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Negative Perception of Generic versus Name Brand Pharmaceuticals

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Abstract

With generic products, the generic version is typically given a bad rap, with claims that these versions "are not as satisfactory" – but these products are usually the same product with two different labels being printed. Sometimes these products are even coming from the same lab. In the pharmaceutical world, the generic version carries the same sort of stigma – the idea that it is less effective, and sometimes individuals believe that this version does more harm than it does good. However, if one were to look at the list of ingredients on a bottle of Tylenol and then a bottle of Kroger-brand Acetaminophen – one will find that both have the same active ingredient: acetaminophen. Even with this information, some individuals are unable to be convinced – they do not support generic medicine due to personal perception. The purpose of this study was to determine why this preference exists, and if there is a difference in name brand vs. generic over-the-counter pharmaceuticals. Due to the global pandemic currently going on, the theory of this study has been altered significantly to further compare and contrast name brand and generic over the counter medications (acetaminophen and ibuprofen). The results of this study are likely to lead to further research in eliminating the stigma that generic medicines carry with them.

Keywords and phrases: *generic, brand name, over the counter, pharmaceuticals, perception, acetaminophen, ibuprofen, Tylenol, Advil*

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Negative Perception of Generic versus Name Brand Pharmaceuticals

When they go to the grocery store, many people have a predisposition upon walking in the door and they are not even aware of it. This predisposition is one of preferring generic brands (BigK Cola) to name-brands (Coca-Cola), or vice versa. They are usually the exact same product, but the generic version is typically a cheaper version without the glorified name. Generic brands seem to carry a stigma that they are not as good/or as effective; when in reality, the two comparable products have the same individual makeup. With products like food and art supplies, the generic version may be distinguishable from the brand-name with taste, appearance, or how well it works – but that should not be the case with medications. One should not have to pay more for the same type of medicine, both products should function in equal ways. Unbeknownst to most, medicines can have brand-name and generic options, both within the pharmacy and out on the selves (over the counter, OTC). Even though generic brands may be cheaper, that does not mean they are inadequate, or ineffective.

These generic versions are required to meet the FDA's approval,[1] which involves their own list of high standards to ensure that the generic version works the same as the brand name it is replacing. They are supposed to be chemical clones of the brand-name counterparts that contain the same active ingredients as the brand-name, are identical in the strength, dosage form, and administration. They must also meet the same standards for identity, strength, purity, and quality.[1] While there is significant research regarding the dispute between generic and over-the-counter pharmaceuticals, there is not much to be found on the dispute between OTCs like Tylenol and Advil and their generic branded counterparts, Acetaminophen and Ibuprofen. Both are named after the active ingredient found in the trademarked name. Therefore, why are people still reaching for the $4.19 bottle of Advil 200mg as opposed to the $1.50 Meijer Ibuprofen

200mg[2] if they consist of the same active ingredients and perform the same tasks? That question is the main purpose for the conduction of this study.

Purpose Statement

The purpose of this study is to decide if college-aged students prefer one type of OTC over the other. Do they prefer generic? If they do prefer generic, is it because of the assumption that all college students are poor and would rather save their money for things more important to them? Or do they prefer brand-name, because they would rather pay for the brand-name due to the notion that it works in a superior way to the generic? Or do they not have a preference at all, and they simply grab the first bottle they see? Upon the collection of certain literature, it is evident that there is a high preference for brand-name pharmaceutical medications because of the belief that the generic versions do not work as well; and to some individuals, they do not work at all. Due to the lack of literature discussing the choice in the different types of OTC, this study sought to find out what college students had to say. Along with this point of view (an open-ended survey geared towards college students enrolled in entry level general chemistry courses, in attempts to get results from students of all majors and livelihoods), chemical analyses of four different over-the-counter medicines (Advil, Meijer Ibuprofen, Tylenol, and Kroger Acetaminophen) were scheduled to be conducted. Although the original research plan was shifted due to the global pandemic further known as COVID-19, this study had the goal of finding a way to let others know that there is no reason to discriminate against generic OTCs. Additionally, a disclaimer: by no means is this study claiming anything regarding the reliability, strength, or accuracy of pharmaceutical medications, because all medicine effects all individuals in different ways. What may work for one individual might present adverse effects on another.

Research Question

Do college students have a preference for one type of OTC over the other, or are they unaffected? Additionally, does one form of the OTC contain something different than the other, truly making it better and/or not as effective? It is hypothesized that because of the social perception that college students are deemed poor, they would have had a preference for generic medications as opposed to brand-name over-the-counters.

However, due to unforeseen circumstances known as the global COVID-19 pandemic, the theory of this thesis has been altered significantly. This study discusses the similarities and differences between name brand ibuprofen and acetaminophen and their generic brand counterparts.

Literature Review

Mira Patel, Marion Slack, Janet Cooley and Sandipan Bhattacharjee's cross-sectional survey determines what many pharmacists' (who have the education to understand that generic medicines are not less effective than name-brands) personal preference for over-the-counter medications is, for their own self treatment. Many reasons that consumers are refusing generic medications is the belief that the generic counterparts are not as safe and/or not as effective.[3] Additional research has indicated that the majority of consumers do not want to utilize the generic version, even if they have the knowledge that it is of good value and is cost effective. Consumer preference can reflect misinformation that is derived by the advertising companies of the brand-name produces, leading to their distaste for the generic counterpart.

The authors' claim that due to their vast knowledge and larger than average income, their decisions should not be in regard to safety or financial savings. This claim produced a survey that would set out to analyze a pharmacist's personal choice regarding nine different health symptoms (aches, allergies, acid reflex, constipation, cough, pain, insomnia, nighttime cold and flu, and daytime cold and flu) along with thirty-one (31) brand-generic pairings for the licensed pharmacist to select. If by chance the pharmacist did not prefer either medication, the survey also included a "neither" option. Additionally, questions regarding cost, bio equivalency influences, health status, and general demographics were collected, but the study was mainly focused on the preference for one type of OTC over the other. This study allowed Patel, Slack, Cooley, and Bhattacharjee to notice that pharmacists had an overwhelming preference for generic OTC medications when compared with brand OTC medications for their own personal symptoms. While the findings in this specific study may not be applicable to pharmacists around the globe, it is indicative with the notion that pharmacists are typically more informed than the average

consumer due to their years of experience. However, pharmacists with more years of experience were less likely to select generic versions because they grew up in a time where making substitutions could have been detrimental. If consumers were as knowledgeable as pharmacists, there is a possibility that the generic OTC stigma could decrease, leading to a greater consumption of generic OTC, costing consumers less money over time. This study does not clearly state what a pharmacist's preference is when supplying the consumer, and several studies have shown that they do not treat themselves in the same way as they treat their patients.[3] One might think, if the consumers were informed that both contain the same active ingredient, and should therefore have no difference – would they not make the switch then and there? Sadly, that is not the case according to one study where consumers were informed of this, and their choice of generic medications remained unaffected.[4] This study does an exemplary job discovering and explaining pharmacist preference and provides the leg up for additional research regarding how pharmacists treat patients, and even their own children.

Generic Medication Preference Against Brand Name Preference

Arina Denoth, Christophe Pinget, and Jean-Blaise Wasserfallen's pilot study assessed the preference of Swiss citizens regarding acute and chronic conditions and their preference for brand name versus generic medicines to treat these conditions. While generics are advocated to decrease healthcare costs, consumers are still underusing them, and this study sought to determine why.[5] There have only been a limited number of studies that addressed the issue of the reluctancy to rely on generics, and a sizeable proportion of German patients still believe that if a medication is inexpensive, it is ineffective.[5] Additionally, one survey discovered by the authors explained that using generic substitutions often create confusion and produce a decreased rate of

compliance in their patients. This study analyzed the consumer's willingness-to-pay, forcing consumers to attach a financial value to an object.

The questionnaire assessed citizen preference based on their willingness-to-pay for brand-names and generics for both acute and chronic conditions. An ascending and descending scale of prices was suggested to the customer, and their answers were recorded further. Additionally, participants were asked if they suffered from an acute/chronic illness, to see if that differentiated consumer values. On average, those with these conditions were willing to pay more for brand-name pharmaceuticals than those in good health would be willing to pay.[5] These results also expressed that a majority of participants had the required health insurance, while some had additional forms of health insurance as well.

Additionally, less than half of these individuals had already spent their insurance deductible only halfway through the year. Those with higher willingness-to-pay could have come from somewhere other than Switzerland, which could be the result of a cultural difference among the participants. The medications with the lowest willingness-to-pay values were also the first drugs that had generic versions available, leading to the consideration that most individuals were already incorporating these prices into their own willingness-to-pay. This study expressed that the willingness-to-pay was a feasible method of interpreting preference, even though a vast majority of the study participants expressed no willingness to pay for brand names as compared with the generic counterpart. Also, this pilot study can inform physicians that these patients can be offered generic medications when they are available, no problem. Additionally, patient education about generic medications should be improved because if there is no issue in willingness-to-pay, there should be no underuse of generic medications.

Amy Keenum, et. al's, study sought to evaluate the perception of English-speaking women of childbearing age that are enrolled in U.S. TennCare (Medicaid) about generic medications. Generic medications are known to have lower costs, and because of this, various strategies have been used in order to promote a greater uptake of generic medications.[6] In the 2003 National Ambulatory Medical Care Survey by Steinman, et. al,[7] it was found that physicians were more likely to refer to medications using their brand name, even if the medication had a generic counterpart. Additionally, when observing a cross-sectional sample of adults from Wisconsin, Ganther and Kreling discovered that consumer risk perceptions for generics when compared with brand names differed as a function of the specific medical condition that was being treated.[8] This study sought to find a new comparison between generic and brand name medications – the opinions of those enrolled in Medicaid. While Medicaid medication formularies are almost exclusively generic, it is possible that patients with a higher preference for brand-name drugs who are then limited to generic versions may have reduced compliance, requiring higher health costs and other negative outcomes in the future.[6]

These perceptions allowed the authors to create a questionnaire focusing on these women and their beliefs regarding the efficacy, safety, cost, and preferences for their own personal use of generic medicines along with the assessment of how they communicate with their healthcare providers about generic medications including phrases such as "My doctor talks to me about generic medications" and "I feel comfortable asking my pharmacist to substitute a generic form of a brand name medication."[6] Less than half of the women questioned stated that they would rather be taking generic medicines, and nearly two-thirds actually agreed that generics were of better value than the brand name version they were replacing. 77% of the women also stated that generics were equally as effective as their brand name equivalents. However, even with this

information, fewer women preferred to take generic medicines when asked if they would substitute generics for their acute health concerns (back pain).[6] The results of this study mirror an additional study (a population of patients with commercial insurance) where the participants were well aware of the benefits of generic medications, but their personal preference kept them from selecting generic when it came to make that decision. This study suggested that patients with lower incomes are not often receptive towards generic medications, which was in agreement with previous research. These findings are relevant because Medicaid formularies use generic medicines extensively, meaning that the population utilizing Medicaid has very little choice towards brand name medications. In the state of Tennessee, those without patient consent under U.S. TennCare are required to utilize mandatory generic substitutions. Additionally, the women involved in this study claimed that their physicians and/or pharmacists infrequently discussed the substitution of generic medicines with them, which is directly correlated to the lack of usage. This study provides an honorable look into the preference of the populations that may be required into utilizing generic medications due to their medical payment beneficiary.

The Perception of Labelling

Rafael Goldszmidt, Andre Buttendorf, Guenther Filho, Jose Souza Jr, and Marco Bianchini's randomized controlled trial analyzes how the labelling on various medications can affect patient consumption of prescribed medication.[9] While it has been proven that generic drugs are equivalent to their brand name counterpart, a systematic review[10] claimed that approximately 35% of patients, 29% of doctors, and 28% of pharmacists still consider generics less effective than the name brand opponents.[11] Additionally, the negative opinions by certain physicians and pharmacists could thus negatively influence patient opinions,[11] causing them to treat generic medication as lesser than, when theoretically, they should be receiving the same

treatment regardless of the brand. This negative influence convinces patients that the generic medication they had been prescribed no longer performs the specified task it is supposed to perform, increasing the nocebo effect (the treatment exhibits more of a negative effect than it otherwise would have).[9] When patients refuse to take/finish their generic prescriptions, this could lead to hospitalization and mortality – both of which could have been avoided if their prejudice had not obstructed their healthcare ideals. The authors' experiment sought out to directly assess how the labels on medication (generic versus brand name) impacted the consumption, adherence, perceived efficacy, and recommendation.

In this study specifically, non-adherence refers to the use of a non-prescribed drug against medical recommendation (taking an additional drug or a supplemental drug as opposed to the one prescribed). Following a dental procedure, the authors created their randomized controlled trial with a once-daily analgesic (Tramal, produced by Pfizer – 50mg Tramadol Hydrochloride) that would be taken for up to 7 days afterwards. Patients were offered a single envelope, containing either the information for a generic brand of the medication (Tramadol chlorohydrate generic drug, produced by Medley; complete with the label and retail price of $18), or the information of the brand name (Tramal, manufactured by Pfizer, along with a label and $50 retail price). After the patients enrolled in the trial received their first pill, they were able to leave the dental clinic and received telephone follow up calls 24 hours, 4 days, and 7 days after the specified surgery performed for data assessment (number of prescribed pills taken, if they had discontinued consumption, number of non-prescribed pills taken, current pain, perceived efficacy, and the likelihood that the medication would be recommended to a friend). Among the authors findings was that the generic labelling of the prescribed medicine was related to a lower

consumption of the medication and an increased number of non-prescribed pills taken, when compared to those that had been prescribed the brand name version.

Due to consumer bias, this led to some of the study's participants not finishing their prescribed medication and deciding that they knew what was best for them – as opposed to the medical professional that had given it the patient in the first place. The manipulation of the labels in this trial heavily influenced the discontinuation of the provided treatment, based on false confidence that claimed that the generic medicine was less effective. However, this effect of non-adherence was still present even with a previously positive evaluation of the quality of generic drugs. Additionally, those with the generic label associated an increased subjective pain with the generic medication they had received, thus resonating with previous studies regarding randomized brand name and generic levels. However, it is important to acknowledge that this study was limited and bound to only a specific clinical setting and only one type of drug. Results may be different if different pharmaceuticals were introduced to the trial, and patient opinions may be subject to change. This trial does an excellent job expressing label bias and how even if one understands that the two medications are bioequivalent, receiving a generic medication could lead to non-compliance.

Methods

The purpose of this research took two separate routes, that quickly turned to three paths due to COVID-19. First, an open-ended survey (see attached) was to be distributed to all General Chemistry 111 and 112 students at Eastern Kentucky University in efforts to see if college students did have a preference for one type over the other. The questions asked about possible factors that might have influenced a student's perspective, and if cost was a factor. Specifically, the survey wished to see if students had any positive/negative experiences attributed to generic OTCs, if they had a preference, and if cost was influential to their choice (who pays for the medication?). This survey would have gotten approval by the Institutional Review Board at Eastern Kentucky University prior to the in-person distribution of the open-ended surveys. Participants had to be over eighteen years of age, enrolled at Eastern Kentucky University, and a member of one of the General Chemistry 111 and 112 courses, as this course was to be distributed during student's specified lab periods. General chemistry students were to be selected due to the faculty mentor being the coordinator over these courses, and that the general chemistry courses typically contain students of all majors, not just majors focused in the science department. As Eastern turned to remote learning for the remainder of the semester, the survey (see attached) had to be scrapped from use due to the requirements of the Institutional Review Board.

Additionally, four different over the counter medications (Advil, Meijer brand Ibuprofen, Tylenol, and Kroger brand Acetaminophen) were to be analyzed through various chemical techniques. These included: the dissolution of all four pills in a highly acidic solution of hydrochloric acid (approximately 12M), Fourier Transform Infrared Spectroscopy (FTIR) to gather information about the active ingredients, and the combinatory technique of gas

chromatography-mass spectrometry (GC-MS) to fully break down the components of the four selected pills. As well as this chemical analysis, price comparison research (Tables 1-8) was conducted regarding how different stores price their generic brand as opposed to the name brand. Additionally, ingredient lists of all four medications (Figures 1-4) and their chemical structures have been attached (Figures 5 and 6). However, due to the lack of instrumental access, the above information has been altered to better reflect that there should not be a difference between the generic and name brand versions of OTCs, and if there is a difference – what is it? In attempt to still gather the necessary data, the following changes have been made: all four pills (Figures 7-10) were dissolved in 150mL of distilled water as opposed to 12M hydrochloric acid and observed for 1 hour, and FTIR standards of acetaminophen and ibuprofen were omitted, along with the GC-MS collection of data as well. The four pills were observed for one hour (1 minute afterwards, 5 minutes, 10 minutes, 30 minutes, and 1 hour) upon being dropped into a glass of 150mL of room temperature distilled water (Figures 11-30).

Results

Preference Survey

As the world adapts to this global pandemic, results were not able to be gathered and analyzed for the attached survey. However, it would have been preferential if there had been approximately 200 participants for analyzation purposes. Their positive and negative experiences would have been analyzed when it came to generic over the counter medicines, along with whether or not the participants had a preference, if cost influenced this preference, and how whoever paid for the medicine influenced their decision, if it did at all. These results would have been analyzed for mean and standard deviation regarding the preference, if there was one at all.

Price Comparison Research

Upon the comparison of four popular grocery retail storefronts (Dollar General, Kroger, Meijer, and Target), it is clear that generic medications are sold at much lower prices than name brand over-the-counters (Tables 1-8). When at Dollar General[12,13], there is a $7 difference between the brand name medication and the Dollar General alternatives. While at Kroger[14,15], there is a bit less of a price difference, with $6 differentiating the brand name with Kroger brand. At Meijer[2,16] on the other hand, with 200 Advil tablets being purchased there is a price of $15.79, while 200 of Meijer's ibuprofen tablets come up to only $3.95. Finally, at Target[17,18], it seems that Tylenol is more expensive than Advil, with the medication price differences being close to $8 for acetaminophen and $6 for ibuprofen.

Chemical Composition: Ibuprofen

Ibuprofen[19] (Figure 5) has the chemical formula $C_{13}H_{18}O_2$, and a molecular weight of approximately 206 g/mol. This is a derivative of propionic acid and a nonsteroidal anti-inflammatory drug (NSAID), with anti-inflammatory, analgesic, and antipyretic (reduces fever) effects.[20] Ibuprofen is generally tolerated well in the body; but rarely, too much can cause acute injury to the liver.

Chemical Composition: Acetaminophen

Acetaminophen[21] (Figure 6) has the chemical formula $C_8H_9NO_2$, and a molecular weight of 151 g/mol. This is a p-aminophenol derivative that contains analgesic and antipyretic activities. This drug could possibly be inhibiting the nitric oxide pathway that is mediated by a variety of receptors within the body,[22] which result in an elevation of the pain threshold. While it is harmless at low doses; like ibuprofen, acetaminophen has a direct hepatotoxic potential that can result in acute injury/death to the liver.

Dissolution of OTC

The four tablets took varying times to dissolve over the course of the hour they were observed. First, the orange coating around the Advil tablet began to dissolve (Figures 11-13), and after approximately 30 minutes, the tablet had almost completely broken apart, releasing the white powder within the tablet itself (Figures 14 and 15). With the Meijer brand ibuprofen tablet, there was no slick coating surrounding the pill. The orange color began to bubble up around the pill once placed in the distilled water (Figures 16), and after 5 minutes, the pill was beginning to break apart (Figure 17). After 10 minutes, the pill had separated into two pieces, revealing the white powder inside (Figure 18). Over the next hour, the pill began to dissolve further into the distilled water (Figures 19 and 20). With the extra strength Tylenol caplet, dissolution began as soon as the pill was dropped into the water (Figure 21). Throughout the hour, there appeared to be no change to the pill after it had further broken apart past 5 minutes (Figure 22-25). Finally, when the Kroger Acetaminophen caplet was dropped into the distilled water, it began to bubble as it began dissolving (Figure 26). The pill puffed up over the next hour, much like it was inflating (Figures 27-30).

Discussion

While the original survey was unable to be run, a survey conducted by Kesselheim et. al discussed the variation that patients have regarding generic drugs and the usage of these types of medications.[23] Over the past few years, more statements regarding the quality and substitutability of generic medicines have been publicized, claiming that generic medicines have been adulterated due to their inadequate manufacturing facilities.[23] Additionally, it has been stated that these lower costs have led to some concerns regarding the effectiveness of generics,[24] as it has been ingrained in their minds that there is no possible way for an adequate medication to

be available at such a low cost. This survey[23] questioned how patients thought about the prices related to these medications, and what they thought about the safety of specific medicines. Surprisingly, patients generally had a positive view towards generic drugs, and 83% of survey participants agreed that their physician should be prescribing generic prescriptions whenever possible. Even with this positive result, there are still negative perceptions lingering over generic medication. These negative statements will simply have to be overcome to ensure that consumers are still experiencing cost-savings, as well as an improved patient outcome. While this study was not the same as the survey that was intended to run, common themes were expressed in this literature that would have been answered with the college student survey on preference.

With these generic over-the-counters, there is a significant difference in price when compared to their name brand counterparts. After a drug manufacturer (such as Tylenol and Advil, for example) has been granted the exclusive rights to produce and sell their drug for a limited time with a patent; other companies are then given the opportunity to make the generic version, as long as the patent had ended.[25] These costs remain low because the product has already been developed by the brand name company, keeping prices low within the pharmacy and on the shelves. Additionally, as there is competition among multiple varying companies[25], the generic version's price remains low.

Ibuprofen's structure consists of a monocarboxylic acid (of which is propionic acid) with one of the hydrogens on position 2 being substituted by a 4-(2-methylpropyl) phenyl group.[26] In 1961, Stewart Adams initially marketed the drug as Brufen[26], allowing the drug to be available under common trade names (Advil and Motrin). The wholesale cost within the developing world lies between $0.01US and $0.04US per dosage and has been referred to as the safest and most effective medicine needed in a health system.[26] Acetaminophen on the other hand is in the

phenol class (4-aminophenol) in which one of the hydrogens that was attached to the amino group is replaced by an acetyl group.[27] Another name for acetaminophen based on the structure is paracetamol, and this is because of the structure described. This drug has been claimed to be the most commonly used medication for both pain and fever in both the United States and Europe. In the developing world, the wholesale price remains less than $0.01US per dose, but in the United States the cost remains steady at approximately $0.04US a dose.[27] With cost of production levels as low as they are, it is no surprise that generic medications are a significant amount lower than their name brand counterparts.

As the Advil began to dissolve, the orange coating surrounding the tablet began to dissolve first, separating from the white powder it was containing. This process of powder separation from the hard shell of the tablet took approximately 30 minutes. The Meijer ibuprofen on the other hand began to separate from its own orange coating after only 10 minutes. This time difference in rate of dissolution can be related to the list of ingredients (Figures 1b and 2b). These varying rates can be attributed to the varying ingredients in both pills, because as long as the active ingredient is the same, manufacturers are able to input any number of materials within the pill. Ibuprofen contains these discrepancies within its inactive ingredient list: hypromellose, iron oxide red, iron oxide yellow, polyethylene glycol, and polysorbate 80, any of which could be attributed to the earlier dissolution. With the dissolution of the Tylenol, within 1 minute the pill had almost entirely dissociated within the water. On the other hand, the Kroger brand Acetaminophen took between 10 and 30 minutes to fully dissociate. There is less of a difference in the ingredients of Tylenol and Kroger acetaminophen (Figures 3b and 4b), croscarmellose sodium, povidone, and stearic acid, which can again, potentially be attributed to the difference in dissolution time. However, because the dissolution of pills in water is dissimilar to the

dissolution in the stomach, these results may not be completely representative of the dissolution in 12M hydrochloric acid in a human stomach.

Conclusion

Perceptions may always be negative when discussing generic counterparts to pharmaceuticals, but perhaps the stigma can begin to erase itself when it comes towards generic over-the-counter medications. Further research should be conducted to determine if cost is relevant when it comes to over-the-counters, as it is typically relevant with pharmaceutical medications. While addressing the comparison between name brand pain reliever off of the shelf and the retail store's generic brand, it is hard to disclose a firm statement regarding if they are entirely chemically bioequivalent. A possible explanation may be able to be found with further instrumental analysis in order to further examine the components of each.

Limitations

With all studies, there are sure to be some limitations. The main limitation with this study was the developing of the novel coronavirus over the course of this second semester. Before students were to return back to campus after spring break, Eastern Kentucky University temporarily closed for the semester, halting all on-campus research, heavily impacting this study. A few weeks later, when Eastern made the decision to close for the remainder of the Spring 2020 semester, this study required a further change in order to be finalized. However, if the survey had been able to be conducted, some limitations could have been that the survey questions were confusing, or that not enough participants were able to participate. Additionally, while it would have been simple to recruit individuals to participate in this survey, many may have felt obligated as they were given the optional survey during the beginning of their lab section. These limitations would have been considered further, prior to the global COVID-19 pandemic.

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Appendix

Survey Instrument

Please answer the questions to the best of your abilities.

1. Do you innately have a predisposition to purchase generic or name-brand? (Do you go into the store already prepared to only select the generic versions of the items in the store? Only the name-brands? A mix?)

    a) Yes, I prefer generic
    b) Yes, I prefer name-brand
    c) No, I do not prefer one or the other

2. Have you ever had any negative experiences when it comes to generic over-the-counters (OTCs)?

    a) Yes
    b) No

If yes, would you mind elaborating?

3. Have you ever had any positive experiences when it comes to generic over-the-counters (OTCs)?

    a) Yes
    b) No

If yes, would you mind elaborating?

4. Do you have a preference for generic medicine, or do you have a preference for name-brand medicine?

a) Yes, I prefer generic OTC medicine
b) Yes, I prefer name-brand OTC medicine
c) No, I have absolutely no preference, medicine is medicine

If yes, why do you have this preference?

5. Does the cost of medicine influence your choice on which one you select?

    a) Yes, cost influences which medicine I select
    b) No, cost does not influence which medicine I select

6. How do you pay for your own OTCs?

    a) I pay for them
    b) My parents/guardians/grandparents/someone else
    c) Insurance/Medicaid/Payment plan
    d) Other:

7. If you are not the person paying for your medications and instead it is someone else, do they require that you choose one version over the other? Please explain. For or example, do your parents require that you only select the generic version of medicine? (OPEN-ENDED)

Acetaminophen	Prices
Tylenol Extra Strength 500mg, 100 caplets	$9.50
DG Health Extra-Strength Pain Reliever 500mg, 100 caplets	$2.50

Table 1. Dollar General Price Comparisons of Acetaminophen.

Ibuprofen	Prices
Advil 200mg, 100 coated tablets	$9
DG Health Ibuprofen Pain Reliever Tablets 200mg, 100 count tablets	$2.50

Table 2. Dollar General Price Comparisons of Ibuprofen.

Acetaminophen	Prices
Tylenol Extra Strength 500mg, 100 caplets	$9.49
Kroger Acetaminophen 500mg, 100 caplets	$2.49

Table 3. Kroger Price Comparisons of Acetaminophen.

Ibuprofen	Prices
Advil 200mg, 100 coated tablets	$8.99
Kroger Ibuprofen 200mg, 100 coated tablets	$2.99

Table 4. Kroger Price Comparisons of Ibuprofen.

Acetaminophen	Prices
Tylenol Extra Strength 500mg, 100 caplets	$9.49
Meijer Pain Relief Extra Strength 500mg, 100 caplets	$3.49

Table 5. Meijer Price Comparisons of Acetaminophen

Ibuprofen	Prices
Advil 200mg, 200 coated tablets	$15.79
Meijer Ibuprofen 200mg, 200 tablets	$3.95

Table 6. Meijer Price Comparisons of Ibuprofen.

Acetaminophen	Prices
Tylenol Extra Strength 500mg, 100 caplets	$9.49
Up&Up Extra Strength Acetaminophen 500mg, 100 caplets	$1.99

Table 7. Target Price Comparisons of Acetaminophen.

Ibuprofen	Prices
Advil 200mg, 100 coated tablets	$7.99
Up&Up Ibuprofen 200mg, 100 tablets	$2.29

Table 8. Target Price Comparisons of Ibuprofen.

Figure 1a. Advil 200mg.

Active Ingredient: Ibuprofen 200mg

Inactive Ingredients: acetylated monoglycerides, colloidal silicon dioxide, corn starch, croscarmellose sodium, methylparaben, microcrystalline cellulose, pharmaceutical glaze, pharmaceutical ink, povidone, pregelatinized starch, propylparaben, sodium benzoate, sodium lauryl sulfate, stearic acid, sucrose, synthetic iron oxide, titanium dioxide, and white wax.

Figure 1b. The ingredient list of 200mg Advil.

Figure 2a. Meijer Brand Ibuprofen, 200mg.

Active Ingredient: Ibuprofen 200mg

Inactive Ingredients: Colloidal silicon dioxide, corn starch, croscarmellose sodium, hypromellose, iron oxide red, iron oxide yellow, microcrystalline cellulose, polyethylene glycol, polysorbate 80, stearic acid, and titanium dioxide.

Figure 2b. The ingredient list of 200mg Meijer Brand Ibuprofen.

Figure 3a. Tylenol Extra Strength 500mg.

Active Ingredient: Acetaminophen 500mg

Inactive Ingredients: Carnuba wax*, corn starch*, FD&C red no. 40 aluminum lake, hypromellose, magnesium stearate, modified starch*, polyethylene glycol*, powdered cellulose, pregelatinized starch, propylene glycol, shellac, sodium starch glycolate, and titanium dioxide.
*Contains one or more of these ingredients.

Figure 3b. The ingredient list of 500mg Tylenol Extra Strength.

Figure 4a. Kroger Brand 500mg Acetaminophen.

Active Ingredient: Acetaminophen 500mg Inactive Ingredients: Carnauba wax, corn starch*, croscarmellose sodium*, hypromellose, polyethylene glycol, povidone, pregelatinized starch, sodium starch glycolate*, and stearic acid. *May contain one or more of these ingredients.

Figure 4b. The ingredient list of 500mg Kroger Brand Acetaminophen.

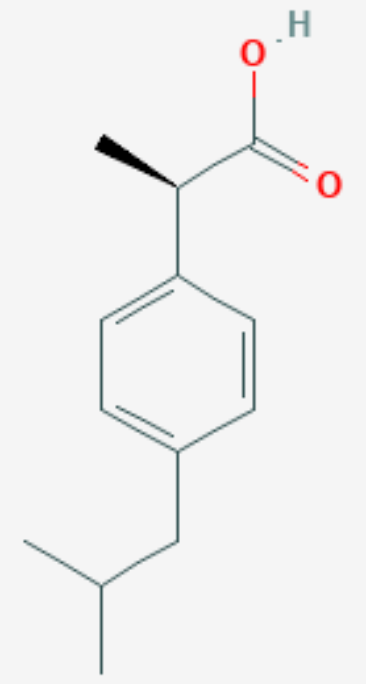

Figure 5. Chemical 2D Structure of Ibuprofen. $C_{13}H_{18}O_2$.

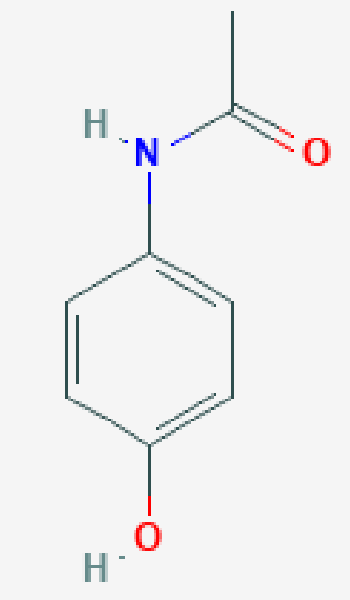

Figure 6. Chemical 2D Structure of Acetaminophen. $C_8H_9NO_2$.

Figure 7. Image of a coated Advil tablet. Advil is printed on the pill in black ink.

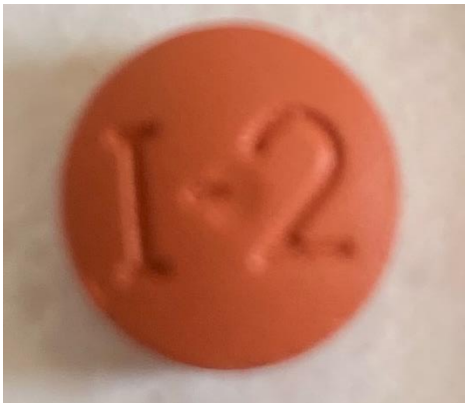

Figure 8. Image of Meijer Brand Ibuprofen. I-2 is imprinted within the pill.

Figure 9. Image of Tylenol caplet. Tylenol 500 is printed on the pill in red ink.

Figure 10. Image of Kroger Brand Acetaminophen. L484 is imprinted within the pill.

Figure 11. Advil tablet after 1 minute.

Figure 12. Advil tablet after 5 minutes.

Figure 13. Advil tablet after 10 minutes.

Figure 14. Advil tablet after 30 minutes.

Figure 15. Advil tablet after 1 hour.

Figure 16. Meijer Ibuprofen tablet after 1 minute.

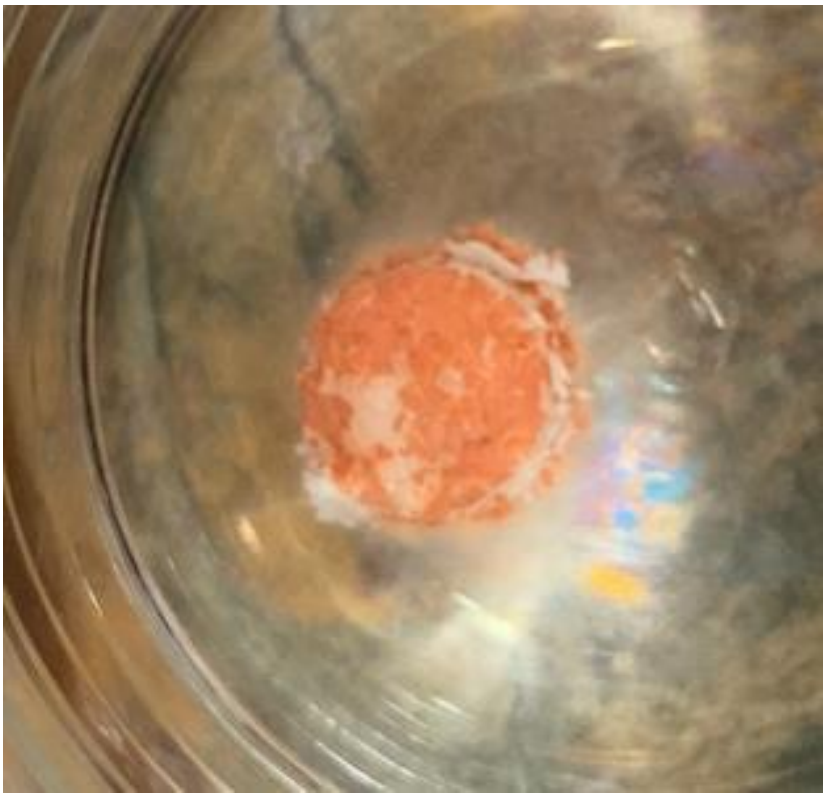

Figure 17. Meijer Ibuprofen tablet after 5 minutes.

Figure 18. Meijer Ibuprofen tablet after 10 minutes.

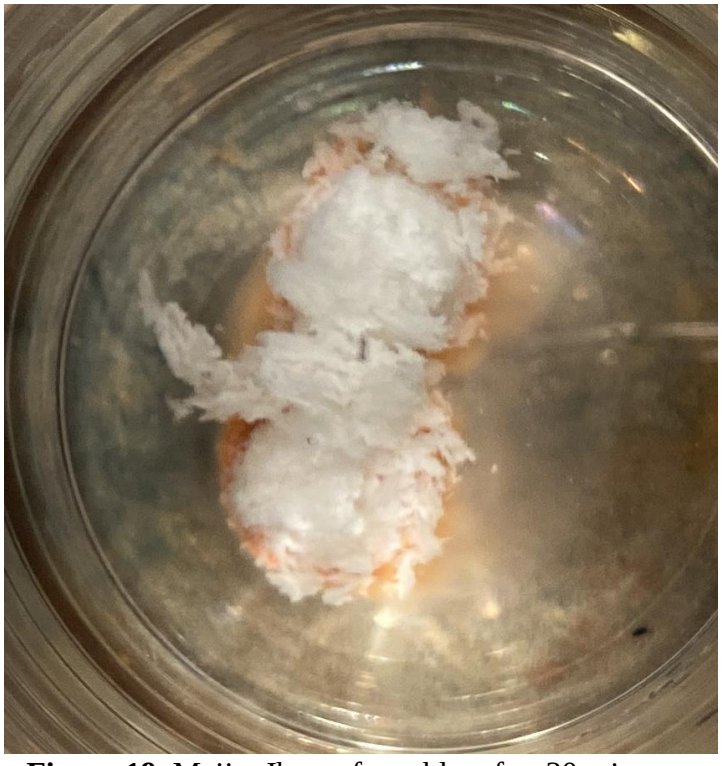

Figure 19. Meijer Ibuprofen tablet after 30 minutes.

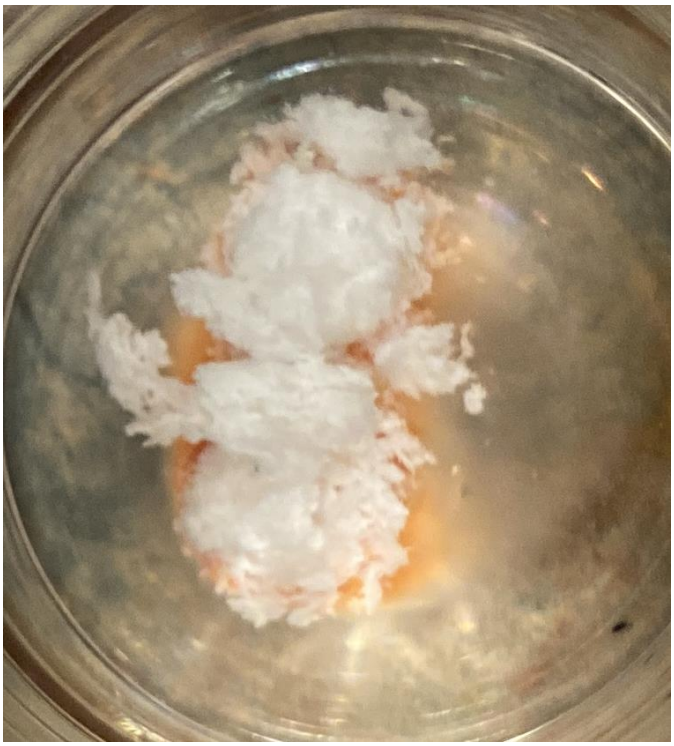

Figure 20. Meijer Ibuprofen tablet after 1 hour.

Figure 21. Tylenol Extra Strength Caplet after 1 minute.

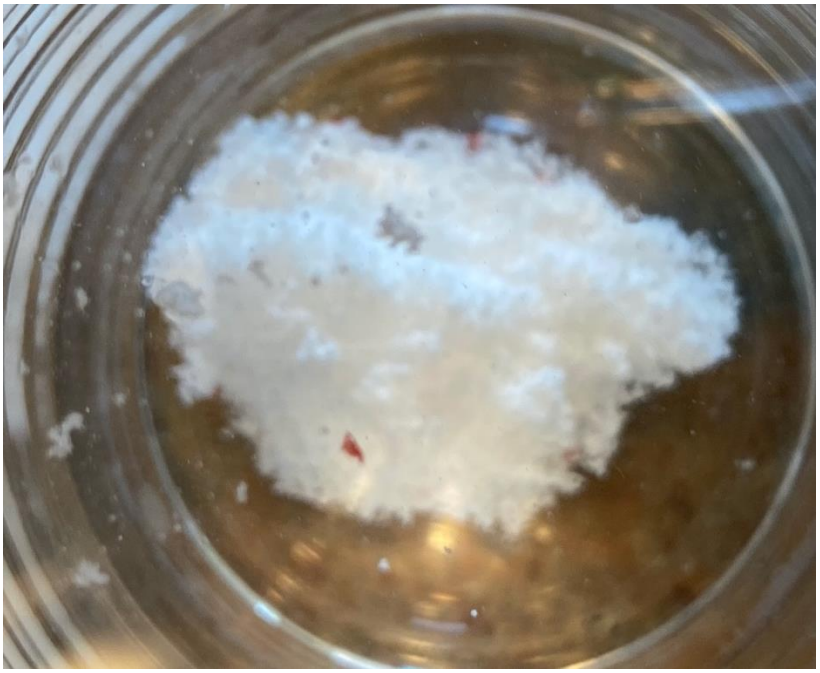

Figure 22. Tylenol Extra Strength Caplet after 5 minutes.

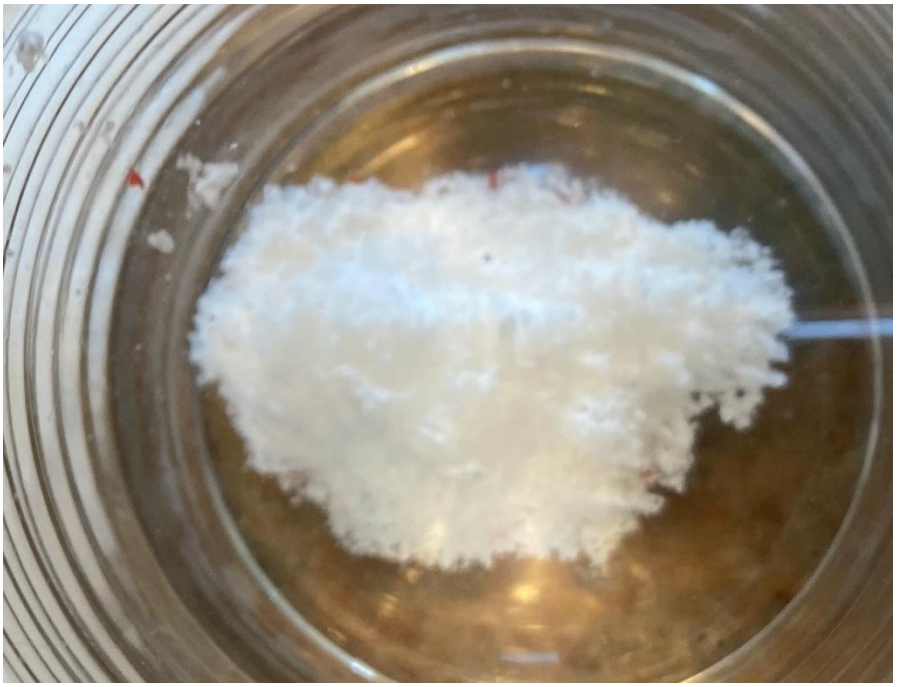

Figure 23. Tylenol Extra Strength Caplet after 10 minutes.

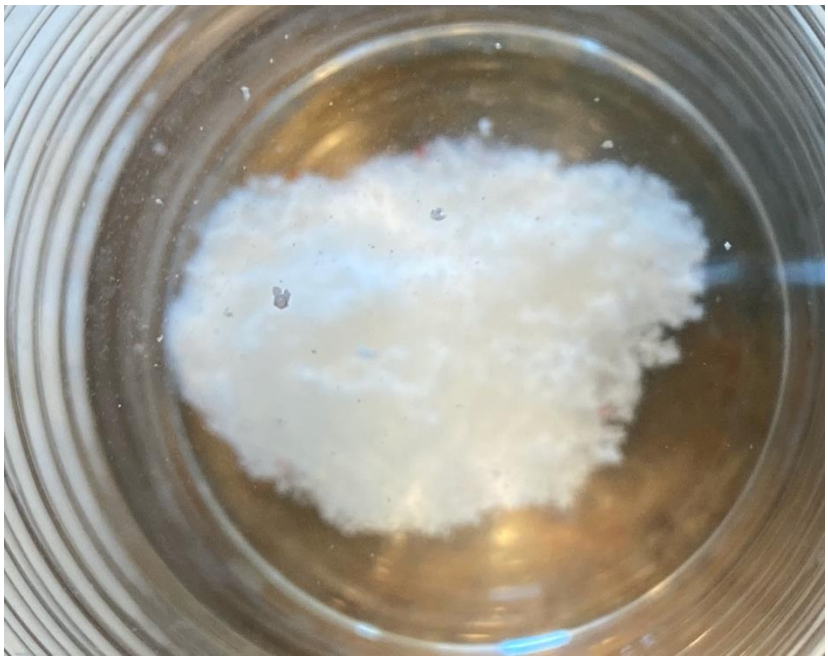

Figure 24. Tylenol Extra Strength Caplet after 30 minutes.

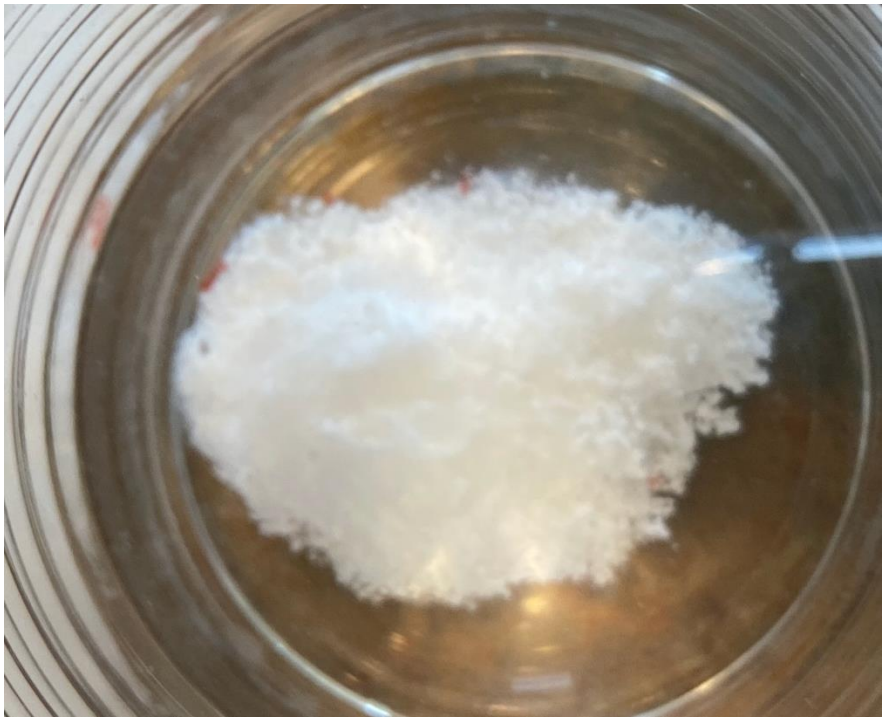

Figure 25. Tylenol Extra Strength Caplet after 1 hour.

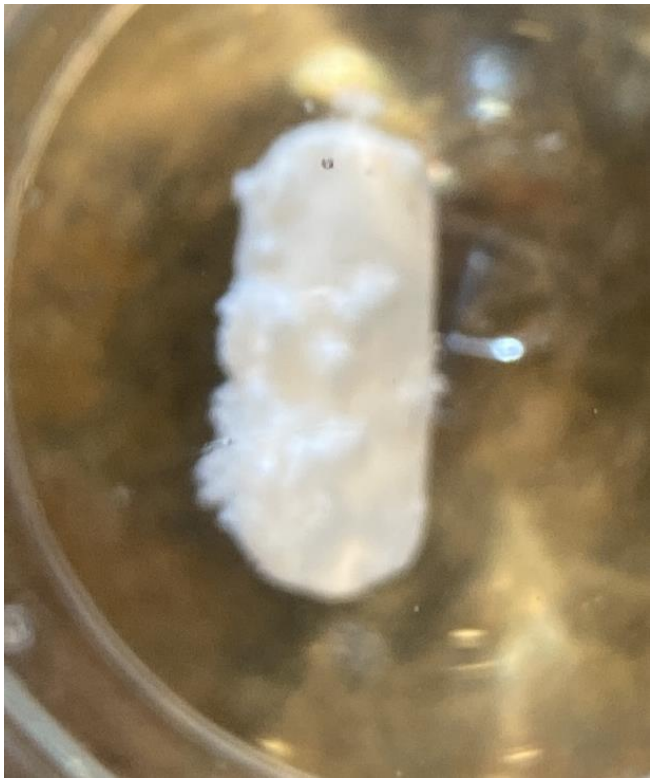

Figure 26. Kroger Acetaminophen Caplet after 1 minute.

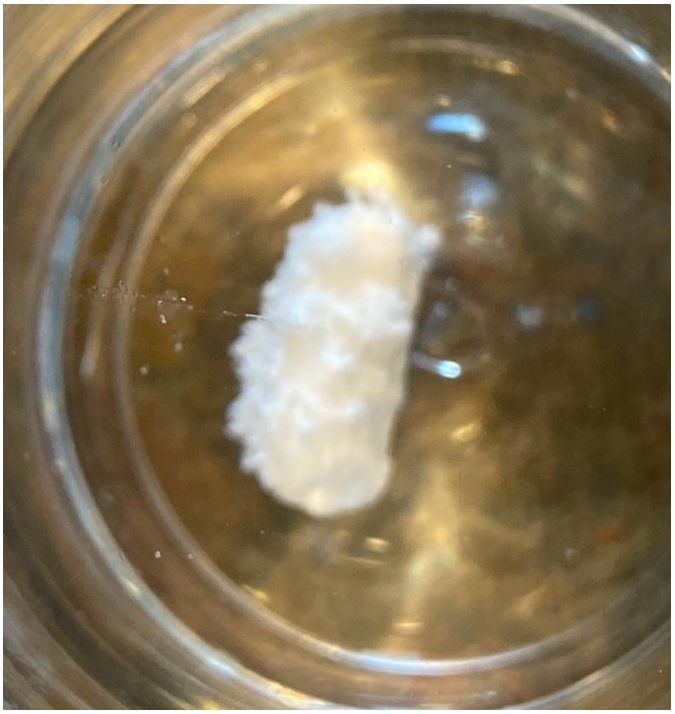

Figure 27. Kroger Acetaminophen Caplet after 5 minutes.

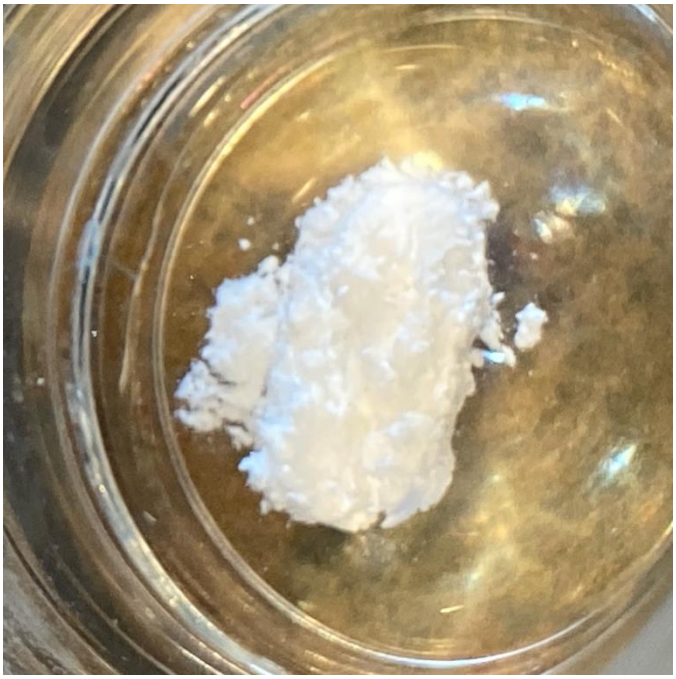

Figure 28. Kroger Acetaminophen Caplet after 10 minutes.

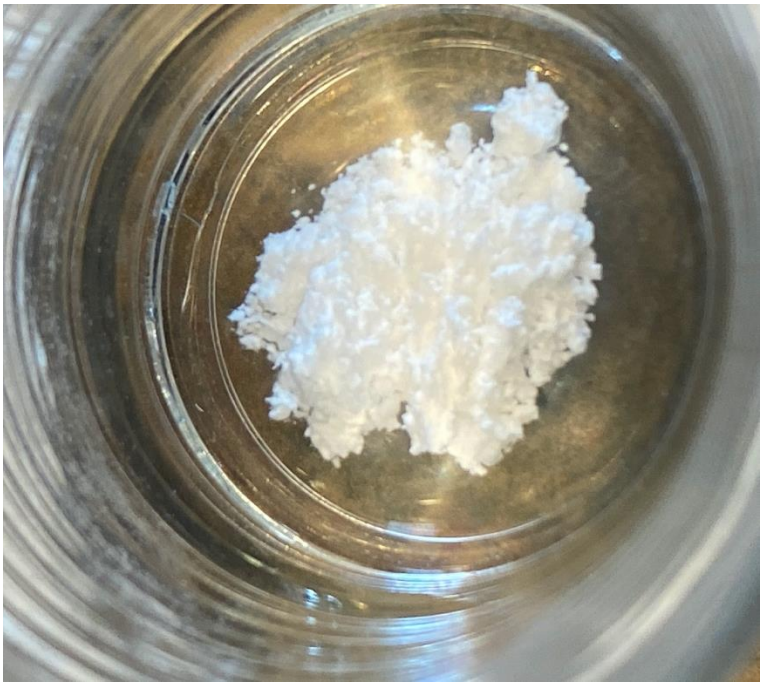

Figure 29. Kroger Acetaminophen Caplet after 30 minutes.

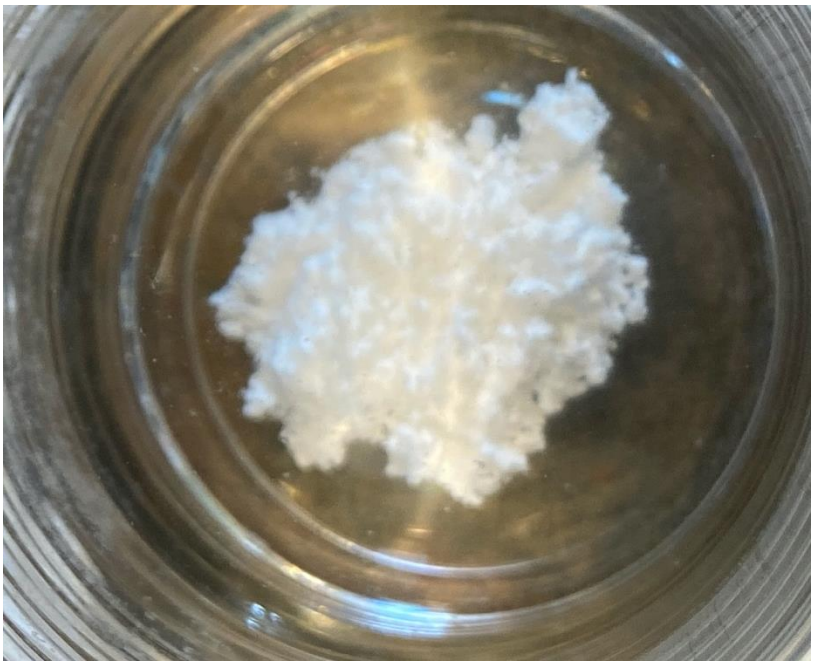

Figure 30. Kroger Acetaminophen Caplet after 1 hour.