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Low Level Laser Technology (LLLT) to Reduce Dependency Substance Nicotine on Cigarette for Student at the University of Mataram

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ABSTRACT
Cigarettes are one of the addictive substances which, when used Excessive use can result in a hazard to individual and public health. Cigarettes are made from processed tobacco products, including cigars or other ingredients others produced from the plants Nicotiana Tabacum , Nicotiana Rustica and other species or their synthesis containing nicotine and tar with or without chemical additives. In a cigarette contained more than: 4000 type compound chemical, 400 substance dangerous and 43 substance reason cancer (carcinogenic). The purpose of this writing and research is to knowing factors what just which cause somebody smoke, give information about impact negative usage cigarette for long-term organ health, as well as the development of LLLT using photobiomodulation to reduce dependence on nicotine substances present in cigarette. The research was conducted using the survey i method , namely by filling out the form for undergraduate students in the university environment Mataram. The method used to analyze the data is the technique of descriptive quantitative which disclosed in distribution score and percentage.

***Keywords**: Technology Laser, LLLT, Active Smoker, Electromagnetic, University of Mataram.*

ABSTRAK
Rokok merupakan salah satu zat adiktif yang apabila penggunaannya berlebihan dapat mengakibatkan bahaya bagi kesehatan individu maupun masyarakat. Rokok merupakan hasil olahan tembakau, termasuk cerutu atau bahan lain lain yang dihasilkan dari tanaman Nicotiana Tabacum, Nicotiana Rustica dan spesies lainnya atau sintesisnya yang mengandung nikotin dan tar dengan atau tanpa bahan tambahan kimia. Dalam sebatang rokok terkandung lebih dari: 4000 jenis senyawa kimia, 400 zat berbahaya dan 43 zat penyebab kanker (karsinogenik). Tujuan dari penulisan dan penelitian ini adalah untuk mengetahui faktor-faktor apa saja yang menyebabkan seseorang merokok, memberikan informasi tentang dampak negatif penggunaan rokok bagi kesehatan organ dalam jangka panjang, serta pengembangan LLLT menggunakan fotobiomodulasi untuk mengurangi ketergantungan terhadap zat nikotin yang terdapat dalam rokok. Penelitian ini dilakukan dengan menggunakan metode survei, yaitu dengan mengisi formulir untuk mahasiswa S1 di lingkungan Universitas Mataram. Metode yang digunakan untuk menganalisis data adalah teknik deskriptif kuantitatif yang diungkapkan dalam bentuk distribusi skor dan persentase.

***Kata Kunci**: Teknologi Laser, LLLT, Perokok Aktif., Elektromagnetika, Universitas Mataram.*

INTRODUCTION
D'nature skeleton going to Indonesia Healthy 2010 is implementing insightful health development Clean and Healthy Life Behavior (PHBS). It means, every program effort must have a positive impact on shape behavior healthy and environment healthy. Though not everyone can live a healthy lifestyle. According to Wageningen University researchers, there are four a healthy lifestyle that must be carried out is to be careful heart with food (diet), avoid alcohol, sport, and stop habit smoke. After 10 years conducted

research on more from 1,500 person aged 70-90 year which originated from i 11 countries Europe, it turns out they who runs Four healthy lifestyles have health conditions which positive. For that person must minimize consumption alcohol and avoid cigarette.

Cigarettes have widely become one of the causes biggest death in the world. As for the main cause Dead the smoker that is cancer, disease heart, lungs, and strokes . Besides cancer also cause stress disorders in office spaces disclosed various circles researcher about the various dangers of smoking to health, but smokers don't seem to care about the results various study that. Study latest which involve 34,439 person and published by British Medical Journal show, smoke make somebody no long age. If compared to non-smokers, age the smoker average more short 10 year and use up money millions dollar.

Smoke, drink alcohol, drive vehicle without belt safety, sex which no safe specifically those who live only for fun (having fun) is a risky behavior that is behavior risky tall experience disability and Dead early.Illness and Dead early consequence cigarette in many country proven increase from time to time. To date, there is no definitive limit to the amount of cigarette smoke exposure that can cause disease in the human body. However, existing evidence suggests that prolonged exposure to cigarette smoke can increase the risk of serious health problems.(Dewi, S. K. 2022).Some people see it as part of everyday life, while others are increasingly aware of its negative impact on health.(Achmad Y., F., et.,al.,.2024).

Increase prevalence smoke in countries developing, including Indonesia causing problems cigarette Becomes the more are you serious. Day without tobacco worldwide which is commemorated every May 31 discourage smokers to reduce their habit. Part smoker in Indonesia has consider that smoking is a necessity that cannot be circumvented, so that smoke is Thing normal for people young. Appearance for people young Becomes capital main in get along no just with fellow type, but also with opponent type.(Ahleyani, M., et.,al.,2025).

Efforts to prevent and control smoking behavior have been implemented, such as warnings about the dangers of smoking on cigarette packages, accompanied by images of the diseases caused by smoking. However, many people still smoke for various reasons(Monifa P, & Fitriyani B.,2023). Smoking is a how to acceptable social. So, part from they which smoke due to peer pressure. Although there is also which smoke caused see person parents who smoke. Basically, novice smoker usually begins with nausea, coughing, and feeling other bad taste, but still they smoke though actually they enough well-informed to danger smoke.

Figure 1. The phenomenon of minors addicted to smoking

Smoke according to sitepoe is burning tobaccothen sucked the smoke good use cigarette or use pipes. Smoked cigarette smoke or cigarette smoke inhaled through the two components. First, components that quickly evaporate in the form of gases. Second, component which together gas condensed into particulate components. Thus, smoke cigarette which sucked could in the form of gas amount 85 percent and the rest in the form of particle. Smoke which generated cigarette consists of the main smoke (main stream smoke) and smoke side (side stream smoke) (George et al., 2019). The main smoke is smoke

tobacco which sucked direct by smoker, while the side smoke is tobacco smoke which dispersed into the air, so that it can be inhaled by other people who are known as passive smokers. Smoke The smoked cigarette contains 4000 types of ingredients chemicals with various types of work on the body. A number of ingredient chemical which there is in cigarette capable of having a detrimental effect on health. including carbon monoxide, nicotine, tar, and various other heavy metals (Banks et al., 2023).

Carbon monoxide is substance which tie hemoglobin in blood and make blood no capable tie oxygen. Nicotine is drug stimulant (stimulus drugs) which can give stimulation, addicted, feeling happy at a time calm. Tar is a hydrocarbon substance that sticky and sticks to the lungs. Because that somebody will disturbed his health if smoke continously (O'Brien et al., 2021). Thing that caused nicotine in smoke cigarette which sucked Stop behavior smoke not effort easy, especially for smokers in Indonesia. Results survey which conducted by LM3 (Institution Tackling Smoking Problems), from 375 respondents stated that 66.2 percent of smokers have tried quit smoking, but they failed. This failure there are various kinds; 42.9 percent don't know how; 25.7 percent have difficulty concentrating and 2.9 percent are tied by cigarette sponsors. Meanwhile, something worked stop smoke caused awareness alone (76 percent), sick (16 percent), and demands profession (8 percent) (Tehrani et al., 2022). In Indonesia and especially the city of Mataram , smoking cessation therapy is carried out through the stop smoking or smoking cessation section yet many known. Whereas through part the one will receive therapy on a step by step basis Step as well as counseling from the expert. Service health for stop smoke more many based on experience person other (Barrington-Trimis et al., 2016).

In studies related to electromagnetics , dependence on cigarettes for active smokers caused by the influence of the nicotine substance contained in cigarettes can be reduced and even cured with assistive technology in the form of the use of lasers . (InGaAIP) can be used to treat active smokers who are addicted (Seiler-Ramadas et al., 2021).

The problem of smoking is also a socio-economic problem. because 60 percent of active smokers or 84.84 million people out of 141.44 million people are they come from of the poor or economically weak who daily day difficulty in Fulfill needs the main thing is. Besides that, with decrease day work which caused sick, so cigarette lower productivity worker. With thereby, amount reduced income and expenses increase for cost treatment (Almeida-da-Silva et al., 2021).

a. Laser Indian, Gallium-Aluminum-Lhosophide (InGaAIP)

LASER stands for light amplification by stimulated emission of radiation , which is a high concentration of light energy that is placed in a focused area that is the target lesion. Laser therapy treatment, also known as low level laser therapy (LLLT) was first introduced in 1966 which shows tissue repair with the application of a low-energy (1J/cm2) ruby laser. Laser therapy is often referred to as 'Low Level Laser Therapy' (LLLT) or soft laser. Modern laser irradiation procedures on the human tongue are now mostly performed with minimally invasive surgery, one of which is laser therapy. Laser light has the ability to sever or thicken the tissues and cells in the tongue with its high energy density. Hyperplastic or hypertrophic lesions and other lesions requiring excision are good indications for laser removal. In addition, aphthae or herpes labialis can also be treated with laser, which can reduce dependence immediately after irradiation (Zavala-Arciniega et al., 2022).

The use of laser technology for the reduction of dependence on nicotine substances has a fairly good effect on the cure of active smokers and has been studied extensively in recent years. Many investigators suggest the combination of low-level laser therapy (LLLT) with traditional surgical approaches, for biostimulation of tissue healing.use of lasers,Gallium-Aluminum-Lhosophide (InGaAIP) or Er,Cr:YSGG lasers have great potential in reducing nicotine dependence (Yao et al., 2020).

Laser shooting aims to affect a person's dependence on the substance nicotine. LLLT

technology works by stimulating brain cells that are already in a state of dependence. This laser irradiation does not damage living cells, but restores the biochemical structure

b. Indium Laser Related Research, Gallium-Aluminum- Lhosophide (InGaAIP).

Another study that analyzed the use of LLLT in soft tissue lesions in vitro and in vivo reported a stimulation of tissue repair that was seen in the form of increased granulation tissue, accelerated epithelialization process, increased fibroblast proliferation, increased matrix synthesis and increased new vascularity formation. The mechanism of action of LLLT has been analyzed in several in vitro studies. The mechanism is influenced by the type of cells exposed, wavelength and dose. The three main functions of a laser beam are:
(1) analgesic function (λ=630-650nm, =780- 900nm),
(2) anti-inflammatory function (with the same wavelength)
(3) network repair function (λ=780-805nm)

The mechanism of the molecular and enzymatic tissue repair process mainly works by activating the mitochondrial energy production (ATP) . Low Lever Laser Technology (LLLT) has now been introduced to prevent or reduce nicotine dependence on cigarettes . human tongue cells . Furthermore, LLLT can reduce pain, severity and duration of addiction. Several studies have tried to evaluate when is the best time to give LLLT. Administration of LLLT as a prophylactic therapy was said to be more effective than curative therapy.28-30 If therapy was given to prevent oral mucositis, the study showed a significant difference where only 18% experienced nicotine dependence compared with 73% in the placebo group (p=0.03). This shows that LLLT can prevent the occurrence of severe dependence . Meanwhile, if given to patients who have experienced severe dependence , there will be a decrease in dependence (based on the Visual Analogue Scale) accompanied by a decrease in the level of willingness to smoke. Furthermore, in addition to decreasing the intensity of cravings, LLLT was reported to also shorten the duration of the desire to smoke , from 19.3 days to only 8.1 days (Song et al., 2023).

c. InGaAIP Laser Equations Characteristics and electromagnetism

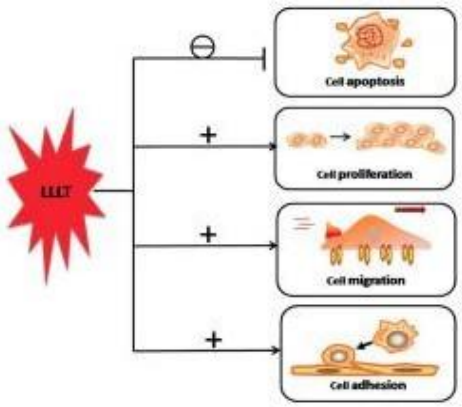

Figure 2. InGaAIP Laser characteristic for LLLT applications

For the present study, the JV characteristics of the QCLs were recorded along with the 3 laser emitted intensity (L) as a function of the magnetic field applied along the growth axis within the temperature range 4-200 K. In Fig.1 the BJL map for the Au-device is presented on the left (1000 pulses per macro-pulse with width 95 ns, T=4.2 K). Below the map, the Landau level fans for the involved upper state and lower miniband are plotted for the first few orders, according to the non-thebolicity-corrected formula21,22 E(B, n) = 1 2 (E(0)− EG) + 1 2 r (E(0) EG) 2 + 4EG E(0) + n + 1 2 ~eB m (0) where E(0) is

the energy of the state at B=0 T, EG = 816 meV is the gap energy, n the Landau level index, ~ the reduced Planck constant and m (0) is the effective mass at B=0 T. The bold lines mark the Landau index n=0 of the upper state |5, 0i and of the lower-lying miniband |(4, 3, 2), 0i. For the level |5, 0i broadening is taken into account according to the formula = 0 B assuming 0=1 meV at B=0T.23,24 Equivalently, one could instead consider the un-broadened state |5, 0i interacting with a continuum of states delimited by |4, ni and |3, ni. Thinner lines constitute the higher index Landau levels while dashed lines are indicating the B-field position of their crossings with |5, 0i. One has also to note that the lower effective mass of InGaAs with respect to GaAs allows one to reach a 1.6-times (m GaAs /m InGaAs =67/43) higher confinement for the same magnetic field (Zoccai et al., 2020).

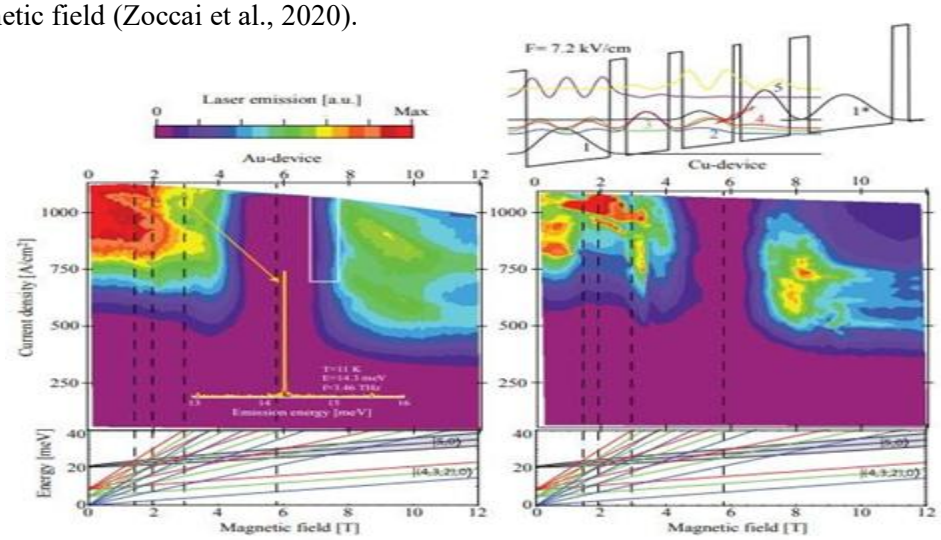

Figure 3. Relationship between InGaAIP laser and electromagnetic field

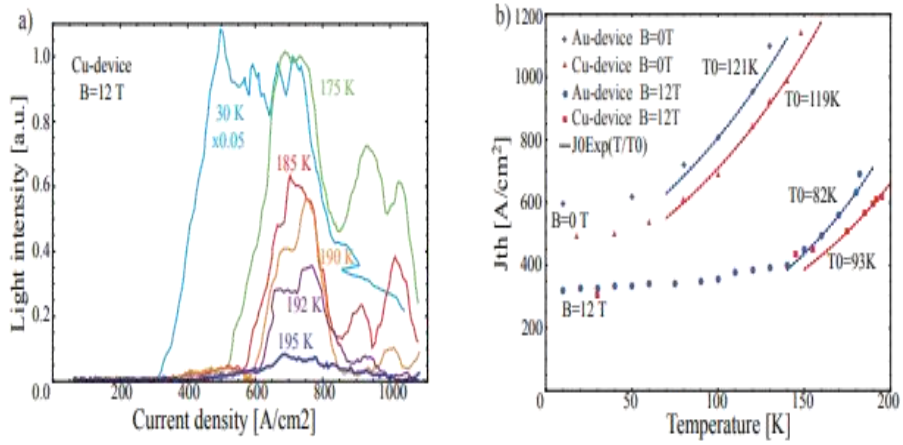

Figure 4. Graph of thr relationship beetween density temperature on a laser

QCL emission plotted against magnetic field and injected current density for the Au-device at 4.2 K (left) and the Cu-device at 30 K (right). For clarity the Landau fan of the involved states, calculated with the non-thebolicity- corrected formula, is reported below each map. In the left map, the white rectangle about 7.5 T identifies the region in which lasing at 1.4 THz also occurs, while the spectrum shows the laser emitting at 3.46 THz at B=3 T, T=11 K and J=1077 A/cm^2 . In the upper-right corner the conduction band diagram of the layer sequence at the alignment is shown.

The welding performance of the QCLs were studied at different magnetic fields and temperatures.

The first benefit of the in-plane carrier confinement is the improvement of the maximum operating temperature of the lasers: the Cu-device (Au-device) raised from 148 K (130 K) to 195 K (182 K) when applying a magnetic field of intensity 12 T. The JL curves of the Cu-device at selected temperatures at 12 T are presented LJ curves for the Cu- device at B=12 T for temperatures of 30 K (light blue), 175 K (green), 185 K (red), 190 K (orange), 192 K (violet) and 195 K (blue , thick). b) Jth vs Temperature for both devices at B=0 T and B=12 T .

The temperature behavior of the threshold current density (Jth) is shown in fig at B=0 T and B=12 T for both devices. The 0 T-series is extracted from measurements performed in an external flow cryostat coupled to a bolometer (the difference in the values of Jth at low temperatures between the maps and the points here reported might stem from a different reading of the temperature sensor). Comparing the performances at B=0 T, one can see how the Cu-device has a lower threshold current density in the whole temperature range that allows it to reach a higher maximum temperature, despite of the very similar T_0.

d. Laser Mechanism of Action (InGaAIP) for LLLT

In the human body there are various kinds of cells that also perform various functions. Cells in the human body have skin cells in large numbers which will provide energy intake (ATP). Mitochondria in cells that are under stress or in the context of nicotine dependence are cells that are affected by chemical contamination . This is what causes dependence stress and depletes ATP reserves and causes inflammation and decreased cell function , so the body will respond to substances that have entered and cause dependence.

If the tongue tissue is applied to light with the appropriate wavelength found in LLLT, then this li ght will be absorbed by cytochrome c oxidase. Absorption of light by cytochrome c oxidase will replace mtNO thereby reducing oxidative stress, preventing ATP use and reducing nicotine dependence but increasing cellular metabolism. Cellular metabolism will continue with the activity of Ca2+ ions, secretion of growth factors, activation of enzymes and other secondary messengers. This is what causes that within a few hours after LLLTdown window on the left of the MS word formatting toolbar.

At certain points that receive laser light, explained Gabel, there are nerves and blood vessels. These twenty-nine have the greatest access to brain work. One area that gets light is the lips. The two points that get irradiation are the ends of the left and right lips. Lips are one of the areas directly affected by smoking. The lip area usually becomes wrinkled and blackened quickly. These two areas also have great access to influencing nicotine dependence.

Figure 5. Examples of LLLT technolgy theraphy in humas to reduce addiction of nicotine

RESEARCH METHOD

a. Research location

Figure 6. Research data collection location

This research, which was conducted in Mataram City, West Nusa Tenggara. Special reason for selection This location was done, because he wanted to know the level of active smokers in various faculties in the Mataram University environment. Spradley identify five requirements for choose informant which "good". First, enculturation full. Enculturation is process experience in learn something culture certain. Informant which potential varied level enculturation they and they knowing the culture with good. Second, direct involvement. That is, when the informant is involved in atmosphere culture, they use their knowledge to guide their actions. They make interpretation about various incident new and apply it in life daily. Third, the cultural atmosphere known by informants, because they are fully enculturated. Fourth, time which enough for Interview. At least this approach takes six to seven times Interview. Each interview lasts for one o'clock. Fifth, non-analytical. It means, informant use language they for describe various incident and action without analysis from events and actions. After the selection informant is known that third informant in study this has Fulfill fifth condition in on as informant which good.

b. Data collection

Collection data this use method qualitative. Method qualitative emphasize or focus on amount proof which allow person for understand meaning what which currently occur. What which they tell me or do will interpreted by researcher. Studies case chosen, because in accordance with experience each each informant as smoker which different one with which other.

Analysis qualitative (qualitative analysis) is effort for reach definition about something symptom social with use data which has been collected through observation, Interview, and case.Data which collected through observation and Interview is data primary which still "raw" from field then sorted customized with theme (recontextualization). Data sorted based on context, so that Becomesrational.

The data collected in the form of descriptive data informants from getting to know cigarettes to being addicted to cigarettes. Besides that, obtained also data about process stop smoke until incident which cause he quit smoking. Oral data obtained from the results in-depth interviews with informants. Writing data obtained from studies literature, Internet, newspaper, and magazine other. During Interview conducted in field, tape recorder used as process recording, so that data stored with good.

RESULT AND DISCUSSION

A person who is trying to quit smoking will looking for a way out. But not everyone can succeed with method which recommended from person other.Hal that also occur on third informant in studies which conducted moment this. Method means implementation or application from what which already planned. Plan will vain if permanent stay as plan. So plan that must held. Method of course only wrong

one part from plan, but the role very big and important. The selection of the right method will determine level success activity. Because that, method stop smoke in Thing this refers to on third the informants above, among others, by treatment methods, change behavior, and encouragement positive. All method which worn informant based on intention or desire which strong. If nothing will/desire, so method the no will ever work.

Everyone certainly has a different reason for stop smoke. Reason the nature no single, but can double. However, there is reason which nature main as well as there is reason supporters. Reason disturbance health almost equally found on smoker which want to stop habit smoke it. Appearance disturbance health likehypertension, high fever, cough, chest pain and aches head (dizzy seven around).

On plan for stop smoke, method or therapy which will chosen influenced by information which he obtained. Method means implementation or implementation of what was planned. Election method which appropriate will determine level success activity 11 . Method which chosen by The three informants are the method of treatment (therapy), change behavior (changing behavior), and encouragementpositive (positive encouragement).

All methods that worn informant based on intention which strong (strong will). If no there is intention, so method the nowill once succeed.

Informant A once tried to quit smoking with look for treatment which can cure addiction to cigarettes. At first he left to treatment traditional. Information that obtained through a friend. The friend told that there are special herbs that can remove nicotine from in body. A direct go buy Herb which shown by his friend. But he doesn't feel satisfied. Then he try with treatment modern, namely through a special doctor who handles smoking addiction problem. The doctor gave drug in the form of candy "antique" to him. A feel happy with drug the. Candy the for removes nicotine and tar in the lungs lungs. After the candy is consumed, the taste turns out to be bitter, so that he feel no nice for smoke.

The cigarettes he often receives when hanging out together her friends cause he try for smoke again. Will but sick chest which he feel and Keep going attack him every time smoke causes him to have to stop smoking if he wants to healthy. He want to healthy and aged long. On finally he decide for stop smoke by reason of illness and of his own volition. He no depend on treatment special for help his wish stop from smoke, but only strength heart with determination (strong determination) and desire stop smoke.

After quitting smoking, there will be a change which occur there is body ex- smoker that is withdrawal symptoms (symptom withdrawal return). After all, cigarettes and nicotine are substances that make somebody addicted. Stop smoke actually is displacement from state addiction to freedom. Below is explained how the ex- smoker stop withdrawal itssymptoms.

Informant C the situation more unique again. When answer question from results Interview about condition after quitting smoking, B answered that the money feel more intact, because no used for buy cigarettes. Besides, B also avoids eating spicy food as experienced by A.Environment have role which very big will success of a person quitting smoking. According to A, environment very important in carry out his life. A including lucky, because A quit smoking after finding a positive environment. Thing that also experienced by B. new friends and environment also no smoke which followed by si B.

a. Percentage result

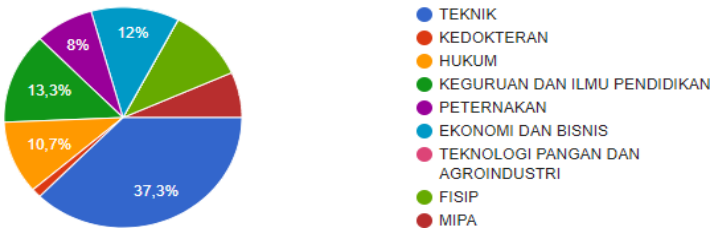

Figure 7. Percentage of research respondents

Table 1. List of research respondents from various faculties

No.	Faculty	Responden	Percentage
1	Engineering	28	37,3 %
2	Education	10	13,3 %
3	Economy and Bussines	9	12 %
4	Law	8	10 %
5	Social Science Politics	8	10 %
6	Animal husbandary	6	8 %
7	Natural Science	5	6,2 %
8	Medicine	1	1,3 %
	Total	75	100%

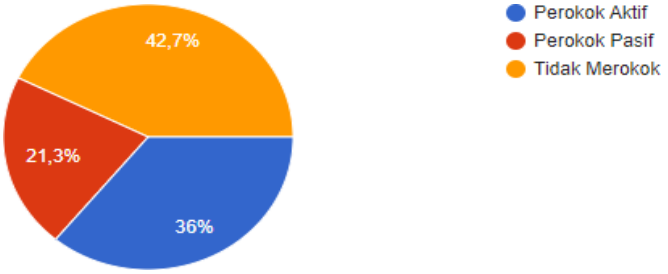

Figure 8. Percentage of active smokers, passive smokers and non-smokers.

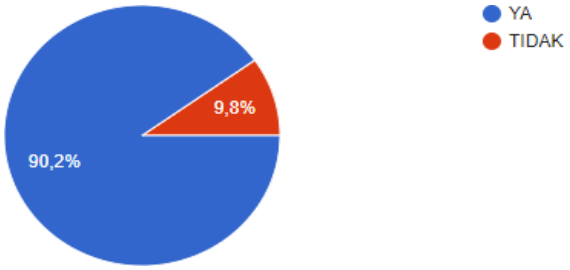

Figure 9. Percentage of active smokers who want to quit smoking

CONCLUSION

Based on the available literature data, it can be concluded that LLLT has a clear role in reducing the severity of oral mucositis induced by chemotherapy and/or radiation. However, research has focused on the impact of smoking on humans and the role of LLLT in preventing and reducing nicotine dependence on cigarettes.

Various studies have shown the function of lasers for various purposes, especially in the field of health when using LLLT technology. The procedure for administering LLLT can be performed in as many as 7 0-80 % of a person who states a decrease in nicotine dependence immediately after administration of laser light on LLLT.

The use of LLLT technology to reduce nicotine dependence on cigarettes in the Mataram University campus environment, especially for the engineering faculty environment with the most respondents, is expected to be able to improve environmental conditions due to cigarette butt waste and improve healthier air quality in the campus environment.

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