.001
Hebei	41.1	70.8	<0.001
Ningxia*	57.6	64.6	0.156
Chongqing	27.4	69.3	<0.001
Yunnan	26.3	43.4	<0.001
ALL	35.7	62.8	<0.001

Prevalence of RE

- Among persons 51310 who received presenting VA examination, 19981 persons was confirmed as RE by subjective refractive examination. 8454 persons with myopia, 9826 persons with hyperopia, 1701 persons with mixture RE.
- The prevalence of un-corrected RE in adults aged 50 or above is 38.94%.
- The prevalence of un-corrected myopia in adults is 19.8%.
- The prevalence of un-corrected hyperopia in adults is 22.4%.

Deduction from our study

- Population in China:1350 million
- Estimated percentage of adults aged 50 or above among the whole population:20%
- Blindness individuals: 3.326 million
- VI individuals: 10.854 million
- Un-corrected myopia: 49.3 million

Conclusions

- The prevention of blindness in China has got a great progress. The prevalence of blindness decreased about 25% in 8 years.
- The cataract coverage rare increased since 2006.
- However, VI and blindness is still an important public health problem in rural China. Prevention of blindness programs targeting the rural elderly should be expanded, particularly in areas with limited access and affordability of eye care services. Special emphasis should be given to reaching females and those without education. Greater attention should also be given to correction of refractive error.

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Thank you for your attention!