

DESCRIPTION

TITLE OF INVENTION: HEALTH MANAGEMENT SYSTEM, HEALTH
MANAGEMENT METHOD, AND PROGRAM

5 TECHNICAL FIELD

[0001]

The present invention relates to a health management system, a health
management method, and a program.

Priority is claimed on Japanese Patent Application No. 2023-222420, filed
10 December 28, 2023, the content of which is incorporated herein by reference.

BACKGROUND ART

[0002]

A nutrition management system for performing nutrition management according
to the pregnancy duration and nutritional state of a pregnant woman by performing
15 ranking of dishes and presenting the ranked dishes to a user based on nutrient
excess/deficiency information calculated from user information of the user as the
pregnant woman and nutrition analysis result information, and amounts of nutrients
capable of being acquired from the dishes is known (see, for example, Patent Document
1).

20 Citation List

Patent Document

[0003]

Patent Document 1: Japanese Unexamined Patent Application, First Publication
No. 2015-194807

25 SUMMARY OF INVENTION

Technical Problem

[0004]

Pregnancy gives rise to a possibility of developing gestational diseases. In view of this, it is desirable to appropriately perform health management in consideration
5 of gestational diseases.

[0005]

Therefore, an objective of the present invention is to perform appropriate health management in consideration of gestational diseases in view of the above-described problem.

10 Solution to Problem

[0006]

According to an aspect of the present invention for solving the above-described problem, there is provided a health management system including: an information acquisition unit configured to acquire user information including at least living-situation
15 information indicating a living situation of a user and pregnancy situation information indicating a pregnancy-related situation of the user; an onset-related situation determination unit configured to determine an onset-related situation related to onset of a gestational disease of the user based on the user information acquired by the information acquisition unit; a recommendation unit configured to determine meal content to be
20 recommended to the user in accordance with a recommendation rule, which has been formulated in advance, based on the onset-related situation determined by the onset-related situation determination unit and a predetermined index value corresponding to the meal content; and a presentation unit configured to present meal recommendation information based on a determination result of the recommendation unit on a user
25 terminal.

[0007]

According to an aspect of the present invention, there is provided a health management method in a health management system, the health management method including: an information acquisition step in which an information acquisition unit
5 acquires user information including at least living-situation information indicating a living situation of a user and pregnancy situation information indicating a pregnancy-related situation of the user; an onset-related situation determination step in which an onset-related situation determination unit determines an onset-related situation related to onset of a gestational disease of the user based on the user information acquired in the
10 information acquisition step; a recommendation step in which a recommendation unit determines meal content to be recommended to the user in accordance with a recommendation rule, which has been formulated in advance, based on a risk determined in the onset-related situation determination step and a predetermined index value corresponding to the meal content; and a presentation step in which a presentation unit
15 presents meal recommendation information based on a determination result of the recommendation step on a user terminal.

[0008]

According to an aspect of the present invention, there is provided a program for causing a computer in a health management system to function as: an information
20 acquisition unit configured to acquire user information including at least living-situation information indicating a living situation of a user and pregnancy situation information indicating a pregnancy-related situation of the user; an onset-related situation determination unit configured to determine an onset-related situation related to onset of a gestational disease of the user based on the user information acquired by the information
25 acquisition unit; a recommendation unit configured to determine meal content to be

recommended to the user in accordance with a recommendation rule, which has been formulated in advance, based on a risk determined by the onset-related situation determination unit and a predetermined index value corresponding to the meal content; and a presentation unit configured to present meal recommendation information based on a determination result of the recommendation unit on a user terminal.

Advantageous Effects of Invention

[0009]

According to the present invention, health management is appropriately performed in consideration of gestational diseases.

10 BRIEF DESCRIPTION OF DRAWINGS

[0010]

[FIG. 1] A diagram showing an example of an overall configuration of a health management system according to a first embodiment.

[FIG. 2] A diagram showing an example of a user registration screen and a pregnant-woman checkup management screen according to the first embodiment.

[FIG. 3] A diagram showing an example of a reservation screen and a web meeting screen according to the first embodiment.

[FIG. 4] A diagram showing an example of a living-situation record screen and a meal content recommendation screen according to the first embodiment.

[FIG. 5] A diagram showing an example of a risk item selection screen and a meal content recommendation screen according to the first embodiment.

[FIG. 6] A diagram showing an example of a hardware configuration of a health management device according to the first embodiment.

[FIG. 7] A diagram showing an example of a functional configuration of the health management device according to the first embodiment.

[FIG. 8] A diagram showing an example of a functional configuration of a user terminal according to the first embodiment.

[FIG. 9] A diagram showing an example of a processing procedure executed by the health management device according to the first embodiment in relation to meal content recommendation according to an onset-related situation of a user.

[FIG. 10] A flowchart showing an example of a processing procedure for onset-related situation determination executed by the health management device according to the first embodiment.

[FIG. 11] A diagram showing an example of determination condition information according to the first embodiment.

[FIG. 12] A flowchart showing an example of a processing procedure for recommended meal content determination executed by the health management device according to the first embodiment.

[FIG. 13] A diagram showing an example of an allowable maximum value table according to the first embodiment.

[FIG. 14] A diagram showing an example of a required energy level table according to the first embodiment.

[FIG. 15] A diagram showing an example of menu data according to the first embodiment.

[FIG. 16] A diagram showing an example of a processing procedure executed by a health management device according to a second embodiment in correspondence with a recommendation rule change.

DESCRIPTION OF EMBODIMENTS

[0011]

<First Embodiment>

[Overall Configuration Example of Health Management System]

FIG. 1 shows an example of an overall configuration of a health management system according to the first embodiment.

In the health management system shown in FIG. 1, a health management device
5 100 executes a process related to health management of a user U (a user) who is a pregnant woman. In particular, the health management device 100 according to the present embodiment executes, as health management, a process according to prevention, symptom improvement, and the like for gestational diseases that may occur as a result of pregnancy. The gestational disease supported by the health management device 100
10 according to the present embodiment may be, for example, at least one of hypertensive disorders of pregnancy and gestational diabetes.

[0012]

The health management device 100 is communicatively connected to a user terminal 200 used by the user U via a network.

15 Moreover, in the health management system according to the present embodiment, experts such as a registered dietitian N and a doctor D (e.g., an obstetric clinic) support health management of the pregnant user U. For this purpose, an expert terminal 300 of the registered dietitian N and an expert terminal 400 of the physician D (obstetric clinic) are communicatively connected to the health management device 100
20 via a network.

In addition, in the health management system according to the present embodiment, the physician D merely supports the pregnant user U from a health perspective, for example, by proposing preventive measures for the gestational diseases, and does not perform medical examinations, treatments related to the gestational
25 diseases, and the like.

[0013]

The health management device 100 may be provided as a server device on the network. In this case, the health management device 100 may be distributed and provided across a plurality of server devices to which predetermined functions are
5 assigned on the network. Alternatively, the health management device 100 may be provided as a cloud server.

[0014]

[Regarding Health Management Application]

A health management application is installed on the user terminal 200 possessed
10 by the pregnant user U. The user U performs health management using the health management application operating in the user terminal 200.

The user terminal 200 in which the health management application operates accesses the health management device 100 via the network to display an application screen of the health management application. The user U manages his or her own
15 health by operating the application screen and viewing content displayed on the application screen.

[0015]

In addition, instead of the health management application, a web application for displaying the health management screen as a web page on a web browser installed on
20 the user terminal 200 may be used when the web browser accesses the health management device 100.

[0016]

Examples of operations performed by the user U on a health application and examples of operations of the health application according to such operations will be
25 described with reference to FIGS. 2 to 5. FIGS. 2 to 5 show examples of aspects of

application screens displayed on the user terminal 200.

[0017]

When the user U installs the health management application on his or her own user terminal 200 and uses the health management application for the first time, the user
5 is prompted to register user information. Therefore, the user operates the health management application to display, on the user terminal 200, an application screen serving as a user registration screen for registering the user information.

In addition, in a step in which the user information has not yet been registered, a user registration screen may be displayed as an initial screen when the health
10 management application is activated in the user terminal 200.

[0018]

FIG. 2(A) shows an example of the user registration screen. In the user registration screen of FIG. 2(A), a user-related basic information area AR1 and pregnancy-related information AR2 are arranged.

15 The user-related basic information area AR1 is an area in which basic information related to the user (basic information) is input by an operation of the user U. The basic information may include information items such as a name of the user U, a date of birth (or age), an address, a telephone number, and an e-mail address.

The pregnancy-related information AR2 corresponds to an area in which
20 information related to the pregnancy of the user U (pregnancy-related information) is input by an operation of the user U. The pregnancy-related information may include information items such as a name of an obstetric clinic, an address (contact information) of the obstetric clinic, a primary care physician, an estimated due date, a pre-pregnancy weight, and a height.

25 If the above-described information items are input to the user registration screen,

the user U performs a predetermined operation (registration operation) for issuing an instruction to register the input information items. When the registration operation is performed, user information including the information items input to the user registration screen is stored in the health management device 100. That is, the user registration is performed. If the user registration is performed, the user U becomes able to use the health management application thereafter.

[0019]

The health management application is capable of pregnancy checkup management for the user U, who is a pregnant woman, at an obstetric clinic.

FIG. 2(B) shows an example of an aspect of a pregnancy checkup management screen corresponding to the pregnancy checkup management as an application screen of the health management application. The pregnancy checkup management screen of FIG. 2(B) corresponds to one pregnancy checkup, and a checkup date area AR10, a checkup result area AR11, an ultrasound image area AR12, a today's memo area AR13, a calendar area AR14, and a next reservation button BT11 are arranged.

[0020]

The checkup date area AR10 is an area in which a date on which the corresponding checkup was performed is displayed.

The checkup result area AR11 is an area in which an operation for recording the results of the corresponding checkup is performed and in which the recorded checkup results are displayed.

The ultrasound image area AR12 is an area in which an operation for acquiring ultrasound images captured during the corresponding checkup is performed and in which the acquired ultrasound images are displayed.

The today's memo area AR13 is an area in which an operation for inputting

content to be recorded in relation to the corresponding checkup, for example, by text, is performed, and in which the input text is displayed.

The calendar area AR14 is an area in which a calendar is arranged. For example, the schedule of the next checkup reserved by operating the next reservation button BT11 may be reflected in the calendar.

[0021]

Moreover, an operator of the health management application provides a reservation service that allows the user U to make reservations for an online nutrition guidance service as a form of support for the user U as a pregnant woman. Moreover, the operator of the health management application provides a reservation service that allows the user U to make reservations for checkups at an obstetric clinic.

[0022]

FIG. 3(A) shows an example of a reservation screen on which operations corresponding to the above-described reservation services are performed as an application screen of the health management application. In the reservation screen of FIG. 3(A), an online nutrition guidance reservation area AR21 and a checkup reservation area AR22 are arranged.

The online nutrition guidance reservation area AR21 is an area in which an operation for reserving online nutrition guidance is performed. A reservation schedule for online nutrition guidance designated by an operation on the online nutrition guidance reservation area AR21 may be registered, for example, via the health management device 100, in the expert terminal 300 of the corresponding registered dietitian N.

The checkup reservation area AR22 is an area in which an operation for reserving a checkup is performed. A reservation schedule for a checkup designated by an operation on the checkup reservation area AR22 may be registered, for example, via

the health management device 100, in the expert terminal 400 of the corresponding physician D (obstetric clinic).

[0023]

The user U can receive the online nutrition guidance reserved by an operation on
5 the online nutrition guidance reservation area AR21 of FIG. 3(A) on the health management application. In this case, the health management device 100 may control a web meeting to be conducted between the expert terminal 300 of the registered dietitian N and the user terminal 200 of the user U. At this time, a web meeting screen may be displayed on the user terminal 200 as an application screen in the health management
10 application.

[0024]

FIG. 3(B) shows an example of an aspect of a web meeting screen displayed in correspondence with the above-described web meeting, as an application screen of the health management application. The web meeting screen of FIG. 3(B) includes an
15 example in which a camera image area AR31, an information sharing area AR32, and a memo area AR33 are arranged.

The camera image area AR31 is an area in which a camera image of a meeting counterpart is displayed.

The information sharing area AR32 is an area in which information shared with
20 the meeting counterpart is presented.

The memo area AR33 is an area in which an operation for inputting, for example, by text, matters that the user U wishes to record is performed. Text input to the memo area AR33 may be stored as data of the health management application in the user terminal 200 or the health management device 100.

25 [0025]

Moreover, the health management application has a function in which information related to the living situation of the user U, who is a pregnant woman (living-situation recording function) can be recorded.

FIG. 4(A) shows an example of an aspect of a living-situation record screen corresponding to the living-situation recording function, as an application screen of the health management application. In the living-situation record screen of FIG. 4(A), a meal information record area AR41 and an activity record area AR42 are arranged.

[0026]

The meal information record area AR41 is an area in which an operation for inputting (recording) the meal content of the user U for the day is performed. The user U can perform an operation for inputting the meal content of the day to the meal information record area AR41.

Recording of the meal content may be performed, for example, by designating the meal content (menu) ordered from a meal kit delivery service, when the user U receives a meal kit delivery service linked with the health management application. The meal information record area AR41 of the FIG. 4(A) shows an example of an aspect in which meal content is recorded by the user U having performed an operation for selecting a menu of meals that he or she consumed on the day from a list of meal content (menu) orderable from the meal kit delivery service.

Alternatively, the meal content may be recorded by performing an operation for selecting a menu or food ingredients of meals that the user U consumed on the day from a list of menus or food ingredients presented in the meal information record area AR41, regardless of a meal kit delivery service.

That is, the living-situation information in the present embodiment may include information (dietary habit information) indicating dietary habits based on meals in the

daily life of the user U.

[0027]

Moreover, in the meal information record area AR41 of FIG. 4(A), a nutritional balance and the like evaluated according to the meal content recorded by the user U are
5 displayed.

Moreover, in a blood glucose rise index value area AR411 of the meal information record area AR41, a blood glucose rise index value calculated according to the meal content recorded by the user U is displayed.

The blood glucose rise index value is an index value indicating the degree of
10 postprandial blood glucose increase. Specifically, the blood glucose rise index value may be at least one of a glycemic load (GL) value and a glycemic index (GI) value. In the example of FIG. 4(A), both the GL value and the GI value are displayed.

Moreover, in the blood glucose rise index value area AR411, a result of evaluating the appropriateness of the blood glucose rise index value calculated in
15 correspondence with the recorded meal is also displayed. In the example of FIG. 4(A), a display of “OK” or “NG” is performed in accordance with whether or not the blood glucose rise index value calculated in correspondence with the recorded meal falls within an allowable range calculated in accordance with a gestational disease situation of the user U.

20 [0028]

A process for displaying nutrition-related information, blood glucose rise index values, and the like may be performed when the user terminal 200 transmits the meal content recorded in the meal information record area AR41 to the health management device 100, and the health management device 100 transmits nutrition-related
25 information or blood glucose rise index values calculated based on the received meal

content to the user terminal 200. Alternatively, the process for displaying the nutrition-related information, the blood glucose rise index values, and the like may be performed by calculating such values in the user terminal 200 in the health management application based on the meal content recorded in the meal information record area AR41.

5 Moreover, in the display of the blood glucose rise index value area AR411, the health management device 100 may perform the display related to evaluation of the appropriateness of the blood glucose rise index value calculated in correspondence with the recorded meal based on a result of comparison with an allowable value calculated in correspondence with the gestational disease situation of the user U.

10 [0029]

 Moreover, an activity record area AR42 of FIG. 4(A) is an area in which an operation for recording activity content of the user U for the day is performed. The activity content recorded in the activity record area AR42 is included in living-situation information indicating the living situation of the user U.

15 As a specific example, in the activity record area AR42 of FIG. 4(A), items such as a sleep situation of the user U, a blood pressure or blood glucose level measured by the user U himself or herself, and the like can be recorded. Moreover, in the activity record area AR42 of FIG. 4(A), icons indicating evaluation results for recorded items such as the sleep situation, the blood pressure, and the blood glucose level are arranged.

20 Indications indicating evaluation results for the items are not limited to the icons of FIG. 4(A), and may be, for example, symbols, text comments, or the like.

[0030]

 Moreover, the health management application has a meal content recommendation function of recommending meal content (menus) contributing to health

25 management for the user U as a pregnant woman.

The health management application transmits user information including input (recorded) living-situation information, pregnancy situation information, and attributes of the user U to the health management device 100.

[0031]

5 The living-situation information included in the user information may include information recorded in the living-situation record screen (FIG. 4(A)).

 The pregnancy situation information included in the user information may include pregnancy-related information input to the pregnancy-related information area AR2 of the user registration screen (FIG. 2(A)) and information (checkup information)
10 recorded in a pregnant-woman checkup management screen (FIG. 2(B)).

 Moreover, the attributes of the user U may include information about physical characteristics such as a date of birth, an estimated due date, a height, and a weight included in the user information registered in correspondence with the user U. In addition, pregnancy weeks and days can be calculated using the estimated due date and
15 the current date. Such pregnancy weeks and days calculated based on the estimated due date may also be included in the pregnancy situation information. In the present embodiment, such attribute information of the user U may be treated as being included in the living-situation information (including dietary habit information).

[0032]

20 The health management device 100 determines an onset-related situation related to gestational diseases of the user U based on the received user information. The onset-related situation is a so-called disease-related risk, and may include whether or not a gestational disease has occurred, a level of a possibility of occurrence of a gestational disease, and a level of severity of the disease in a case where it is determined that a
25 gestational disease has occurred. Based on the determination result of the onset-related

situation and the blood glucose rise index values prepared in advance for the meal content, the health management device 100 determines the meal content (menu) deemed appropriate for the user U. The health management device 100 causes an application screen (meal content recommendation screen) for presenting (recommending) the
5 determined meal content to be displayed on the health management application operating in the user terminal 200.

[0033]

FIG. 4(B) shows an example of an aspect of the meal content recommendation screen as an application screen of the health management application. In the meal
10 content recommendation screen of FIG. 4(B), a recommended meal content area AR51, a recommended menu ordering area AR52, and an advice area AR53 are arranged from bottom to top.

[0034]

The recommended meal content area AR51 is an area in which meal content
15 determined to be appropriate by the health management device 100 (i.e., meal content recommended to the user U (recommended menu)) is presented. Moreover, in the recommended meal content area AR51 of FIG. 4(B), blood glucose rise index values (a GL value and a GI value) for each presented recommended menu are displayed.

In addition, presentation of such blood glucose rise index values (the GL value
20 and the GI value) is not limited to specific numerical values, and may be presented, for example, in the aspect of graphs or charts.

[0035]

The recommended menu ordering area AR52 is an area in which an operation
for ordering ingredients of the recommended menus in a meal kit delivery service is
25 enabled.

[0036]

The advice area AR53 is an area in which an advice generated for the user U based on the user information of the user U is displayed. Content of the advice in the advice area AR53 may be content corresponding to pregnancy weeks and days as shown in the drawing, or may be content for advising in relation to gestational diseases based on the onset-related situation of the user U.

The advice content displayed in the advice area AR53 may be created by the health management application based on the user information, or may be created by the health management device 100 based on the user information.

10 [0037]

Moreover, when the health management device 100 determines that the user U has a risk of a gestational disease as the onset-related situation of the user U based on the user information, a meal content recommendation screen may be presented for each gestational disease risk.

15 Specifically, when it is determined that the user U is affected by, or has a possibility of developing, a gestational disease as the onset-related situation of the user U, the user terminal 200 may first display a risk item selection screen as an application screen, and then may display a displayed meal content recommendation screen corresponding to an item selected by an operation on the risk item selection screen.

20 [0038]

FIG. 5(A) shows an example of an aspect of the risk item selection screen. In the risk item selection screen of FIG. 5(A), buttons BT60 (BT60-1 to BT60-5) corresponding to respective risk items are arranged. The user operates a button BT60 corresponding to a risk item applicable to his or her own onset-related situation from among the arranged buttons BT60. In accordance with an operation of the button BT60,

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a meal content recommendation screen for the risk corresponding to the operated button BT60 is displayed.

[0039]

FIG. 5(B) shows a meal content recommendation screen displayed in accordance with an operation performed on the button BT60-1 corresponding to a gestational diabetes risk. The meal content recommendation screen of FIG. 5(B) includes the recommended meal content area AR51, the recommended menu ordering area AR52, and the advice area AR53, as in FIG. 4(B).

In the recommended meal content area AR51, a recommended menu determined by the health management device 100 as reducing the risk of gestational diabetes is presented.

In the recommended menu ordering area AR52, the recommended menu determined by the health management device 100 as reducing the risk of gestational diabetes is presented as menu options corresponding to ingredients to be ordered from the meal kit delivery service.

In the advice area AR53, advice content related to the reduction of the gestational diabetes risk is presented.

[0040]

[Example of Hardware Configuration of Health Management Device]

An example of a hardware configuration of the health management device 100 will be described with reference to FIG. 6. The health management device 100 of FIG. 6 includes a communication device 1001, a read-only memory (ROM) 1002, a random-access memory (RAM) 1003, a storage 1004, a central processing unit (CPU) 1005, and a graphics processing unit (GPU) 1006. The communication device 1001, the ROM 1002, the RAM 1003, the storage 1004, the CPU 1005, and the GPU 1006 are connected

via a bus 1007.

[0041]

The communication device 1001 is a device that supports communication via a network.

5 The ROM 1002 stores non-rewritable data.

The RAM 1003 temporarily stores data for use in an arithmetic operation that is executed by the CPU 1005.

The storage 1004 is, for example, a hard disk drive (HDD) or a solid-state drive (SSD), and stores, for example, various types of data such as program data.

10 The CPU 1005 executes various types of arithmetic operations according to control, a process, and the like by executing programs stored in the storage 1004.

The GPU 1006 executes a process related to image processing.

In addition, functions equivalent to those of the health management device 100 may be implemented by a plurality of network-enabled devices distributed to be capable
15 of executing a predetermined process on a network.

[0042]

[Example of Functional Configuration of Health Management Device]

An example of a functional configuration of the health management device 100 will be described with reference to FIG. 7. The health management device 100 may be
20 configured to include a CPU, a ROM, a RAM, and a storage device such as an HDD or an SSD as hardware. Functions of the health management device 100 of FIG. 7 are implemented by a CPU included in the health management device 100 executing programs.

[0043]

25 The health management device 100 of FIG. 7 includes a communication unit

101, a control unit 102, and a storage unit 103.

The communication unit 101 is communicatively connected, via the network, to the user terminal 200, the expert terminal 300 of a registered dietitian N, and the expert terminal 400 of the physician D (obstetric clinic).

5 [0044]

The control unit 102 executes various types of control in the health management device 100. The control unit 102 includes an information acquisition unit 121, an onset-related situation determination unit 122, a recommendation unit 123, and a presentation unit 124.

10 [0045]

The information acquisition unit 121 acquires user information including living-situation information, pregnancy situation information, and attributes input by the user U to a health management application operating in the user terminal 200. When the user information such as the living-situation information, the pregnancy situation information, and the attributes is input according to an operation of the user U for the health management application, the user terminal 200 transmits the input user information to the health management device 100. The information acquisition unit 121 of the health management device 100 acquires the user information received by the communication unit 101.

20 The information acquisition unit 121 may cause the acquired user information to be stored in the user information storage unit 131.

[0046]

Moreover, the information acquisition unit 121 may acquire, from the user information storage unit 131, user information used by the onset-related situation determination unit 122 in determining the onset-related situation, and may pass the

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acquired user information to the onset-related situation determination unit 122.

[0047]

The onset-related situation determination unit 122 determines an onset-related situation with respect to a gestational disease of the user U using the user information of the user U stored in the user information storage unit 131.

[0048]

The recommendation unit 123 determines meal content to be recommended to the user U using the onset-related situation of the user U determined by the onset-related situation determination unit 122, the blood glucose rise index value for each food ingredient or menu stored in a food ingredient index value information storage unit 135, and the recommendation rules (an example of the recommendation rules) stored in a recommendation rule storage unit 138. The meal content determined by the recommendation unit 123 has a blood glucose rise index value appropriate in accordance with the onset-related situation of the user U.

[0049]

The presentation unit 124 presents meal recommendation information reflecting a determination result of the meal content in the recommendation unit 123 on the user terminal 200. Specifically, the meal recommendation information may be information presented in the recommended meal content area AR51 and the recommended menu ordering area AR52 of the meal content recommendation screen shown in FIGS. 4(B) and 5(B).

[0050]

The storage unit 103 stores various types of information handled by the health management device 100. The storage unit 103 includes a user information storage unit 131, a determination condition information storage unit 132, a food ingredient database

storage unit 133, a menu database storage unit 134, the food ingredient index value information storage unit 135, an allowable maximum value table storage unit 136, an energy amount derivation information storage unit 137, and a recommendation rule storage unit 138.

5 In addition, a recommendation result information storage unit 139 and an implementation-related information storage unit 140 correspond to a second embodiment, and therefore, descriptions thereof will be omitted here.

[0051]

 The user information storage unit 131 stores user information for each user U.

10 The determination condition information storage unit 132 stores determination condition information indicating a determination condition used by the onset-related situation determination unit 122 to determine the onset-related situation.

[0052]

 The food ingredient database storage unit 133 stores a food ingredient database
15 in which food ingredient information corresponding to each predetermined food ingredient is stored.

[0053]

 The menu database storage unit 134 stores a menu database in which menu information related to each menu prepared using one or more food ingredients is stored.

20 [0054]

 The food ingredient index value information storage unit 135, for example, stores ingredient index value information indicating blood glucose rise index values for respective food ingredients in the food ingredient database stored in the food ingredient database storage unit 133. Moreover, the food ingredient index value information
25 storage unit 135 may store the food ingredient index value information indicating the

blood glucose rise index values corresponding to each menu in the menu database stored in the menu database storage unit 134.

[0055]

5 The allowable maximum value table storage unit 136 stores an allowable maximum value table. The allowable maximum value table is, for example, a table indicating maximum values of blood glucose rise index values allowed in accordance with combinations of disease types and onset situations of gestational diseases.

[0056]

10 The energy amount derivation information storage unit 137 stores energy amount derivation information used to derive a required energy amount for the user U. As an example, the required energy amount may be used when the recommendation unit 123 determines meal content to be recommended to the user U.

[0057]

15 The recommendation rule storage unit 138 stores recommendation rules. The recommendation rules are rules applied by the recommendation unit 123 in determining meal content to be recommended to the user U.

[0058]

[Example of Functional Configuration of User Terminal]

20 An example of a functional configuration of the user terminal 200 will be described with reference to FIG. 8. The user terminal 200 may be configured to include a central processing unit (CPU), a read-only memory (ROM), a random-access memory (RAM), and a storage device such as a hard disk drive (HDD), or a solid-state drive (SSD) as hardware. The functions of the user terminal 200 shown in FIG. 8 are implemented by a CPU included in the user terminal 200 executing a program.

25 [0059]

The user terminal 200 shown in FIG. 8 includes a communication unit 201, a control unit 202, a storage unit 203, and a user interface unit 204.

The communication unit 201 is communicatively connected to the health management device 100 via a network.

5 [0060]

The control unit 202 executes various types of control in the user terminal 200. The control unit 202 includes an application-compatible processing unit 221.

The application-compatible processing unit 221 executes functions corresponding to the health management application.

10 The storage unit 203 stores various types of information corresponding to the user terminal 200.

[0061]

The user interface unit 204 is a unit that includes a user interface provided in the user terminal 200 or a user interface connected to the user terminal 200. The user interface unit 204 includes an input device operated by the user and an output device that outputs images and sounds to the user. The user interface unit 204 may include, for example, a touch panel capable of receiving operations on an image display surface and the like.

[0062]

20 [Example of Processing Procedure]

An example of a processing procedure executed by the health management device 100 in relation to the recommendation of meal content according to the onset-related situation of the user U will be described with reference to the flowchart of FIG. 9. The process of FIG. 9 may be executed, for example, in response to a request for a meal content recommendation screen from the health management application at a timing

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when the display transitions to the display of the meal content recommendation screen by the health management application operating in the user terminal 200. The request for the meal content recommendation screen includes a user ID of the corresponding user U.
[0063]

5 Step S100: The information acquisition unit 121 acquires user information of a target user from the user information storage unit 131. At this time, the information acquisition unit 121 may acquire, from the user information storage unit 131, user information associated with a user ID identical to that included in the received request for the meal content recommendation screen.

10 [0064]

 Step S102: The onset-related situation determination unit 122 determines whether or not the target user U is pregnant based on the user information acquired in step S100. Specifically, for example, the onset-related situation determination unit 122 may determine whether or not the user U is pregnant according to whether or not
15 pregnancy situation information is included.

 When it is determined that the user U is not pregnant, subsequent steps may be skipped and the process of FIG. 9 may be terminated.

[0065]

 Step S104: When it is determined that the user U is pregnant in step S102, the
20 onset-related situation determination unit 122 performs onset-related situation determination for the target user U.

[0066]

 Step S106: The recommendation unit 123 executes a process for determining recommended meal content. That is, the recommendation unit 123 determines meal
25 content (a menu) to be recommended to the user U according to the onset-related

situation determined in step S104.

[0067]

Step S108: The presentation unit 124 controls meal recommendation information presentation. Specifically, the presentation unit 124 generates meal recommendation information reflecting a determination result of the recommendation unit 123 in step S106. The presentation unit 124 transmits, to the user terminal 200, screen information used for displaying a meal content recommendation screen reflecting the generated meal recommendation information.

In the user terminal 200, the application-compatible processing unit 221 corresponding to the health management application causes a display unit of the user interface unit 204 to display the meal content recommendation screen using the received screen information.

[0068]

An example of a processing procedure for the onset-related situation determination as step S104 of FIG. 9 will be described with reference to the flowchart of FIG. 10.

Step S200: The onset-related situation determination unit 122 selects a disease type serving as a determination target. The disease types serving as options include gestational diabetes mellitus and hypertensive disorders of pregnancy. Further, in the present embodiment, a low-birth-weight infant is additionally included as a determination target.

Selection of the disease type serving as the determination target of the onset-related situation determination unit 122 may be executed, for example, in accordance with an operation by the user U to select a disease type of the determination target for the health management application.

Although the onset-related situation determination unit 122 may determine an onset-related situation corresponding to each of the gestational diabetes mellitus, hypertensive disorders of pregnancy, and low-birth-weight infant, an example in which the onset-related situation determination is performed for one disease type selected in step S200 will be described in the following description.

[0069]

Step S202: The onset-related situation determination unit 122 acquires, from the user information corresponding to the target user U stored in the user information storage unit 131, information (diagnostic item information) corresponding to diagnostic items used for determining the onset-related situation. The diagnostic item information may include age and diagnostic items used to determine the onset-related situation of the disease type selected as the determination target among diagnostic items included in medical examination information.

[0070]

Step S204: The onset-related situation determination unit 122 determines whether or not the diagnostic item corresponds to the disease of the determination target (applicability determination) for each diagnostic item included in the diagnostic item information acquired in step S202.

In performing the applicability determination of diagnostic items, the onset-related situation determination unit 122 uses determination condition information stored in the determination condition information storage unit 132.

[0071]

FIG. 11 shows an example of the determination condition information. The determination condition information of FIG. 11 includes diagnostic items and reference values associated with the diagnostic items, for each disease type (the gestational

diabetes mellitus, the hypertensive disorders of pregnancy, and the low-birth-weight infant).

The onset-related situation determination unit 122 compares a value (diagnostic value) for each diagnostic item in the diagnostic item information acquired in step S202
5 with a reference value of the corresponding diagnostic item in the determination condition information.

Specifically, when the disease of the determination target selected in step S200 is the gestational diabetes mellitus, for example, diagnostic item information corresponding to a diagnostic item associated with the disease type of the gestational
10 diabetes mellitus shown in FIG. 11 is acquired in step S202. Then, in step S204, the onset-related situation determination unit 122 compares the diagnostic value for each diagnostic item in the diagnostic item information acquired in step S202 with the reference value of the corresponding diagnostic item in the determination condition information. The reference value may be a threshold according to the diagnostic item or
15 may indicate a predetermined numerical range. Based on the comparison result, it is determined whether or not the diagnostic value of each diagnostic item in the diagnostic item information corresponds to the target disease. In this case, if the diagnostic value of the diagnostic item in the diagnostic item information deviates from the reference value and is not within a normal value range, it is determined that the diagnostic item
20 corresponds to the target disease. The onset-related situation determination unit 122 performs such applicability determination for each diagnostic item included in the diagnostic item information.

[0072]

Description returns to FIG. 10.

25 Step S206: The onset-related situation determination unit 122 calculates a ratio

(applicable item ratio) $R (= N1/N2)$, where $N1$ indicates the number of diagnostic items determined to be applicable in step S204, and $N2$ indicates the total number of diagnostic items determined in step S204.

[0073]

5 Step S208: The onset-related situation determination unit 122 determines the onset-related situation of the user U based on the applicable item ratio R calculated in step S206.

 For example, the onset-related situation determination unit 122 may determine whether or not the target disease has occurred (whether or not the user U has been
10 affected by the target disease) based on the value of the applicable item ratio R .
 Furthermore, when it is determined that the user U has not been affected by the target disease, the onset-related situation determination unit 122 may determine a level of a possibility of occurrence of the target disease at the current time in accordance with the value of the applicable item ratio R . Moreover, when it is determined that the user U
15 has been affected by the target disease, the onset-related situation determination unit 122 may determine a degree of onset (a severity level) of the target disease at the current time in accordance with the value of the applicable item ratio R .

 In addition, a process for determining whether or not the user U has been affected by the target disease, the level of the possibility of occurrence of the target
20 disease, the degree of onset of the target disease, and the like may be performed simply based on the number of diagnostic items, $N1$.

[0074]

 An example of a processing procedure for determining recommended meal content in step S106 of FIG. 9 will be described with reference to the flowchart of FIG.

25 12.

Step S300: In the health management device 100, the recommendation unit 123 acquires the determination result of the onset-related situation obtained in step S104 of FIG. 9.

[0075]

5 Step S302: The recommendation unit 123 derives an allowable maximum index value corresponding to the onset-related situation indicated in the determination result acquired in step S300.

The allowable maximum index value is a maximum value of a blood glucose rise index value that is allowable in accordance with the onset-related situation of the
10 user U.

[0076]

As one specific example, the recommendation unit 123 may derive the allowable maximum index value as follows. For convenience of simplifying the description, an example in which the determination result of the onset-related situation is two-stage-
15 based determination indicating whether a level of possibility of occurrence (a risk level) of the target disease type is high or low will be described.

In this case, the recommendation unit 123 may refer to an allowable maximum value table stored in the allowable maximum value table storage unit 136 when deriving the allowable maximum index value.

20 FIG. 13 shows an example of the allowable maximum value table. The allowable maximum value table of FIG. 13 indicates an appropriate range and an appropriate value of a GI value corresponding to each of the risk levels “low” and “high” for each disease type of gestational diabetes mellitus, hypertensive disorders of pregnancy, and a low-birth-weight infant. For example, the risk level “low” may
25 indicate a state in which the possibility of occurrence of the target disease type is lower

than or equal to a certain level. Moreover, the risk level “high” may indicate a state in which the possibility of occurrence of the target disease type is higher than or equal to the certain level, or a state in which the disease has occurred.

The recommendation unit 123 may derive an allowable maximum value of the
 5 GI value based on the GI value corresponding to the risk level determined for the target disease type as indicated by such an allowable maximum value table.

In addition, the recommendation unit 123 may derive an allowable maximum value of a GL value with reference to an allowable maximum value table corresponding to the GL value having a structure similar to that shown in FIG. 13.

10 [0077]

Description returns to FIG. 12.

Step S304: The recommendation unit 123 acquires living-situation information and attribute information of the user U from the user information of the target user U stored in the user information storage unit 131.

15 [0078]

Step S306: The recommendation unit 123 derives an energy amount required for the target user U (a required energy amount) using the living-situation information and the attribute information acquired in step S304.

Specifically, in deriving the required energy amount, the recommendation unit
 20 123 acquires, for example, information about the physique of the user U (e.g., a height and weight), an activity level, and gestational age (the number of weeks or days) from the acquired living-situation information and attribute information.

The recommendation unit 123 derives an energy level required for the target user U (a required energy level) by comparing the acquired physique and activity level
 25 information with a required energy level table stored in the energy amount derivation

information storage unit 137 as one item of energy derivation information.

FIG. 14 shows an example of the required energy level table. The required energy level table stores a value of the required energy level for each of the combinations of three physique categories (“obese,” “average,” and “thin”) and three activity level categories (“high,” “normal,” and “low”) of the user.

The physique category “obese,” “average,” or “thin” corresponding to the user U may be determined, for example, according to the height and weight of the user U. Information such as BMI may also be used to determine the physique.

The recommendation unit 123 may calculate the required energy amount using, for example, a calculation formula for the required energy amount indicated in the energy amount derivation information stored in the energy amount derivation information storage unit 137. The calculation formula for the required energy amount may use, as variables, the above-described required energy level, physique, age, gestational age (the number of weeks or days), and the like.

[0079]

Description returns to FIG. 12.

Step S308: The recommendation unit 123 acquires a food ingredient database stored in the food ingredient database storage unit 133, menu data stored in the menu database storage unit 134, and food ingredient index value information stored in the food ingredient index value information storage unit 135.

When the recommendation unit 123 acquires the food ingredient database, the menu data, and the food ingredient index value information in this way, the blood glucose rise index value for each food ingredient indicated in the food ingredient database is identified. Moreover, because the menu data indicates food ingredients used for each menu, a blood glucose rise index value is also identified in units of menus.

[0080]

Moreover, FIG. 15 shows an example of the menu data. The menu data of FIG. 15 is classified according to each menu type such as a staple food, main dishes, side dish, and nutrition-adjustment dish, and a corresponding menu is presented for each classification. In correspondence with each menu, information items such as an item quantity, calories, a GI value, a GL value, nutritional details, and a recipe (cooking method) are provided. In FIG. 15, the information items of nutritional details and recipes are shown as URL links to corresponding web pages or the like.

[0081]

10 Description returns to FIG. 12.

Step S310: The recommendation unit 123 determines recommended meal content. As the recommended meal content, the recommendation unit 123 determines a menu to be recommended to the user U from among menus stored in the menu database.

At this time, the recommendation unit 123 identifies a menu that satisfies conditions that the blood glucose rise index value does not exceed the allowable maximum value derived in step S302 and that the calories are equivalent to the required energy amount derived in step S306 from the menu data. In this case, the recommendation unit 123 may be configured to select, as a menu for one meal, at least one item from each of categories of dishes such as staple foods, side dishes, and nutrition-adjustment dishes.

[0082]

In determining the menu to be recommended as described above, the recommendation unit 123 may be configured to perform the determination in accordance with recommendation rules stored in the recommendation rule storage unit 138.

25 According to the recommendation rule, for example, a menu may be determined so that

combinations of menus such as main dishes and side dishes provide as high a nutritional value as possible and form easy-to-eat combinations. Moreover, depending on the recommendation rules, appropriate menus may be determined in accordance with the type of gestational disease, gestational age (the number of weeks or days), and symptoms during pregnancy such as morning sickness. Moreover, a menu reflecting dietary preferences of the user U may be determined.

The recommendation rules may solve an optimization problem of searching menu data for a menu that best satisfies constraints such as energy and preferences.

The recommendation rules may be implemented using a trained machine learning model trained to determine a recommended menu by inputting, for example, an allowable maximum value of the blood glucose rise index value, a required energy amount, a type of gestational disease, gestational age (the number of weeks or days), and pregnancy symptoms to the learning machine.

[0083]

15 <Second Embodiment>

Next, a second embodiment will be described. A health management system according to the second embodiment determines effects of recommending menus to a user U (recommendation effects). Here, the recommendation effects may indicate, for example, to what extent the recommended menus contribute to reduction of a risk of gestational diseases of the user.

The health management system of the present embodiment changes recommendation rules stored in the recommendation rule storage unit 138 in accordance with the recommendation effects.

With such a configuration, it becomes possible to recommend menus that are more effective for each user U.

[0084]

The health management device 100 of the present embodiment may be similar to that shown in FIG. 7. In the present embodiment, the storage unit 103 further includes a recommendation result information storage unit 139 and an implementation-related
5 information storage unit 140.

The recommendation result information storage unit 139 stores a menu recommendation result of the recommendation unit 123.

The implementation-related information storage unit 140 stores information related to execution by the user U for a menu recommendation process of the
10 recommendation unit 123 (implementation-related information). The implementation-related information may include execution situation information indicating whether or not the user U has incorporated the recommended menu into the user's daily meals on a per-day basis. Moreover, the implementation-related information may include symptom change information indicating changes in symptoms of gestational diseases determined
15 based on a history of medical examination results of the user U.

[0085]

The flowchart of FIG. 16 shows an example of a processing procedure corresponding to a recommendation rule change performed by the health management device 100 based on the implementation-related information of the user U in the present
20 embodiment. The process of FIG. 16 becomes a process for changing a recommendation rule corresponding to one user U.

The process of FIG. 16 may be executed periodically, or may be executed with, for example, an instruction from a terminal of the user U, a registered dietitian N, a physician D, or the like as a trigger.

25 [0086]

Step S400: In the health management device 100, the recommendation unit 123 acquires recommendation result information of the target user U from the recommendation result information storage unit 139.

[0087]

5 Step S402: The recommendation unit 123 acquires implementation-related information of the target user U from the implementation-related information storage unit 140.

[0088]

 Step S404: The recommendation unit 123 acquires user information of the target
10 user U from the user information storage unit 131.

[0089]

 Step S406: The recommendation unit 123 determines a recommendation effect for the target user U. At this time, the recommendation unit 123 determines how effective menu recommendation content indicated in the recommendation result
15 information acquired in step S400 is for the user U. For this purpose, the recommendation unit 123 may determine the recommendation effect based on content of symptom change information included in the implementation-related information acquired in step S402. The recommendation effect, for example, may be determined as the presence or absence of an effect in the simplest example, or may be determined as an
20 effect level based on three or more stages according to a degree of presence or absence of the effect.

 Moreover, the recommendation unit 123 may estimate factors that caused the determined recommendation effect using implementation situation information included in the implementation-related information acquired in step S402. For example, when it
25 is determined that no recommendation effect has been obtained, the recommendation unit

123 can estimate that a factor is that the user has not adopted the recommended menu in meals based on the implementation situation information.

[0090]

Step S408: The recommendation unit 123 changes (updates) the
5 recommendation rules stored in the recommendation rule storage unit 138 to enhance the recommendation effect, based on the determination result of the recommendation effect obtained in step S406.

In this case, the recommendation unit 123 may change the recommendation rules in accordance with a predetermined logic or an algorithm. At this time, the
10 recommendation unit 123 may also change the recommended rule using the result of determining the factor that caused the recommendation effect.

Moreover, when the recommendation rules are constructed as a trained model, the recommendation unit 123 may retrain the trained model based on a result of determining the recommendation effect in step S406, a result of estimating a factor that
15 caused the recommendation effect, and the like.

Moreover, the recommendation rules may be changed by an operation performed by an administrator or the like.

[0091]

<Modified Examples>

20 Modified examples corresponding to the above-described embodiments will be described below.

[First Modified Example]

For example, experts such as a registered dietitian N or a physician D may cause their expert terminals (300 and 400) to access the health management device 100 and
25 view appropriate information from among user information, recommendation result

information, implementation-related information, and the like of the user U. Thereafter, experts such as the registered dietitian N or the physician D may provide the health management device 100 with support information such as advices or materials related to, for example, prevention of gestational diseases or alleviation of symptoms, directed to the user U. Such provided support information may be stored in the storage unit 103 in association with the user ID of the user U who is a receiver.

In the health management device 100, the presentation unit 124 may present the support information provided from the expert on the user terminal 200 of the corresponding user U via the health management application. As one specific example, the support information may be displayed in the advice area AR53 (FIGS. 4(B) and 5(B)) on the meal content recommendation screen. Alternatively, although not shown, the information may be presented on an application screen in which the support information provided for the user U is aggregated in the health management application.

[0092]

15 [Second Modified Example]

For example, the health management system of the present embodiment may be configured so that health management including users U who plan to become pregnant but are currently in a pre-pregnancy state as targets can also be performed. By performing health management in correspondence with gestational diseases also for such pre-pregnancy users U, it becomes possible to effectively reduce the risk (possibility of onset) of gestational diseases after the user U becomes pregnant.

[0093]

In this case, the user information stored in the user information storage unit 131 of the health management device 100 may include information indicating whether or not the user is pregnant.

Moreover, the determination condition information storage unit 132 may store determination condition information corresponding to each of users U who are pregnant and users U who are not pregnant.

Moreover, among the food ingredients and menus stored in the food ingredient database storage unit 133 and the menu database storage unit 134, those intended for users U who are not pregnant may be stored. For example, for the users U who are not pregnant, low-carbohydrate items may be included in correspondence with obese body types.

Moreover, the allowable maximum value table storage unit 136 may store allowable maximum value tables that store different allowable maximum values of blood glucose rise index values in correspondence with users U who are pregnant and users U who are not pregnant.

Moreover, the energy amount derivation information storage unit 137 may store energy amount derivation information in which information indicating different energy amount derivation methods is stored in correspondence with users U who are pregnant and users U who are not pregnant.

Moreover, the recommendation rule storage unit 138 may store recommendation rules in which different rules are defined in correspondence with users U who are pregnant and users U who are not pregnant.

[0094]

In addition, programs for implementing the functions of the health management device 100, the user terminal 200, the expert terminals 300 and 400, and the like described above may be recorded on a computer-readable recording medium, and the above-described processes of the health management device 100, the user terminal 200, the expert terminals 300 and 400, and the like may be performed by causing a computer

system to read and execute the programs recorded on the recording medium. Here, “causing a computer system to read and execute the program recorded on the recording medium” includes installing a program on the computer system. It is assumed that the “computer system” used here includes an OS and hardware such as peripheral devices.

5 Moreover, the “computer system” may also include a plurality of computer devices connected via a network including the Internet, a WAN, a LAN, and a communication circuit such as a dedicated circuit. Moreover, the “computer-readable recording medium” refers to a flexible disk, a magneto-optical disk, a ROM, a portable medium such as a CD-ROM, or a storage device such as a hard disk built into a computer system.

10 Thus, the recording medium storing the program may be a non-transient recording medium such as a CD-ROM. Moreover, the recording medium also includes a recording medium provided inside or outside that can be accessed from a distribution server for distributing the program. Program codes stored in the recording medium of the distribution server may be different from program codes of a format executable in the

15 terminal device. That is, any format may be used as long as the program can be downloaded from the distribution server and installed in an executable form on the terminal device. In addition, a configuration in which the program is divided into a plurality of parts and the parts are downloaded at different timings and then combined with each configuration provided in the terminal device or distribution servers for

20 distributing the parts of the divided program may be different. Furthermore, the “computer-readable recording medium” is assumed to include those that hold a program for a certain period of time like a volatile memory (RAM) inside a computer system serving as a server or client when the program is transmitted via a network. Moreover, the program may be for implementing some of the above-described functions.

25 Furthermore, the above-described function may be implemented in combination with a

program already recorded on the computer system, a so-called difference file (difference program).

[0095]

<Appendixes>

5 (1) According to an aspect of the present embodiment, there is provided a health management system including: an information acquisition unit configured to acquire user information including at least living-situation information indicating a living situation of a user and pregnancy situation information indicating a pregnancy-related situation of the user; an onset-related situation determination unit configured to determine an onset-
10 related situation related to onset of a gestational disease of the user based on the user information acquired by the information acquisition unit; a recommendation unit configured to determine meal content to be recommended to the user in accordance with a recommendation rule, which has been formulated in advance, based on the onset-related situation determined by the onset-related situation determination unit and a
15 predetermined index value corresponding to the meal content; and a presentation unit configured to present meal recommendation information based on a determination result of the recommendation unit on a user terminal.

 (2) According to an aspect of the present embodiment, in the health management system according to (1), the presentation unit may include a blood glucose rise index
20 value indicating a degree of postprandial blood glucose increase according to the recommended meal content, in the meal recommendation information that is based on a determination result of the recommendation unit.

 (3) According to an aspect of the present embodiment, in the health management system according to (1) or (2), the presentation unit may present a blood glucose rise
25 index value on the user terminal, the blood glucose rise index value being calculated in

correspondence with a meal consumed by the user and indicating a degree of postprandial blood glucose increase.

(4) According to an aspect of the present embodiment, in the health management system according to (3), the presentation unit may present an evaluation result on the user terminal, the evaluation result being obtained by comparing the blood glucose rise index value calculated for the meal consumed by the user with an allowable value of the blood glucose rise index value derived in correspondence with the user based on a determination result of the onset-related situation determination unit.

(5) According to an aspect of the present embodiment, in the health management system according to any one of (1) to (4), the information acquisition unit may further acquire an implementation situation of a meal that is based on the recommended meal content, and the recommendation unit may determine an effect of a recommended meal based on the acquired implementation situation and checkup-related information of the user included in the user information.

(6) According to an aspect of the present embodiment, in the health management system according to (5), the recommendation unit may use a newly formulated recommendation rule based on a determination result for the effect of the recommended meal.

(7) According to an aspect of the present embodiment, in the health management system according to any one of (1) to (6), the gestational disease may be at least one of hypertensive disorders of pregnancy and gestational diabetes.

(8) According to an aspect of the present embodiment, the health management system according to any one of (1) to (7) may include a determination condition information storage unit configured to store determination condition information indicating a reference value of each predetermined diagnostic item related to the

gestational disease, wherein the onset-related situation determination unit may determine the onset-related situation based on a diagnostic value of each diagnostic item acquired from the user information and the reference value indicated in the determination condition information for each diagnostic item.

5 (9) According to an aspect of the present embodiment, in the health management system according to (8), the onset-related situation determination unit may determine a possibility of onset or a degree of onset based on the number of diagnostic items for which diagnostic values deviate from reference values.

 (10) According to an aspect of the present embodiment, in the health
10 management system according to any one of (1) to (9), the recommendation unit may derive an allowable value of a blood glucose rise index value indicating a degree of postprandial blood glucose increase based on a determination result of the onset-related situation determination unit, and determine meal content to be recommended to the user to satisfy the derived allowable value.

15 (11) According to an aspect of the present embodiment, in the health management system according to (10), the recommendation unit may further derive a required energy amount based on information including at least one of an activity level and a physique of the user included in the user information, and determine the meal content to be recommended to the user to satisfy both the derived allowable value and the
20 required energy amount.

 (12) According to an aspect of the present embodiment, in the health management system according to (11), the recommendation unit may further use an additional required energy amount that is based on information indicating a progress period of pregnancy included in the user information in deriving the required energy
25 amount.

(13) According to an aspect of the present embodiment, in the health management system according to any one of (1) to (12), the information acquisition unit may further acquire advice information about a meal for the user from a third party, and the presentation unit may output the acquired advice information so that the acquired
5 advice information is presented on the user terminal.

(14) According to an aspect of the present embodiment, in the health management system according to any one of (1) to (13), when the user is not pregnant, the recommendation unit may determine the meal content to be recommended to the user in accordance with recommendation rules determined for non-pregnant users, using
10 predetermined index values set for the non-pregnant users as the predetermined index values corresponding to the meal content.

(15) According to an aspect of the present embodiment, there is provided a health management method in a health management system, the health management method including: an information acquisition step in which an information acquisition
15 unit acquires user information including at least living-situation information indicating a living situation of a user and pregnancy situation information indicating a pregnancy-related situation of the user; an onset-related situation determination step in which an onset-related situation determination unit determines an onset-related situation related to onset of a gestational disease of the user based on the user information acquired in the
20 information acquisition step; a recommendation step in which a recommendation unit determines meal content to be recommended to the user in accordance with a recommendation rule, which has been formulated in advance, based on a risk determined in the onset-related situation determination step and a predetermined index value corresponding to the meal content; and a presentation step in which a presentation unit
25 presents meal recommendation information based on a determination result of the

recommendation step on a user terminal.

(16) According to an aspect of the present embodiment, there is provided a program for causing a computer in a health management system to function as: an information acquisition unit configured to acquire user information including at least living-situation information indicating a living situation of a user and pregnancy situation information indicating a pregnancy-related situation of the user; an onset-related situation determination unit configured to determine an onset-related situation related to onset of a gestational disease of the user based on the user information acquired by the information acquisition unit; a recommendation unit configured to determine meal content to be recommended to the user in accordance with a recommendation rule, which has been formulated in advance, based on a risk determined by the onset-related situation determination unit and a predetermined index value corresponding to the meal content; and a presentation unit configured to present meal recommendation information based on a determination result of the recommendation unit on a user terminal.

[0096]

The above-described embodiment can be represented as follows.

A computer-readable non-transitory storage medium storing a program for causing a computer to function as: an information acquisition unit configured to acquire user information including at least living-situation information indicating a living situation of a user and pregnancy situation information indicating a pregnancy-related situation of the user; an onset-related situation determination unit configured to determine an onset-related situation related to onset of a gestational disease of the user based on the user information acquired by the information acquisition unit; a recommendation unit configured to determine meal content to be recommended to the user in accordance with a recommendation rule, which has been formulated in advance,

based on a risk determined by the onset-related situation determination unit and a predetermined index value corresponding to the meal content; and a presentation unit configured to present meal recommendation information based on a determination result of the recommendation unit on a user terminal.

5 INDUSTRIAL APPLICABILITY

[0097]

According to the present invention, health management is appropriately performed in consideration of gestational diseases.

REFERENCE SIGNS LIST

10 [0098]

100 Health management device

101 Communication unit

102 Control unit

103 Storage unit

15 121 Information acquisition unit

122 Onset-related situation determination unit

123 Recommendation unit

124 Presentation unit

131 User information storage unit

20 132 Determination condition information storage unit

133 Food ingredient database storage unit

134 Menu database storage unit

135 Food ingredient index value information storage unit

136 Allowable maximum value table storage unit

25 137 Energy amount derivation information storage unit

	138 Recommendation rule storage unit
	139 Recommendation result information storage unit
	140 Implementation-related information storage unit
	200 User terminal
5	201 Communication unit
	202 Control unit
	203 Storage unit
	204 User interface unit
	221 Application-compatible processing unit
10	300 Expert terminal
	400 Expert terminal
	1001 Communication device
	1002 ROM
	1003 RAM
15	1004 Storage
	1005 CPU
	1006 GPU
	1007 Bus

CLAIMS

[Claim 1] A health management system comprising:

an information acquisition unit configured to acquire user information including at least living-situation information indicating a living situation of a user and pregnancy

5 situation information indicating a pregnancy-related situation of the user;

an onset-related situation determination unit configured to determine an onset-related situation related to onset of a gestational disease of the user based on the user information acquired by the information acquisition unit;

a recommendation unit configured to determine meal content to be
10 recommended to the user in accordance with a recommendation rule, which has been formulated in advance, based on the onset-related situation determined by the onset-related situation determination unit and a predetermined index value corresponding to the meal content; and

a presentation unit configured to present meal recommendation information
15 based on a determination result of the recommendation unit on a user terminal.

[Claim 2] The health management system according to claim 1, wherein the presentation unit includes a blood glucose rise index value indicating a degree of postprandial blood glucose increase according to the recommended meal content, in the meal recommendation information that is based on a determination result of the

20 recommendation unit.

[Claim 3] The health management system according to claim 1 or 2, wherein the presentation unit presents a blood glucose rise index value on the user terminal, the blood glucose rise index value being calculated in correspondence with a meal consumed by the user and indicating a degree of postprandial blood glucose increase.

25 [Claim 4] The health management system according to claim 3, wherein the

presentation unit presents an evaluation result on the user terminal, the evaluation result being obtained by comparing the blood glucose rise index value calculated for the meal consumed by the user with an allowable value of the blood glucose rise index value derived in correspondence with the user based on a determination result of the onset-related situation determination unit.

[Claim 5] The health management system according to claim 1 or 2,

wherein the information acquisition unit further acquires an implementation situation of a meal that is based on the recommended meal content, and

wherein the recommendation unit determines an effect of a recommended meal based on the acquired implementation situation and checkup-related information of the user included in the user information.

[Claim 6] The health management system according to claim 5, wherein the recommendation unit uses a newly formulated recommendation rule based on a determination result for the effect of the recommended meal.

[Claim 7] The health management system according to claim 1 or 2, wherein the gestational disease is at least one of hypertensive disorders of pregnancy and gestational diabetes.

[Claim 8] The health management system according to claim 1 or 2, comprising a determination condition information storage unit configured to store determination condition information indicating a reference value of each predetermined diagnostic item related to the gestational disease,

wherein the onset-related situation determination unit determines the onset-related situation based on a diagnostic value of each diagnostic item acquired from the user information and the reference value indicated in the determination condition information for each diagnostic item.

[Claim 9] The health management system according to claim 8, wherein the onset-related situation determination unit determines a possibility of onset or a degree of onset based on the number of diagnostic items for which diagnostic values deviate from reference values.

5 [Claim 10] The health management system according to claim 1 or 2, wherein the recommendation unit derives an allowable value of a blood glucose rise index value indicating a degree of postprandial blood glucose increase based on a determination result of the onset-related situation determination unit and determines meal content to be recommended to the user to satisfy the derived allowable value.

10 [Claim 11] The health management system according to claim 10, wherein the recommendation unit further derives a required energy amount based on information including at least one of an activity level and a physique of the user included in the user information and determines the meal content to be recommended to the user to satisfy both the derived allowable value and the required energy amount.

15 [Claim 12] The health management system according to claim 11, wherein the recommendation unit further uses an additional required energy amount that is based on information indicating a progress period of pregnancy included in the user information in deriving the required energy amount.

[Claim 13] The health management system according to claim 1 or 2,
20 wherein the information acquisition unit further acquires advice information about a meal for the user from a third party, and
wherein the presentation unit outputs the acquired advice information so that the acquired advice information is presented on the user terminal.

[Claim 14] The health management system according to claim 1 or 2, wherein, when
25 the user is not pregnant, the recommendation unit determines the meal content to be

recommended to the user in accordance with recommendation rules determined for non-pregnant users, using predetermined index values set for the non-pregnant users as the predetermined index values corresponding to the meal content.

[Claim 15] A health management method in a health management system, the health

5 management method comprising:

an information acquisition step in which an information acquisition unit acquires user information including at least living-situation information indicating a living situation of a user and pregnancy situation information indicating a pregnancy-related situation of the user;

10 an onset-related situation determination step in which an onset-related situation determination unit determines an onset-related situation related to onset of a gestational disease of the user based on the user information acquired in the information acquisition step;

a recommendation step in which a recommendation unit determines meal
15 content to be recommended to the user in accordance with a recommendation rule, which has been formulated in advance, based on a risk determined in the onset-related situation determination step and a predetermined index value corresponding to the meal content;
and

a presentation step in which a presentation unit presents meal recommendation
20 information based on a determination result of the recommendation step on a user terminal.

[Claim 16] A program for causing a computer in a health management system to function as:

an information acquisition unit configured to acquire user information including
25 at least living-situation information indicating a living situation of a user and pregnancy

situation information indicating a pregnancy-related situation of the user;

an onset-related situation determination unit configured to determine an onset-related situation related to onset of a gestational disease of the user based on the user information acquired by the information acquisition unit;

5 a recommendation unit configured to determine meal content to be recommended to the user in accordance with a recommendation rule, which has been formulated in advance, based on a risk determined by the onset-related situation determination unit and a predetermined index value corresponding to the meal content; and

10 a presentation unit configured to present meal recommendation information based on a determination result of the recommendation unit on a user terminal.