ORIGINAL ARTICLE

Multiple Questions for Understanding Excessive Sweating Tendencies (M-QUEST): A New Japanese Patient-Reported Outcome Measure for the Assessment and Grading of Primary Axillary Hyperhidrosis Concerns

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Abstract

The treatment goal of primary focal hyperhidrosis is to improve the patient's quality of life, but current patient-reported outcome measures (PROMs) have some concerns when used clinically. This study aimed to develop an easy-to-use measure that identifies concerns related to the axilla, a prevalent body area for hyperhidrosis.

A new PROM was prepared based on previous reports and interviews with 12 individuals with primary axillary hyperhidrosis. The PROM, named the Multiple Questions for Understanding Excessive Sweating Tendencies (M-QUEST), comprises 10 items and a 5-point scale. A web-based questionnaire survey of 192 individuals confirmed that M-QUEST comprehensively captured concerns due to primary axillary hyperhidrosis, and its internal consistency was confirmed (Cronbach's alpha was 0.91). Convergent validity was verified by its correlation coefficient (0.73) with the Dermatology Life Quality Index (DLQI), which exceeded the correlation coefficient (0.47) between the DLQI and the Hyperhidrosis Disease Severity Scale. Known-groups

validity was considered universal for the backgrounds with overlapping 95％ confidence intervals：sex, presence/absence of a previous visit, and occupation.

Although further longitudinal studies in patients are required, M-QUEST has been shown to have acceptable reliability and validity to measure concerns related to primary axillary hyperhidrosis.

Introduction

Primary focal hyperhidrosis is characterized by excessive, bilateral sweating affecting localized body areas, most often head and face, palms, soles, and axillae[1]. Patients with hyperhidrosis experience poor quality of life（QOL）and adverse impacts on mental health[1]. The treatment goal of hyperhidrosis is to improve the patient's QOL, rather than preventing excessive sweating[1].

Patient-reported outcome measures （PROMs） are measures developed to quantitate patients' subjective outcomes. Currently available PROMs to evaluate the QOL of patients with hyperhidrosis include the Short Form 36 health survey questionnaire, Skindex, and hyperhidrosis-specific measures. The Dermatology Life Quality Index（DLQI） is a PROM for the evaluation of health-related QOL of individuals with skin diseases[2)3)] and was used as a secondary endpoint in some clinical trials for hyperhidrosis[4]. The DLQI is suitable for study use, but its complex questions make it less practical for actual clinical use. The Hyperhidrosis Disease Severity Scale（HDSS）, which is used as a severity index of primary focal hyperhidrosis[5], is a hyperhidrosis-specific 4-point PROM based on subjective symptoms and is the most common measure for the evaluation of hyperhidrosis severity in Japan. HDSS is simple and easy to use in clinical practice,

but it also combines two distinct concepts （i.e., tolerability and interference with daily activities） within individual items, which limits the interpretation of any study results[6]. The Hyperhidrosis Quality of Life Index[7] is a hyperhidrosis-specific PROM, but it too has limitations, as the number of its question items is large and it is uncertain whether the concerns among those of Japanese people are encompassed.

Therefore, we aimed to develop a new PROM to evaluate QOL improvement for primary axillary hyperhidrosis which has a high prevalence in Japan[8]. The PROM was attempted to be easily used in actual clinical practice.

Ⅰ Methods

This study had the following three steps while considering the psychometric properties required for the development of the measures[9)10)]. In step 1, a draft of the Multiple Questions for Understanding Excessive Sweating Tendencies （M-QUEST） was prepared. In step 2, M-QUEST was confirmed to comprehensively cover all concerns using a web questionnaire survey. With comprehensiveness confirmed, the study proceeded to step 3. In step 3, the validity and reliability of M-QUEST were evaluated on the basis of answers to the questionnaire survey.

This study was conducted with the approval of the ethics committee of Kitamachi Clinic on 19 April 2023. The overview of the study and contact information were disclosed before the start of the questionnaire survey. The survey was performed after consent was obtained on the website home page. For study participants younger than 18 years of age, consent was obtained from the parent or guardian as well as the participant.

1. Step 1：Drafting M-QUEST

To extract specific items that capture concerns associated with hyperhidrosis symptoms, previous reports on hyperhidrosis were referred, such as the diagnostic criteria for primary focal hyperhidrosis[11], impacts of hyperhidrosis on QOL[12], the DLQI, and indices specific to hyperhidrosis[6)7)13]. Moreover, online interviews were performed with 12 individuals who met the diagnostic criteria for primary axillary hyperhidrosis (18-60 years of age) to identify concerns due to hyperhidrosis symptoms and asked them about what caused their worries about sweating, current worries, their protective measures against sweating, and their treatment needs. Based on previous reports and the interviews, the authors, who included clinicians and a certified public psychologist/ clinical psychologist, discussed and selected 10 items that reflected concerns due to hyperhidrosis and prepared M-QUEST accordingly. Referring to previous reports[3)14], a 5-point scale that ranged from 0 (not at all) to 4 (considerable volume/extremely/ always) was adopted.

2. Step 2：Comprehensiveness of the Concerns on M-QUEST

To design the survey, responses from 497 individuals (16-59 years of age) who met the diagnostic criteria for primary focal hyperhidrosis (i.e., individuals with primary focal hyperhidrosis) in a previously reported web questionnaire survey were used. This design was approved by the ethics committee of Kitamachi Clinic on 19 April 2023 and performed from 15 June to 20 July 2023 in Japan[15]. An overview of this web questionnaire survey is shown in **Table S1**. The survey included items designed to evaluate M-QUEST and the ranking of worries about sweating, and the results were compiled by area (axillae, head and face, palms, and soles of the feet). Regarding the ranking of worries, respondents could rank up to eight options including worries about sweating linked with M-QUEST to seven options and an "others" option in the free response section. Whether questions should be deleted from or added to M-QUEST was assessed with the following conditions and confirmed the comprehensiveness of M-QUEST.

1) Deleted Questions from M-QUEST

For each question in M-QUEST, the percentage of respondents who chose the bottom two options, "not at all" and "small volume/a little/seldom," was noted. Questions for which both this rate > 90% and whose worry was not one of the top three options were deleted.

2) Added Questions to M-QUEST

Regarding the "others" options, new worries other than those described in the questions were considered for addition to M-QUEST.

Data related to areas other than axilla (head and face, palms, and soles of the feet) were collected to evaluate the applicability of M-QUEST to other areas.

3. Step 3：Evaluation of the Reliability and Validity of M-QUEST

The above-mentioned web survey incorporated the following survey items[15], which were used in Step 3.

- ・HDSS score
- ・Employment status and occupation
- ・DLQI[3]
- ・Patient Health Questionnaire-9 (PHQ-9)[16][17]
- ・Generalized Anxiety Disorder-7 (GAD-7)[17][18]

The PHQ-9 is a measure for the evaluation of depressive symptoms, and the GAD-7 is a measure for the evaluation of generalized anxiety disorder.

In this step, reliability by internal consistency and validity by construct validity (convergent validity and known-groups validity) were evaluated using the answers from 192 individuals who met the diagnostic criteria for only the axillae (i.e., "individuals with primary axillary hyperhidrosis").

1）Reliability

Internal Consistency

Cronbach's alpha of M-QUEST was calculated, and the target value for Cronbach's alpha was ≥ 0.7[19].

2）Validity

Construct Validity

（1）Convergent Validity

Spearman's correlation coefficients and p-values were calculated among the measures (M-QUEST, HDSS, DLQI, PHQ-9, and GAD-7). Assuming that M-QUEST can capture the impacts of hyperhidrosis symptoms on daily life and mental health more sensitively than HDSS, we hypothesized that the correlation coefficients of the M-QUEST total scores with the DLQI total scores, PHQ-9 total scores, and GAD-7 total scores would be higher than those of the HDSS scores with the DLQI total scores, PHQ-9 total scores, and GAD-7 total scores.

（2）Known-Groups Validity

The mean M-QUEST total score and the minimum and maximum of the 95% confidence intervals（95% CI）by respondent background（sex, HDSS, presence/absence of a previous visit, and occupation）were evaluated. If an overlap of 95% CI was detected between subgroups, M-QUEST was considered independent of the respondent's background. If no overlap was detected, M-QUEST was considered dependent on the respondent's background.

Ⅱ Results

The backgrounds of the 497 individuals with primary focal hyperhidrosis and 192 individuals with primary axillary hyperhidrosis who answered the web questionnaire survey are shown in **Table 1**.

1. Comprehensiveness

1）Answers to Questions on M-QUEST

The percentage of respondents who chose the bottom two options, "not at all" and "small volume/a little/seldom," for each question was a combined 5.2-68.2% among individuals with primary axillary hyperhidrosis. No question had a response rate > 90%. The range of respondents who chose the top two options, "considerable volume/extremely/ always" and "large volume/very much/ frequently," was 17.2-79.7%（**Figure 1** and **Table S2**）.

The percentage of answers to each question on M-QUEST among individuals with primary focal hyperhidrosis whose lesions were

Table 1　Respondents' backgrounds characteristics

	Individuals with primary focal hyperhidrosis	Individuals with primary axillary hyperhidrosis
	n （%）	n （%）
Total	497 （100.0）	192 （100.0）
Sex		
Male	226 （ 45.5）	57 （ 29.7）
Female	271 （ 54.5）	135 （ 70.3）
Age		
16-19 years	34 （ 6.8）	3 （ 1.6）
20-29 years	91 （ 18.3）	38 （ 19.8）
30-39 years	123 （ 24.7）	51 （ 26.6）
40-49 years	161 （ 32.4）	71 （ 37.0）
50-59 years	88 （ 17.7）	29 （ 15.1）
Area		
Axillae only	192 （ 38.6）	－ （ － ）
Head and face only	149 （ 30.0）	－ （ － ）
Palms only	115 （ 23.1）	－ （ － ）
Soles of the feet only	41 （ 8.2）	－ （ － ）
HDSS		
1	－ （ － ）	2 （ 1.0）
2	－ （ － ）	57 （ 29.7）
3	－ （ － ）	66 （ 34.4）
4	－ （ － ）	67 （ 34.9）
Previous visit		
Present	－ （ － ）	24 （ 12.5）
Absent	－ （ － ）	168 （ 87.5）
Occupation		
Service industry	－ （ － ）	44 （ 22.9）
Non-service industry （customer-facing）	－ （ － ）	23 （ 12.0）
Non-service industry （back office）	－ （ － ）	66 （ 34.4）
Others	－ （ － ）	46 （ 24.0）
Unemployed	－ （ － ）	13 （ 6.8）

HDSS：Hyperhidrosis Disease Severity Scale

Figure 1 Percentage of answers to each question on M-QUEST among individuals with primary focal hyperhidrosis

The scale bars indicate percentages (%).
　The percentages of answers using M-QUEST (Japanese version) are shown by area (axillae, head and face, palms, and soles of the feet). Details of the percentages are shown in Table S2. "XX" represent areas with hyperhidrosis symptoms (axillae, head and face, palms, and soles of the feet) as selected by each respondent.
The English language validation for each question shown here has not been obtained.
M-QUEST : Multiple Questions for Understanding Excessive Sweating Tendencies

restricted to areas other than axillae（i.e., head and face, palms, and soles of the feet）are shown in **Figure 1** and **Table S2**.

2）Answers for Worries About Sweating

The percentage of respondents who chose each of the seven worries about sweating（"appearance," "attention from people around you," "odor," "discomfort due to the sweat itself," "burden of belongings," "stress from dealing with the sweat," and "burden associated with the cost"）as the first, second, or third rank was 2.1-83.9％. All seven concerns were included among the top three ranks（**Figure 2** and **Table S3**）. Conversely, only 3.1％ of respondents selected "others"（**Figure 2**）, which was lower than the percentage for all other worries. All concerns listed as "others" were included in M-QUEST.

The percentage of answers for the ranking of worries about sweating among individuals with primary focal hyperhidrosis whose lesions were restricted to areas other than axilla（i.e., head and face, palms, and soles of the feet）are shown in **Figure 2** and **Table S3**.

2．Reliability

Internal Consistency

Among individuals with primary axillary hyperhidrosis, Cronbach's alpha was 0.91, confirming high internal consistency for the questions on M-QUEST.

3．Validity

1）Convergent Validity

Correlations between M-QUEST and other measures are shown in **Table 2**. The correlation coefficients of the M-QUEST total scores with HDSS scores, DLQI total scores, PHQ-9 total scores, and GAD-7 total scores were 0.55（$p<0.05$）, 0.73（$p<0.05$）, 0.36（$p<0.05$）, and 0.31（$p<0.05$）, respectively. In comparison, the correlation coefficients of the HDSS scores with the DLQI total scores, PHQ-9 total scores, and GAD-7 total scores were 0.47（$p<0.05$）, 0.13（$p=0.06$）, and 0.15（$p<0.05$）, respectively.

2）Known-Groups Validity

The M-QUEST total scores in subgroups by sex, HDSS, presence/absence of previous visits, and occupation are shown in **Table 3**. Those by sex（mean [minimum and maximum of the 95％ confidence interval]）were 19.2 [16.6, 21.9] for men and 20.8 [19.3, 22.3] for women；by HDSS, 1.0 [−11.7, 13.7], 14.8 [12.9, 16.8], 19.4 [17.5, 21.3], and 26.5 [24.5, 28.5] for HDSS 1, 2, 3, and 4, respectively；by previous visits, 21.3 [16.6, 25.9] with a previous visit and 20.2 [18.8, 21.6] with no previous visit；and by occupation, 21.4 [18.3, 24.5] for service industry, 22.1 [18.8, 25.4] for non-service industry（customer-facing）, 19.2 [17.1, 21.2] for non-service industry（back office）, 19.8 [16.7, 23.0] for others, and 21.1 [16.4, 25.8] for unemployed. Except for M-QUEST total scores by HDSS, an overlap of 95％ CI was detected in all comparisons.

Ⅲ Discussion

The treatment goal of primary focal hyperhidrosis is improvement in the patient's QOL. There are multiple PROMs to evaluate QOL, but these PROMs have several concerns：they are not disease-specific；they take too much time to complete in clinical practice；they are too simple to comprehensively cover the concerns associated with hyperhidrosis；and they lack reliability and validity as measures. Thus, in this study, we aimed to develop a new PROM that solves the above those
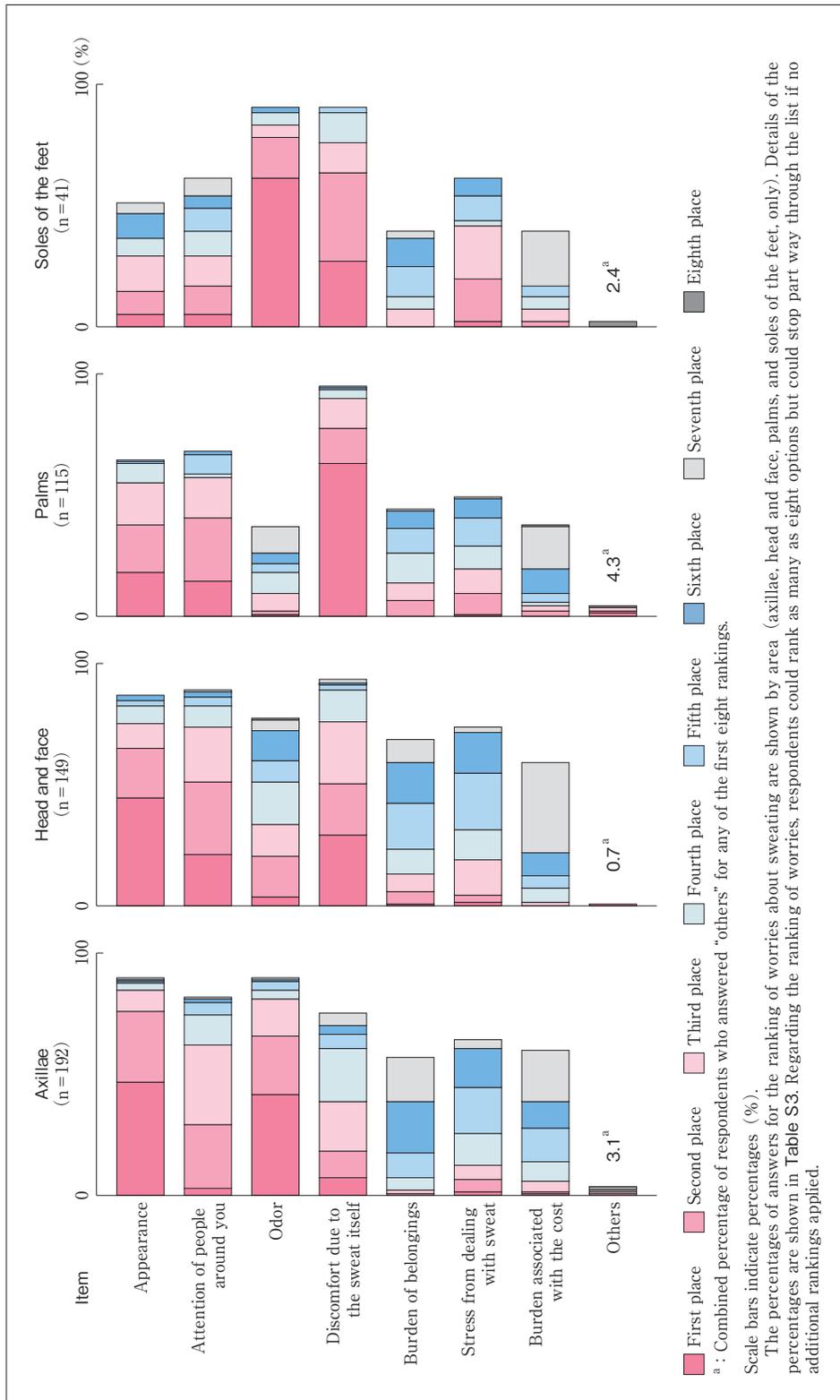
Figure 2 Percentage of answers for the ranking of worries about sweating among individuals with primary focal hyperhidrosis

Scale bars indicate percentages (%).

The percentages of answers for the ranking of worries about sweating are shown by area (axillae, head and face, palms, and soles of the feet, only). Details of the percentages are shown in Table S3. Regarding the ranking of worries, respondents could rank as many as eight options but could stop part way through the list if no additional rankings applied.

a : Combined percentage of respondents who answered "others" for any of the first eight rankings.

Table 2 Correlations between measures in individuals with primary axillary hyperhidrosis

	M-QUEST	HDSS	DLQI	PHQ-9	GAD-7
M-QUEST	1.00	0.55 （$p<0.05$）	0.73 （$p<0.05$）	0.36 （$p<0.05$）	0.31 （$p<0.05$）
HDSS	－	1.00	0.47 （$p<0.05$）	0.13 （$p=0.06$）	0.15 （$p<0.05$）
DLQI	－	－	1.00	0.36 （$p<0.05$）	0.34 （$p<0.05$）
PHQ-9	－	－	－	1.00	0.84 （$p<0.05$）
GAD-7	－	－	－	－	1.00

Spearman's correlation coefficients and p-values among the measures were calculated.

M-QUEST：Multiple Questions for Understanding Excessive Sweating Tendencies
HDSS：Hyperhidrosis Disease Severity Scale
DLQI：Dermatology Life Quality Index
PHQ-9：Patient Health Questionnaire-9
GAD-7：Generalized Anxiety Disorder-7

Table 3 M-QUEST total score in each subgroup among individuals with primary axillary hyperhidrosis

		n	Mean	Minimum of the 95% CI	Maximum of the 95% CI
Sex	Male	57	19.2	16.6	21.9
	Female	135	20.8	19.3	22.3
HDSS	1	2	1.0	－11.7	13.7
	2	57	14.8	12.9	16.8
	3	66	19.4	17.5	21.3
	4	67	26.5	24.5	28.5
Previous visit	Present	24	21.3	16.6	25.9
	Absent	168	20.2	18.8	21.6
Occupation	Service industry	44	21.4	18.3	24.5
	Non-service industry (customer-facing)	23	22.1	18.8	25.4
	Non-service industry (back office)	66	19.2	17.1	21.2
	Others	46	19.8	16.7	23.0
	Unemployed	13	21.1	16.4	25.8

The mean M-QUEST total score and the minimum and maximum of the 95% CI by respondent background （sex, HDSS, presence/absence of a previous visit, and occupation） were calculated.

M-QUEST：Multiple Questions for Understanding Excessive Sweating Tendencies
HDSS：Hyperhidrosis Disease Severity Scale
CI：confidence interval

concerns.

According to the results of **Figure 1** and **Figure 2**, no M-QUEST questions were deleted, and no new questions were added. In other words, the 10 items in M-QUEST adequately captured concerns due to hyperhidrosis symptoms in the axillae without an excess or deficiency. The results of the questionnaire survey confirmed the comprehensiveness of the PROM designed interviews and other surveys aimed to sufficiently reflect concerns due to hyperhidrosis symptoms, which supports the conclusion that M-QUEST has content validity. Furthermore, the results of **Figure 2** showed that collateral issues arising from sweating（worries about appearance, attention of people, and odor）tend to rank higher than the discomfort caused by sweating itself. This finding suggests that a multidimensional assessment including psychological aspects, in addition to sweat volume, may be necessary when determining if the serious problems of patients with axillary hyperhidrosis were successfully addressed.

Cronbach's alpha of 0.91 confirmed M-QUEST has high internal consistency, indicating that all question items on M-QUEST can measure the same concept；i.e., concerns due to hyperhidrosis. Additionally, the correlation coefficients of the M-QUEST total scores with DLQI total scores, PHQ-9 total scores, and GAD-7 total scores were higher than those of HDSS scores with the same measure, further supporting the convergent validity of M-QUEST and its superior sensitivity to the impact on QOL and mental health compared with HDSS. Further, the results showed no overlap of 95% CI among HDSS 2, 3, and 4, suggesting

the possibility that M-QUEST can distinguish patients with different self-reported hyperhidrosis severity. An overlap of 95% CI was detected among subgroups by sex, presence/absence of a previous visit, and occupation, indicating that the evaluation can be performed with M-QUEST independently of these patient backgrounds. These findings indicate an acceptable known-groups validity of M-QUEST. Regarding structural validity, we plan to evaluate whether items can be integrated while considering responsiveness.

This study evaluated the reliability and validity of M-QUEST exclusively in individuals with primary axillary hyperhidrosis. However, even among individuals with primary focal hyperhidrosis in other areas（face and head, palms, and soles of the feet）, there was no question on M-QUEST for which > 90% of the respondents chose the bottom two options, "not at all" and "small volume/a little/seldom." Regarding worries about sweating and their rankings, all responses to the question items included the top three ranks, and the percentage of respondents who answered "others" was < 5%. These findings suggest that M-QUEST has the potential to capture concerns related to hyperhidrosis symptoms in regions other than the axillae, although further research is needed to confirm its applicability to the relevant site.

There are some limitations with the development and evaluation of M-QUEST. The sample sizes for individuals younger than 20 years of age and HDSS 1 are small, necessitating further study with increased participation from these groups. In Addition, this study is based on self-reported outcomes without including diagnoses of hyperhidrosis by physicians. As shown in **Table 4**, this

Table 4 Psychometric properties examined in this study

Properties				State in this study
Reliability	Test-retest reliability			Need to be evaluated
	Internal consistency			Confirmed within the criteria
Validity	Content validity			Confirmed within the criteria
	Construct validity	Structural validity		Plan to evaluate while considering responsiveness
		Hypothesis testing for construct validity	Convergent validity	Confirmed within the criteria (Convergent validity)
			Discriminatory validity	
			Known-groups validity	Confirmed within the criteria
	Criterion validity			Not evaluated because confirmation is not essential
Responsiveness				Need to be evaluated

This table was prepared in accordance with the psychometric properties necessary for measures, as indicated in Guidance Collection on the Use of Patient-Reported Outcome[9].

study, being a cross-sectional questionnaire survey, has some psychometric properties that could not be evaluated, and these will need to be assessed through longitudinal clinical use.

In conclusion, we developed M-QUEST for primary axillary hyperhidrosis that can identify all concerns with acceptable reliability, validity and potential usefulness.

Patients with axillary hyperhidrosis may be hesitant to express concerns about axillary sweat, which has been a challenge. We anticipate that clinical use of M-QUEST will assist both patients and healthcare professionals who are struggling to accurately convey or understand the concerns and the severity of those concerns. This, in turn, is expected to lead to the provision of more suitable treatment for patients.

M-QUEST（Japanese version）is shown in **Table S4**.

This questionnaire is freely available for non-profit and clinical use only.

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原著

原発性腋窩多汗症の困りごとの把握とその程度を評価するための新規のPatient-Reported Outcome Measure：Multiple Questions for Understanding Excessive Sweating Tendencies（M-QUEST）

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要　旨

　原発性局所多汗症の治療ゴールは患者の生活の質が改善されることとされているが，既存の患者報告アウトカム尺度（Patient-Reported Outcome Measures；PROMs）を実臨床で使用するあたってはいくつかの課題があると考えている。その課題を解決すべく，本研究では，新たな尺度としてMultiple Questions for Understanding Excessive Sweating Tendencies（M-QUEST）を設定した。

　M-QUESTは既報と原発性腋窩多汗症の診断基準該当者（以下，該当者）12名へのインタビューを基に作成し，10項目と5段階の選択肢から構成される。該当者192名によるWebアンケート調査の結果，M-QUESTが原発性腋窩多汗症の困りごとを網羅的に捉えられることが確認され，その内的整合性も確認された（Cronbach's alpha＝0.91）。M-QUEST合計スコアはHyperhidrosis Disease Severity Scale（HDSS）よりもDermatology Life Quality Index合計スコアとの相関係数が高かったことから（M-QUEST：0.73，HDSS：

0.47），仮説どおりの結果が得られ収束的妥当性が確かめられた。既知グループ妥当性は，95％信頼区間が重複した性別，受診歴の有無，職種の背景に対して普遍性があると考えられた。

　患者でのさらなる研究が必要であるものの，M-QUESTは実臨床で使用するために必要となる信頼性および妥当性を有しており，原発性腋窩多汗症患者の困りごととその程度を評価するにあたって有用な尺度であると考えられた。

Table S1　Overview of the web questionnaire survey

Survey period	June 15 to July 20, 2023
Method	Questionnaire survey using the internet
Study participants	When consent was obtained, participants were individuals aged 16-59 years with or without primary focal hyperhidrosis in accordance with the following selection criteria and did not violate any of the exclusion criteria： Selection criteria： 　Individuals with primary focal hyperhidrosis； 　・Met the diagnostic criteria for primary focal hyperhidrosis 　・Hyperhidrosis symptoms in one of the following areas：axillae, head and face, palms, and soles of the feet 　・HDSS score 2-4 at the screening survey 　Individuals without primary focal hyperhidrosis； 　・Did not meet the diagnostic criteria for primary focal hyperhidrosis 　・Concerned about sweating in one of the following areas：axillae, head and face, palms, and soles of the feet 　・HDSS 2-4 at the screening survey Exclusion criteria： ・Considered to have secondary hyperhidrosis ・Diagnosed with bromhidrosis ・History of a disease that was expected to affect the evaluation measure

HDSS：Hyperhidrosis Disease Severity Scale

Table S2 Percentage of answers to each question on M-QUEST among individuals with primary focal hyperhidrosis

	Questions	Proportion of respondents (%)				
		Not at all	Small volume /a little /seldom	Medium volume /to some degree /sometimes	Large volume /very much /frequently	Considerable volume /extremely /always
Axillae (n=192)	How high is the volume of your sweat on axillae?	1.0	4.2	15.1	43.2	36.5
	Did you feel embarrassed?	15.6	19.8	28.6	20.3	15.6
	Were you concerned about the attention of people around you?	8.9	22.4	22.4	28.6	17.7
	Did you restrict your clothing choices?	12.5	13.0	20.8	25.5	28.1
	Have you ever avoided interacting with people?	24.5	29.2	26.6	12.0	7.8
	Was your job, housework, or schoolwork affected?	38.0	30.2	14.6	9.9	7.3
	Did you need to carry a change of clothes or a cloth to wipe the sweat?	22.9	21.4	21.9	15.6	18.2
	Was it burdensome ; for example, having to change your clothes and use a cloth to wipe the sweat?	22.9	20.8	18.8	19.3	18.2
	How much did the odor worry you?	7.3	18.2	19.8	31.3	23.4
	How much did you feel burdened by the cost of dealing with the sweat?	15.6	29.7	33.3	14.6	6.8
Head and face (n=149)	How high is the volume of your sweat on head and face?	1.3	2.0	8.1	35.6	53.0
	Did you feel embarrassed?	8.1	20.8	30.2	23.5	17.4
	Were you concerned about the attention of people around you?	8.1	22.1	22.1	26.8	20.8
	Did you restrict your clothing choices?	30.9	18.8	25.5	15.4	9.4
	Have you ever avoided interacting with people?	30.2	15.4	28.9	14.8	10.7
	Was your job, housework, or schoolwork affected?	30.9	21.5	28.9	10.7	8.1
	Did you need to carry a change of clothes or a cloth to wipe the sweat?	16.8	14.1	21.5	19.5	28.2
	Was it burdensome ; for example, having to change your clothes and use a cloth to wipe the sweat?	18.8	19.5	24.2	20.1	17.4
	How much did the odor worry you?	23.5	30.9	23.5	15.4	6.7
	How much did you feel burdened by the cost of dealing with the sweat?	32.2	34.9	19.5	9.4	4.0

Palms (n = 115)	How high is the volume of your sweat on palms?	1.7	4.3	25.2	47.0	21.7
	Did you feel embarrassed?	29.6	24.3	24.3	16.5	5.2
	Were you concerned about the attention of people around you?	29.6	25.2	23.5	16.5	5.2
	Did you restrict your clothing choices?	60.0	17.4	14.8	5.2	2.6
	Have you ever avoided interacting with people?	44.3	17.4	25.2	8.7	4.3
	Was your job, housework, or schoolwork affected?	33.0	32.2	20.9	10.4	3.5
	Did you need to carry a change of clothes or a cloth to wipe the sweat?	39.1	16.5	25.2	10.4	8.7
	Was it burdensome ; for example, having to change your clothes and use a cloth to wipe the sweat?	45.2	19.1	17.4	11.3	7.0
	How much did the odor worry you?	67.8	18.3	7.8	1.7	4.3
	How much did you feel burdened by the cost of dealing with the sweat?	63.5	18.3	10.4	6.1	1.7
Soles of the feet (n = 41)	How high is the volume of your sweat on soles of the feet?	2.4	2.4	17.1	48.8	29.3
	Did you feel embarrassed?	29.3	41.5	17.1	9.8	2.4
	Were you concerned about the attention of people around you?	29.3	34.1	17.1	14.6	4.9
	Did you restrict your clothing choices?	56.1	17.1	17.1	2.4	7.3
	Have you ever avoided interacting with people?	48.8	24.4	17.1	7.3	2.4
	Was your job, housework, or schoolwork affected?	56.1	29.3	9.8	2.4	2.4
	Did you need to carry a change of clothes or a cloth to wipe the sweat?	46.3	19.5	12.2	12.2	9.8
	Was it burdensome ; for example, having to change your clothes and use a cloth to wipe the sweat?	43.9	26.8	4.9	19.5	4.9
	How much did the odor worry you?	4.9	31.7	9.8	29.3	24.4
	How much did you feel burdened by the cost of dealing with the sweat?	26.8	48.8	19.5	2.4	2.4

M-QUEST : Multiple Questions for Understanding Excessive Sweating Tendencies

Table S3 Percentage of answers for the ranking of worries about sweating among

		First place	Second place	Third place
Axillae (n = 192)	Appearance	46.4	28.6	8.9
	Attention of people around you	2.6	26.0	32.8
	Odor	41.1	24.0	15.6
	Discomfort due to the sweat itself	7.3	10.9	20.3
	Burden of belongings	0.0	0.5	1.6
	Stress from dealing with the sweat	1.0	5.2	5.7
	Burden associated with the cost	0.5	0.5	4.7
	Others	0.0	0.5	0.5
Head and face (n = 149)	Appearance	44.3	20.8	10.1
	Attention of people around you	20.8	30.2	22.8
	Odor	3.4	16.8	13.4
	Discomfort due to the sweat itself	28.9	21.5	25.5
	Burden of belongings	0.7	5.4	6.7
	Stress from dealing with the sweat	1.3	2.7	14.8
	Burden associated with the cost	0.0	0.0	1.3
	Others	0.7	0.0	0.0
Palms (n = 115)	Appearance	18.3	20.0	17.4
	Attention of people around you	14.8	26.1	16.5
	Odor	0.9	1.7	7.0
	Discomfort due to the sweat itself	63.5	14.8	12.2
	Burden of belongings	0.0	7.0	7.0
	Stress from dealing with the sweat	0.9	8.7	10.4
	Burden associated with the cost	0.0	2.6	1.7
	Others	1.7	0.9	0.9
Soles of the feet (n = 41)	Appearance	4.9	9.8	14.6
	Attention of people around you	4.9	12.2	12.2
	Odor	61.0	17.1	4.9
	Discomfort due to the sweat itself	26.8	36.6	12.2
	Burden of belongings	0.0	0.0	7.3
	Stress from dealing with the sweat	2.4	17.1	22.0
	Burden associated with the cost	0.0	2.4	4.9
	Others	0.0	0.0	0.0

individuals with primary focal hyperhidrosis

| Proportion of respondents （%） | | | | |
Fourth place	Fifth place	Sixth place	Seventh place	Eighth place
3.1	1.0	0.5	0.5	0.0
12.5	4.7	1.6	1.0	0.0
3.1	3.6	0.5	1.0	0.0
21.9	5.2	4.2	4.7	0.0
4.7	10.4	20.8	18.8	0.0
13.0	19.3	16.1	3.1	0.0
7.8	13.5	11.5	20.8	0.0
0.0	0.0	0.0	0.5	1.6
7.4	2.0	2.0	0.0	0.0
8.1	4.0	2.0	0.7	0.0
17.4	8.7	12.1	4.7	0.7
12.8	2.0	0.7	2.0	0.0
10.7	18.8	16.8	9.4	0.0
12.8	22.8	16.8	2.7	0.0
6.0	4.7	9.4	37.6	0.0
0.0	0.0	0.0	0.0	0.0
7.8	0.9	0.9	0.0	0.0
1.7	7.8	1.7	0.0	0.0
8.7	3.5	4.3	11.3	0.0
3.5	0.9	0.9	0.0	0.0
12.2	10.4	7.0	0.9	0.0
9.6	11.3	7.8	0.9	0.0
1.7	3.5	10.4	17.4	0.9
0.0	0.0	0.0	0.0	0.9
7.3	0.0	9.8	4.9	0.0
9.8	9.8	4.9	7.3	0.0
4.9	0.0	2.4	0.0	0.0
12.2	2.4	0.0	0.0	0.0
4.9	12.2	12.2	2.4	0.0
2.4	9.8	7.3	0.0	0.0
4.9	4.9	0.0	22.0	0.0
0.0	0.0	0.0	0.0	2.4

Table S4 Multiple Questions for Understanding Excessive Sweating Tendencies（M-QUEST©）

この1週間の腋窩（わき）の症状や汗の影響について，教えてください。

Q1	あなたの腋窩（わき）の汗の量は？	⓪全くない　①少ない　②中くらい　③多い　④かなり多い
Q2	恥ずかしい思いをしましたか？	⓪全くない　①少し　②ある程度　③とても　④極めて
Q3	まわりの人の目が気になりましたか？	⓪全くない　①少し　②ある程度　③とても　④極めて
Q4	服装に制限がかかりましたか？	⓪全くない　①少し　②ある程度　③とても　④極めて
Q5	人との交流を避けることがありましたか？	⓪全くない　①あまりない　②時々ある　③頻繁にある　④常にある
Q6	仕事や家事，学業に影響がありましたか？	⓪全くない　①少し　②ある程度　③とても　④極めて
Q7	着替えや汗拭きシート・タオルを持ち歩く必要がありましたか？	⓪全くない　①少し　②ある程度　③とても　④極めて
Q8	着替えや汗拭きシート・タオルの使用など，面倒でしたか？	⓪全くない　①少し　②ある程度　③とても　④極めて
Q9	どのくらいにおいが気になりましたか？	⓪全くない　①少し　②ある程度　③とても　④極めて
Q10	汗の対処にかかる費用に，どのくらい負担を感じましたか？	⓪全くない　①少し　②ある程度　③とても　④極めて