

YouTube: Are parent-uploaded videos of their unwell children a useful source of medical information for other parents?

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ABSTRACT

YouTube is a vast source of freely accessible user-uploaded medical information. To our knowledge no study has analysed the quality of parent-uploaded videos which depict illness in their children. We aimed to investigate the quality and quantity of videos representing two common conditions, croup and dehydration.

YouTube was searched using the search terms 'croup+child' and 'dehydration+child'. The first 400 videos of each search were screened. Parent-uploaded videos were systematically analysed for characteristics (duration, likes/dislikes, number of views) and technical quality. Each video was then assessed for whether it represented a good clinical example.

RESULTS – Out of 38 'croup' videos which met criteria, 15 were judged to be a good clinical example. Only 7 of these 15 videos were also of high technical quality. Seven 'good clinical example' videos had poor technical quality.

Out of 28 'dehydration' videos which met the inclusion criteria, two were a good clinical example. One of these videos had good technical quality. In most videos, there was no indication of the reason for upload.

CONCLUSION – There were very few videos of either condition which were simultaneously a good clinical example and of high technical quality. It is extremely difficult and time consuming to isolate such examples from the mass of information available. Parents could be misled by apparently high technical quality videos which are not in fact good clinical examples. Healthcare professionals should not currently advise parents to seek medical information on YouTube, but instead be able to direct them towards more reputable resources.

INTRODUCTION

YouTube is the second most popular website globally, with over a billion users and four billion video views per day [1]. It is a vast and constantly growing source of user-uploaded

video content and is a potential source of un-moderated freely available medical information that anyone can access.

Medical professionals have begun to use YouTube as a tool for patient education in certain areas [2], but the volume of professionally created content is far outweighed by content that is created by non-medical YouTube users. As videos are not moderated, there is a wide variation in the quality and reliability of videos available.

In the published literature, there are isolated studies examining the type and quality of information available on YouTube for a variety of adult health conditions. These studies have generally found that a significant proportion of content relating to whichever health condition studied is misleading [3-6], and in certain conditions, misleading videos have a higher number of hits than accurate videos. [7]

YouTube is increasingly being used to disseminate health information [8] in a format that is familiar to those who have grown up with social media. This generation have begun to have children of their own, and as new parents they are increasingly likely to turn to social media when they need medical information.

As YouTube is such a popular video sharing website, parents may be using the site either in order to find out more about a known (physician diagnosed) condition, or to attempt to 'self-diagnose' by comparing their child's symptoms to videos of similar symptoms. Inaccurate YouTube videos which misrepresent a medical condition, may mislead parents and feed their misconceptions around clinical signs and/or management of the condition [8]. For healthcare professionals, knowledge of potential sources of misinformation could help to guide parents towards more appropriate sources of medical information.

It is also important to bear in mind that even healthcare professionals may find it difficult to judge the acuity of a case on video depending on its technical quality [9] - non medically trained parents would likely find this even more challenging.

There has been limited study into YouTube videos of paediatric epilepsy [10-12] and outside of this condition very few other paediatric health conditions have been examined. No study to our knowledge has yet specifically analysed the quality of parent-uploaded videos demonstrating certain symptoms in children.

AIM

To describe the quantity, quality and popularity of parent-uploaded YouTube videos featuring unwell children, and to analyse their reliability as a potential source of medical information for other parents.

METHODS

Two common paediatric conditions (croup and dehydration) were chosen for comparison, as the former has clearly visible and audible clinical signs – potentially lending itself well to video portrayal - whereas the latter may not be as easily represented on video.

We performed identical internet searches via servers based in the UK and the Netherlands separately for each condition on October 6th, 2015. Search terms were 'croup+child OR croup+baby' for croup, and 'dehydration+child OR dehydration+baby' for dehydration.

The first 400 videos identified in each search were explored (twenty webpages of search results). Videos created by doctors or by educational institutions were excluded. Videos which clearly had been uploaded by parents or caregivers were included for evaluation. The current number of views, comments, likes and dislikes for each video was documented.

The videos which met the inclusion criteria were analysed independently by four individual paediatricians (a junior clinician and senior clinician based in the UK, and a junior clinician and senior clinician based in the Netherlands). Each individual scored each video for its technical quality using the validated Medical Video Rating System (MVRS) [11]. A score of

either 1 or 0 was given for each attribute: light, sound, angle, duration and resolution. This gave a total possible high score of 5 for technical quality.

Each clinician separately gave their subjective opinion of whether or not they regarded the video as a 'good clinical example' of the condition – i.e. whether the video would provide useful information for a non-medically trained parent whose child had the condition.

RESULTS

CROUP (table 1)

Video	Title of video	Age of child (in title / description of video)	Date Uploaded	Duration	No. of views	Comments	Likes	Dislikes	Good clinical example ?	Good technical example?
1	baby with Croup Stridor Barking Cough visual & audio sound	2y	Apr-11	02:49	1,212,928	342	1066	184	yes	no
2	Croup Cough	Not stated	Dec-10	02:03	648,556	57	0	0	no	no
3	POOR TODDLER HAS CROUP! :(Not stated	May-15	11:21	334,615	1284	9187	167	no	yes
4	Connor in hospital with Croup (Stridor)	Not stated	Apr-09	00:38	153,926	44	44	3	yes	yes
5	Inspiratory stridor at rest - severe croup	Not stated	Oct-10	00:34	258,812	80	149	19	yes	yes
6	This is what CROUP looks like and sounds like	12m	Oct-13	09:04	113,364	34	45	30	yes	no
7	The Cough of Croup	Not stated	Jan-14	00:20	65,006	7	24	12	yes	yes
8	croup	9y	Sep-10	00:58	75,354	23	23	5	no	yes
9	8 year old with croup, stridor, respiratory distress	8y	Aug-11	00:28	20,571	7	8	7	no	no
10	First time with playdough and a croup cough.	Not stated	Feb-14	00:44	1569	2	10	1	no	no
11	I've Got the Croup	Not stated	May-08	00:37	98,056	0	0	0	no	yes
12	Croup with stridor-severe	Not stated	Jan-12	00:35	76,527	7	20	3	no	yes
13	Carter has Croup! Using Nebulizer	Not stated	Mar-15	03:34	142	3	8	0	no	no
14	Croup Stridor	6m	Apr-14	00:40	1236	3	0	0	no	yes
15	CROUP EJEMPLO 16-5-2011.AVI	Not stated	Oct-11	00:20	6648	0	3	0	yes	no
16	croup cough laugh	Not stated	May-12	00:57	3,247	1	5	3	no	yes
17	does your child have croup?/? what is croup????	2y	Jun-15	08:53	244	0	1	0	no	yes
18	Croup	Not stated	Jul-14	00:09	155	0	0	0	yes	no
19	CROUP-Laryngitis	Not stated	Feb-09	00:11	53,713	4	2	0	no	yes
20	9 month old 'croup'	9m	Apr-14	00:28	895	2	0	0	yes	no

21	Juliana with croup at four months old	4m	Feb-13	01:50	1721	0	0	0	no	no
22	Croup sounds of baby	Not stated	Mar-13	00:20	4194	0	0	5	no	yes
23	Cameron and croup	Not stated	Oct-09	01:25	5670	5	0	0	yes	no
24	Croup in 4month old baby (barking cough)	4m	May-15	00:54	1198	0	1	0	yes	no
25	Sick baby has croup.	Not stated	Feb-12	00:42	2326	0	1	0	no	no
26	Lila with croup	Not stated	Jun-11	00:35	4049	2	0	1	no	no
27	Croup "Barking Cough"	Not stated	Feb-12	00:54	19,390	0	0	0	no	no
28	4month old baby with croup, breathing difficulties	4m	May-15	00:48	301	0	1	0	no	no
29	Keatyn with Croup	Not stated	Sep-14	00:46	634	0	2	0	no	no
30	Zacharie Laryngite striduleuse Faux croup 7 février 2010 001.avi	Not stated	Feb-10	00:22	15,116	2	1	1	yes	yes
31	Croup Cough	14m	Jul-14	00:07	1442	1	1	1	no	yes
32	Isabella has croup! Signs, symptoms, and treatment of croup.	Not stated	Jan-15	06:41	465	0	1	0	no	no
33	3-month-old with croup (audio only)	3m	Oct-14	00:42	298	0	0	0	yes	no
34	Croup cough	12m	Jun-14	00:26	928	0	0	1	no	no
35	Croup cough baby	12m	Feb-11	00:29	24,340	2	12	3	yes	no
36	3-month-old with Croup	3m	Oct-14	00:19	397	0	0	0	yes	no
37	Snoring baby with croup	Not stated	Jul-11	00:24	3501	0	2	0	yes	no
38	Severe Croup in Toddler	2y	Dec-14	00:23	1478	0	3	0	no	no

The search identified over 12,400 videos. From the first 400 videos in the search results, forty croup videos met the inclusion criteria. Two of these were later removed by their creators before all members of the study team were able to view the videos. This left thirty-eight (38) videos which underwent full analysis.

There was a wide range of number of views per video – from 142 to over 1.2 million. Ten of the videos had over 50,000 views. Median number of views was 3501.

Out of thirty-eight videos, fifteen were judged to be a good clinical example. Four of these fifteen were highly rated for technical quality (MVRS 4 or 5).

Fifteen videos were of a high technical quality (MVRS score 4 or 5), but only six of these were judged to be a good clinical example. Three of the simultaneously high clinical quality, good technical example videos had had over 50,000 views.

Five videos which were of low clinical quality, but high technical quality, had over 50,000 views.

Nine videos were of a low technical quality (MVRS score 1 or 2), although three of these were judged to be a good clinical example. The most viewed of these 'poor technical quality, good clinical example' videos was seen 23,000 times and the least viewed was seen 298 times.

DEHYDRATION (table 2)

Video	Title of video	Age of child (in title or description of video)	Date uploaded	Duration	No. of views	Comments	Likes	Dislikes	Good clinical example?	Good technical example?
1	INFANT DEHYDRATION 0002	not stated	Apr-11	04:56	5,767	3	15	0	yes	yes
2	holy sh*t and vomit: both my kids go to the ER with rotavirus!	not stated	Apr-13	08:52	134,557	117	343	58	no	no
3	Phoenix ICU Sick Kids	2 years	Mar-13	00:33	2,677	3	4	0	no	no
4	Discharged and Going Home	not stated	Dec-14	17:43	3,506	8	13	1	no	no
5	Child with Salmonella poisoning	not stated	Jun-13	00:34	277	0	1	0	no	no
6	My crazy child	not stated	Aug-07	00:26	1,987	1	1	1	no	yes
7	Dehydrated Fredward	not stated	Jul-08	00:46	258	0	0	1	no	yes
8	Dehydrated toddler	not stated	Apr-11	00:52	282	0	0	0	no	no
9	Dehydrated baby	not stated	Mar-13	00:30	139	0	0	0	no	no
10	Adventures of a Baby: Dehydration	not stated	May-11	00:43	148	0	0	0	no	no
11	My sweet baby Levi- having a conversation with momma - YouTube	not stated	Mar-10	03:59	695	0	1	0	no	yes
12	Dancing hospital baby! Liam makes the best of it. 😊☹️😊	not stated	Mar-15	02:12	145	0	0	0	no	no
13	Kadyn is sick	not stated	Oct-12	00:52	1804	5	10	1	no	no
14	my baby and toddler have ROTAVIRUS!	not stated	Apr-13	12:50	17,337	33	122	3	no	no
15	Baby Viral Gastroenteritis...A very stressful week!	not stated	Feb-15	02:38	371	0	2	0	no	no
16	diarrhea factory #19	not stated	Nov-11	01:30	432	0	2	1	no	no
17	Projectile Vomiting Baby	not stated	Aug-10	00:45	159,005	64	218	37	no	yes
18	AC vomits- caught on cam	not stated	Jun-10	00:36	1031	0	0	0	no	no
19	ER VISIT! FOOD POISONING!	not stated	Sep-13	02:16	1,846,307	746	2469	643	yes	yes
20	Laughing and vomiting	not stated	Aug-12	02:08	121	0	0	0	no	no

21	Dakota eating, playing with, and vomiting up her dinner! Oh	not stated	Oct-12	10:08	127	0	0	0	no	no
22	Surprise vomit	not stated	Mar-13	00:35	100	1	0	0	no	no
23	Baby projectile vomiting	not stated	Aug-15	00:09	2053	0	4	0	no	no
24	Diarrhea baby surprise	18 months	Jul-10	00:29	41,025	.	62	19	no	no
25	Eww! Newborn Baby Vomit Surprise! ...wait for it.	1 day	Jan-12	01:04	15,516	5	32	11	no	no
26	incredible projectile vomit	6 weeks	Apr-09	00:43	147,021	142	174	34	no	no
27	Funny baby milk vomit	5 months	Jan-13	00:23	1280	3	4	1	no	yes
28	Baby Vomit Fountain	not stated	Dec-12	00:21	7299	1	11	3	no	no

The search identified over 13,000 videos. From the first 400 videos in the search results, twenty-eight dehydration videos met the inclusion criteria.

There was a wide range of number of views per video – from 100 to over 1.8 million. Four videos had been viewed over 50,000 times. Median number of views was 1542.

Out of twenty eight-videos, two were judged to be a good clinical example. One video identified was simultaneously a good clinical example, scored highly for technical quality and had had a high number of views (this video had over 1.8 million views).

There were five videos out of the 28 that were of a high technical quality (MVRS score 4 or 5). Four of these high technical quality videos were a poor clinical example, however one of them had been viewed over 159,000 times.

There were three videos of a low technical quality (MVRS score 1 or 2). None of these was a good clinical example, however one had been viewed over 15,000 times.

DISCUSSION

For each condition, the search identified a similar number of videos (over 12,000). The videos automatically displayed at the top of the search results were the ones with the highest view counts, although there was no association between number of views and the quality of a video as a clinical example.

There was a stark contrast between the number of useful clinical examples for croup and the number of useful clinical examples for dehydration. Raw search results identified roughly the same number of hits for each condition, however once the videos that matched the inclusion criteria were analysed, there were only two useful clinical examples of dehydration compared to fifteen useful clinical examples of croup.

This reflects the fact that croup is a condition with clear visual and audible signs that can be demonstrated on video. Many of the results for 'dehydration' identified by our search were 'amusing' videos of otherwise well children unexpectedly vomiting - irrelevant to somebody searching for medical information regarding the clinical condition of dehydration.

Clinical quality of videos and technical quality of videos was disconnected. We observed this for both croup and dehydration. Only four of the fifteen 'good clinical example' croup

videos were rated as having high technical quality. Conversely three out of the nine 'low technical quality' croup videos were found to be a good clinical example.

The non-medical viewer of a poor technical quality video (ie a video with poor lighting, bad angle or inadequate sound) may be less likely to persist with viewing it, and falsely ascribe a negative judgement regarding its utility as an informative piece of media [11]. Equally, a video with high production values may appear more 'trustworthy' than it is – its high technical quality masking an insufficiency of useful medical information. It would be of great value to study laypersons' reactions to these same videos to determine whether this is indeed the case (it has been observed that there is a discrepancy of opinions regarding clinical information when videos of variable quality are shown to doctors [8]).

It was beyond the scope of this study to examine the reasons behind parents' choice to upload videos of their unwell children. Only a minority of uploaders reported on reasons for upload (given in the text description accompanying some videos). Whatever the reason behind uploading, however, the number of views of the videos is striking – the most popular videos have been viewed well over a million times.

As well as the motive for uploading, it would therefore also be valuable to understand more about who is searching for and viewing these videos, and their reasons why.

The strengths of this study include the use of a validated video rating scale to analyse technical aspects of the videos, and the fact that each video was independently analysed by four clinicians all specialising in paediatrics, of varying clinical experience. The study team was also equally split between the UK and the Netherlands and the search performed in each country identified the same videos, demonstrating that the same online content is available in the UK as in mainland Europe, supporting generalisation of our results to a wider European population.

It is not possible on YouTube to determine what proportion of video views come from any one area of the world. The vast majority of videos were uploaded in the United States. Further areas of study might include contacting the content creator/uploader to ask about their motivation for uploading, and analysis of comments below popular videos to gain understanding of viewers' reactions and motivations for viewing.

CLINICAL IMPLICATIONS

The medical professional or medical educator searching YouTube for resources will be able to find excellent examples of clinical signs if they are willing to spend time searching; although many of the videos with useful clinical signs are in fact of low technical quality. Videos which are simultaneously high technical quality and which display useful clinical signs are rare, and we found more of these videos for croup – a condition which has clear audible and visual signs compared with dehydration.

The sheer amount of video material on YouTube means that many low quality parent-uploaded videos are present within search results, and it is extremely time consuming and difficult to isolate any useful videos. The difficulties non-medically trained parents or carers will have in identifying such resources would be significantly greater [8, 13].

As medical professionals we should be conscious of social media trends and maintain a broad awareness of the range of medical information which parents and carers may be accessing, and know that their perceptions may be informed by inaccurate sources.

The fact that it is very difficult to find useful clinical examples on YouTube should mean that we do not advise parents to seek medical information about their child's condition on YouTube, and that we should have suggestions of reputable internet resources they can

access instead. These recommended reputable resources will vary from country to country and between institutions.

It is currently unclear in most cases why parents choose to upload videos of their unwell children. If this was better understood, this could lead to collaborative projects between parents and healthcare professionals to create relevant, accurate and informative content in a format that may be preferred by healthcare students and parents alike.

CONCLUSIONS

There were very few videos of either condition which were simultaneously a good clinical example and of high technical quality, and it is extremely difficult and time consuming to isolate such examples from the mass of information available.

Parents and laypeople could be misled by apparently high technical quality videos (which have good light, sound and picture quality), which are not in fact good clinical examples. Healthcare professionals should be aware of the content available on YouTube in order to be able to assist parents in their health information seeking practices and guide them towards more reputable sources.

CONTRIBUTORSHIP STATEMENT

Damian Roland had the initial idea for the research. Katie Knight and Dorothy van Leeuwen gathered and analysed data, and prepared the abstract and manuscript. Damian Roland, Henriette Moll and Rianne Oostenbrink were all equally involved as supervisors providing advice and guidance at all stages.

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All authors have completed the ICMJE uniform disclosure form at http://www.icmje.org/coi_disclosure.pdf and declare: no support from any organisation for the submitted work [or describe if any]; no financial relationships with any organisations that might have an interest in the submitted work in the previous three years, no other relationships or activities that could appear to have influenced the submitted work.

What is already known about this topic

YouTube is the second most popular website globally, with over a billion users and four billion video views per day.

It is a constantly growing source of unmoderated user-uploaded medical information.

Information is lacking on the quality of parent-uploaded videos on YouTube demonstrating certain symptoms in children.

What this paper adds

It is extremely difficult and time consuming to isolate high quality video examples of unwell children that would be suitable educational material.

Parents and laypeople could be misled by apparently high technical quality videos (which have good light, sound and picture quality), which are not in fact good clinical examples.

Healthcare professionals should not currently advise parents to seek medical information on YouTube, but instead be able to direct them towards more reputable resources.

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