The process of behavioral change in individuals who are uninterested in health: a qualitative study based on professional health knowledge

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Abstract

Background: In Japan and elsewhere, there is major concern over individuals who are uninterested in health and reluctant to change their health behaviors. While previous studies have investigated cognitive and behavioral characteristics in this population, there is limited evidence on whether they recognize the significance of health, nor is it clear how to motivate necessary behavior changes. This study identified specific characteristics of positive psychological and behavioral change in individuals who were uninterested in health, then constructed a model for their behavior change process, as advised via professional health expertise in the Japanese context.

Methods: This qualitative survey study was conducted among 86 health professionals (public health nurses, registered dieticians, and city/prefectural employees). These participants reported their demographic characteristics (gender, age, job, and length of service) and entered free descriptions concerning perceived cognitive and behavior changes in individuals who were uninterested in health. Finally, we thematically analyzed the contents on psychological/behavioral change and constructed a thematic map.

Results: We obtained 409 relative descriptive codes and four main themes, including (1) Health awareness: Recognize the significance of health via personal experience and/or illness among family/friends; (2) Psychological readiness: Preparative psychological state toward health behavior; (3) Gateway behavior: Precursory behavior leading to health behavior; and (4) Health behavior: Traditional healthy lifestyle behavior, with 45 subthemes. We constructed the abovementioned thematic map according to the Transtheoretical Model. Herein, health awareness may catalyze changes in health behavior, while changes in both psychological readiness (e.g., new interest in health behaviors and attitude toward appearance) and gateway behaviors (e.g., new points of discussion and information gathering) may arise before changes in health behavior.

Conclusions: This study clarified positive cognitive and behavior changes in individuals who were uninterested in health and elucidated their behavior change process. As behavior changes in such individuals tend to be rigid, they are often left behind by health care systems and programs. In this regard, we identified pertinent cognitive and behavioral characteristics during the behavior change process and constructed a relevant model. These findings should be useful in developing interventions that can motivate the desire for behavior change.

Keywords: Uninterested, Pre-contemplation, Qualitative, Health behavior, Behavior change, Gateway, Readiness, Transtheoretical model

Introduction

The need to prevent non-communicable diseases and increase the quality of life (QoL) through positive health behavior is a significant health issue around the globe [1]. Specifically, health behaviors such as physical activity [2], healthy eating [3], controlled alcohol consumption [4], stress management or mental health promotion [5], and smoking cessation [6] contribute to physical and psychological health while preventing disease [7]. However, there are major concerns over individuals who are indifferent toward health and do not intend to engage in healthy lifestyle behaviors, otherwise known as uninterested people toward health (UPH).

In the Japanese context, the Ministry of Health, Labour and Welfare [MHLW] [8] reported that 10.5% of females and 16.5% of males do not want to improve their unhealthy eating behaviors. Similarly, 11.1% of females and 13.9% of males had no interest in physical activity, nor did they intend to engage in such practices. In the Netherlands, Ronda, Van Assema, and Brug [9] reported that 29.6% of participants were inactive and had no intention to change their lifestyles. In Korea, a report showed that 72% of smokers did not intend to quit [10]. A study among
students in Inner Mongolia investigated multiple negative health behaviors, including physical inactivity, unhealthy eating, poor stress management, alcohol consumption, and smoking, thus finding that 4–14% of respondents reported unhealthy lifestyles and did not intend to change [11]. In Japan and many other countries, there is a clear and urgent need for policies and practices that encourage UPH to engage in healthy lifestyle behaviors.

Several previous studies have focused on identifying the underlying reasons why UPH do not practice health behaviors, including their relevant behavioral characteristics. According to a comprehensive research review, the UPH population is characterized by the following: does not practice health-related behavior, no intention to change unhealthy lifestyle, and uninterested in health status or information, including discussions with friends or family members, despite their health condition [12]. Under the Transtheoretical Model (TTM) [13], UPH are regarded as persons in the pre-contemplation stage. Prochaska and DiClemente [13] defined the pre-contemplation stage as that in which individuals are unaware, unwilling, or discouraged when changing a particular problem behavior. The characteristics of the pre-contemplation population include the lack of self-efficacy toward health behavior change [14] and an unbalanced perception of the benefits (i.e., pros) and psychological burdens (i.e., cons) associated with engagement in health behavior [15]. Under another framework, self-determination theory (SDT) [16] entails that UPH are in the motivational state of “amotivation,” in which they either do not engage or have no motivation to engage in health behavior. Ryan et al. [17] argued that populations with amotivation lack autonomy, competence, and relatedness. Moreover, these populations have four-dimensional irrational beliefs about health promotion, including a suspicion of health promotion programs, the lack of confidence in their efforts, a sense of insufficient capacity, and helplessness [18]. Other relative SDT research has shown that populations with amotivation have higher depressive symptoms, anxiety, negative affective states, lower QoL, and vitality, and inactivity [19]. Surprisingly, a national survey in Japan found that the most common answer and primary cause for health indifference was “no reason” [8].

Extensive efforts have been dedicated to documenting the assumed rate of UPH and its characteristics. By contrast, relatively little is known about whether UPH recognize the importance of health and the need to change their unhealthy lifestyles (i.e., positive psychological and behavioral change processes). This knowledge may be useful in developing intervention strategies for UPH. As such, this study aimed to identify specific substances of positive psychological and behavioral changes and construct a model for the cognitive and behavior change process in Japanese UPH, as advised by qualitative evidence and empirical knowledge held by health professionals who support affected persons on a daily basis.

Methods

Qualitative approach and research paradigm

This study followed the Standards for Reporting Qualitative Research (SRQR) guidelines [20]. Additional file 1 contains the SRQR checklist. As mentioned, we constructed a model for the behavior change process in UPH, which necessitated a phenomenological qualitative approach. We also conducted a literature review, data analysis, and interpreted the results (the authors are Ph.D. level researchers and medical doctors specializing in health psychology, epidemiology, and public health).

Context and setting

We recruited health care and promotion professionals from the community setting. This was done because professional health practitioners in Japan are legally obliged to encourage UPH according to the Health Promotion Act [21]. In this context, they communicate with and provide health guidance to UPH on a daily basis. These health professionals should thus have a good understanding of UPH cognitive and behavioral characteristics.

The qualitative survey was conducted in Kanagawa prefecture, an area adjacent to Tokyo, the capital city of Japan, and Tochigi prefecture, Tokyo’s northern suburb area. We recruited participants via snowball sampling. The researchers consulted with three familiar health professionals in management positions, who were informed about the research aims and privacy policy. They then shared this information with their acquaintances and coworkers. Three primary collaborators independently recruited participants near their working area (Collaborator A: Yokohama city, the eastern metropolitan area of Kanagawa prefecture; Collaborator B: The wide western suburban area of Kanagawa prefecture; Collaborator C: Utsunomiya city in Tochigi prefecture).

A required minimum sample size was assumed based on the methodological guidelines for thematic analysis [22]. Based on the lowest prevalence of interest theme among study participants = 20% and appearance of relevant description = 75%, the adjusted prevalence was supposed at 15%. According to previous research [23], the desired number of theme instances was assumed as four (i.e., emotional, psychological, behavioral, and background factors). The minimum sample size at 80% power was \( n = 44 \).

Regarding the circumstances of recruitment, 109 participants (Yokohama city, the eastern area of Kanagawa prefecture: \( n = 7 \); western area of Kanagawa prefecture: \( n = 67 \); Tochigi prefecture: \( n = 35 \)) were recruited and responded to the questionnaire survey. The inclusion criteria were as follows: (1) hold a full-time public health-related job, (2) answered their professional job, and (3) described relative cognitive or behavioral description in at least one sentence. Meanwhile, 23 participants were excluded for the following: part-time instructors who were university student staff (\( n = 12 \), did not answer their professional job (\( n = 5 \), and did not respond to the qualitative question.

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Table 1 Participant characteristics

| Variables                        | n   | (%)  | χ²  | df | w  |
|----------------------------------|-----|------|-----|----|----|
| Gender                           |     |      |     |    |    |
| Female                           | 79  | (91.9)| 60.28**| 1  | 0.84 |
| Male                             | 7   | (8.1 )| 0.36 | 1  | 0.56 |
| Age (years)                      |     |      |     |    |    |
| 20–29                            | 16  | (18.6) | 3.02 | 3  | 0.19 |
| 30–39                            | 20  | (23.3) | 0.00 | 1  | 0.00 |
| 40–49                            | 27  | (31.4) | 0.34 | 1  | 0.58 |
| 50–59                            | 23  | (26.7) | 0.50 | 1  | 0.50 |
| Job                              |     |      |     |    |    |
| Public health nurse              | 56  | (65.1) | 230.84** | 7  | 1.64 |
| Dental hygienist                 | 1   | (1.2 )| 0.00 | 1  | 0.00 |
| City or prefectural employee     | 9   | (10.5) | 0.00 | 1  | 0.00 |
| Registered dietitian             | 13  | (15.1) | 0.00 | 1  | 0.00 |
| Fitness instructor               | 4   | (4.7 )| 0.50 | 1  | 0.50 |
| Nurse                            | 1   | (1.2 )| 0.00 | 1  | 0.00 |
| Teacher                          | 1   | (1.2 )| 0.00 | 1  | 0.00 |
| Medical Doctor                   | 1   | (1.2 )| 0.00 | 1  | 0.00 |
| Professional work experience (years) | 0–4 | (24.4) | 20.44** | 6  | 0.50 |
|                                  | 5–9 | (20.9) | 0.00 | 1  | 0.00 |
|                                  | 10–14 | (10.5) | 0.00 | 1  | 0.00 |
|                                  | 15–19 | (15.1) | 0.00 | 1  | 0.00 |
|                                  | 20–24 | (14.0) | 0.00 | 1  | 0.00 |
|                                  | 25–29 | (4.7) | 0.00 | 1  | 0.00 |
|                                  | 30+  | (5.8 )| 0.00 | 1  | 0.00 |
|                                  | No response | 4  | (4.7) | 0.00 | 1  | 0.00 |

*p < .01

Note. Effect size indicated bias as small (>0.10), medium (>0.30), and large (>0.50).

Thus, data from a total of 86 participants (Yokohama city, the eastern area of Kanagawa prefecture; n = 6; western area of Kanagawa prefecture: n = 48; Tochigi prefecture: n = 32) were subjected to analysis. Table 1 shows their demographic characteristics. The results of the present study reflected the opinions of female public health nurses and early career (0–9 years) professionals.

**Data collection method and instrument**

The survey was conducted from December 2019 to February 2020. Participants answered items on their demographic characteristics (gender, age, job, and length of service). Regarding behavioral and psychological changes in UPH, they were asked the following: "When did you feel there was a positive change in behavior or conversation among UPH?" Immediately before the answer box, they were shown a few examples, such as taking a walk around the neighborhood, being interested in sportswear, expressing concern about calories in a convenience store and restaurant, scrutinizing the health section of a magazine, going outside at least once each day, and buying dental floss. Participants were allowed to give free descriptions. The first author entered the obtained data into the computer in the form of a Word document.

**Data analysis**

The risk of bias stemming from participant characteristics was tested via a chi-square goodness-of-fit test by R version 3.2.3. This study used the thematic analysis method [24] to identify cognitive and behavioral characteristics. The thematic analysis is useful for exploring unknown components of concepts or factor structures that are matched with a given research subject. Our thematic analysis defined the description classifications as follows: code: short sentences retrieved from descriptive data referring to specific cognitive or behavioral phenomenon, category: integrated data of the codes via similar meaning, subtheme: cognitive or behavioral unit consolidated category, and theme: primary component of the theoretical model synthesized from subtheme. The thematic analysis consisted of the following six-step data analysis process: step 1: reviewing and familiarizing the overall collected law descriptive data, step 2: coding and classifying relevant code (i.e., gateway behavior and cognition), step 3: exploring the central and subthemes of the overall code, step 4: reviewing and confirming the identified theme and generating a thematic map that illustrates the hypothesized relationships among themes, step 5: confirming and defining the theme name and finalizing the thematic map, and step 6: describing the scientific research report [24]. In step 4, we conducted a theoretical (i.e., deductive) thematic analysis for theme mapping. The theoretical thematic analysis described the detail of existing models more appropriately. We constructed our study model based on TTM [13], which is a well-established behavior change theory. At least two authors conducted each analysis step. Therefore, the correspondence ratio of code interpretations was calculated differently from the coauthors’ interpretation, per the first author’s interpretation in steps 3 through 5. The detailed data analysis process is described in Additional file 2.

**Results**

We obtained 430 codes (i.e., behavioral or cognitive variables) from the study participants. The mean, minimum, and maximum codes from each participant were M = 5.00 (SD = 3.55), minimum = 1, and maximum = 18. A total of 21 codes were excluded in steps 1 and 2 (code = 1), step 3 (code = 14), and step 4 (code = 6). None were excluded in step 5 (see Additional file 2). There were 409 total relevant codes. Finally, we identified four themes with 45 subthemes. Additional file 3 shows the results of the original Japanese version. Examples of specific descriptions are reported within “ ” in the manuscript.

Table 2 shows the contents of Theme 1: Health awareness. Health awareness was defined as the recognition of health significance via internal and external resources. Theme 1 consisted of two subthemes, including Awareness of one’s own health and Attention to the health of others. Participants frequently reported “perceive a change in their health” and “Concerned about the illness of close family and friends.”

Table 3 shows the characteristics of Theme 2: Psychological readiness. Psychological readiness was defined as
Table 2: Retrieved subtheme, category, and description of theme 1: Health awareness

| Subtheme: Awareness of one’s own health (Total response = 11) | Category | Examples of description | Response |
|-------------------------------------------------------------|----------|-------------------------|----------|
| Perceived change in health                                  |          | Perceive a change in their health | 4        |
| Anxiety                                                     |          | Worried about their health  | 3        |
| Pain                                                        |          | Look at the pain in their knee and back | 1        |
| Future outlook                                               |          | Concerning their future    | 1        |
| Review lifestyle                                             |          | Review own lifestyle       | 1        |
| Recognizing the impact on others                            |          | Does not want to cause trouble for family and friends | 1        |
| Subtheme: Attention to the health of others (Total response = 11) |          |                         |          |
| Attention to the health of family and friends               |          | Concerned about illnesses among close family and friends | 5        |
| Interest in health-related conversations                     |          | Shows interest in health-related information from friends and acquaintances | 4        |
| Health precautions among celebrities                        |          | Concerned about information on illness in celebrities and public figures | 1        |
| Interest in successful experience                            |          | Talk to successful people who have lost weight | 1        |

Table 3: Retrieved subtheme, category, and description of theme 2: Psychological readiness

| Subtheme: Interest in physical activity (Total response = 22) | Specific to health behavior | Example of descriptions | Response |
|--------------------------------------------------------------|-----------------------------|-------------------------|----------|
| Interest in materials                                        |                             | Interested in yoga mats | 7        |
| Introspection of current activity level                      |                             | Start monitoring number of steps taken | 5        |
| Interest in physical activity                                |                             | Start to think about exercising | 4        |
| Interest in facilities                                       |                             | Attach public information about sports gyms | 4        |
| Willingness to go out                                        |                             | Motivated to go out      | 2        |
| Subtheme: Consciousness of eating (Total response = 17)      |                             |                         |          |
| Awareness of calories                                        |                             | Worry about calories when eating out | 7        |
| Interest in food                                             |                             | Having an interest in foods | 6        |
| Interest in supplements                                      |                             | Curious about supplements | 1        |
| Attention to nutrient composition                            |                             | Pay attention to nutrient composition | 1        |
| Awareness of salt content                                    |                             | Started to pay more attention to low-sodium products | 1        |
| Awareness of carbohydrates                                   |                             | Worry about the amount of rice | 1        |
| Subtheme: Reconsideration of smoking (Total response = 6)    |                             |                         |          |
| Considering the effects on surroundings                      |                             | Considering how smoking impacts children | 3        |
| Considering effects on the household budget                  |                             | Wondering about the burden of tobacco on the household budget | 2        |
| Intention to quit smoking                                    |                             | Thinking about quitting smoking | 1        |
| Subtheme: Consciousness of oral care (Total response = 3)    |                             |                         |          |
| Halitosis awareness                                          |                             | Worried about bad breath | 2        |
| Interest in oral health care products                        |                             | Show interest in an electric toothbrush | 1        |
Table 3 (Continued.)

| Subtheme: Attitudinal change toward health checkups (Total response = 2) | Specific to health behavior | Response | General | Example of descriptions | Example of descriptions | Response |
| --- | --- | --- | --- | --- | --- | --- |
| Intention to get health checkups | Going to get health checkups | 1 | Category | Example of descriptions | Response |
| Risk perception | Concern about a similar-aged friend who was retested for cancer screening | 1 |

Subtheme: Attention to body weight (Total response = 2)

| Weight concerns | Worried about body weight | 1 |
| Exploring factors of weight change | Consider factors associated with weight change | 1 |

Subtheme: Interest in health events (Total response = 1)

| Interest in health events | Show interest in health checkups | 1 |

Subtheme: Interest in blood pressure management (Total response = 1)

| Interest in sphygmomanometer | Show interest in sphygmomanometer | 1 |

Subtheme: Interest to reduce alcohol consumption (Total response = 1)

| Interest in information on reduced alcohol consumption | Showing interest in information on reduced alcohol consumption | 1 |

Table 4 shows the characteristics of Theme 3: Gateway behavior. Gateway behavior was defined as precursory behavior that arises prior to engagement in health-related behavior. Theme 3 was similar in structure to theme 2. There were 17 subthemes, including gateway behaviors that were specific to health (Healthy eating, Physical activity, Smoking cessation, Oral care, Health checkups, Health events participation, Weight management, Blood pressure management, Mental health promotion, and Lifestyle improvement) and those that were general (Changing points of discussion, Information gathering, Social participation, Using healthcare devices and applications, Self-analysis, Goal setting, and Stimulus control). Gateway behaviors that were specific to health included those that were not direct health behaviors, but which were still positive behavioral changes, including “looking at food labels while shopping” and “buying a pedometer.” General gateway behaviors were preparative, and without any specific relation to health, including “check body shape in front of the mirror” and “setting a goal to improve health.” As noted, both the health-specific and general gateway behaviors included verbal expressions related to change (e.g., “asking others about health”) and information gathering (e.g., “considering health-related information via the newspaper and TV”).

Finally, Table 5 shows the characteristics of Theme 4: Health behavior related to the contents of traditional healthy lifestyle behaviors. Theme 4 was comprised of 13 subthemes (Eating behavior change, Physical activity, Weight management, Reducing alcohol consumption, Participation in health events, Health checkups, Mental health promotion, Oral care, Smoking reduction, Blood pressure management, Improving life rhythm, Help-seeking behavior, and Trial of health behavior), all of which entailed a low psychological burden and high feasibility.

As shown in Fig. 1, the thematic map of the model for the behavior change process in the initial stages among the UPH population was constructed according to the present study results and TTM model. Although we could not establish a causal relationship, health awareness (Theme 1) may arise first during the processual stage moving from pre-contemplation to contemplation. Increasing awareness of health conditions for themselves and others may be linked to increased psychological readiness for health care (Theme 2) and gateway behavior change (Theme 3). These themes interact during the pre-contemplation to preparation stages. In addition, psychological readiness (Theme 2) and gateway behavior (Theme 3) were situated in the contemplation stage. The contemplation and preparation stage refers to the intention to start but not yet practicing health behavior. However, it may already act as a preparative...
Table 4  Retrieved subtheme, category, and description of theme 3: Gateway behavior

| Subtheme: Healthy eating gateway behaviors (Total response = 31) | Subtheme: Changing talking content (Total response = 32) |
|---------------------------------------------------------------|--------------------------------------------------------|
| **Specific to health behavior** | **Response** | **Category** | **Example of descriptions** | **Response** | **General** | **Example of descriptions** | **Response** |
| Conferring food labels | 14 | Questioning | Asking others about health | 9 |
| Looking at food labels while shopping | | | | |
| Gathering information | 4 | Communication | Talk about health with friends and acquaintances | 7 |
| Visiting cooking websites | | | | |
| Cooking | 4 | Self-disclosure | Taking about the experience and thoughts on health-related conversations | 5 |
| Stared cooking | | | | |
| Dietary recording | 2 | Intention to change | Saying “I should change my lifestyle” | 2 |
| Recording the contents of consumed foods | | | | |
| Change talk | 2 | Future perspective | Start to talk about the expectations of future health conditions | 2 |
| Talk about barriers to improving eating habits | | | | |
| Eating together | 1 | Economical concerns | Talk about large expenses after getting sick | 2 |
| Participate in lunch or dinner meetings with aged persons | | | | |
| Home cultivation | 1 | Consultation | Consultation for own physical condition | 1 |
| Start growing some vegetables in their home | | | | |
| Goal setting | 1 | Expressing a sense of crisis | Saying “I will not make” to their lifestyle | 1 |
| Setting goals about daily calorie intake | | | | |
| Communication | 1 | Expressing conflict | Comments such as “I cannot do this easily” | 1 |
| Consuls others about food contents | | | | |
| Tooth brushing | 1 | Positive talk | Talk becomes positive | 1 |
| Brushing their teeth soon after dinner to prevent excessive eating | | | | |
| Diettalk | 6 | Imagery | Imagining walking route | 1 |
| Talk about the reflection of physical inactivity | | | | |
| Material preparation | 5 | Getting from mass media | Seeing health-related information on newspaper and TV | 12 |
| Buying pedometer | | | | |
| Cloths selection | 4 | Obtaining books | Renting or purchasing illness-related books | 1 |
| Select a bag that is easy to move, like a backpack or shoulder bag | | | | |
| Information gathering | 3 | Read books | Reading related books | 1 |
| Seeing a gymnastic exercise program on TV | | | | |
| Seeking companion | 3 | Browsing website | Browsing health-related websites | 1 |
| Go to a gym with friends or spouse | | | | |
| Going out | 2 | Using computer | Start to use a computer (including tablet PC) for information gathering | 1 |
| Increased frequency of going out | | | | |
| Goal setting | 1 | Self-observation | Con firms inside of mouth via mirror | 1 |
| Setting a goal about the number of steps | | | | |
| Imagery | 1 | Social participation | An increasing opportunity to meet other people | 2 |
| Imagining walking route | | | | |
| **Subtheme: Smoking cessation gateway behavior (Total response = 6)** | **Subtheme: Information gathering (Total response = 16)** |
| Change talk | 2 | Confirmation of body shape | Check body shape in front of the mirror | 1 |
| Declaring they will quit smoking | | | | |
| Avoiding shops where smoking is possible | | | | |
| Communication | 1 | Purchase healthcare device | Purchases a device that links to smartwatch and phone | 1 |
| Talking about smoking | | | | |
| Change of cigarette type | 1 | Installs application on the device | Install healthcare applications on a smartphone | 1 |
| Switching from cigarettes to an electronic cigarette | | | | |
| Purchase oral health products | 2 | **Subtheme: Oral care gateway behavior (Total response = 4)** | **Subtheme: Self-analysis (Total response = 2)** |
| Purchase electronic toothbrush | | | | |
| Information gathering | 1 | Confirmation of body shape | Check body shape in front of the mirror | 1 |
| Seeking oral health care information | | | | |
| Self-observation | 1 | Breakdown the self-analysis | Change the answer to the health-related questionnaire as always answered normal to response good or bad | 1 |
| Confirm inside of mouth via mirror | | | | |
| **Subtheme: Health checkups gateway behavior (Total response = 3)** | **Subtheme: Goal setting (Total response = 1)** |
| Change talk | 2 | Goal setting | Setting a goal to improve health | 1 |
| Talking about health checkups with family and friends | | | | |
| Appreciation | 1 | Action planning | Autonomously think about action to improve their condition | 1 |
| Appreciation for health checkups | | | | |
### Table 4 (Continued.)

| Specific to health behavior | General | Example of descriptions | Response |
|-----------------------------|---------|-------------------------|----------|
| **Category**                | **Example of descriptions** | **Response Category** | **Example of descriptions** | **Response** |
| **Subtheme: Health events participation gateway behavior (Total response = 2)** | | | | |
| Registration                | Registration with health point project | | 2 | |
| **Subtheme: Stimulus control (Total response = 1)** | | | | |
| **Subtheme: Weight management gateway behavior (Total response = 1)** | | | | |
| Purchase scale              | Purchase a scale | | 1 | |
| **Subtheme: Blood pressure measurement gateway behavior (Total response = 1)** | | | | |
| Purchase                    | Buying a sphygmomanometer | | 1 | |
| **Subtheme: Mental health promotion gateway behavior (Total response = 1)** | | | | |
| Information gathering       | Seeking stress management techniques | | 1 | |
| **Subtheme: Lifestyle improvement gateway behaviors (Total response = 1)** | | | | |
| Daytime activities          | Although day-night reversal, waking up during daylight | | 1 | |

### Table 5 Retrieved subtheme, category, and description of theme 4: Health behavior change

| Category | Description | Response |
|----------|-------------|----------|
| **Subtheme: Eating behavior change (Total response = 62)** | | |
| Restriction of carbohydrate and sugar-sweetened food | Choose non-sugar drinks | 12 |
| Healthy food choice | Consciously consume foods that look healthy | 8 |
| Vegetable intake | Eating veritable every meal | 7 |
| Restricting salt content | Making a lightness of taste | 6 |
| Having regular meals | Eating all meals regularly | 5 |
| Considering order to eat | Eating vegetables first | 5 |
| Restricting between-meal eating | Reducing between-meal eating | 5 |
| Balance | Become more aware of nutrient balance. | 4 |
| Calorie restriction | Change snacks to go with alcohol toward healthy products (green beans, tofu, and vegetables) | 4 |
| Ingenuity in eating | Eating moderately | 4 |
| Limiting fat | Reduce fat intake | 1 |
| Increasing total meal intake | People who could not intake enough nutrients begin to eat well | 1 |
| **Subtheme: Physical activity (Total response = 46)** | | |
| Walking | Walking ten minutes per day | 11 |
| Daily walking | Park a car far from the entrance of the market for walking | 10 |
| Using stairs | Using stairs instead of the elevator | 10 |
| Go to sport facilities | Start to go to the sports gym | 4 |
| Stretching | Try to do stretching exercises introduced on a TV program | 3 |
| Lifestyle physical activity | Going shopping every day | 2 |
| Brisk physical activity | Physically active during in-between time | 2 |
| Running | Go for a run | 1 |
| Bicycle use | Ride a bicycle | 1 |
| Yoga | Start to do yoga | 1 |
| **Subtheme: Weight management (Total response = 14)** | | |
| Body weight management | Measuring body weight every day | 14 |
| **Subtheme: Reducing alcohol consumption (Total response = 11)** | | |
| Reducing alcohol consumption | Select smaller can sizes | 5 |
| Setting a non-alcohol day | Establish a rest day of drinking | 4 |
| Selected purchase of ingredients | Select sugar-free alcohol products | 1 |
| Stop holding a reserve | Stop a stock of alcohol beverages | 1 |
Table 5 (Continued.)

| Subtheme: Participation in health events (Total response = 11) | Description | Response |
|---------------------------------------------------------------|-------------|----------|
| Participate in health events                                  | Participate in health events | 11       |

| Subtheme: health checkups (Total response = 9) | Description | Response |
|------------------------------------------------|-------------|----------|
| Getting health checkups                             | Getting health checkups | 9        |

| Subtheme: Mental health promotion (Total response = 8) | Description | Response |
|-------------------------------------------------------|-------------|----------|
| Taking a rest                                        | Take a holiday for refreshment | 3        |
| Communication                                        | Consultations to avoid frustration and compliment | 2        |
| Hobbies                                               | Engage in hobbies for stress reduction | 2        |
| Sleeping                                              | Keep sleeping time | 1        |

| Subtheme: Oral care (Total response = 5) | Description | Response |
|----------------------------------------|-------------|----------|
| Getting a dental examination           | Getting a dental examination | 2        |
| Practicing oral health care            | Use dental floss | 2        |
| Use of chewing gum                     | Chewing gum with xylitol | 1        |

| Subtheme: Smoking reduction (Total response = 4) | Description | Response |
|--------------------------------------------------|-------------|----------|
| Reducing cigarette use                         | Reduce the number of cigarettes used per day | 4        |

| Subtheme: Blood pressure measurement (Total response = 3) | Description | Response |
|------------------------------------------------------------|-------------|----------|
| Measuring blood pressure                                  | Measuring blood pressure | 3        |

| Subtheme: Improving life rhythm (Total response = 2) | Description | Response |
|-------------------------------------------------------|-------------|----------|
| Regularization of life                                 | Maintain a regular rhythm of life | 1        |
| Quit staying up late                                   | Stop staying up late | 1        |

| Subtheme: Help-seeking behavior (Total response = 2) | Description | Response |
|-------------------------------------------------------|-------------|----------|
| Communicate with health professionals                  | Meets with health professionals | 2        |

| Subtheme: Trial of health behavior (Total response = 1) | Description | Response |
|--------------------------------------------------------|-------------|----------|
| Trial of health behavior                                | Trying to engage in any health behaviors | 1        |

Fig. 1 Theme map of the stage of changes process in individuals who are uninterested in health
This theme map is a proposed model for lower-stage behavior changes in individuals who are uninterested in health.
behavior due to the slight interest in lifestyle changes. These themes may work as preceding factors for small health behavior changes in the preparation to action stage (Theme 4).

**Discussion**

This study explored the behavior change process in UPH based on professional knowledge and expertise. Our thematic analysis identified four main themes, including health awareness, psychological readiness, gateway behavior, and health behavior, with 45 subthemes. We then constructed a thematic map based on TTM. Thus, we created a model for the behavior change process in the lower stage population.

The most significant finding of our qualitative analysis was that health awareness may be an essential factor in health behavior changes among UPH. Although traditional behavioral change intervention focuses on increasing the motivation, self-efficacy, and behavioral intention of the general population [16, 25], promoting health awareness may be an essential first step for UPM. The health behavior change continuum model begins with the awareness phase, including the internalization of health information [26]. A previous study found evidence of relationships between negative/positive self-awareness and health behaviors/outcomes [27]. According to the health belief model [28], perceived susceptibility, seriousness, and threat to adverse health outcomes predict preventive health action. Another study also reported that self-evaluations of body appearance were associated with proper nutrition behaviors and positive attitudes toward health behavior [29]. Awareness of one’s own and health and that of close others also has the potential to be highly relevant information. The perceived health condition of close relations such as family and friends may work as a significant and substantial resource for cognition and attitude changes [30].

Of particular note, we identified that both Theme 2: Psychological readiness and Theme 3: Gateway behavior were precursory cognitive and behavioral concepts that preceded the practice of health-related behaviors. These themes may therefore be regarded as gateways to health behavior changes. Schwandt et al. [23] developed a gateway model focused on slight precursory psychological and behavioral changes to health behavior, therein showing that small emotional, cognitive, and behavioral changes occurred during the gateway moment (e.g., significant experiences in developmental stages or life events); here, a gateway behavior that shows preliminary interest in health-oriented action emerges. However, empirical research has not considered specific cognitive changes and gateway behaviors. As such, this study identified specific cognitive changes and the details of gateway behaviors. Specifically, many participants frequently reported changes in points of discussion and the active search for relevant information. This finding implies the significance of talk that is related to change, as reflected by the well-established motivational interviewing framework [31]. This type of talk implies the motivation for change, desire for health, ability, reasons, needs, and commitment to changing one’s health behavior [32]. Likewise, we found that access to health information may also be a significant factor that is related to change. Several studies have reported that health exposure in the media increases health awareness [33]. In addition, Lambert and Loiselle [34] found that seeking health information had positive effects on emotional, cognitive, and behavioral changes while increasing QoL.

Based on the TTM, this study constructed a model for the process of behavior change in lower stages among the UPH population. Previous meta-analyses have shown that the advanced effect of the stage-matched approach to encourage health behavior was unclear when compared to the non-matched intervention [35]. However, few studies have considered differences in behavior change strategies according to the stage. The constructed model indicated no equivalence of the behavior change process of pre-contemplation (i.e., UPH) to the contemplation stage and contemplation to the upper stage. Changing pre-contemplation to contemplation requires increasing awareness of our own and essential others’ health. On the other hand, contemplation changing to the upper stage needs to reinforce traditional psychological and behavioral variables such as motivation, self-efficacy, behavioral intention, and small lifestyle changes.

Behavior change programs are rooted in evidence-based techniques. In particular, setting goals and establishing action plans are critical first steps to encouraging behavior change [36]. Although other studies have emphasized it is difficult to create action plans in the UPH context [37]. These inconsistencies suggest that traditional health education strategies and models are not sufficient for inducing or explaining the behavior change process in UPH. Setting goals and creating action plans may be premature in UPH. We speculate that individuals in the pre-contemplation stage require a specialized intervention strategy. In this regard, a comprehensive meta-analysis showed that both self-monitoring (i.e., the experience of facing oneself) and perceiving health issues as a personal matter primarily contributed to behavior change [38]. As part of an essential intervention strategy, it may therefore be critical to promote self-monitoring in UPH.

This study had several limitations that require further research and practical consideration. First, the thematic analysis and model construction were based on professional health experience. There was also the existing risk of an indirectness bias. The uncertain quality of the evidence elicited from expert opinions was considered [39]. Although the qualitative data were based on professional experience and sufficiently reflected the characteristics of UPH, there may be several gaps between actual psychological and behavioral statuses in the actual target audience and the present study results. Second, the participants of this study were female public health nurses and early ca-
behavioral characteristics of UPH and constructed a model for their behavior change process, as these issues have received very little attention in the literature. Our findings constitute fundamental knowledge that health professionals can use to encourage UPH to engage in healthy lifestyles. Future studies should aim to increase the reliability and validity of our study variables and model via quantitative and longitudinal approaches. Moreover, sophisticated statistical analyses may offer causal insights into the dose-response relationships between the primary psychological and behavioral variables.

Conclusion

Behavior changes in UPH are among the most significant concerns in the healthcare setting. However, it is difficult to encourage health behaviors in this population, meaning they are often left behind in the context of healthcare policies and systems, especially when health professionals resign their efforts. This study clarified the specific cognitive-behavioral characteristics of UPH and constructed a model for their behavior change process, as these issues have received very little attention in the literature. Our findings constitute fundamental knowledge that health professionals can use to encourage UPH to engage in healthy lifestyles. Future studies should aim to increase the reliability and validity of our study variables and model via quantitative and longitudinal approaches. Moreover, sophisticated statistical analyses may offer causal insights into the dose-response relationships between the primary psychological and behavioral variables.

Supplementary information

The online version contains supplementary material available at https://doi.org/10.1265/eihpm.22-00072.

Additional file 1: Standards for Reporting Qualitative Research (SRQR)*.

Additional file 2: The detailed thematic analysis process.

Additional file 3: The results of the original Japanese version of tables.

Declarations

Ethics approval and consent to participate

This study was approved via the Sophia University Regulations and Ethics Committee (Reference No. 2019-114). The study procedure was planned according to the ethical principles for medical research involving human subjects specified in the Declaration of Helsinki. All participants provided their informed consent prior to completing the questionnaires. This study was an anonymous questionnaire survey. Participants were informed that their responses to the survey would be considered as indicating their consent to participate. The questionnaire explained that consent to participate in the study could not be withdrawn after the questionnaire was submitted. The written questionnaires and electronic data for analysis were stored and managed in the first author’s laboratory. They were also ensured that any personal responses would remain confidential. Only participants who agreed to give their informed consent answered questionnaires.

Consent for publication

Consent for publication was explained to all participants before they answered questionnaires. All understood that any information would be solely used for research purposes and that the results may be reported at academic conferences and/or published in journals.

Availability of data and material

The data collected in this study are not publicly available due to ethical concerns. However, they may be made available upon reasonable request to the corresponding author.

Competing interests

We have no known conflicts of interest to disclose.

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Authors’ contributions

T.S. designed the study protocol, conducted the analysis, and drafted the manuscript. H.O. and T.Y. cooperated in the data analysis and interpretation procedures. M.S. and K.T. interpreted the data, supported the construction of the thematic map, and organized the overall research process.

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