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Original Research Article

Validity of the Q plus question for suicide risk among general population in Nonthaburi Province, Thailand

Sontaya Rortseanglum[1], Tatree Bosittipichet[2], Thanakamon Leesri[3]*

[1]Department of Family Medicine, Bang Kruai Hospital, Nontaburi, Thailand
[2]Department of Social Medicine, Phra Nakhon Si Ayutthaya Hospital, Phra Nakhon Si Ayutthaya, Thailand
[3]Department of Community Health Nursing, Nursing Institution, Suranaree University of Technology, Nakornratchasima Province, Thailand

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***Correspondence:**
Dr. Thanakamon Leesri,
E-mail: thanakamon@sut.ac.th

ABSTRACT

Background: Suicidality is an important problem in Thailand. Currently, a Suicide risk screening questionnaire (Q plus) has been developed and tested in psychiatric patients. However, there is limited data on the general population. This study aims to determine the accuracy of the Q plus assessment and the use of Q plus in combination with the 9Q to screen for suicide risk in the general population. Data was collected during December 2022 to May 2023.
Methods: Cross-sectional study (Diagnostic accuracy research) was established in this study. Data was collected using the 2Q plus 9Q 8Q evaluation form by health volunteers in the general population aged 18 to 60 years and above.
Results: The sensitivity and specificity of the Q plus questions, the 9Q assessment and the combination of Q plus and 9Q were analysed. The Q plus questions showed sensitivity and specificity values of 53.13% and 97.2% respectively. These values were close to the screening by 9Q assessment with a score greater than or equal to 7 before the 8Q suicide risk assessment, which had sensitivity and specificity values of 46.88% and 94.9% respectively. It can be concluded that both assessments have low sensitivity, but using the Q plus and 9Q screening tests together increased the sensitivity to 81.25%.
Conclusions: The prevalence of suicide risk in Nonthaburi Province, Thailand, was found to be 5%. The evaluating the Q plus with the 9Q when either one is positive has a sensitivity and specificity making it useful for screening suicide risk in other people.

Keywords: Q Plus Question, 2Q plus assessment, 9Q assessment, 8Q assessment, Suicide risk

INTRODUCTION

According to the World Health Organization, suicide is one of the leading causes of death globally. Men are three times more likely to commit suicide than women, with the main risks being depression and substance abuse, especially alcohol. Depression is a psychiatric illness that can be effectively treated. In 2019, the World Health Organization estimated that around 739,000 people would die from suicide worldwide, with a global average of 10.5 per 100,000 people of all ages.[1] The Department of Mental Health, as the primary mental health and psychiatric agency in Thailand, has been continuously monitoring and preventing suicide issues for over 20 years.

Starting from the year 2000, the suicide rate in Thailand saw a decline to 5.77 per 100,000 people in 2006, the lowest recorded. Subsequently, the suicide rate-maintained levels between 5.97 and 6.2 per 100,000 people until it reached its peak in 2015 at 6.47 per

100,000 people. The latest data available from 2018 indicates a suicide rate of 6.32 per 100,000 people. A national survey among individuals aged 15-59 revealed that the suicide risk across the country was 7.3 per 100,000 people, classified as low risk at 6.0%, medium risk at 0.6% and high risk at 0.7%. Females exhibited a risk of 8.6% while males had a risk of 5.2%. The northern region of the country showed a higher suicide risk.

The group with the highest suicide risk was individuals aged 35-44, at 8.1%, followed by the widowed/divorced/separated group at 11.5%, the unemployed group at 13.8% and the mentally ill group. Studies have identified patients with mood disorders and psychotic features, as well as patients with bipolar disorder and manic episodes, as being at significantly high risk of suicide 87.9% and 64.3% respectively.[2] Among teenagers, the risk of suicide ranges from 16.8% to 22.5% while among the elderly, the risk is 20.4%.[3-6]

Bang Kruai Hospital has been actively monitoring and addressing depression issues. Data collected from 2009 to July 2023 indicates that 1,167 individuals were diagnosed with depression, accounting for a prevalence rate of 1.4% of the population. In 2023, 3 completed suicides were reported, equivalent to a rate of 2.24 completed suicides per 100,000 people.

In response to this issue, the Department of Mental Health recognizes its importance and has developed various suicide risk assessment tools tailored to different contexts. In primary care systems, a common tool used for screening and evaluating depression and suicide risk is the 2Q 9Q 8Q assessment.[7] However, this assessment has limitations as it lacks suicide risk screening questions before the 8Q evaluation, potentially leading to an underestimation of suicide risk in individuals without depression.

Subsequently, additional suicide risk screening questions were developed, known as the Q plus assessment, which has shown promising accuracy in a study conducted among psychiatric patients receiving services from the Department of Mental Health outpatient clinics.[8] The study compared the efficiency of the Q plus screening form with other tools such as the International Neuropsychiatric Interview (M.I.N.I.) Thai version in the suicide category, revealing a sensitivity of 84% and specificity of 95%.[9,10]

Despite the evaluation of the accuracy of the Q plus questions among high-risk psychiatric patients, there has been no study assessing its accuracy in the general population within primary care settings. Therefore, there is a need to investigate the accuracy of the Q plus tool in the general population, comparing it with the 8Q tool.

The primary objective of the research is to study the accuracy of the suicide risk screening questions (Q plus), the 9Q assessment and the use of the Q plus assessment in conjunction with 9Q in the general population of Nonthaburi Province, Thailand. The secondary objectives include studying the prevalence of suicide risk among the general population in, Nonthaburi Province, Thailand.

METHODS

Study design and population

This study was the cross-sectional research study (Diagnostic accuracy research). The target population is people aged 18 years and over living in Bang Kruai District, Nonthaburi Province, Thailand. The sample size was determined using Buderer's formula, considering a study with sensitivity of 84% and specificity of 95% and a prevalence of Suicide risk at 8.5%, aiming for a precision of 0.1 with a 95% confidence interval and accounting for a 5% dropout rate.[2,10,11]

The total sample size was determined to be 640 people, with sampling done through random sampling using a stratified method by village, age group and gender. Sampling was conducted across 5 age groups: 18-29, 30-39, 40-49, 50-59 and older than 60 years old. Each age group was sampled with 22 participants, comprising 11 males and 11 females, totaling 110 samples per village. Therefore, the entire sample size amounted to 660 participants.

The health volunteers proclaimed an invitation to attend a mental health assessment and screening for suicide risk.

Inclusion criteria

Inclusion criteria for the research required participants to be aged 18 and above, able to communicate in Thai and willing to participate voluntarily. Exclusion criteria included patients with vision or hearing problems, those diagnosed with dementia and those unable to complete the assessment.

Data collection

Data collection involved two parts: general information collection and screening for depression and suicide risk using 2Q plus. Participants then underwent an in-depth depression assessment (9Q) and an in-depth suicide risk assessment (8Q). All research participants were required to complete both the 2Q plus 9Q and 8Q assessments.

Protection of research rights and ethics data collection in this research should be carried out according to the following steps.

The researcher writes a letter requesting permission to use the location from the hospital and the Bang Kruai Primary care unit. This research has been reviewed and approved by the Human Research Ethics Committee of the Nonthaburi Provincial Public Health Office, with Certificate number 26/2566 dated July 17, 2016.

Before conducting the research, the researcher explains the principles and reasons to the participants and obtain written inform consent. Data should be recorded using codes instead of personal information to ensure confidentiality. Information about the research participants should not be disclosed to anyone outside the study. All records should be stored in a secure, locked filing cabinet in the researcher's office at Bang Kruai Primary care unit. Data stored in the computer system have been password-protected and only accessible to the researcher.

Statistical analysis

Data Analysis The collected data should be checked for accuracy, recorded in an Excel data file and analysed using statistical methods as described below

General descriptive statistics, including averages, standard deviations and percentages, should be used for analyzing general data and assessing suicide risk levels.

The validity of the standard criteria for diagnosing suicide risk should be analyzed. The 8Q assessment form is considered the gold standard and various screening tools (Predicter) should be evaluated using the following criteria. A score of 7 or higher on the 9Q assessment form (the conventional assessment format before the Q plus screening test was developed). A positive result on the Q plus assessment. A positive result on the Q plus assessment or a score of 7 or higher on the 9Q assessment form.

To determine sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV), positive likelihood ratio (LR+) and negative likelihood ratio (LR-), the data should be compared and analysed.

Research instruments

The 8Q suicide risk assessment form, developed by the Department of Mental Health, consists of 8 questions. It uses the same questions as the M.I.N.I.-Thai version (items C2-C9) with all questions being scored. Questions that are not scored should be eliminated. The assessment is widely used in primary care settings and is often used in conjunction with depression assessment questions (2Q and 9Q). The 8Q assessment focuses on suicide risk and should only be conducted if the individual scores 7 points or higher on the 9Q assessment.[7]

The question to screen for suicide risk (Q plus) is as follows: "During the past month, up to today, have you experienced distress to the point where you no longer wish to live?".[8] The Depression and Suicide Risk Screening Assessment (2Q plus) comprises the original depression screening with 2 questions (2Q) plus supplementary inquiries specifically targeting suicide risk (Q plus).[8]

The suicide risk screening assessment was positive, signifying that the respondent reported experiencing symptoms in the Q plus question. The depression assessment (9Q) was positive, indicating the respondent scored seven points or more across the nine questions. The suicide risk assessment was positive, as the respondent scored more than zero points on question 8Q.

The M.I.N.I.-Thai version assessment form includes a suicide risk category. This translated assessment has been rigorously tested for accuracy and is frequently employed as the gold standard in research comparing newly developed assessments.[9]

The PISRA assessment is frequently utilized for evaluating inpatients. It was developed via limitations in the frequency of assessment found when using the MINI to assess the severity of suicide risk. The MINI requires reassessment every month, which is inconsistent with care plan guidelines for assessing severity daily per shift in individuals at risk of suicide.[12]

The SAD person scale is an assessment tool that has not been translated into Thai language. It is frequently employed in patients who have attempted suicide unsuccessfully in the emergency room to determine whether hospital admission as an inpatient is warranted.[13]

The columbia-suicide severity rating scale (C-SSRS) is a prototype suicide risk assessment model, widely regarded as a gold standard. It has been translated and adapted into over 30 languages, serving as a model for developing the M.I.N.I.-Thai version.[14]

The HEADS-ED is a suicide risk assessment model designed specifically for teenagers. While it has been rigorously tested for accuracy, it has not yet been developed for use in the Thai language.[15]

Mild suicide risk level is defined as scoring 1-8 on the 8Q assessment. Moderate suicide risk level is defined as scoring 9-16 points on the 8Q. Severe suicide risk level is defined as scoring 17 points or more on the 8Q assessment.

RESULTS

In this study, 640 participants were included, consisting of 310 males (48.44%) and 330 females (51.56%). Participants were evenly distributed across different age groups. A large majority, 94.8%, identified themselves as Buddhists. The most common occupations among participants were company employees (22.81%) and individuals engaged in trading or private businesses (22.66%). Educationally, 29.06% had completed high school, while 28.91% held bachelor's degrees. The predominant underlying health condition was hypertension, affecting 20.16% of the participants (Table 1).

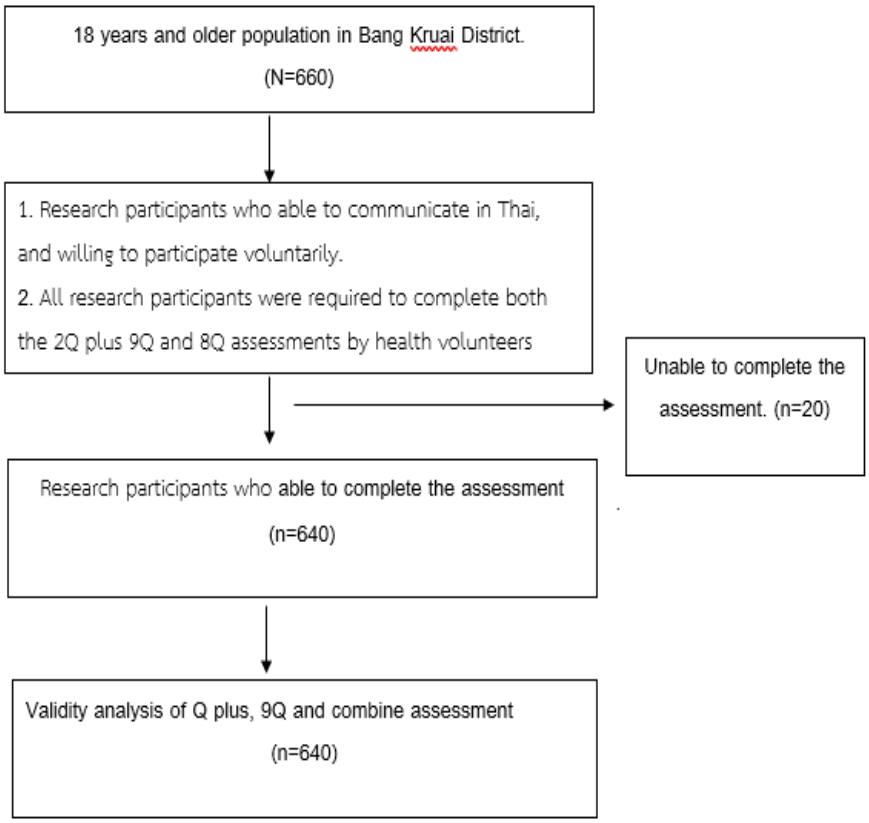

Figure 1: The flow study.

The study findings demonstrate that the suicide risk screening questions (Q plus) exhibit positive validity. When used independently, Q plus showed a sensitivity of 53.13% and a specificity of 97.2%. In contrast, the 9Q assessment, traditionally utilized for suicide risk screening with scores equal to or greater than 7 points, had a sensitivity of 46.88% and a specificity of 94.9%. However, combining Q plus with the 9Q assessment substantially increased the sensitivity to 81.25%, while maintaining a specificity of 93.09% (Table 2).

The risk of suicide among females was found to be 6.97%, which was higher than males at 2.9%. The highest prevalence was observed in the 30-39 age group at 6.82%, followed by individuals aged 60 years and over (6.45%) and both the 18-29 and 50-59 age groups at 4.69%. The lowest rate was recorded in the 40-49 age group at 2.34%. Divorced/separated/widowed individuals exhibited the highest risk at 6.82%, followed by singles at 4.86% and married individuals at 4.48%. In terms of educational attainment, those with primary school education showed the highest risk (9.65%), followed by those with no education (9.09%), while bachelor's degree holders had a risk of 5.95% and vocational certificate/associate's degree holders had 3.65%. High school graduates had the lowest risk at 2.15% and no risk was observed among Master's/PhD degree holders.

Among occupational categories, individuals in contract occupations had the highest risk at 10.08%, followed by the unemployed at 6.06%, civil servants'/government employees/pensioners at 5.88%, students at 4.26%, company employees at 4.11%, house workers at 3.57% and trading/private businesses at 1.38% (Table 3).

Table 1: Participant demographics and characteristics data (n=640).

General information	Number	%
Gender		
Male	310	48.44
Female	330	51.56
Age group (years old)		
18-29	128	20
30-39	132	20.63
40-49	128	20
50-59	128	20
60 and older	124	19.38

Continued.

General information	Number	%
Marital status		
Marriage/pair	223	34.84
Single	329	51.41
Divorced/separated/widowed	88	13.75
Religion		
Buddhist	618	96.56
Christ	14	2.19
Islam	8	1.25
Education level		
Not studying	11	1.72
Primary education	114	17.81
Secondary education	186	29.06
Bachelor's degree	185	28.91
Vocational certificate/associate's degree	137	21.41
Master's degree/PhD	7	1.09
Occupation		
Unemployed	66	10.31
Housework	56	8.75
Student	47	7.34
Trading/personal business	145	22.66
Work for hire	129	20.16
Company employee	146	22.81
Civil servants/government employees/pensioners	51	7.97
Underlyingdisease		
Diabetes	62	9.69
Hypertension	129	20.16
Dyslipidemia	89	13.91
Other	93	14.53

Table 2: Validity for Q plus, 9Q and Q plus with 9Q questions , respectively, with 8Q as the goal standard.

Parameter	Q plus	9Q	Q plus with 9Q
Sensitivity	53.13	46.88	81.25
Specificity	97.20	94.90	93.09
PPV	50	32.61	38.24
NPV	97.52	97.14	98.95
Accuracy	95.00	92.50	92.50
LR+	19.00	9.19	11.76
LR-	0.48	0.56	0.20

Table 3: The suicide risk rate of Thai people aged 18 years and older was classify according to general characteristics.

General characteristics	Suicide risk rate									
	No		Mild		Moderate		Severe		Total	
	N	(%)	N	(%)	N	(%)	N	(%)	N	(%)
Gender										
Male	301	(97.1)	8	(2.58)	1	(0.32)	0	(0)	9	(2.90)
Female	307	(93.0)	16	(4.85)	0	(0)	7	(2.12)	23	(6.97)
Age groups (in years)										
18-29	122	(95.3)	3	(2.34)	1	(0.78)	2	(1.56)	6	(4.69)
30-39	123	(93.2)	8	(6.06)	0	(0)	1	(0.76)	9	(6.82)
40-49	125	(97.7)	3	(2.34)	0	(0)	0	(0)	3	(2.34)
50-59	122	(95.3)	4	(3.13)	0	(0)	2	(1.56)	6	(4.69)
60 and older	116	(93.5)	6	(4.84)	0	(0)	2	(1.61)	8	(6.45)

Continued.

General characteristics	Suicide risk rate									
	No		Mild		Moderate		Severe		Total	
	N	(%)	N	(%)	N	(%)	N	(%)	N	(%)
Marital status										
Marriage pair	213	(91.42)	8	(3.59)	0	(0)	2	(0.90)	10	(4.48)
Single	313	(90.99)	10	(3.04)	1	(0.30)	5	(1.52)	16	(4.86)
Widowed/separated/divorced	82	(87.23)	6	(6.82)	0	(0)	0	(0)	6	(6.82)
Religion										
Buddhist	586	(94.8)	24	(3.88)	1	(0.16)	7	(1.13)	32	(5.18)
Chris	14	(100)	0	(0)	0	(0)	0	(0)	0	(0)
Islam	8	(100)	0	(0)	0	(0)	0	(0)	0	(0)
Education level										
Not studying	10	(90.9)	1	(9.09)	0	(0)	0	(0)	1	(9.09)
Primary education	103	(90.4)	7	(6.14)	0	(0)	4	(3.51)	11	(9.65)
Secondary education	182	(97.8)	4	(2.15)	0	(0)	0	(0)	4	(2.15)
Bachelor's degree	174	(94.1)	8	(4.32)	0	(0)	3	(1.62)	11	(5.95)
Vocational Certificate/associate's degree	132	(96.4)	4	(2.92)	1	(0.7)	0	(0)	5	(3.65)
PhD/Master's degree	7	(100)	0	(0)	0	(0)	0	(0)	0	(0)
Occupation										
Unemployed	62	(93.9)	4	(6.06)	0	(0)	0	(0)	4	(6.06)
Housework	54	(96.4)	2	(3.57)	0	(0)	0	(0)	2	(3.57)
Student	45	(95.7)	0	(0)	0	(0)	2	(4.26)	2	(4.26)
Trading/personal business	143	(98.6)	2	(1.38)	0	(0)	0	(0)	2	(1.38)
Work for hire	116	(89.9)	12	(9.30)	1	(0.78)	0	(0)	13	(10.08)
Company employee	140	(95.9)	1	(0.68)	0	0)	5	(3.42)	6	(4.11)
Government employee/civil servant/ Pensioners	48	(94.1)	3	(5.88)	0	(0)	0	(0)	3	(5.88)
Underlyingdisease										
Diabetes	56	(90.3)	4	(6.45)	0	(0)	2	(3.23)	6	(9.68)
Hypertension	120	(93.0)	7	(5.43)	0	(0)	2	(1.55)	9	(6.98)
Dyslipidemia	83	(93.3)	4	(4.49)	0	(0)	2	(2.25)	6	(6.74)
Other	80	(89.9)	6	(6.74)	0	(0)	3	(3.37)	9	(10.11)

DISCUSSION

The newly developed suicide risk screening assessment (Q plus), when used independently from depression screening, shows a sensitivity of 53.13% and a specificity of 97.2%, closely mirroring traditional community-level screening using the 9Q assessment where scores-7 indicate suicide risk, with sensitivity at 46.88% and specificity at 94.9%. Both tools exhibit relatively low sensitivity values around 50%, likely due to suicide risks partly from depression and temporary stress or psychiatric disorders not meeting depression criteria.

However, when Q plus is combined with 9Q, yielding a positive result in either, sensitivity increases substantially to 81.25%. This suggests improved screening for both depression criteria and other mental health issues not meeting depression criteria, enhancing sensitivity significantly. Such values are suitable for community-level suicide risk screening, differing from studies in psychiatric patients using only Q plus (sensitivity 84%, specificity 95%).[10] This could be attributed to data collection methods in prior studies involving psychiatric nurses, who are typically more skilled in assessment compared to health volunteers.

Moreover, individuals undergoing screening may lack familiarity or experience in responding to assessments, unlike psychiatric patients who are regularly evaluated. This discrepancy may lead to reluctance in providing honest responses compared to psychiatric patients. Furthermore, psychiatric patients generally face a higher risk of suicide compared to the general population.

The prevalence of suicide risk in Bang Kruai Subdistrict, Bang Kruai District, Nonthaburi Province, is 5%, lower than national surveys among 15–59-years-olds in Bangkok (8.5%) and nationwide (7.3%).[2] This difference may reflect 2008's economic conditions when Thailand's economy grew 2.6%, down from 4.9% the previous year, amid global economic slowdown and domestic political unrest impacting industrial production and tourism, likely elevating societal stress and suicide risks then. Research format and assessor expertise, involving trained health volunteers versus experienced psychiatric personnel, may also influence lower prevalence compared to national

data.[16] Other participant data paralleled national surveys, showing higher suicide risk among females compared to males. Individuals who were divorced, separated or widowed faced the greatest risk. The 30-39 age group exhibited the highest risk, consistent with the national risk for the 35-44 age group, a predominant working-age bracket.[2]

Additional survey data highlighted suicide risks among the elderly, with mortality rates at 20.4%.[5,6] Diverse occupational findings revealed contractors facing the highest suicide risk, diverging from national unemployment trends, possibly influenced by economic fluctuations since the 2008 survey period. During that time, Thailand's economy grew 2.6%, down from 4.9% the prior year, with global economic slowdown and internal political unrest affecting industrial output and tourism.[16]

Additionally, the research format may underestimate the true prevalence due to variations in the proficiency of assessors using the evaluation form. This is particularly influenced by the expertise of health volunteers who have received training, differing from data collection conducted at a national level. In contrast, medical professionals with at least five years of experience working with psychiatric patients can adeptly utilize assessment skills, potentially yielding different prevalence rates.

A strength of this research lies in its design, aligning closely with actual primary health service operations. The gathered data facilitates the development of proactive services. Data collection was thorough, ensuring an equal representation across genders and age groups, applicable to individuals aged 18 years and older.

However, training on the depression assessment tool was limited to a single session before data collection commenced, lacking subsequent refreshment or periodic knowledge evaluations. This limitation may have impacted the efficiency of later data collection compared to the initial phase. Furthermore, the study does not encompass individuals under 18 years of age, suggesting a need for future exploration in this demographic.

CONCLUSION

The suicide risk screening questions (Q plus) alone demonstrate a sensitivity of 53.13% when used for screening in the general population, which may not be adequate as a standalone screening tool. However, when combined with the 9Q screening assessment, the sensitivity increases significantly to 81.25%, making it suitable for community-level screening among individuals aged 18 years and over.

The researcher recommends different approaches for using the suicide risk screening questions (Q plus) based on the following scenarios. For psychiatric patients, Q plus can be used independently. A positive result prompts further evaluation with the 8Q assessment.

In the general population, the same approach applies with consideration of both Q plus (positive response) and 9Q assessment (score 7). Either condition warrants continuation to the 8Q assessment for further evaluation. The application of acquired knowledge must consider the education level of the population, as data only covers individuals aged 18 years and older. Contextual application is crucial, given the study's proactive data collection in an urban community.

Future research might adopt a more accurate gold standard than the 8Q assessment, such as the M.I.N.I.-Thai version (9), where assessments should ideally be conducted by doctors or psychiatrists to enhance diagnostic precision. Expanding data collection to encompass multiple centers (Multicenter) could bolster data accuracy. Selecting health volunteers trained in assessment should prioritize those with substantial tenure, fostering community trust in assessment responses. Regular knowledge assessments and skill refreshers during the data collection period would further enhance reliability.

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