**Eye Care in Primary School**

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**Introduction**

***Sight Loss***

Refractive errors are the second leading cause of blindness among all age groups. The World Health Organization estimates that 12.8 million children aged 5-15 years worldwide are visually impaired from uncorrected refractive error (Resnikoff S, et al., 2004). More than six million people in the UK live with uncorrected refractive error and sight-threatening conditions (Harvey, S., & Perkins, D.,, 2016). Some may not yet be experiencing any symptoms and may have no idea that anything is wrong. This sight loss can have a significant impact on their daily lives.

Loss of sight has a substantial impact on people’s quality of life. This is reflected in the high cost to society – independent research commissioned by RNIB estimates that the total cost of sight loss to our economy is in the region of £28 billion a year, a figure which has spiralled from 22 billion since 2008 (Harvey, S., & Perkins, D.,, 2016). Sight loss can lead to a process of bereavement, where they experience a range of emotions, including shock, anger and denial, before eventually coming to accept the condition. Any level of sight loss, including uncorrected refractive error, has a tangible influence on quality of life (Cumberland P.M & Rahi J.S., 2016).

Nearly half of all cases of sight loss in the UK could have been prevented (Access Economics, 2009). Regular sight testing and early detection of eye conditions on the high street, followed by timely intervention and management can prevent sight loss and save the public purse millions of pounds each year. However, far too many people only have an eye test when they experience a problem with their eyes or their vision, which may be too late. Major changes are needed to embed eye health within health and social care policy and services and to raise public awareness of the importance of eye health.

***Children’s Eye Health***

The main pathological causes of vision impairment in children are cerebral vision impairment, disorders of the retina, and disorders of the optic nerve. Sight plays a vital part in children’s development of language, social, cognitive skills and literacy (Bruce, A et al. 2016). It is estimated that around 20 per cent of school-age children have an undiagnosed vision problem (Association of Optometrists (n.d.)) (Thomson, 2016). Often children do not realize they have problems with their vision because they don’t know anything different. They learn to compensate with their vision problems without fixing them, which can lead to more problems in school and later in life.

Vision impairment in children creates unique challenges to learning and development, which can have a profound impact on their education and wellbeing. A child’s ability to see the board and the words on a page clearly is critical to their learning experience.

Eye problems can range from common refractive errors such as near-sightedness and farsightedness, to serious eye conditions including:

**Amblyopia or “lazy eye”** - the most common cause of visual impairment in children. As the brain develops and receives diminished images from the

affected eye, it begins to suppress those images and favour the unaffected eye. If this condition persists, the weaker eye may become useless. Amblyopia becomes more difficult to treat effectively as the child becomes older.

**Strabismus or “crossed eyes”** – a condition where eyes are misaligned, or do not line up with each other. This problem is caused when the muscles do not work together. Strabismus may eventually lead to amblyopia. Approximately one in 50 children has strabismus (Prevent Blindness America)

When a child is born their eyes are still developing in the primary years. It is essential to have children’s eyes tested within this age range to avoid ‘lazy eye’ or ‘crossed eye’ conditions. Children’s eyes can be tested fully from the age of 2. Eye test for children aged under 16 and anyone in full-time education under the age of 18 is free in Wales. However, a YouGov poll of parents, conducted by RNIB, determined that 63% (43% if Asian) of parents stated their children had an eye test before the age of 8, 16% (28% if Asian) stated their child had never had an eye test (Harvey, S., & Perkins, D.,, 2016). Many studies which tried to address the problem of uncorrected refractive error through school-based vision testing and spectacle distribution programs; unfortunately, most programs have found that at follow-up, the majority of children provided spectacles at no charge were not wearing them (Congdon et al, 2008) (Crane et al, 1952) (Dandona et al, 2002). Reasons for not wearing glasses ranged from forgetableness, concerns regarding appearance or being teased to worried about eyeglasses making eyes worse.

***The Study***

A school has a key role to play in promoting health and well-being; it is within this role that they have capacity to participate in preventing sight loss and promoting eye care. The project intends to utilize School as a mechanism to promote eye care and encourage engagement with primary eye care providers i.e. Optometrists. In Wales, there is an optometry practice within 20 minutes’ drive of every household, including those living in rural areas and deprived communities (WalesOnline, 2013). The engagement with primary eye care providers could potentially reduce the number of Welsh children failing in education because of uncorrected eye problems, increasing the opportunities for our youth and improving their quality of life. A positive effect of providing glasses on educational outcome was observed in China (Ma et al, 2014).

This study seeks to analyse uptake of eye care post-delivery of eye health awareness information to pupils and children. A rewarded action will be implied to boost engagement. The project was delivered in Pillgwenlly primary school in March 2015. One month after the delivery of workshops at the school completed Eye Test Reward cards were collected from the school. Within a month 1/3 of the pupils in the school (142) had brought back completed reward cards to the school. 11 out of 142 were already going to optometrist, however, 131 pupils engaged with eye care for the first time. From 142, 42 (30%) were prescribed glasses. The number of prescriptions given required further investigation to determine the reasoning behind such high number of prescriptions. The project attracted funding from Community Gateway, Cardiff and also ABHB public health to deliver the project in schools in Cardiff and Newport.

**What we did?**

Six primary schools participated in delivering the project Cardiff: St Patrick’s, St Paul’s and Grangetown Primary and in Newport: Lliswerry, St Woolos and Maindee primary schools. The initial data was collected from each school based roll number, ethnicity data, children with special educational needs (SEN)/ additional learning needs (ALN) and also English as an Additional Language (EAL).

Volunteers were trained on basic eye health message to deliver in primary school. The training included:

1. Use model of an eye to describe the basic anatomy of the eye.
2. Use of sym spectacles to demonstrate what happens when things go wrong in the eye. The conditions described included Glaucoma, Cataract and Diabetic Retinopathy.
3. 5 ways to keeps your eyes health: Healthy diet, exercise, smoke free environment, wear sun glasses and regular eye test.
4. Sight loss awareness and need to wear glasses if prescribed.

Volunteers (Sight Cymru staff/ volunteers and Cardiff University undergraduate students) observed delivery of project initially in a classroom and then participated in delivering the workshops.

A questionnaire was sent to parents to determine:

1. If the child has had an eye test?
2. Any Diabetes in family
3. Any smoker in household
4. Any family member with sight loss

All local optometrists were informed about the reward card project in primary schools and what to do with reward cards prior to project delivery at school through postal mailing to each optometric practice.

Workshops were delivered classroom by classroom basis at each school, 20-30 minutes interactive session was delivered in each classroom. At the end of each session each child were given a letter to take home to parents attached with a list of local optometrist and eye test reward card. The letter informed the parents:

. regarding the need for children to have an eye test,

.NHS eye test for children is free,

. children’ eyes could be tested from the age of 2,

. minority communities more likely to experience sight loss and need for regular eye test.

The letter informed parent regarding the reward card and what to do with the reward card.

Each reward had two sections, first to be completed by parent/ care-giver and second to be completed by optometrist. The parent/ care-giver sections determined age of child at next birthday, ethnicity of child, name and ascertained permission for optometrists to disclose eye test details. The optometrist completed the data of eye test, optometrist details (stamp of name and address), whether or not glasses were prescribed and prescription details.

The project was delivered in all schools June and July 2016 prior to summer holiday. As it was not possible to collect completed reward card over the summer holiday, all reward cards were collected post summer holiday in September 2016.

Focus group interviews were held with parents and teachers at each school, to determine their views and awareness of eye health. The questions asked are included in the appendix.

**Outcome/ Results**

Project was delivered in 6 schools (Cardiff (Grangetown (411), St Patricks (300), St Paul’s Primary (212)) and Newport (Lliswerry (cohort: 505), Maindee (cohort: 501) and St Woolos Primary (cohort: 348)). Total cohort was 2277 pupils.

*Figure 1: Percentage of Free School Meals (FSM), ethnic minority, English as an Additional Language (EAL) and Additional Learning Need (ALN) within each school*

The percentage of FSM ranged from 20% (Lliswerry) to 40% (St Woolos), the average was 28% for all schools. The average for Wales was 17.3% FSM and so these schools displayed higher level of FSM than the national average and reflects the high level of deprivation within Cardiff and Newport.

The percentage of ethnic minority within the school roll was high amongst Grangetown, Maindee and St Woolos Primary Schools and lower percentage amongst St Patrick and St Paul’s. No data for Lliswerry Primary. In line with ethnic population within the school was the percentage of EAL in each school highest amongst Grangetown, Maindee and St Woolos and lower amongst St Paul’s and St Patrick’s.

The term additional learning needs describes learners with a diverse range of needs who require targeted support to enable them to access educational opportunities and fulfil their potential. ALN ranged from 16-33% with an average of 24.7% for all schools.

***Initial Questionnaire Responses***

*Figure 2: Responses from initial questionnaire*

St Patrick’s could not do initial questionnaires to parents, due to lack of time end of term. The responses from other schools ranged 3-51% returns with and mean average of 18%. From the questionnaire key findings included:

1. The average of those that stated they had taken children child for eye test was 50% and 50% stated they had not taken the child for an eye test in the last year. Some schools were performed better than others i.e. St Woolos, Lliswerry and Grangetown showed over 50% had taken their child for an eye test, whereas Maindee and St Paul’s over 50% had not taken their child for an eye test.
2. 55% stated there is no Diabetes amongst the family members and 43% stated there was Diabetes amongst the family members
3. 72% stated there were no smokers in the household and 27% stated there were smokers in the household.
4. 20% stated there was a family member with sight loss.

***Reward Card Results***

An average of 11% reward cards was returned to the school after the summer vacation. The lowest 3% from Grangetown and highest 17% from Maindee Primary. A total of 237 reward cards were returned to the schools.

*Figure 3: Ethnicity recording from returned reward cards*

A range of ethnicity was recorded amongst those reward cards returned to the schools.

**Age**

*Figure 4: Age of child from returned reward card*

Cards were returned by all age group children from 4-12 years of age.

**Optometrists**

Figure 5: Optometrist on returned reward card

A range of optometrists was used by children, however most popular amongst most schools were Specsavers, followed by Darlington and Boots.

**Access to Eye Care Service**

*Figure 6: Percentage Eye Test undertaken pre and post project delivery.*

26% of the children had eye test prior to the delivery of the project and 65% had eye test post-deliver of the project in school, thus engaged with eye care service for the first time.

*Figure 7: Outcomes of Eye Test on returned reward cards*

An average of 30% were prescribed glasses, 1 was being monitored and 1 was referred to secondary care.

**Level of Prescription**

The level of prescriptions varied and the equivalent sphere for Right and Left eye prescriptions were calculated.

*Figure 8: Hyperopic Prescription Values*

*Figure 9: Myopic Prescription Level*

|  |  |
| --- | --- |
| ANISOMETROPIC RX |  |
| Right Eye | Left Eye |
| 0.37 | -0.25 |
| 1 | -0.5 |
| 1 | -0.5 |
| 2 | -0.75 |
| 2 | -0.75 |
| 0.25 | 2.25 |
| 0.5 | 1.75 |

**Table 1: Anisometropic Prescriptions**

The prescription level for hyperopic were mainly 1.00D or higher, hypo-opic prescriptions were mainly -0.5D or lower. There were some anisometric prescriptions given, where the two eyes had unequal refractive error.

**Focus Group Outcomes**

Focus groups were held with set questions for parents and teachers. Teacher focus groups were held prior to project delivery or during the day of project delivery at the school. Parents’ focus groups were held post project delivery at the school.

|  |  |  |
| --- | --- | --- |
| **School** | **Parents Focus Group Number of Attendees** | **Teacher Focus Group Number of Attendees** |
| St Woolos | 6 | 5 |
| Maindee | 4 | 10 |
| Lliswerry | 6 | 7 |
| Grangetown | Unable to arrange | 3 |
| St Patrick’s | 8 | 4 |
| St Paul’s | 11 | Unable to arrange |

**Table 2: Focus group interviews**

***Teachers Focus Group***

Teachers felt that a number of factors could play a role in children’ dis-engagement in classroom including language, learning and physical difficulty as well as behavioral, emotional or mental disabilities. However, the most popular were lack of hearing, followed by poor vision and feeling tired. Majority of teacher felt good visual contact demonstrates classroom engagement. 90% of teachers felt good eye sight is most important in classroom engagement; it supports the teaching environment which often relies on the use of many visual aids. All felt they would consider sight as a potential issue if a child is disengaged in classroom.

Teachers recognised certain features that could be linked to poor eye-sight such as having headaches, squinting, can’t see board, poor handwriting, holding work close to see and not recognising letters.

When asked who would they go to if there was concerns about a child’ eye sight they mainly stated they would inform parent and Special Educational Needs Co-ordinator or Family Engagement Teacher. They all recognised the need for the child to go to the Opticians.

All schools indicated that they have reception vision screening. However teachers stated "We do have the school nurse, but as I mentioned earlier we're not really privy to the results of that. Usually letters go out to parents, but we don't find out." Some schools mentioned other small projects in terms visiting Specsavers or having Specsavers visit the school or use a kit they provide. But, all stated that there was very little about vision and good eye sight.

When asked how often should people go for an eye test mixed responses were received, whilst some recognised children should go once a year and adult every two years, the age at which people should go for eye test varied from 3 years to 13 years of age.

Teacher were asked roughly how many wear glasses in the school they stated 2/3 -5/6 per classroom of 26/30 and so 6-23% per classroom. However teachers felt is was difficult to state accurately, one teacher stated "I did try to put a list together for each class as to which children have glasses, but again, as we rely on the parents or the children to tell us, unless somebody tells us we don't know. "

Teachers also stated concerns that often children forget to bring their glasses to school or to wear them, they break them and many don’t want to wear them.

The teachers expressed the need to engage with parent "because all the children will go home today and say 'I need to do this' but it's whether the parents will actually follow it through and take them." When asked about barriers to engagement, many barriers were identified linked to language and family:

* **Language, knowledge of the area, stigma, not knowing if it's free or if you've got to pay for it.**
* **Missing reception year screening**: "every year a lot of children don't start with reception, so they miss that screening. I'm not sure what percentage but I'm sure large proportions miss that screening every year. They arrive in year four, five and six but it's only receptions that get the screening. So I would say a big chunk of them don't get it."
* **Families are wary of outside agencies**. "They don't want anybody involved in their life because they think even the optician's going to start asking how much they earn or who lives in their house or do they claim, are they overcrowded and to try and say to them that the optician isn't interested in who lives in your house or how much you earn, for our families that's quite big. We try to say, it's the same as qualifying for free school meals. A lot of our families won't admit to what they're claiming because they think that then someone's going to come and check."
* **Parents lack of awareness and knowledge**, e.g. not knowing that they're free and that you can have two pairs or knowing that the eye tests are free but thinking that glasses have to be paid for. "Because the parent can't see it, and don't realise there's an issue, they think well they can see, because they would have told me if they're having issues with it or they're struggling. So a lot of it does come down to parents."
* **Parents lack of time.** They have to be taken to it, it has to be booked.
* **Parent's lack of interest/understanding**. "We have parents who don't bring their children to school, who don't see school as being important so, you know eyesight! If they can't even get their kids to come to school then taking them for regular eye tests is not going to be on their radar."

Teacher stated that in order to inform engagement to eye health amongst children it was necessary to do:

* **Awareness raising workshops for the families**
* **Regular awareness rising** so that it's continually out there for parents.
* **Use the 'Design to Smile' model**, 'they do all sorts of things and we send out letters to parents and not all parents take it up, but the vast majority do and therefore they get all these different things happening to them around dental care'. "They get their toothbrush and toothpaste don't they!"
* **Eye tests in school**. Instead of having the parents take them to have the eye tests they could have the eye tests in school. This would enable teachers to facilitate building the habit.
* **Build the habit in children** of annual/biannual checks. 'It’s educating your children to do it, that's what you're doing. You might not be able to change the parent, but you might be able to change the child'. " once they've been the first time they'll be more minded to go again"
* **Rewards schemes and incentives. "** It needs to be a rewarding experience rather than something that's a bit invasive."
* **Role models**
* **Types of glasses available** that make them look cool and trendy. 'I think it has come a long way though. It's not like when I was a child. People would be wearing like round little glasses. Now you can get some really nice glasses. It doesn't have the stigma now that it had in the past.'
* **Schools could do initial screening**. Identify ones who needed further investigation.

***Parent Focus Group***

Parents felt vision is very important in education and classroom engagements. The children’ behavior could suggest they needed glasses. When asked whether all members of family had an eye test 98% parents stated all have had an eye test. However, this was because there were problems detected at hospital when the child was born, school screening or because there was a family history. They felt that had problems not been picked up they probably would not have attended, as eye health is not discussed. Dental health played a bigger role with parents stating “Dentist come to school in little wagons. Brush teeth. But, nothing happens regarding eye health”.

When parents were asked at what age should people go for an eye test and how often, a varied response was received, 2.5- 8 years of age and based on experience they have been going 6 monthly, yearly or 2 yearly. Parents responded mainly by stating if there was a concern about eyes they would go to an optician, however 30% stated they would go to GP. Parents were all aware of free eye tests for children under the NHS, through adverts in opticians, however mainly through actually visiting optician and then determining it is free. Parents felt opticians are seen as a place to get glasses and not necessarily to provide eye health monitoring services, much of the optician promotion is often based on selling glasses, “Adverts are based on buy one get one free for glasses and not come and check.”

Parents participating in focus groups mainly had children with eye sight problems or already wore glasses, when asked whether children wore glasses or not, they stated although there may be peer pressure not to wear them there are very fashionable glasses and glasses with Disney characters that the children want to wear. They stated that if someone in the family wears glasses i.e. parents then the children are often comfortable with wearing glasses.

Parents suggested the need to have screening at school at different stages i.e. reception and then in juniors. They also stated the need for teachers to know more. “No teachers know about eye issue, no-one knows about what my daughter’s prescription is. Record should be shared with school”

The parents stated that the reward card project was well received amongst children “Yes, they can’t wait to do it!” Children were happy to get free eye test and also get a reward. Parents from different schools were aware of parent that had registered and taken their children for an eye test for the first time as a result of the project, some suggestions were made in terms of improving the project:

1. Need to inform parents prior to project delivery through meeting, workshop or coffee morning.
2. Junior school children would be fine taking letter home. However, infants teachers need to direct them
3. Test at school “could they not have a van like the dentist.”

**Conclusion**

* Eye health message reached a large number of pupils (2277 total number of pupils across six schools). 237 (an average of11% of total cohort) pupils returned reward cards to the school post sight test. This was lower than the level of engagement seen within Pillgwenlly primary; this could have been due to project being delivered close to end of educational year compared to March delivery in Pillgwenlly School. Due to the time of project delivery not much support was provided from school to encourage uptake, some children moved school over summer vacation and there was some loss of cards and information over summer vacation.
* Engagement was observed from people from varied ethnicity and age. 65% pupils indicated going to eye test post-project delivery, engaging with primary eye care for the first time. The pupil attended a range of optometrists, however most popular was Specsavers (Figure 5). This demonstrates that informing and rewarding positive action does help improve engagement with services.
* 30% of children were prescribed glasses; this was the same as observed at Pillgwenlly primary school project. The schools existing in high deprivation areas of South Wales and this could have played a role in number of people prescribed glass (Johnson MRD et al; 2011). The ethnicity profile and number of children with additional learning needs were also captured, however no direct link was made in terms of glasses prescribed and ethnicity or ALN within this study. Levels of deprivation, ethnicity and learning disability have been linked to sight loss through previous studies ( Johnson MRD & Morjaria-Keval A, 2007) (Johnson MRD et al., 2011) (Carvill, 2001).
* From the initial questionnaires in schools it was also noted that 50% of parents stated they never took their children for an eye-test whilst it was noted that there was a high prevalence of Diabetes (43%)within the families along with some households with smokers and some with vision impairment within the families within the schools involved in the study. Diabetes, smoking and family history of sight loss can lead to sight loss (Ronald Klein et al., 1984) (Mitchell P et., 2002).

30% of children within primary school age group were prescribed glasses. The prescriptions levels could impact on literacy skill development (Bruce, A et al. 2016) (Atkinson J et al, 2007) (Shankar S et al, 2007). The prescription level, based on the biggest equivalent sphere were mainly over 1.00D hyperopic, and the myopic range was from -0.50D up to -5.00D and some that were anisometropic. Whilst a child’s vision is emmetropisation from birth up until the age of 6, guidelines and research providing guidelines to prescrition for children of school age suggests it is necessary to prescribe beyond 0.75D hyperopic and early onset of myopia (Leat, 2011). Partial or underprescription beyond the age of 6 could potentially increase myopia later in life (Leat, 2011)and visual acuity will be comprimised for hyperopic readings beyond 1.00D (Leat, 2011). The level of prescription indicates that the prescriptions provided were necessary and that it would enhance the child’ visual function and thereby educational engagement in school. The optometrists who prescribed lower prescriptions could have considered other symptoms i.e. headache, difficulty focusing, squinting, blinking, poor attention span or reading difficulty, as these factors could potentially be resolved with the support of weak prescribed glasses.

Both parents and teachers recognised the importance of vision in engaging with learning in school. They stated that there was a lack of engagement with eye care due lack of awareness, time and interest of parents. Both parents and teachers valued the eye screening service at reception, but felt there should be screening at different stages of schooling and not just at reception and the outcome of the screening service should be shared with teachers. Parents and teachers talked about dental health model of engagement should be used for eye health to engage more primary school children with eye care. The reward card project was appreciated by teachers and parents.

**Recommendations**

There is a lack of engagement at primary schools with eye care. There is a need to educate children, parents and teachers regarding eye care.

Eye health impacts of children’s development and thus making it essential to assess eye sight. The project educated parents, school and children and the engagement of children with eye care service was enhanced. 65% of children attended an eye test for the first time. The project should be delivered in all primary schools across Wales annually or biannually to increase the engagement of people in the primary school age group with eye care.

The project engaged with many children, families and school with eye care and was able to pick up a large number (30%) of undetected sight problems. It is important to consider rolling this project out further and engage with all schools on an annual basis

Reducing the burden of avoidable blindness due to uncorrected refractive error will remove barriers to education and employment and thereby improve the quality of life for millions of disadvantaged people and starting the engagement with eye care from a young age will bring change in behaviour across generations.

Screening eye sight at reception was effective as it’s a service recognised by parents and teachers. However, this often missed children, as identified in focus group interviews with teachers and as a result the eye sight of children is not tested unless problems occur. The screening service should be provided not only to reception aged children, but throughout primary age group or at least at 4, 6, 8 and 10 years of age. The results of screening service are not shared with teachers. A more robust method of testing eye sight of children is required.

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