



Palatability of Liquid Medications Used to Treat Pediatric Mental Health Conditions

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Abstract

There is an increase in prescribing trends of psychotropic medications over the past twenty years to treat children with mental health disorders.^{1,2} Pediatric patients receiving medications are likely to be treated for multiple diseases concomitantly.² Children often require liquid formulations and taste is a significant limiting factor that impacts adherence. Currently, there are no reports of palatability studies for the psychotropic class of liquid medications used in children. Therefore, the purpose of this study is to determine the palatability of liquid medications used to treat mental health disorders in children.

Background

- ❖ Mental health disorders are increasing among the pediatric population and children are being diagnosed as early as 3 years of age. The most commonly diagnosed mental health disorders include attention deficit/hyperactivity disorder (ADHD), major depressive disorder (MDD), autism spectrum disorder (ASD), and anxiety disorders.
- ❖ Consequences of untreated psychiatric illnesses in children and adolescents include increased severity of symptoms, increased duration of illness and higher relapse rates.¹
- ❖ Uncontrolled ADHD results in impaired academic achievement, social interactions and the overall well-being of children.² In 2003, the National Survey of Children's Health (NSCH) found that 2.5 million children with ADHD (56% of those with the diagnosis) were reported to be currently taking a medication for treatment.¹ Stimulant medication is the first-line choice for treating ADHD and psychosocial interventions are also be warranted. There are several stimulant medications, such as methylphenidate or amphetamine products, available for the treatment of ADHD, however, for the purposes of this study we will focus on liquid medications that can potentially be flavored.
- ❖ ASD is a neurodevelopmental disorder characterized by social and communication impairments as well as behavioral and motor abnormalities.³ Its prevalence in children is about 1%. Signs and symptoms often seen in children with ASD include language delays, diminished social interactions, and intolerance of change.² Due to the poor understanding of the pathophysiology of ASD, medications are often prescribed to treat the symptoms of ASD including antidepressants, anxiolytics and antipsychotics.⁵ The two FDA approved antipsychotics to treat patients' irritability are risperidone and aripiprazole.⁵
- ❖ About 5-10% of children and adolescents have symptoms of MDD, which is often linked to a family history of mood disorders.⁹ The risk of depression increases as the child reaches puberty. Cognitive-behavioral therapy is the first line treatment option.¹¹ Fluoxetine is the only medication approved for children with depression. Fluoxetine is a selective serotonin reuptake inhibitor (SSRI) and is supplied as an oral tablet, capsule, and oral solution.
- ❖ Between 1995-2010, prescribing trends of these psychotropic medications has increased.^{1,2} In an effort to explore the palatability of the liquid medications used to treat mental health disorders in children, this study will provide a more unified view on the flavoring options of these medications and how they affect children's preferences and parents' stress levels during administration.

Purpose

There are no current studies available that describe the palatability of psychotropic liquid medications. The purpose of this study is to determine the percentage of children that consider their medication to be Super Yum or Yum. Secondary objectives include comparing children's preferences to parents' and to describe the difficulty related to administering these medications to children.

Methods

- ❖ Cross-sectional survey study.
- ❖ Institutional Review Board approval pending.
- ❖ Surveys administered verbally to pediatric patients, ages 3 to 11, and their caregivers.
- ❖ Patient age, gender, liquid medications used, use of flavoring and type of flavoring, how their medications tastes (using the Mr. Yuck scale as seen in **Figure 1**), their least preferred flavor and most preferred flavor will be collected.
- ❖ Caregivers will be asked the same survey questions (**Table 2**) as the children (**Table 1**) and also be asked about how they help their child with medications, stress administering medications to their child, and about flavoring use.
- ❖ Upon completion of the survey, parents will receive educational materials on tips for techniques to ease medication administration.
- ❖ The qualitative data will be analyzed to identify emerging themes based on the child and caregivers' responses regarding palatability of liquid medications used to treat mental health disorders.
- ❖ Responses from children and caregivers will be compared to look for differences in preferences.

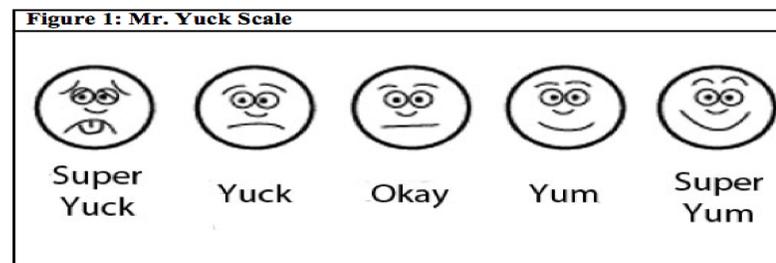


Figure 1: The Mr. Yuck scale is a visual tool from (Dr. Yum) that will be used to assess the children's preference of taste for the mental health medications they take. The scale utilizes facial expressions with descriptive words below to rank preference. The scale ranges from the most unfavorable taste as "super yuck" to most favorable as "super yum."



Figure 2: The Flavorx flavor scale will assess the child's taste preference based on the flavors available from Flavorx. The flavor choices include a photo to help the child identify the flavor.

Surveys

Table 1: Child Questionnaire	
Question	Response
Which of the following liquid medications are you currently taking?	1. Procentra® (dextroamphetamine) 2. Methylin® (methylphenidate) 3. Quillivant XR® (methylphenidate ER) 4. Risperidal® (risperidone) 5. Abilify® (aripiprazole) 6. Prozac® (fluoxetine) 7. Cymbalta® (duloxetine) 8. Other: _____
Was something added to the medication to change the flavor?	Y/N If yes, what?
How do your medications taste?	Super Yuck / Yuck/ Okay / Yum / Super Yum
Which flavors do you like the most?	Select from FlavorRX Flavor Chart
Which flavors do you like the least?	Select from FlavorRX Flavor Chart

Table 2: Caregiver Questionnaire	
Question	Response
Which of the following liquid medications is your child currently taking?	1. Procentra® (dextroamphetamine) 2. Methylin® (methylphenidate) 3. Quillivant XR® (methylphenidate ER) 4. Risperidal® (risperidone) 5. Abilify® (aripiprazole) 6. Prozac® (fluoxetine) 7. Cymbalta® (duloxetine) 8. Other: _____
How many chronic medications is your child taking?	
Was something added to the medication to change the flavor?	Y/N If yes, what?
How do your child's medications taste?	Super Yuck / Yuck/ Okay / Yum / Super Yum
Which flavors does your child like the most?	Select from FlavorRX Flavor Chart
Which flavors does your child like the least?	Select from FlavorRX Flavor Chart
Does your child have trouble taking their medications?	Y/N
If yes, on average how difficult is it to have your child take their medications?	Not difficult / Somewhat difficult / Difficult / Very difficult
What do you think is the reason for the difficulty taking the medications?	Difficult to swallow Dislikes the taste Dislikes the texture Burden of taking more than one a day Other: _____
What do you do to help your child take their medication?	Nothing Administer the medication Measure the medication Store the medication Mix the medication with food or drink Other: _____
Have you used a flavoring service for your child's medication?	Y/N
If yes, did it help ease administration of medication to your child?	Y/N
How stressful is it to administer medication to your child?	Not stressful / Somewhat stressful / Stressful / Very Stressful

Bibliography

- Centers for Disease Control and Prevention. Mental health in the United States. Prevalence of diagnosis and medication treatment for attention-deficit/hyperactivity disorder—United States, 2003. *MMWR Morb Mortal Wkly Rep.* 2005 Sept; 54(34): 842-7
- Practice Guideline for the Diagnosis, Evaluation, and Treatment of Attention-Deficit/Hyperactivity Disorder in Children and Adolescents. *American Academy of Pediatrics.* 2011 Nov; 128 (5): 1-16
- Clarke C. Autism Spectrum Disorder and Amplified Pain. *Case Reports in Psychiatry.* 2015 Jan 9; 2015(2015): 1-4
- Ghosh A, Michalon A, Lindemann L et al., Drug discovery for autism spectrum disorder: challenges and opportunities. *Nat Rev Drug Discov.* 2013 Oct; 12(10): 777-90.
- Klein DN, Shankman SA, Lewinsohn PM et al., Subthreshold depression in adolescence and mental health outcomes in adulthood. *J Am Acad Child Adolesc Psychiatry.* 2010 Jul 1. 48 (7): 703-710.
- King RA, Ayres WA, Benedek E et al., Practice parameter for the psychiatric assessment of children and adolescents. *Jam Acad Child Adolesc Psychiatry.* 1997, Mar 13. 36 (10 Supplement): 4S-20S.