

## Pixelated vision:

### Validation of the complaint with no objective findings

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#### Abstract

**Background:** We encountered a young female presenting with a complaint of “pixelated vision”. A brief literature search at the time of consultation showed no peer reviewed publications. Our objective was to use an infodemiologic approach to investigate the possible occurrence of an unidentified visual phenomenon.

**Methods:** An Internet search with the metabrowser search engine Dogpile ([www.dogpile.com](http://www.dogpile.com)) was conducted on April 24, 2018, using free text words “pixelated” and “vision.” The first 100 results were scanned for forum posts and cross-referenced to minimize duplication.

**Results:** Of the first 100 results, 15 unique posts were identified. The majority of posts were made by the affected individual (n=14, 93%). Sex was female (n=5, 33%), male (n=2, 13%) or unknown (n=8, 53%). Onset was identified as new (n=10, 67%) or chronic (n=5, 33%).

**Conclusion:** The availability and content of these forum postings suggest that pixelated vision is an uncommon, non-pathological visual phenomenon not yet documented in conventional medical literature.

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#### Background

Complaints of visual phenomena are a common reason to consult pediatric neurologists. These can be divided into negative symptoms, for example: visual field loss, and positive visual phenomenon including scotoma and the creation of false visual images caused by the brain’s perception of the incoming visual stimuli<sup>1</sup>.

We encountered a young female presenting to a pediatric neurology clinic with a complaint of “pixelated vision.” She described her vision as having normal acuity and color but had an overlay of finely pixelated dots, similar to what one would experience while looking at an older analog television. Symptoms were binocular, persistent, included the entire visual field and had been present for several years. A previous ophthalmological examination was normal with intact visual fields and normal acuity testing. No abnormalities were identified on neurological examination and brain imaging was not pursued.

A brief review of the literature at the time of her consultation showed no peer reviewed publications within the conventional medical literature describing such a phenomenon described as “pixelated vision.” Self-reported posts reporting this description were however, readily encountered on the Internet. We decided to explore this possible phenomenon using nontraditional data sources. Eysenbach et al. described a Web-based method known as “infodemiology” which they defined as “the science of distribution

and determinants of information in an electronic medium, specifically the Internet, or in a population, with the ultimate aim to inform public health and public policy<sup>2</sup>.” Our objective was to use a supply side, information prevalence infodemiologic approach to investigate the possible occurrence of pixelated vision as a yet unidentified visual phenomenon within the conventional medical literature.

#### Methods

We conducted an internet search with the metabrowser search engine Dogpile ([www.dogpile.com](http://www.dogpile.com)) that retrieves results from several search engines including Google, Yahoo!, Live, and Ask<sup>3</sup>. The search was conducted on April 24, 2018, using the free text words “pixelated” and “vision.” The first 100 results were scanned specifically for forum posts discussing symptoms of pixelated visual phenomenon. After the first 100 results, subsequent results were found to be primarily irrelevant or duplicates. Username, reported age, and sex were recorded for each post if available. These details were then cross-referenced to minimize the potential for duplicate inclusions.

#### Results

Of the first 100 results, 15 unique posts were identified describing “pixelated visual” phenomenon (for specific posts, see Table 1). Posts were made by the

Table 1. Unique forum posts that describe pixelated visual phenomenon.

Age (y)/Sex	Synopsis
Unknown/Unknown	“For over 20 years I have suffered from what I call "Pixelated" vision. I see a swimming pattern of minute dots or "pixels" super imposed on everything. The lower the light level, the more prominent the pixels appear. It makes driving at night extremely difficult”.
56/Male	“This past year however I have had on three or four occasions the disturbing occurrence of pixelated vision. It seems to affect the lower outer edge of my sight spectrum. Both eyes are affected. It does not seem to be a problem with my eyes per se; that is, if I cover the left eye, the identical problem pixelated pattern is in the opened right eye and vice versa when the right eye is covered and the left eye opened the same pixelated pattern is there”.
Unknown/Female	“It is something that works like white noise. I don't notice it, but its there. It simply just fills the air. Tiny pinpricks of light, all of which seem multicolored, but do not alter my perception of color. As previously mentioned, it's like the pixels of a tv screen. This condition has not altered my vision in any way, nor does it hurt me, or annoy me. It's just the way it is for me. I want to know what it is that I have, and if its common or not”
Unknown/Male	“However, the specific visual phenomenon that concerns me most is the wavy or "pixelated" appearance of straight lines. It is worse on the computer, but apparent on any high contrast straight line on paper, highway signs, etc. These are not huge waves or distortions that would indicate AMD or other obvious retinal issues, but more like "noise”
Unknown/Female	“Has anybody else experienced pixelated vision? This started a few weeks ago with me. It is not constant but I've started to notice that when I blink and then open my eyes my vision is darkness with white and greenish dots like pixels. This lasts a split second and my vision returns to normal but was just wondering if this is another MS thing or something else”.
25/Unknown	“It looks like the pixels on a tv screen, or like static. Especially noticeable in the dark, or against a solid-colored background. It's definitely not dust. It's too concentrated and too small. It isn't "floaters," which are larger, and fleeting. It appears to be only in the air, and not resting on objects”
Unknown/Unknown	“Since the beginning of September I have been having like fuzzy vision. The best way I found to describe it is if you go to Photoshop and use the Noise filter, that's what I see...its like a fuzzy screen over my vision...its not a major problem, but it gets annoying. I still see in the same clarity and my prescription is fine I still see everything, its just this like fuzzy screen over my vision”.
Unknown/Female	“Hi, I have come upon a recent phenomena call 'visual snow', but I prefer to call it pixelated vision, because it resembles the reverse images of pixels on a computer. Lately, I have been seeing it, and I was wondering how many people also have been experiencing this problem”.
13/Unknown	“Ok. So last night (and still a little bit this morning) I had blobs which made everything in real life pixelated and blurry - they were making it impossible to see anything. I had a really bad headache while this was happening”
Unknown/Female	“My vision is very densely pixelated. like thousands of tiny dots swarming around everywhere in my field of vision and they are still there when I close my eyes. my eyes can't even adjust to the dark because the dots are white and swarming and flashing around everywhere”.
Unknown/Unknown	“Why is my vision pixelated, like on a tv? Is this an eye condition or am I going crazy?”
Unknown/Unknown	“Why is my vision pixelated, like on a tv? What does it mean when my vision is fine but it s fuzzy”
61/Female	“The patient has a 30+ year history of Type 1 diabetes, has had cataract surgery in both eyes and never had laser or vitreo-retinal surgery for treatment of her diabetic retinopathy. Essentially, she has been doing very well. I see her at least twice a year to insure there is no diabetic macular edema and no sign of proliferative diabetic retinopathy. She has been complaining of a "pixelated" change to the vision of the left eye”.

Unknown/Unknown	"Relaxed start to the day...light breakfast...suddenly peripheral vision in left eye is slightly blurred...like viewing TV... where the screen is pixelated at the very edge...taken BG reading...up from 5.8...to 9"
Unknown/Unknown	"One day, I was hanging out with my friend, and he told me that he's started seeing everything in pixels. strangely, I've always seen everything in pixels or like everything had a grainy texture to it. after asking more about it, he said around a few months ago, his vision entirely went pixelated like you'd see looking at your computer screen".

affected individual the majority of the time (n=14, 93%) or a health care provider (n=1, 7%). The affected individuals' sex were female (n=5, 33%), male (n=2, 13%) or unknown (n=8, 53%). Pixelated vision was a new onset phenomenon in (n=10, 67%) and a chronic phenomenon in (n=5, 33%).

## Discussion

Our infodemiologic approach identified 15 independent web-based forum postings describing pixelated vision as an unidentified visual phenomenon. Of these, one third were described as a life-long experience while the remaining two thirds were more acute in onset. The majority described pixelated vision as an isolated symptom with no other health concerns suggesting that this is unlikely pathological in nature. The availability of these forum postings suggests that pixelated vision is an uncommon, but normal visual phenomenon as yet undocumented in conventional medical literature.

Beyond this case report, limited studies have been noted in the migraine literature describing a similar phenomenon referred to as "visual snow". Schankin et al. described visual snow as a persistent disturbance in the entire visual field similar to that of an analog television. Through a retrospective chart review, those with visual snow were often found to have additional visual symptoms such as palinopsia or photophobia, comorbid migraines and normal ophthalmological examinations. They concluded that although these associations exist, the temporal overlay does not support a hypothesis of visual snow being the result of migraine type aura but rather a unique clinical syndrome requiring further characterization and research<sup>45</sup>. Furthermore "visual snow" within the pediatric literature is limited, with less than 10 peer reviewed publications at the present time. "Visual snow" and "pixelated vision" may represent similar phenomena, however, one may argue that for millennial youth who have a large exposure to screen time "pixelated vision" may be a more appropriate term. Moreover, some of our descriptions of acute "pixelated vision" could be more accurately ascribed to migraine scotoma had more information been reported (Table 1).

The strength of our study was the relative accessibility of online posts describing this

phenomenon, which are not otherwise found in more traditional scientific literature. The isolation of the visual phenomenon in the majority of cases suggests a real, non-pathological process, with an unknown incidence and prevalence in the population. Conversely, our approach is limited to its qualitative design and reported co-morbidities, where objective validation of information is not possible. It is important to note that non-refereed information on the internet, though abundant at times may lead to premature conclusions. This further necessitates the need for vigorous scientific methodology in the medical community. Nevertheless, this study confirms utility for web-based infodemiology studies when conventional medical literature fails to characterize unusual and uncommon subjective medical phenomenon. This knowledge may provide a role in both identifying pixelated vision as a potential variation of normal and providing reassurance to patients seeking medical care of the validity of their symptoms and its apparent benign nature.

## Conflict of Interest Statement

The authors have no competing interests to declare.

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