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Influence of Exposures, Benefits, and Barriers Toward OTC Medicine Behavior

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***Abstract*—This study examines factors affecting consumer behavior toward the use of over the counter (OTC) medicine, including the perceived benefits and barriers affecting their use of OTC and herbal medicines. Variables used in this research are based on the existing Health Belief Model and its derivatives, particularly the result from Jones, et al. (2016) that includes how variables including barriers, benefits, perceived efficacy, and threats influenced behavior regarding the H1N1 vaccine campaign. Focus Group Discussion to 4 OTC and Non-OTC users groups showed that exposure, benefits, and barriers influence consumer behavior toward OTC and non-OTC (herbal) medicines but that efficacy and threats were not significant factors affecting the use of OTC medicines. The focus group discussion results were reconfirmed based on 404 responses to a questionnaire using convenience sampling through digital media. Quantitative results were statistically tested using a Structural Equation Model (SEM) to determine the influence of and the relationship between benefits, barriers, and perceived trust as they affect behavior toward OTC medicine. The study shows that both perceived benefit and perceived barriers significantly influence behavior both for OTC and herbal medicines while variables regarding perceived trust and exposure do not have a significant impact on the use of OTC or herbal medicines.**

Keywords—health belief model, exposure, health information, barrier, benefit, behavior, OTC, Non-OTC, herbal, Structural Equation Modelling

I. INTRODUCTION

The pharmaceutical market in Indonesia has been growing year after year. This market consists of two categories, known as prescription medicines or ethical drugs, and over the counter (OTC) or unregulated medicines. Based on IMS Health Data, in 2016, the OTC category represented 78.7% of the market by volume compared to ethical drugs' 21.3% share. However, in terms of value, ethical drugs represented 62.5% of total sales versus 37.5% for the OTC market. This is because prices of OTC medicines are lower than prices of prescription medicine. In 2012–2015, OTC medicine still showed positive growth by value, while by volume the sum of its main contributors such as non-narcotic analgesics (headache medicines), antitussives (cough medicines), and antirrheumatics showed slowing sales.

The objective of this research is to identify the factors involved in consumers' attitudes toward OTC medicines. We study factors used in the Health Belief Model, as it is the most extensive model for health-related issues. The specific model adopted for this research is based on [1] whose model for the H1N1vaccination campaign included exposure variables and supported the fact that consumers' health behavior influences behavior in seeking health information [2] and that changes in technology have exposed consumer to more information, including health information.

Lynch and Berry [3] show differences in perceived risks and benefits regarding OTC medicine, both conventional and herbal. However, although many studies have reported the benefits of using the Health Belief Model, there is a need for extended research regarding consumer attitudes toward self-medicating using OTC drugs that includes exposure as one of the factors. This study identifies factors that influence consumers' attitudes and behaviors toward the use of OTC and herbal medicine and determined a suitable channel for a communication strategy regarding OTC and herbal medicine.

A qualitative study involving four focus groups discussion showed that perceived trust regarding exposure to information about the medicines, benefits from the medicine, and the barriers to obtaining the medicines are three main factors that influenced consumer's usage decision. A quantitative study involving 404 respondents determines the relationships between perceived trust in information about medicines to which consumers are exposed, perceived benefits, perceived barriers and behavior toward OTC and non-OTC medicine. The term OTC refers to drugs that do not require a doctor's prescription and can be bought directly by the consumer off the shelf in stores [4]. The term non-OTC in this research refers to all health-related treatment behaviors other than consuming OTC and other chemically-based medicines, including consuming herbal medicine, rest, sleep, massage, and other actions.

II. LITERATURE REVIEW

Consumer behavior is the study of the process by which individuals or groups select, purchase, use or dispose of products, services, ideas or experiences to satisfy needs and desires [5]. Perception is the process by which people select, organize, and interpret these sensations and consist of three processes: exposure, attention, and interpretation. Exposure occurs when a stimulus comes within the range of someone's sensory receptors, while attention refers to the extent to which processing activity is devoted to a particular stimulus and interpretation refers to the meanings we assign to sensory stimuli [5].

From the ABC Model of Attitudes, we knew that attitude has three components: affect, behavior, and cognition and that there is a hierarchy of effect concepts that differentiates

high involvement and low involvement, and an experiential hierarchy [5].

The most cited model related to health is *the Health Belief Model* [6] which was derived from consumers' failure to obtain free monitoring in a TB scan program by US Public Health Services. This program provided a free x-ray exam for adults, using mobile x-ray units that were deployed in residential communities. Some people did not participate in the program, and Hochbaum then investigated the differences underlying people's motivation to obtain an x-ray or not. He found there was no single factor that determined whether someone would choose to have the x-ray. The individual's perception and the information they had about the program had the most influence on behavior. The most important thing that influenced the decision was his or her own knowledge that he might have TB (perceived risk) and that it would be beneficial if detected sooner (perceived benefit).

This research identified four main concepts regarding behavioral influences, particularly in the health field. These four concept are *perceived susceptibility* (the possibility he/she could catch a TB), *perceived severity* (the severity of the illness it could cause), *perceived benefit* (the benefit to be gained by knowing their TB status), and the *obstacles* (ease or difficulty of obtaining the TB checkup).

In 1971, Becker, Drachman, & Kirscht modified the *Health Belief Model* concerning motivation [7] and the variable *Cues To Action* was later added by Rosenstock [8]. This variable means that symptoms or drivers are an important cue that will motivate people's health behavior. An example of this is the physical discomfort or pain someone bears. Bandura [9] then introduced the concept of *self-efficacy* that related to behavior changes. In 1988, the *self-efficacy* concept was added to Health Belief Model to explain why people engage in unhealthy habits such as smoking or over-eating [10]. The role of *self-efficacy* in the *Health Belief Model* is similar to the role of *perceived behavior* in *The Theory of Planned Behavior* [11].

Some of the research based on the *Health Belief Model* (HBM) includes patient education on hypertension [12], mammography usage and its relationship to breast cancer detection and outcomes [13-19], research related to colorectal cancer [20], and the influence of the H1N1 vaccine prevention promotion campaign [1].

Nowadays, health and lifestyle information are becoming easier to access as technology in the communication and media fields grows rapidly. The ability to search for information on the internet is affected by education level and internet usage habits and is inversely affected by income and internet costs [21]. Moreover, based on proportion analysis, the number of online searches compared to the number of total searches can replace offline to online searching. There are relationships between perceived health risk, health self-efficacy, and behavioral intention in the context of social media that can be accessed with a mobile phone [22]. Socioeconomic status contributes to the decision regarding the correct choice of health information [2]. One's health behavior will affect search habits regarding health information in and is largely related to gender, in this case, female.

Health information can originate from various sources, such as family, school, physicians, other organizations [23], [24] and recently from online sources including social media [25-27]. Although health information resources can be diverse, the most trusted sources are physicians [23], as well as other healthcare providers and government health agencies [28]. The same health information can be perceived differently depending upon the resource [29] and this difference can influence health communication output [26].

Regarding trust toward the medical field, it was found that during situations where a decision has a high impact on consequences, effect and cognition are highly influential. For decisions with low impact consequences, cognition is more influential compared to effect. Effect becomes important when cognitive aspects (such as physicians' competency) are perceived to be low [30]. It's also known that trust is a mediator between effect and cognition [30].

From studies evaluating the influence of trust on electronic/online shopping [31], consumers' trust was found to have a positive impact, both directly and indirectly, on the desire to purchase, and was as strong as a negative influence from consumers' perceived risk that decrease the desire to purchase. Perceived benefit also increased consumers' desire to purchase. In a study conducted on college students regarding healthy food and the basics of the HBM, it was reported that perception of a high benefit along with a low barrier resulted in an overall increase (behavior) in consuming healthy food and being physically active [32]. Trust in online medical information had implications for cognitive, affective, and behavioral health outcomes [25]. Trust plays a key role in information exchange and in determining an individual's choices. Trust also has a role in information utilization and promotes the effectiveness of interactive communication, from which trust is born [24].

Age, education status, and gender have no significant association with the level of trust in health information obtained from digital media [25, 33, 34]. These findings indicate that individuals, regardless of their level of education, have difficulties differentiating the credibility of health information from various websites and homogenously trust all of the health information obtained from websites [25]. Therefore, a health information provider has to ensure that all the information provided can be easily understood by the general public [25].

Menon, et al. similarly found that respondents' trust in traditional media such as television and newspaper ads, TV programs, and newspaper articles has a positive association with trust in medical information obtained from the internet/new technology [33-35]

However, trust based on interpersonal relationships, such as with physicians, family, and friends, cannot predict trust in digital health information. Ye [25] mentioned that the lack of similarities between interpersonal communication and internet as a communication media might be the reason. Conversely, there are similarities between traditional media and internet in terms of mass media publishing health information or displaying it on the website.

Mou and Cohen [36] find that perceived benefits have a significant influence on behavioral intention, consistent with the HBM. They suggest digital health information providers can maximize their perceived benefit by promoting the value of utilizing health information from digital media. The same study also reported that the self-efficacy variable in the HBM did not significantly influence consumers' desire, that trust

has the strongest impact on behavioral intention and that perceived benefit is influenced by trust.

III. Research Model and Hypotheses

The research model for this study is based on Jones et al. [1] who show that behavior is affected by barriers, benefits, efficacy, and threats that are triggered by exposure, as depicted in the diagram below:

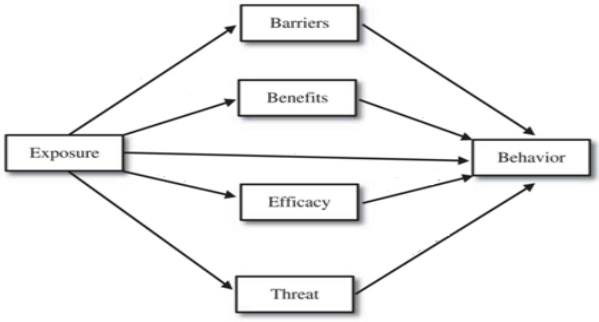

Fig. 1. Research Model. Source: Jones et al, 2016

The focus group discussion with four groups held in December 2018, indicates that efficacy and threat were not relevant for headache medication; thus these two variables were excluded from the model for this study. The Perceived Trust toward Exposure variables are separated into primary exposure, traditional exposure, and digital exposure. Primary exposure includes first-hand information obtained from parents, friends, medical practitioners, and from the medicine package. Traditional exposure includes health information received from traditional media, such as television, newspapers, magazines, and radio.

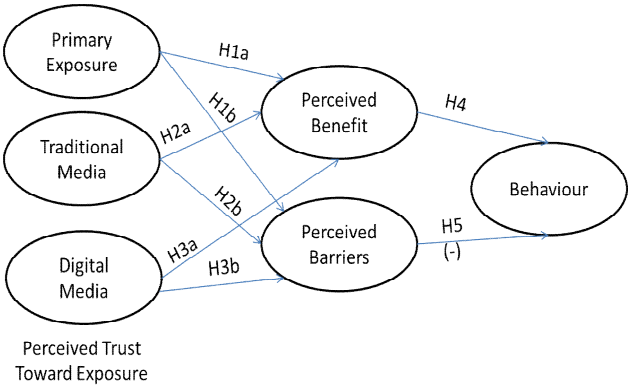

Fig. 2. Observed Model

Exposure plays a role in personal perception processing. Exposure can come from TV and radio campaigns such as the H1N1 vaccine campaign [1]. The focus group discussion results show that, in addition to conventional media like TV and radio, health information can originate from direct information in one's immediate environment such as family, friends, medical practitioners, and medicine packaging. Health information can also be obtained from digital media such as health websites, news portals and social media.

The source of the information can influence a person's trust level. Physicians are perceived to be the most trusted source of health information compared to other sources such as the internet, TV, family/friends, magazines, newspapers, or radio [37]. Before health information has an impact on behavior, someone must first trust and process that information before he/she can adopt a recommendation from the message [28]. Based on this, the hypotheses for this research are:

H1a: Perceived Trust Toward Primary Exposure affects Perceived Benefit

H1b: Perceived Trust Toward Primary Exposure affects Perceived Barriers

H2a: Perceived Trust Toward Traditional Media Exposure affects Perceived Benefit

H2b: Perceived Trust Toward Traditional Media Exposure affects Perceived Barriers

H3a: Perceived Trust Toward Digital Media Exposure affects Perceived Benefit

H3b: Perceived Trust Toward Digital Media Exposure affects Perceived Barriers

Benefits and adverse effects (barriers) perceived by a person with respect to medicine can lead to different behaviors toward OTC medicines. If someone perceives that OTC medicine is beneficial, he/she will consume OTC medicine to relieve his/her symptoms. However, if they want to avoid perceived adverse effect of the medicine, those perceptions will be a barrier to consuming OTC medicine [3]. Therefore, this study also investigates the effect on behavior toward OTC medicine by the other two variables: perceived benefits and perceived barriers. The next hypotheses are

H4: Perceived Benefit affects attitude toward OTC medicine

H5: Perceived Barriers affect attitude toward OTC medicine

IV. Research Methods

A. *Design*

This study uses mixed methods. The first step was a qualitative study using focus group discussions to explore the factors involved in participants' attitudes toward using OTC medicine, based on existing research [3], [1]. The focus groups consisted of OTC medicine users and non-users, and every panel was broken down by socioeconomic status, (upper and middle) based on Nielsen's criteria. This breakdown is based on a study that found different attitudes toward seeking health information between those in different socioeconomic groups [2]. Focus groups consisted of five or six participants per group. The inclusion criteria were males or females age 25–40 years old that had experienced at least one headache in the last six months.

The second step was a quantitative study to confirm the factors affecting attitudes toward OTC medicine use and to measure the influence of each factor. A questionnaire for the quantitative study was distributed via digital media to 404 respondents and used the convenience sampling method. The questionnaire used Likert scale questions to develop the models regarding perceived trust toward exposure, perceived benefits, perceived barriers, and behaviors with respect to a decrease in use or total avoidance of OTC medicines. Result were statistically tested by a *Structural Equation Model* (SEM) to determine the influence and relationships between

perceived benefits, perceived barriers, and exposure variable on behavior toward OTC and non-OTC medicine. The measurement and establish structural model used IBM® SPSS® AMOS software version 22.

TABLE I. OTC MODEL'S GOODNESS OF FIT

GoF indicator	Suitability range	Model output result	Notes
RMSEA	≤ 0.08	0.080	*Close fit*
GFI	0.80 ≤ GFI ≤ 0.90	0.879	*Marginal fit*
NFI	≥ 0.90	0.845	*Marginal fit*
RFI	≥ 0.90	0.810	*Marginal fit*
IFI	≥ 0.90	0.884	*Marginal fit*
TLI	≥ 0.90	0.856	*Marginal fit*
CFI	≥ 0.90	0.883	*Marginal fit*

B. Results

The qualitative study showed that all respondents tried to use other procedures before consuming an OTC medicine. The difference is that respondents on the "used OTC medicines" panels were more concerned with fast relief and focused on benefits of OTC medicines, while respondents on the "did not use OTC medicines" panels, which included herbal remedy users and respondents who do not consume medicines when they get sick, were less focused on the fast relief benefits of the medicines. All respondents from all four groups had a similar perception regarding OTC and herbal remedies, namely, that herbal medicines were perceived to be more safe, while OTC medicines were perceived to have a faster effect [3]. Another finding from the qualitative study concerns usage habits: almost all of the participants said they are decreasing the number of OTC medicines consumed compared to last year. Users from the non-OTC medicine user's panel still used OTC medicine in certain conditions, such as when they have task to be done and have to recover from the headache immediately. Note that when the study was done, there was only one herbal medicine to treat headache in Indonesia and it was launched at about the same time as the study, so participants were not yet familiar with it.

Now we turn to the quantitative study based on the digital questionnaire. A pretest study sent to 30 respondents showed that validity, represented by the KMO indicator, and reliability, represented with Cronbach's alpha indicator, have been fulfilled for all variables. Based on this, the survey was distributed more widely and we obtained a total of 404 responses.

The quantitative results were analyzed using IBM SPSS AMOS software version 22, for SEM analysis. The first step is to construct a measurement model for both OTC and non-OTC medicine users followed by goodness of fit tests and a structural model to test the research hypotheses.

V. OTC & HERBAL USERS MODELS-CONFIRMATORY FACTOR ANALYSIS

After the pretest, Confirmatory Factor Analysis was used to determine whether the hypotheses were accepted or rejected. The first step is to check the validity and reliability of the indicators, represented by the Standard Loading Factor, Composite Reliability, and Average Variance Extracted. All indicators were shown to meet the standard requirement, so the model was determined to fit both the OTC users and non-OTC user's panels.

The structural model was then used to establish the research hypotheses and measure the influence between indicators.

VI. DISCUSSION

From the results, we can see that for the OTC users panel, perceived trust toward primary exposure has no impact on Perceived Benefit This could result from a respondent's beliefs that, regarding OTC benefits, health information can be sourced from family and friends, television, newspaper, and radio, but when related to trusted resources the physician is the most trusted source [23]. For the Herbal panel the impact is significant. This may be because herbal medicine is perceived to be more safe [3] and that the consequences of the overall condition is low [30].

The second hypothesis, H1b: Perceived Trust Toward Primary Exposure (ExpP) affects Perceived Barrier (Bar) is rejected for both the OTC and Herbal panels because respondent's perceived barriers not originated from health information that come from their closest environment [23]. Additionally, for the Herbal panel, the result can be supported by the respondents' perception that herbal medicines are safer [3] so they did not agree that herbal medicine is not safe. The respondents did not trust information regarding herbal medicine adverse effects.

TABLE II. OPERATIONAL VARIABLE

GoF indicator	Suitability range	Model output result	Notes
RMSEA	≤ 0.08	0.072	*Close fit*
GFI	0.80 ≤ GFI ≤ 0.90	0.884	*Marginal fit*
NFI	≥ 0.90	0.856	*Marginal fit*
RFI	≥ 0.90	0.827	*Marginal fit*
IFI	≥ 0.90	0.898	*Marginal fit*
TLI	≥ 0.90	0.877	*Marginal fit*
CFI	≥ 0.90	0.897	*Marginal fit*

TABLE III. HYPOTHESES TEST RESULTS

Variable	Indicator	OTC	Herbal
Perceived Trust Toward Exposure	expP: *Perceived Trust Toward Exposure* Primer/Direct		
	expP1: Information from parents	V	V
	expP2: Information from friends	V	V
	expP3: Information from doctor/ pharmacist /health-related field workers		
	expT: Perceived Trust Toward Exposure from Traditional Media		
	ExpT1: Information from magazine	V	V
	ExpT2: Information from newspaper	V	V
	ExpT3: Information from television	V	V
	ExpT4: Information from radio	V	V
	expD: Perceived Trust Toward Exposure from Digital Media		
	ExpD1: Information from social media	V	V
	ExpD2: Information from searching website	V	V
	ExpD3: Information from health portal	V	V
	ExpD4: Information from news portal		

Variable	Indicator	OTC	Herbal
Perceived Benefit	Ben1: fast to cure	V	V
	Ben2: safe to consume		V
	Ben3: affordable price	V	V
	Ben4: safe to consume before meal		V
	Ben5: easy access	V	V
Perceived Barrier	Bar1: have side-effect	V	V
	Bar2: caused heart palpitation	V	V
	Bar3: caused nausea	V	V
	Bar4: caused sleepiness	V	V
	Bar5: expensive price	V	V
Behavior	Beh1: Took the medicine according to the recommended dose		
	Beh2: Did other activities before taking any OTC medicine	V	V
	Beh3: Stop taking OTC medicine	V	V
	beh4: In the past year, reduced the consumption of OTC medicine	V	V

TABLE IV. HYPOTHESES TEST RESULTS

Hypoteses	OTC	Herbal
H1a: Perceived Trust Toward Primary Exposure (ExpP) affect Perceived Benefit (Ben)	rejected	accepted
H1b: Perceived Trust Toward Primary Exposure (ExpP) affect Perceived Barrier(Bar)	rejected	rejected
H2a: Perceived Trust Toward Traditional Media Exposure (ExpT) affect Perceived Benefit (Ben)	rejected	rejected
H2b: Perceived Trust Toward Traditional Media Exposure (ExpT) affect Perceived Barrier (Bar)	accepted	rejected
H3a: Perceived Trust Toward Digital Media Exposure (ExpD) affect Perceived Benefit (Ben)	accepted	accepted
H3b: Perceived Trust Toward Digital Media Exposure (ExpD) affect Perceived Barrier (Bar)	accepted	rejected
H4: Perceived Benefit (Ben) affects attitude toward medicine behavior (Beh)	accepted	accepted
H5: Perceived Barrier (Bar) affects attitude toward medicine behavior (Beh)	accepted	accepted

The third hypothesis regarding the relationship between trust toward traditional media and benefits is also rejected for both panels. This could be affected by the fact that almost all health information from traditional media is advertising/promotional material from the manufacturer that focuses on product benefits and ignores information about risks. Aikin et al. [38]showed that when participants are exposed to three types of OTC ads (full product claims, OTC ads, and reminder ads), participants that were shown the full product claim and OTC ads perceived the medicine to be more beneficial and effective compared with participants that were shown reminder ads. Full product claims are the complete ads that include both benefit and risk information, OTC ads exclude risk information, and reminder ads exclude both product benefits and risk information. Promotional material from manufacturers regarding product benefits that added information about risks increased consumer knowledge of the risks without decreasing perceived benefits [38].

The next hypothesis regarding the relationship between trust toward traditional media and barriers gave different results for the OTC and herbal panels. This hypothesis is accepted for the OTC panel with a negative value. This means respondents' beliefs were contrary to the message from the manufacturer, and aligns with [38] who compared participants exposed to full product and OTC ads. Participants exposed only to reminder ads perceived more adverse effects from the medicine and believed the medicine was less safe. To reduce perceived barriers it is suggested that ads for OTC medicine also deliver risk information about the medicine. The hypothesis is rejected for the herbal panel because of respondents' beliefs that herbal medicine is safe [3]

Perceived Trust Toward Digital Media Exposure (ExpD) affects Perceived Benefit (Ben) for both the OTC and Herbal panels. This may be because health information from online media is perceived as more neutral and reliable than health information from traditional media, since information from digital media is not produced primarily by the manufacturer and is therefore not promotional in nature. This also applies for the Herbal panel. In accordance with H3a, the H3b hypothesis is also significant for the OTC panel, for the same reason, while it is rejected for the Herbal panel because of respondents' beliefs regarding the safety of herbal medicine [3].

Perceived Benefit (Ben) affects attitude toward medicine behavior (Beh) is significant with a negative value because the behavior indicator in this study is negative (reduce consumption, stop using, or do another activity first before took any OTC medicine). When people perceive the OTC medicine is beneficial they continue to use the drug and do not reduce or avoid the drug consumption. The value is significant and positive for the Herbal panel because when the respondents believe in the herbal medicine's benefit they will use the herbal medicine and do not consume or reduce consumption of OTC medicine.

Perceived Barrier (Bar) affect attitude toward medicine behavior (Beh) also has a significant impact for both the OTC and Herbal panels because when the respondents perceived medicine is not safe and has adverse effects they will try to reduce or avoid using the medicine. For the Herbal panel, the respondents perceived that herbal medicine is safe [3] and this belief reduced their consumption of OTC medicine because they prefer to use herbal medicine.

VII. CONCLUSION

A. Hypotheses Summary

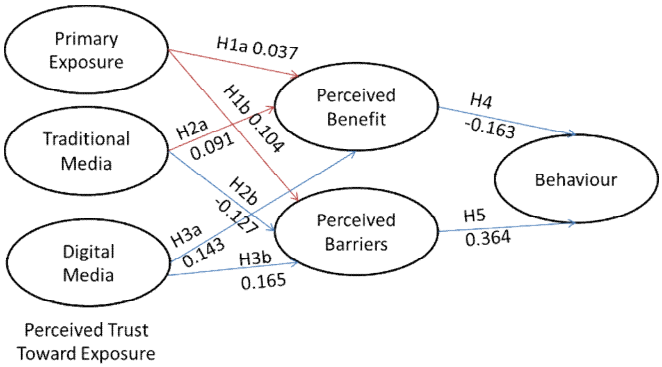

Fig. 3. OTC Hypotheses Result Model

Regarding OTC medicine use, the model found the following hypotheses can be accepted:

- H2b: there is a negative influence from Perceived Trust Toward Traditional Media Exposure on Perceived Barriers, by 12.7%.

- H3a: there is a positive influence from Perceived Trust Toward Digital Media Exposure on Perceived Benefit, by 14.3%.

- H3b: there is positive influence from Perceived Trust Toward Digital Media Exposure on Perceived Barriers, by 16.5%.

- H4: there is a negative influence from Perceived Benefit on Behavior by 16.3%.

- H5: there is positive influence from Perceived Barrier on Behavior by 36.4%.

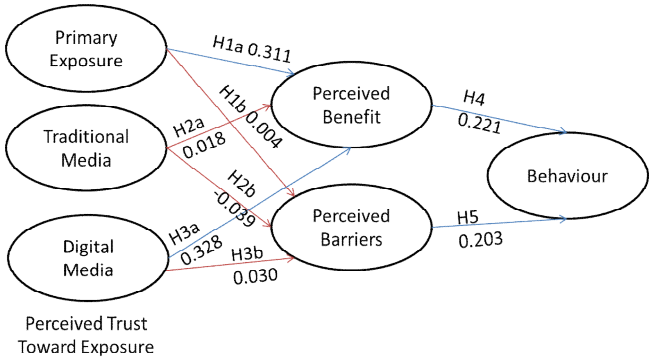

Fig. 4. Herbal Hypotheses Result Model

For the Herbal -OTC model, the following hypotheses can be accepted:

- H1a: there is positive influence from Perceived Trust Toward Primary Exposure on Perceived Benefit by 31.1%.

- H3a: there is positive influence from Perceived Trust Toward Digital Media Exposure on Perceived Benefit by 32.8%.

- H4: there is positive influence from Perceived Benefit on Behavior by 22.1%.

- H5: there is positive influence from Perceived Barrier on Behavior by 20.3%.

B. Communication Strategies

- Digital Media is trusted by both OTC and Herbal panels, so marketers can utilize this channel to promote their products;
- Traditional Media does not significantly impact perceived benefit for either panel. Therefore, marketers should seek new ways to increase trust such as providing information not only about benefit but also about risks and adverse effects (Aikin et al., 2016);

Primary Exposure does not have a significant impact except for perceived benefit in the Herbal model, so marketers can utilize this channel to improve herbal products' perceived benefits.

VIII. Limitations and Future Research

Limitations for this research include using the same indicator for both OTC and Herbal panels for perceived benefit and perceived behavior variables. Since those two models have different characteristics, the construct indicators could be different.

Suggestions for future research:

- Use more specific attributes to obtain a more accurate model since every panels can have special characteristic that different from the other panel so that it may needs more specific parameter to measure the output. The other factor is, habit of the user can be changing over time and their priority can be different and affect the attributes importance.
- Include digital media ads because this media channel is growing fast and promising With rapidly growing of information technology there is also a changing in media habit and switching from conventional/traditional media to high technology media such as digital cannot be avoided.

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