LIFESTYLE MODIFICATION TO IMPROVE GERD AMONG ELDERLY JAPANESE PATIENTS IN THE PRIMARY CARE SETTING

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Abstract

Gastroesophageal reflux disease (GERD) is a common gastric disorder that affects large numbers of people in the world. The worldwide prevalence of people with GERD is approximately 15 to 25 percent of the world population (Bor, 2015). The elderly especially have a high prevalence of GERD due to the disturbance of esophageal motility, decreased gastric emptiness, less salivary production (Chait, 2010), or taking nonsteroidal anti-inflammatory drugs (NSAIDs) for arthritis (Zanten, 2008). GERD causes a variety of symptoms such as heart burn, acid regurgitation, loss of appetite, or insomnia, and having those symptoms can significantly impact a person's quality of life (QOL) (Pubmed, 2015). Additionally, further complications may result as chronic inflammation of the esophagus mucosa by GERD also increases the incidence of eosinophilic esophagitis, Barrett's esophagus (BE) or esophageal adenocarcinoma (MC, 2017; Chait, 2010). Normally, most patients who are suffering from GERD are treated by long term pharmacological therapy using proton-pump inhibitors (PPIs) or H2 receptor antagonists (H2 blockers). However, an alternative approach may be used in which Nurse Practitioners (NPs) can contribute more to the patient's health promotion by incorporating lifestyle modification for their patients to improve GERD symptoms and reduce medication strength and dosage. This paper will address the basic knowledge of GERD to include relevant published literature review, and propose how to facilitate lifestyle modification for patients with GERD using surveys and educational material by an NP in a primary care facility.

Table of contents

Lifestyle Modification to improve GERD among elderly Japanese patients in a primary care setting.

Introduction and background

GERD is one of the most common forms of chronic gastric diseases and it affects a large amount of people in the world. The worldwide prevalence of GERD is approximately 15 to 25% of the world population with the highest prevalence numbers of GERD in the U.S. at 26.2% (Bor, 2015). The prevalence of associated health conditions such as BE and *Helicobacter pylori (H. pylori)* infection affect Asians more with an increased risk of esophageal adenocarcinoma (Zanten, 2008; Katz, Gerson, & Vela, 2013; Lee, 2014), and it is currently estimated to affect more than 10% of the Asian population (Hsu et al., 2016). Especially in Japan, where BE is common among elderly patients due to complications with longstanding GERD, and where the prevalence rates of *H. pylori* associated with BE are higher than in Western countries (Zanten, 2008; Katz, Gerson, & Vela, 2013; Lee, 2014).

GERD occurs when the lower esophageal sphincter (LES) is weak or inappropriately relaxed which results in stomach acid and its contents flowing backward up into the esophagus causing inflamed esophagus mucosa. The factors that increase the incidence of GERD include hiatal hernia, pregnancy, scleroderma, delayed stomach emptying, and obesity. Additionally, the consumption of certain foods/beverages can aggravate acid reflux causing GERD such as: chocolate, fatty foods, caffeinated beverages, and alcohol (Mayo Clinic [MC], 2017; WebMD, n.d.).

The symptoms of GERD include heartburn, chest pain, dysphagia, disrupted sleep, and chronic coughs due to the effects of GERD on the upper respiratory system. Chronic inflammation of the esophagus mucosa caused by GERD increases complications such as

narrowing of the esophagus, eosinophilic esophagitis, esophageal ulcers, and BE which is significantly associated with an increased risk of esophageal adenocarcinoma. Incidentally, the elderly have a high prevalence of complications caused by GERD (MC, 2017; Chait, 2010).

Identification of actual or potential health concern

There are significant factors causing the elderly to have GERD. The physical process of aging is one of the major causes for GERD, and usually their condition becomes more advanced due to the disturbance of esophageal motility and decreased gastric emptiness. Another factor is less salivary production which is needed to neutralize potential acid reflux in the esophagus and protect the surface mucosa. Additionally, the use of specific medications such as PPIs and H2 blockers, are less effective on the elderly and can contribute to causing more complications (Chait, 2010). The incidence and prevalence of dyspepsia associated with the daily use of NSAIDs increases the risk of gastric ulcer and GERD especially among elderly who are taking NSAIDs or acetylsalicylic acid (ASA) every day for osteoarthritis or pain control (Zanten, 2008). Finally, direct esophageal injury related to GERD occurs more often in elderly using medication for cardiovascular or cerebral vascular disease, and injury to the esophageal mucosa associated with GERD can be caused by continued use of potassium tablets, iron supplements, and bisphosphonates (Chait, 2010).

GERD symptoms, such as heartburn and acid regurgitation, can have a negative effect on a patient's QOL. Patients with GERD feel like they have a full stomach, bad taste in the mouth, and often experience nausea/vomiting which causes loss of appetite (PubMed Health, 2015). Other important symptoms of GERD are anemia, unexplained weight loss, and gastrointestinal bleeding (Chait, 2010; Kao et al., 2013).

Nocturnal GERD has a significant impact on QOL compared to daytime symptoms with 78% of GERD patients reporting nocturnal symptoms, and 63% of those patients indicating that sleep was negatively affected (Chait, 2010; Katz et al., 2013). Nocturnal GERD has a greater effect on elderly who often spend more time in bed due to comorbid illness including dementia, Parkinson's disease, and cerebral vascular disease (Chait, 2010).

Elderly Japanese patients with GERD experience the signs and symptoms mentioned previously, and need to receive prompt medical treatment before their condition worsens their overall health and wellbeing. However, most of the time the focus for treatment is based on the dispensing of medication to treat the immediate problem, but not with preventing future occurrences. Therefore, a combination of medical treatment and a program of health promotion which focuses on modifying lifestyle habits and behavior should be provided in the primary care setting.

Reason for selecting the topic

To prevent and treat GERD effectively among the Japanese elderly, a more individualized approach is needed and can be facilitated by a trained NP. The focus should be on assessing each patient's health condition to determine the best approach to modifying relevant lifestyle habits and behaviors to be used in addition to medication. With the help and guidance of the NP, the patient will have a specific plan to make healthy lifestyle choices as part of their daily habits which can help with increasing the effectiveness of their treatment for GERD, and preventing future complications of GERD such as BE or adenocarcinoma of the esophagus and overall patient's QOL.

Review of Literature

The following review of three Japanese studies supports the need of an individualized approach to developing appropriate treatment plans for GERD patients by taking into consideration the patient's lifestyle habits and behaviors. Each study focuses on assessing the patient's health condition via responses to questionnaires that help to provide specific information on identifying lifestyle habits and behaviors that may be risk factors for GERD and other related complications. The results of the questionnaires are then utilized to determine the best approach to modifying the patient's current lifestyle in conjunction with medical treatment to achieve successful treatment of GERD patients and prevent reoccurrences of GERD.

The first study entitled, "Lifestyle factors associated with gastroesophageal reflex disease in the Japanese population", was conducted by Matsuki, et al. (2013) and it emphasized the importance of identifying risk factors of GERD and related lifestyle factors. The purpose of identifying relevant lifestyle factors is needed in order to modify negative lifestyle habits to decrease the risk factors of GERD, and develop a corresponding treatment therapy for GERD patients.

The participants of the study were 886 Japanese patients of which 547 were male and 339 were female. All participants underwent gastrointestinal endoscopy health screening which resulted in 138 participants being diagnosed with erosive esophagitis (EE), and 148 being diagnosed with Non-erosive esophagitis (NERD). Based on the results of the gastrointestinal endoscopy health screening, participants were then divided into three groups: EE, NERD and the control group. All participants took three different questionnaires: the frequency scale for symptoms of GERD (FSSG) questionnaire (Appendix A), the brief-type self-administered diet history questionnaire (BDHQ), and the psychological and physical stress questionnaire.

The researchers found several significant lifestyle habits or behaviors linked to risk factors of GERD among the participants involved in the study. For example, the total number of calories consumed was significantly associated with developing EE and NERD. Also, the participants who habitually ate at irregular meal times on a daily basis, ate a large dinner, or often ate out were found to be at a high risk of developing NERD.

Data from the questionnaires focused on other lifestyle factors such as smoking, alcohol consumption, stress management, and sleep habits to determine which indicated a high risk of developing GERD and other related conditions. The researchers concluded that the primary health care provider (PCP) should consider using questionnaires to assess data to help with identifying high risk lifestyle factors, and to come up with ways to improve those factors which may also become a form of therapy for the treatment of GERD.

The second study entitled, “Lifestyle factors affecting gastroesophageal reflex disease symptoms: a cross-sectional study of healthy adults using FSSG scores”, was conducted by Yamamichi et al. (2012). The focus of the study evaluated lifestyle factors such as poor quality of sleep and irregular dietary habits which were found to be strongly associated with GERD symptoms. Questionnaires were used to gather specific information on the participant’s lifestyle habits, medical history, and medication use. The results of the questionnaires helped to determine the connections between GERD risk factors and unhealthy lifestyle habits and behaviors.

The study population was made up of 19,864 participants (11,493 males and 8,371 females) aged between 40 to 60 years old, and who all underwent medical check-up in Chiba, Japan. Information on prescribed drug use was gathered as 371 participants were found to be using PPIs to treat GERD, while 539 used the H2 blocker digestive drug, and the remaining 18,954 participants were not using either PPI or H2 blocker.

All participants were required to take the FSSG and QSML (Appendix A). QSML are in reference to the history of past/present medical issues, medications use, exercise/eating/sleeping habits, and consumption of alcohol and cigarette use. The results of the questionnaires were used to determine whether specific lifestyle factors and prescribed medication could be used in conjunction to effectively treat and prevent reoccurrences of GERD.

When the researchers analyzed the correlation between FSSG scores and the background factors of all participants, they found specific associate factors and eight significant lifestyle factors commonly related to the prevalence of GERD symptoms. For example, some associate factors that were identified included similarities in current body weight, and the use of NSAIDs, steroids, or antihyperglycemic agents. Additionally, the eight specific lifestyle factors that were identified to strongly influence GERD symptoms were due to the following: inadequate sleep, eating dinner right before bed time, having a habit of eating a midnight snack, frequently skipping breakfast, quickly eating meals, lack of exercise, and habitually drinking alcohol and smoking. The researchers also discovered that digestive drugs (PPIs or H2 blockers) alone did not fully relieve the GERD symptoms because the results of the FSSG questionnaire showed that a high number of participants using PPIs or H2 blocker were still suffering from GERD symptoms.

The research further identified lifestyle habits such as poor quality of sleep and irregular dietary habits as potential risk factors of GERD especially for current PPIs or H2 blocker users. Other lifestyle habits such as inadequate sleep and frequent lack of breakfast were found to be obviously correlated with GERD symptoms in PPI users, and inadequate sleep and midnight snacking habits were strongly associated with H2 blockers users. As a result of the findings, the

researcher concluded that medication alone is not effective to treat GERD, but must be used in conjunction with healthy lifestyle modifications.

The last study reviewed is entitled, “Lifestyle factors and efficacy of lifestyle interventions in gastroesophageal reflux disease patients with functional dyspepsia: Primary care perspectives from the LEGEND study”, and it was conducted by Haruma et al. (2015). The focus of the study was on patients with GERD who were on Lamsoprazole to treat dyspeptic symptoms for four weeks. The progressive status of the patients were assessed and evaluated using questionnaires before and after pharmacological therapy to gather information that can be used to improve their recovery from dyspeptic symptoms.

A total of 12,652 patients participated in this research and they were diagnosed by endoscopy as having erosive esophagitis. The mean age of the patients was 60 years old with more than one third of the patients over 70 years old. The patients were divided into two groups: the intervention group and control group. The intervention group received four weeks of pharmacological therapy and had lifestyle intervention by their physician, but the control group did not receive lifestyle intervention. All patients took two different questionnaires. One of the questionnaires asked questions regarding the patient’s current severity of reflux symptoms and dyspeptic symptoms. The other questionnaire asked about the patient’s current lifestyle habits and risk factors. The questionnaires were administered to the patients before taking PPI (Lansoprazole) and after four weeks of treatment taking PPI in order to determine the effectiveness of medical treatment and lifestyle intervention measures.

The patient responses to the questionnaires provided researchers with information to assess the improvement of reflux and dyspepsia symptoms between the intervention group and control group. The results of the study indicated that lifestyle intervention significantly improved

reflux and dyspepsia symptoms in the intervention group with the rate of improvement rising from 3.7% to 9.2%. The researcher emphasized that taking PPIs was effective in GERD treatment, but noted that 10-20% of patients with GERD in the control group continued to have symptoms by just using the PPI treatment alone. Furthermore, it was suggested that the options of treatment for patients who are resistant to PPI or have recurrent GERD symptoms are to increase strength or dosages of PPI, or add H2 blockers, antacid, or prokinetics with the PPI (but it is not cost effective for patients). As a result of the findings, the researcher strongly recommended that PCP should provide more lifestyle intervention to their patients with GERD in the primary care setting, and that the use of lifestyle modification in conjunction with medical treatment is a very important and cost effective treatment of GERD.

The three studies that were previously reviewed emphasized the significance of lifestyle modification improving the treatment of GERD symptoms in their research. Specific unhealthy lifestyle behaviors were indicated as contributing factors to patients with GERD symptoms such as: inadequate sleep (less than 5 hrs), dietary factors (high calories, high oil/fat intake, high acidic food and caffeine), irregular meal times (skipped breakfast and night snack) alcohol consumption (more than 200 kcal/day), smoking, stress, and lack of exercise. Moreover, it was identified that pharmacological treatment alone was not enough to relieve the GERD symptoms of the patients in each respective study. Consequently, emphasis on the consideration of healthy lifestyle modification with pharmacological treatment may be needed to successfully treat GERD patients.

The results of the studies indicate the importance of incorporating specific lifestyle modification recommendations for GERD patients to be used in conjunction with their prescribed medication use in the clinical setting. Therefore, as part of the overall treatment

process, the PCP needs to assess each patient's lifestyle habits to identify specific lifestyle behaviors that may be contributing factors to GERD symptoms, and consider appropriate lifestyle modification for each patient to use with their prescribed medication. Additionally, the PCP should continue to follow up and assess to determine if the patient's symptoms have improved or not, and to consider the effectiveness of the respective lifestyle modification.

Theoretical Framework

The Health Promotion Model (HPM) is proposed by Nola J. Pender. Pender emphasizes that health promotion is defined as, "behavior motivated by the desire to increase well-being and actualized human health potential," and that the focus of treatment should be on the patient's personal health behaviors to facilitate positive effect on the patient's health and actions. Additionally, PCPs have to encourage their patients to find self-motivation to maintain healthy behaviors and overall well-being. The HPM is configured into three major components: 1) Individual characteristics and experiences, 2) Behavior-specific cogitations and affect, and 3) Behavioral outcome. Each component is necessary to addressing each respective patient's unique characteristics and behaviors that are influenced by prior personal experiences, biological factors, psychological factors and social culture factors (Theoretical Foundation of Nursing, 2011).

The HPM is a helpful framework to use when creating an individualized lifestyle modification treatment plan for patients with GERD. An NP will need to use the HPM concept to carefully understand their patient's unique health behaviors to develop an individualized lifestyle modification treatment plan, and to advocate for appropriate health promotion for each patient. Moreover, the intervention of health promotion should motivate the patient to be proactive in developing self-efficacy by perceiving health benefits, and address potential barriers of action in

order to ensure worthwhile benefits of behavioral changes to their overall health, and positive results with GERD treatment.

Project Description

Project Aim and Goals

This proposal for health promotion project is to provide individual lifestyle modification plans for elderly GERD patients based on the answers from prior surveys (FSSG and QSML) facilitated by an NP to help improve the patient's GERD symptoms and overall quality of life.

The goals of the project are: 1) The patient understands the basic knowledge of the signs and symptoms of GERD, 2) The patient develops an awareness of making changes to personal lifestyle behaviors associated with causing GERD, 3) The patient is motivated to be proactive in developing self-efficacy by perceiving health benefits of making lifestyle modifications, and 4) The half of patients in the project have reduced GERD symptoms by implementing relevant lifestyle modification and they are be able to reduce the dosage or strength of their medication (including PPIs or H2 blockers) due to the improvement of their GERD symptoms.

Timeline, Population and Setting

The timeline for administering the lifestyle modification health promotion for respective GERD patients is within four months. The target population are Japanese patients over 65 years old and whose primary care provider is Dr. Hori, Yasushi-John at The Urgent Care Clinic of Waikiki (UCCW). It is located on the 3rd floor of the Bank of Hawaii building in Waikiki. Dr. Hori, Yasushi-John is the main family practice physician and the director of the clinic. The patients participating in the project visited the Urgent Care Clinic of Waikiki during the month of May 2018 for either a health consultation or physical checkup, and are diagnosed with GERD.

All patients are currently under pharmacological treatment taking OTC anti-acid medication, PPIs, or H2 blockers.

Project Design

This proposal for health promotion project is to provide individual lifestyle modification plans for elderly GERD patients based on the answers from prior surveys (FSSG and QSML) facilitated by an NP to help improve the patient's GERD symptoms and overall quality of life.

Planning of project: The first month of the project will be focused on planning. The NP will meet with Dr. Hori and the clinic staff to inform them of the project goals, timeline, and target populations. The meeting will address how the NP will implement the project to include the use of two surveys: the FSSG and QAML to obtain pertinent patient information to develop individual lifestyle modification plans. Additionally, the NP will explain the purpose for the follow up phone calls and patient visit to evaluate the implementation of the modification plan and effectiveness on the patient's GERD symptoms. The data gathered from the patient visits and follow up phone calls will potentially help Dr. Hori and staff to see the benefits for the respective GERD patients, and identify potential barriers in the project which may need to be addressed in the future.

Implementation: Ten patients (participants) will be selected based on the following requirements: over 60 years old, having severe GERD symptoms, and prescribed to take PPIs, H2 blocker, or anti-acid medication including OTC medication. Before meeting with the NP for initial consultation, the clinic nurse will ask the patients to take two surveys: the FSSG and QSML. Afterwards, the NP will meet with the patient and use educational material (Appendix C) to explain the basic knowledge of GERD and how lifestyle modification is an important factor to

improving GERD symptoms. The patient's responses on the surveys will provide the NP with information needed to develop each patient's individualized lifestyle modification plan such as practicing healthy weight control, exercise plans, stress management, adequate medication treatment, sleep plans, eating habits, and reducing smoking and use of alcohol and caffeine.

The follow up visit will be eight weeks after the initial consultation visit. Before the follow up visit, the NP will call each patient weekly to ask about the patient's lifestyle modification progression and improvement of GERD symptoms. When the patient returns to the clinic for the follow up visit, the patient will be asked to retake the FSSG and QSML surveys. The NP will compare the answers of the patient's responses on the FSSG/QSML to those from the initial consultation visit to assess if GERD symptoms have improved, and if the patient has an understanding of GERD and implementation of preventative measures.

Evaluation: The final month of the project will be used to evaluate the effectiveness of this health promotion project. The NP will use the collective data gathered from the respective surveys to reevaluate the patients' symptoms and changing lifestyle behaviors to determine whether the plans are valid or not, and if adjustments to the plans are needed. The NP will have a follow up meeting with Dr Hori and his staff about their impressions and feedback of the overall project, and how potential barriers could be addressed to increase effectiveness and ensure continued practicability.

Nurse Practitioner Role

The roles of the NP in this health promotion project will be as an educator for the respective GERD patients, and a facilitator to encourage lifestyle modification that can help patients with their GERD treatment to improving/reducing GERD symptoms. In order to educate

the patient, the NP will need to provide the patient with relevant and evidence based information regarding GERD and treatment to promote self-efficacy and encourage appropriate lifestyle modification. Furthermore, the NP will use the patient's survey responses on the initial consultation visit to work with the patient to determine the specific and appropriate lifestyle modification to be addressed, and provide recommendations to ensure the effectiveness of the plan in conjunction with the patient's currently prescribed medical treatment. Follow up visits will be used by the NP and patient to assess the effectiveness of the lifestyle modification plan and GERD treatment. The result of the assessment will be used to determine whether to continue with the current lifestyle modification plan, or reassess to make adjustments such as decrease/increase medication dosage or strength or switching medication. Moreover, the NP will be the patient's PCP who will be closely monitoring the patient's medical condition and ordering labs/tests or referrals to specialists for further diagnostics as needed.

Potential Barriers

There are two potential barriers in the development and resolution of the health issue being addressed. First, it is difficult to change lifestyle behaviors among the elderly. Many of them have their everyday routine that they are used to doing for a long time, and they may have difficulty or be resistant to changing their habits and behaviors. Secondary, the patients might not see a significant improvement of their GERD symptoms within such a short time period, and they may get discouraged and discontinue their lifestyle modification efforts before the project time period has completed.

Evaluation

Two key points will be used to measure and evaluate the effectiveness of lifestyle modification in improving GERD symptoms in the respective elderly patients. The first key point is at least 50% of the patients in the project have reduced GERD symptoms by implementing relevant lifestyle modification. The second key point is at least 50% of the patients in the project are be able to reduce the dosage or strength of their medication (including PPIs or H2 blockers) due to the improvement of their GERD symptoms through lifestyle modification. The method of evaluation strategies that will be used is to require patients in the project to take the post FSSG when they return to the clinic for follow up visits within 8 weeks respectively. If the patient's FSSG score shows an improvement during each consecutive visit compared to the initial visit, then it indicates that the patient's symptoms have improved and that the health promotion efforts were beneficial to the patient. During follow up visit, the NP will interview the patient to evaluate and assess data on which specific lifestyle modification to develop in order to improve GERD symptoms or address the patient's failure to improve health status, and reduce their medication dosages as needed if GERD symptoms improve due to lifestyle modification.

To support the evaluation plan for my project, the strategies I will use to show the impact on the participants will be focused on their responses to the surveys, and improvement of their respective health condition by taking proactive measures to ensure proposed lifestyle modification. I will use the results of the surveys, personal interviews, and data from follow up physical exams to evaluate and assess the overall effectiveness of the proposed lifestyle modification plans for each patient in the project.

Areas for Further Research

Areas for future research in support of my project will be to address the potential barriers and limitations of the project. One barrier or limitation is that the surveys are self-administered questionnaires. Consequently, there is a high risk of patients being biased because the questionnaires are very simple "Yes/No" questions and the patients do not have a variety of answer options. Secondly, the surveys may be time consuming because patients need to take two different surveys (numbering a total of 34 questions) during the initial visit. At each consecutive visit similar surveys will be conducted so it may be very time consuming for some of the patients in the out-patient setting. Finally, for some patients their family members may have to be involved with the project if possible. Changing lifestyle behaviors among the elderly may be difficult because they are set in their ways. However, obtaining family support can encourage change, and may help to be more effective in reinforcing lifestyle modification plans and reducing GERD symptoms. Consequently, additional time may be needed for family members to be educated on the basic knowledge of GERD and how lifestyle modification is an important factor to improving GERD symptoms.

Conclusion

GERD is a common gastric disease that affects large numbers of people worldwide, and those people with GERD, most especially the elderly, can have different kinds of symptoms which impact each individual's QOL. The current published literature indicates that a combination of lifestyle modification and medication therapy is the key for treatment of GERD. Therefore, an NP should assume the role of educator and facilitator to encourage their GERD patients to enable lifestyle modification for improving/reducing symptoms of GERD. This health promotion project suggested that an NP provide a lifestyle modification plan for each patient

based on answers from prior surveys (FSSG and QSML), and assessing the answers to determine an individualized course of action to improve patient's symptoms and overall patient QOL. This project can be easily applied on a daily basis at a primary care facility and can have the potential to encourage a positive effect on patients who are suffering from GERD symptoms. The lifestyle modification approach is both a healthier and cost effective option for patient treatment rather than just relying on pharmacological treatment.

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Appendices Appendix A

FSSG in English

FSSG (Frequency Scale for the Symptoms of GERD)

1) Do you get heartburn?
2) Does your stomach get bloated?
3) Does your stomach feel heavy after meals?
4) Do you subconsciously rub your chest with your hand?
5) Do you feel sick after meals?
6) Do you get heartburn after meals?
7) Do you have an unusual sensation in your throat?
8) Do you feel full while eating meals?
9) Do some things get stuck when you swallow?
10) Do you get bitter liquid coming up into your throat?
11) Do you burp a lot?
12) Do you get heartburn if you bend over?

The answer of symptom frequency is from 0 to 4 on each question as follows: never=0; occasionally=1; sometimes=2; often=3; and always=4.

Questionnaire on symptoms, medical/family histories, and lifestyles

1) Do you have a history of gastrectomy?
2) Do you take some proton pump inhibitors (PPIs)?
3) Do you take some histamine H_2-receptor antagonists (H_2RAs)?
4) Do you take some digestive drugs other than antacids (PPIs or H_2RAs)?
5) Do you take some non-steroidal anti-inflammatory drugs (NSAIDs)?
6) Do you take some steroids?
7) Do you take some anticoagulants?
8) Do you take some antihypertensive drugs?
9) Do you take some antihyperglycemic agents?
10) Do you take some antihyperlipidemic agents?
11) Do you have a history of cerebrovascular disease?
12) Do you have a history of cardiovascular disease?
13) Do you have a history of renal failure?
14) Has your body weight markedly increased in adulthood (more than 10kg from age 20 years)?
15) Is your time of exercise less than 30 minutes a day?
16) Do you have a habit of midnight snack (more than three times a week)?
17) Do you have a feeling of inadequate sleep?
18) Do you have a habit of frequent lack of breakfast (more than three times a week)?
19) Do you have a habit of having dinner within two hours before going to bed?
20) Do you have a habit of quick eating?
21) Do you have a habit of smoking?
22) Do you have a habit of alcohol drinking (almost every day)?

The answer is “Yes” or “No” for each question.

Appendix B

FSSG in Japanese

質　問		記入欄				
		ない	まれに	時々	しばしば	いつも
1	胸やけがしますか？	0	1	2	3	4
2	おなかがはることはありますか？	0	1	2	3	4
3	食事をしたあとに胃が重苦しい（もたれる）ことがありますか？	0	1	2	3	4
4	思わず手のひらで胸をこすってしまうことがありますか？	0	1	2	3	4
5	食べたあと気持ちが悪くなることがありますか？	0	1	2	3	4
6	食後に胸やけがおこりますか？	0	1	2	3	4
7	喉（のど）の違和感（ヒリヒリなど）がありますか？	0	1	2	3	4
8	食後に胸やけがおこりますか？	0	1	2	3	4
9	ものを飲み込むと、つかえることがありますか？	0	1	2	3	4
10	苦い水（胃酸）が上がってくることがありますか？	0	1	2	3	4
11	ゲップがよく出ますか？	0	1	2	3	4
12	前かがみをすると胸やけしますか？	0	1	2	3	4

合計点数 ＋ ＋ ＋

総合計点数

Appendix C

QSML in Japanese

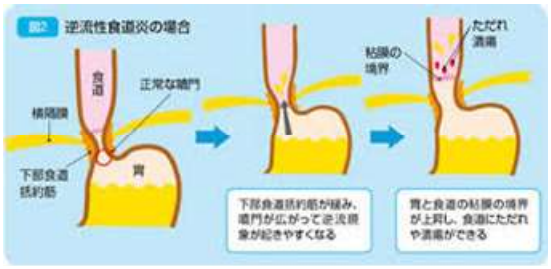
1) 過去に胃の手術をした事がある	はい　いいえ
2) 胃薬を飲んでいる又は飲んでいた	はい　いいえ
3) 痛み止めの薬を飲んでいる	はい　いいえ
4) ステロイド剤を飲んでいる	はい　いいえ
5) 血液さらさらにする薬を飲んでいる	はい　いいえ
6) 血圧を下げる薬を飲んでいる	はい　いいえ
7) 糖尿病の薬を飲んでいる	はい　いいえ
8) コレステロールを下げる薬を飲んでいる	はい　いいえ
9) 過去に脳こうそくや出血を起こしたことがある	はい　いいえ
10) 過去に心筋梗塞や狭心症になったことがある	はい　いいえ
11) 過去に腎不全になったことがある	はい　いいえ
12) ２０歳代に比べて体重が１０ｋｇ以上増えた	はい　いいえ
13) エクササイズを心掛けている(週 3 回以上)	はい　いいえ
14) 夜 9 時以降に食事やスナックを食べることが多い	はい　いいえ
15) 夜中に目を覚ましたり不眠感を感じることがある	はい　いいえ
16) 朝食は食べないことが多い(週 3 回以上)	はい　いいえ
17) 就寝 2 時間以内に夕食を食べることが多い	はい　いいえ
18) 早食いなほうだ	はい　いいえ
19) 喫煙している	はい　いいえ
20) アルコールをほぼ毎日飲む	はい　いいえ
21) 緑茶やコーヒーなどをよく飲む	はい　いいえ
22) 揚げ物や脂っこい食べ物をよく食べる(週 2 回以上)	はい　いいえ
23) 野菜ジュースやトマトジュースをよく飲む	はい　いいえ
24) コーラなどの炭酸入りジュースをよく飲む	はい　いいえ

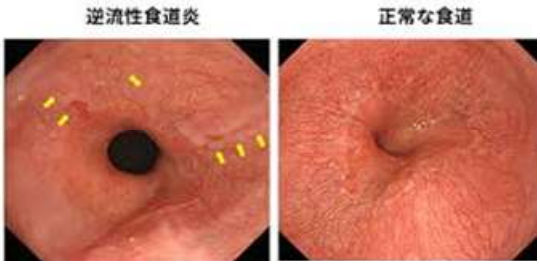
Appendix D

Educational Materials for Japanese Patients

逆流性食道炎って？

- 胃酸が食道に逆流することで、食道の粘膜を刺激して炎症を起こす病気



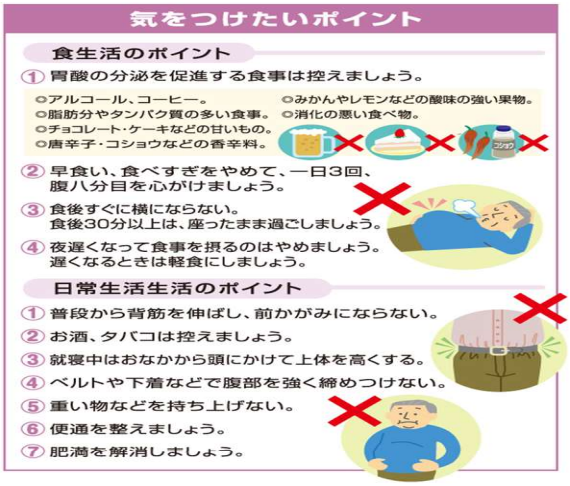


逆流性食道炎の症状は？

- 胃の膨満感
- 胃もたれ
- 声のかすれ
- 口臭
- 胸が締め付けられるように痛い

逆流性食道炎の治療

- 体重のコントロールをしましょう。
- ピロリ菌の検査をする。
- 薬は医師の指示に従い、症状が少し良くなっても続けるましょう。
  （1日１－２回の服用、2か月程度）
- 薬は朝食前30分に服用すると効果的です。
  （1日2回の服用の場合は朝食前30分と夕食前30分に服用する）



Appendix E

Literature Matrix

NUR 7000 **Hidemi Dela Cruz**								
Study name and Authors	**Level of Evidence**	**Hypothesis/ Purpose**	**Independent Variables**	**Dependent Variables**	**Design**	**Sample**	**Results/ Findings**	**Instruments**
Lifestyle factors associated with gastroesophageal reflux disease in the Japanese population. Authors: Matsuki, Nobuyuki Fujita, Tsuyoshi Watanabe, Naoya Sugahara, Atsushi Watanabe, Akihiko Ishida, Tsukasa Yoshida, Masaru Kutsumi, Hiromu Hayakumo, Takanobu Mukai, Hidekazu Azuma, Takeshi	Level V	To evaluate the lifestyle factors associated with erosive esophagitis (EE) and non-erosive reflux disease (NERD) in Japanese population.	N/A	N/A	Meta-analysis	886 subjects who underwent upper gastrointestinal endoscopy during health screening at Yodogawa Christian Hospital in Japan b/w May and September 2007. Subjects have evidence of gastric or duodenal ulcer; h/o upper gastrointestinal tract surgery; undergoing treatment with a PPI or H2 blocker or evidence of malignancy	The lifestyle factors associated with NERD: intake of egg, sleep shortage, strong psychological stress. In male: current smoking for NERD/EE. Alcohol >200 kcal/day and intake of a large quantity of food at supper were risk factors for EE in with hiatal hernia.	Frequency scale for symptoms of gastroesophageal reflux disease (FSSG)

Lifestyle factors affecting gastroesophageal reflux disease symptoms: a cross-sectional study of healthy 19864 adults using FSSG scores. Authors: Yamamichi, Nobutake Mochizuki, Satoshi Asada-Hirayama,Itsuko Mikami-Matsuda, Rie Shimamoto, Takeshi Konno-Shimizu, Maki Takahashi, Yu Takeuchi, Chihiro Niimi, Keiko Ono, Satoshi Kodashima, Shinya Minatsuki, Chihiro Fujishiro, Mitsuhiro Mitsushima, Toru Koike, Kazuhiko	Level IV	To analyze the correlation between GERD symptoms and background variables, especially focused on lifestyle factors. To evaluate the efficacy of PPI and H2 receptor antagonists.	Lifestyle factors	GERD symptoms	Cohort study	20,773 subjects who received medical check-ups at Kameda Medical Center in Japan in 2010 (selected 19,864 subjects: 11,493 men and 8371 women) with a mean age of 50.2+/-9.4y/o men and 55.8+/-9.9 y/o women. Criteria for exclusion were age less than 20 years and insufficient answers to the questionnaire.	Among many lifestyle-related factors correlated with GERD symptoms, poor quality of sleep and irregular dietary habits are strong risk factors for high FSSG scores. PPI or H2RA cannot fully relieve GERD symptoms.	FSSG score as a response variable and 25 background factors (age, gender, BMI, and 22 answers to questionnaires) as explanatory variables. T-test ($p<0.05$) or Pearson's correlation coefficient ($p<0.05$) were used for univariate analyses. Questionnaire on symptoms, medical/family histories, and lifestyles.
Lifestyle Factors and Efficacy of Lifestyle Interventions in Gastroesophageal Reflux Disease Patients with Functional Dyspepsia: Primary	Level III	To evaluate lifestyle interventions, in combination with PPI therapy, improve	Lifestyle factors	Dyspeptic symptoms	Randomized controlled trial	A total 12,653 patients: the mean age of the patient was 60.5 y/o and 34.0% of the patient were >70y/o.	"feeling of continued stress" was common lifestyle factor and >30% of the patients with dyspepsia reported "eating	11 questions related to lifestyle risk factors for GERD. SAS software program (version 9.1.3, SAS

Care Perspectives from the LEGEND Study. Authors: Haruma, Ken Kinoshita, Yoshikazu Sakamoto, Shigeru Sanada, Katsuyuki Hiroi, Shinzo Miwa, Hiroto		reflux and dyspeptic symptoms in GERD patients with dyspepsia.				A total of 58.6% of the enrolled patient were women. 505 patients had kyphosis, 3,035 of 5,195 patients were EE, 689 of 2,903 patients were *H.pylori* positive and 2,498 of 9,626 patients has h/o GERD. The duration of dyspepsia was <1month in 52.3% of patients and >6months in 12.9% of the patients.	sweet foods or greasy foods at least once q two to three days" and "drinking coffee almost daily". Introducing lifestyle interventions had a significant effect on both reflux and dyspeptic symptoms and considered to be important in GERD patients with dyspepsia who receive a PPI.	Institute, Cary, USA) was used for statistical analyses. The Chi-square test was used to compare the between-group symptom improvement rates. P values of <0.05 were considered to be statistically significant.