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Understanding pregnant smokers' adherence to nicotine replacement therapy during a quit attempt: a qualitative study

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ABSTRACT

BACKGROUND

Pregnant smokers may be offered nicotine replacement therapy (NRT) alongside behavioural support to assist with a quit attempt. Yet trials of NRT have found adherence to be low among pregnant women, and this has made it difficult to determine the efficacy of NRT. The aim of this study is to understand the experience of pregnant women who use NRT but discontinue this early or do not use the medication as recommended.

METHODS

Semi-structured telephone interviews were conducted with 14 pregnant smokers who had recently been prescribed NRT, but self-reported poor NRT adherence or discontinuing treatment prematurely. Data were transcribed and analysed using inductive thematic analysis

RESULTS

There were four main themes identified; expectations of NRT, experience of using NRT, safety concerns and experience of using e-cigarettes. Some women intentionally used NRT to substitute a proportion of their cigarette intake and smoked alongside. Most women smoked while using NRT. Women who underutilised NRT did so as they experienced side effects, or were concerned that using NRT instead of smoking could actually increase their nicotine exposure and potential for increased nicotine dependence or fetal harm. Most women spoke about the use of e-cigarettes as a smoking cessation method but only a few had actually experienced using them during pregnancy.

CONCLUSION

Many women underused NRT but simultaneously smoked. Challenging negative perceptions about NRT and educating women further about the risks of smoking may encourage them to use NRT products as recommended.

IMPLICATIONS

These findings add to the research surrounding the efficacy of NRT during pregnancy by providing insight into how pregnant women use NRT during a quit attempt and how this may influence adherence. It may assist health professionals to support pregnant smokers by increasing their understanding about the differing ways in which women use NRT and help them address concerns women may have about the safety of NRT.

INTRODUCTION

Nicotine replacement therapy (NRT) has been found to be effective in reducing smoking in non-pregnant populations ¹, yet, trials investigating NRT during pregnancy have not found it to be effective in helping women to quit smoking ^{2,3}. Pregnant smokers in clinical trials typically have low adherence to NRT ² which has made it difficult to determine its effectiveness^{2,3}. Data from routine practice indicates that NRT adherence is low in routine care settings with many women only being prescribed NRT for a two week period⁴.

Survey data suggests unpleasant side effects, individuals wanting to test their ability to quit without using NRT and a belief that NRT is not working influences medication use during pregnancy⁵. There is also evidence that both non pregnant ⁶ and pregnant smokers^{7,8} believe using NRT is harmful to health and reduce their use of NRT accordingly. One qualitative interview study of women with experience of using NRT in pregnancy reported that while women perceived NRT to be useful in alleviating stress from nicotine cravings they found the most important factor in assisting smoking cessation was midwifery support, and it was felt that deciding to stop NRT was often a decision made without discussion with a stop smoking advisor⁹. Yet women in this study were interviewed at time points after their quit attempt with some women being postpartum at interview, so responses may be subject to recall bias. Therefore, current attitudes and beliefs of women who experience using NRT at a point close to or during their current quit attempt are unknown. The aim of this study was to understand the experience of pregnant women using NRT who discontinue NRT early or do not use the medication as it is recommended.

METHODS

We conducted qualitative semi-structured telephone interviews with 14 pregnant women who had used NRT as part of their most recent quit attempt, but had not used NRT as it was recommended. Favourable ethical opinion was given by the West of Scotland Research Ethics Committee. All interviews were conducted between May and December 2014. We used the Consolidated Criteria for Reporting Qualitative Research (COREQ) tool ¹⁰ to promote a comprehensive report of the methods and findings.

Recruitment

Two NHS stop smoking services (SSS) in Nottinghamshire were used as participant identification centres; pregnant women attending these who received NRT as part of their quit attempt were informed about the study. Smoking cessation advisors were first to approach women, either face to face or by telephone during a smoking cessation consultation, and those who expressed an interest to take part were asked for verbal consent to pass their contact details onto a researcher. The researcher was then alerted and a participant information sheet was posted to all interested women.

Screening procedures

One week after being posted a PIS, women were telephoned by a researcher (KB, female interviewer, midwifery background) to seek consent to take part in the study. They were then asked to complete a short telephone 'screening' survey lasting 5-10 minutes in order to determine whether they had used NRT as recommended by the SSS. The researcher sought information from SSSs as to how pregnant women were prescribed NRT, in order to determine whether women had adhered to NRT as recommended; these recommendations are detailed in Table 1.

Following survey completion, women who, from their responses were judged to have not used NRT as recommended, were asked to participate in a qualitative telephone interview. Women were excluded if they reported abstinence from smoking and were using NRT as recommended. Separate recorded verbal consent was obtained for the qualitative interviews which occurred during the same telephone contact; women were not eligible for the study if they could not understand the study procedure sufficiently or were under the age of 16 years.

Interviews

KB conducted all surveys and interviews and was introduced as a researcher from the University of Nottingham who worked outside the SSS organisation; this was stated to ensure participants would feel able to talk openly about their experiences without concern it could influence their care. Participants were aware that the study was being conducted in order to understand how pregnant women experience using NRT. Interviews lasted between 20-60 minutes, and were audio recorded. Data was transcribed verbatim. All participants received a £20 high street shopping voucher on completion of an interview.

Interviews covered the following areas: expectations about using NRT, experience of using NRT, perceived barriers to using NRT, perceived usefulness of NRT, and general opinions about using NRT as part of a quit attempt during pregnancy. The interview schedule was reviewed by a woman who had previously smoked during pregnancy in order to ensure the language was appropriate. Background questions were asked towards the end of the qualitative interview, they included questions about gestation, age, ethnic group, partner status and partner smoking status. Data collection continued until little or no new insight was gained on the experience of using NRT from the final few interviews, indicating that data saturation had been reached. SSS were subsequently told to stop referring women for recruitment. Each participant was interviewed once and interviews took place 4 to 49 days since the first day NRT had been used. It was not felt necessary to return the transcripts to participants to comment after the interviews had taken place, as clarification of views and experiences had often taken place during the interview.

Analysis

KB led the analysis. Inductive thematic analysis was used to identify and report patterns and themes within the text, and which captured the data in relation to the research questions or other relevant topics mentioned by the women during their interviews¹¹. Data was read, re-read and coded; codes were then reordered by importance, combined where appropriate, and the codes grouped into themes. The emerging themes were explored in depth and mapped back onto the interview transcripts and coded data and consequently refined. Attention was given to cases which deviated from common beliefs within the data as a way of increasing the integrity of the findings¹². A second researcher (KC, co-author) independently coded 20% of the interview transcripts to establish the coherence of the coding framework; the coding consistency was high. NVivo 10 software was used to assist with the coding of the data.

RESULTS

Twenty-three women expressed an interest in participation; six were non-contactable, three declined participation, and 14 (61%) women were surveyed for eligibility, all of whom were eligible for the qualitative interviews and took part in the study. Table 2 displays socio-demographic data and information about participants' self-reported smoking and NRT use during their most recent quit attempt. The most frequently prescribed and used NRT product was the inhalator. Of the eight women who only used short acting NRT products, half reported they used their NRT product four times or fewer

per day, which is far less than the 'on the hour, every hour' recommended advice in Table 1. All women had smoked during their quit attempt, and at the time of the interview 10 were smoking; seven of these 10 women were also still using NRT. Two women were smoking, using NRT and an e-cigarette at the time of the interview. Apart from one woman who was interviewed one month after discontinuing NRT, all other women were either using NRT at the time of the interview or had discontinued using NRT within the previous 7 days.

The following themes were identified within the data: expectations of NRT; experience of using NRT (perceived effects of NRT use, concomitant smoking and side effects); safety concerns and experience of using e-cigarettes.

Expectations of NRT

All women expressed an increased desire to stop smoking once they became aware they were pregnant; protecting the health of their baby was a priority. Some women were initially surprised that they were offered NRT in pregnancy as they had expected that they would have to quit smoking with willpower alone. Women who were aware about the possibility of using NRT to help them quit tended to have made a decision about the type of NRT product they wanted to use before meeting with their smoking cessation advisor. Some women who chose the inhalator often did so as they felt it would imitate the behavioural actions they associated with smoking (e.g. being held like a cigarette and having the hand to mouth action associated with smoking):

I don't know what to do with my hands when I'm not smoking – so that's why I used the inhaler [inhalator] because it's something in my hands and it can help – feels like I'm smoking a fag [cigarette] kind of thing **Respondent 2** (Inhalator)

However, other women who wanted to avoid the behavioural habits they associated with smoking chose products they felt would not remind them of smoking. Patches were viewed as a discreet method of using NRT that were easy to use, easily forgotten about and did not interfere with daily activities:

I didn't want anything really in my mouth because of the taste of it and I thought with patches, you don't see them, you don't really know you've got them on do you?

Respondent 13 (Patches)

All women had been eager to stop smoking as soon as possible, and often reported starting NRT at the earliest opportunity; many commenced on the first day it was prescribed. Women had felt confident that it would help them with their quit attempt.

Experience of using NRT

Perceived effects of NRT use

Women had mixed feelings about the effectiveness of NRT to manage cravings and urges to smoke. Some women thought NRT had helped to reduce their cravings. One woman described the relief she sometimes felt after using NRT:

I mean if I'm stressed or anything, if I get a squirt, once I take my squirt [description of inhalator] it's like a relief, I feel calm, I feel relaxed and that's all it is pretty much.But that's how you basically feel, you feel calmer, more relaxed.

Respondent 6 (Inhalator).

However, this same woman also described situations where she needed to smoke to relieve her nicotine cravings. Another woman described how she struggled to manage her cravings and urges to smoke, and felt NRT was not working:

I was really struggling. It [the patch] was stuck but it felt like I was getting no nicotine. And it didn't matter how much I puffed on the inhalator I was just suffering like really bad. So I started smoking over that weekend

Respondent 7 (Patches, inhalator and mouth spray)

A couple of women who used patches reported feeling the benefits of using them almost instantly after applying the patch, and some felt that after removing the patch they became anxious and began to experience cravings. In such instances some women took measures to manage cravings by keeping the patches on for longer. These decisions were made without consulting a smoking cessation advisor or midwife. One woman decided to wear her patch for 24 hours against the advice of her advisor in order to manage her urges to smoke:

She did say to put them on and take them off before bedtime to give you and baby a rest. I was finding I was waking up and wanting a cigarette so I took it upon myself to leave them on for 24 hours.

Respondent 9 (Patches)

Most felt that short-acting NRT was helpful because it enabled them to keep to the routines they had before their quit attempt by using NRT at times when otherwise they might have smoked. Some women who had used the inhalator expressed disappointment that it did not replicate a cigarette in design and shape, finding it aesthetically off-putting:

I thought it'd be more like a cigarette, like a sort of fag [cigarette] taste but it's not really like a fag taste, maybe because it don't look like a cigarette.....I think if it looked more like one and acted more as a cigarette, a fake cigarette, I think it'd be more effective definitely than just a little white stick thing

Respondent 3 (Inhalator)

Concomitant smoking

As highlighted previously, all women had smoked during their quit attempt; for some these were sporadic relapses, but for the majority, smoking was a regular occurrence. A few women reported using NRT to cut down their smoking; some had planned to do this before quitting, while for others it was something they decided to do after quitting as they reported that avoiding smoking was harder than they had anticipated. Many women felt smoking a cigarette occasionally in order to satisfy their nicotine cravings was necessary as they weren't always alleviated by NRT.

Yeah, I planned to cut out the cigarettes, like halve my cigarette intake and start using the nicotine replacement for the other half that I took out. So I was gradually quitting smoking rather than just trying to go cold turkey and just have the nicotine replacement altogether because I don't think I would have been able to do it otherwise.

Respondent 1 (Microtab)

Most women had not consulted with their smoking cessation advisor about smoking while using NRT. One woman who had previously tried to quit smoking believed that combining smoking and NRT was the only method that would enable her to eventually

quit:

I've not really spoke to her [smoking cessation advisor]it wasn't a case of just stopping completely for me and then just going on to nicotine replacement, because I've tried quitting smoking quite a lot of times and it's been unsuccessful.....So I set myself on a realistic targetI would lower the amount of cigarettes I am actually smoking in a day.

Respondent 5 (Gum)

Side effects

Many women experienced physical side effects when using NRT. Those who had used short acting products reported disliking the taste, experienced swollen lips, sore throats, and nausea. In some cases women prolonged the time between doses of NRT to avoid the side effects:

Yeah, totally delayed cos I keep saying oh I don't want to taste it yet, I'll give it another ten minutes you know or I'll give it a bit longer. It is delaying it cos you think I'm not looking forward to the taste of it so I'll just wait a bit longer.

Respondent 3 (Inhalator)

Some women experienced episodes of nausea when they used NRT; many were already feeling such symptoms as a result of being pregnant, but using NRT could make symptoms worse. Some women felt they would have liked some warning about the potential side effects, as it wasn't something they considered when they were deciding on their NRT product of choice:

'I was just more worried about the side effects obviously because I'm quite early on in pregnancy, and especially with morning sickness anyway, I didn't know that it [NRT] would cause - obviously [it] made me feel more nauseous and [I] vomited quite a few times when I had the gum. So just would have been nice to have a heads up about it that it makes you feel sick'

Respondent 5 (Gum)

Some women developed coping mechanisms to manage the side effects such as using mints or sipping water after using NRT. Most women using patches reported skin irritation but were less able to self-manage these side effects compared to those using short acting NRT products, as often the patches would not adhere to the skin, so many women who experienced skin irritation discontinued NRT early.

Safety concerns

Most women reported reservations about using NRT and some queried whether it would harm their baby. Some were also anxious that NRT was addictive and therefore would not end their addiction to nicotine, but simply change the mode of delivery. A few women felt NRT had the potential to increase nicotine dependence, and believed that the levels of nicotine delivered by NRT products could be higher than that acquired by smoking:

Well, all they keep saying is you know it gets rid of the toxins, you still get the nicotine but it gets rid of the toxins, this, that and the other and it's just in that the nicotine you take it in. The nicotine itself is what makes it addictive, so to me the more nicotine that you're taking in anyway, the more you're going to want to smoke or you know you're going to need that nicotine.

Respondent 6 (Inhalator)

A few women could recall querying the safety of NRT with smoking cessation advisors or with their midwife when they attended an antenatal appointment, and some felt reassured when informed about the likelihood of NRT being safer than smoking. However, some women felt information about the likely safety of nicotine compared to smoking could be made more explicit during consultations.

My main concern was obviously 'smoking passes on horrible chemicals to the child, does this [NRT] still do that' and [the smoking cessation advisor] was like 'no, it's just one main one, it's just the nicotine' so I'd have liked to have known a bit more on how that affects the baby **Respondent 11** (Patches)

One woman was not convinced about the safety of using her nicotine patch even after being advised about this; she decided to revert back to smoking as she felt that the harms of using her patch on her lower back would be too dangerous for her baby:

I can remember the conversation we had about it and [the smoking cessation advisor] was letting me know where I can put [the patches] and what not, but to myself I just thought no, that's just a bit too – you know you sit there thinking about it. I don't know,

it's weird, I just think it's too close to the baby to be having all that nicotine going in.

Respondent 10 (Patches).

Experience of e-cigarettes

Most of the women talked about e-cigarettes when discussing NRT and smoking cessation. The majority were reluctant to use them due to uncertainty surrounding their safety. Five women had used e-cigarettes during their pregnancy; two continued to use them alongside their NRT products despite discussing with their smoking advisor the unknown safety risks of their use during pregnancy. Three women decided to discontinue e-cigarettes following safety discussions with friends or their smoking advisor:

I was doing really well, I mean cos with vaping you do get the sensation like you're still smoking so yeah I felt like I was vaping and you know I didn't feel that bad I mean obviously, but then when I found out through friends that midwives doesn't recommend them I thought I'd better stop them just in case. **Respondent 7** (Patches, mouth spray, inhalator)

However this same woman, after swapping to NRT, felt strong urges and cravings to smoke, and began to smoke again as she felt unable to manage using NRT alone. However, women who continued to use e-cigarettes felt overall they were not helpful to their quit attempt.

DISCUSSION

This study provides novel insight into why some pregnant women do not adhere to NRT as advised by health professionals. Most women smoked regularly while using NRT and many used NRT to cut down their cigarette intake rather than to quit abruptly. A few women were concerned using NRT instead of smoking could increase their nicotine intake and dependence or cause greater harm to the fetus, and so often underutilised their NRT to avoid perceived harm.

There are some limitations to this study. First, there may be some disparity in the advice given by SSS advisors because this was not directly observed by the researcher. Hence it is possible that women were given advice which was different from that intended by the SSS which is outlined in Table 1 and this could have influenced the way in which women used NRT^{13,14}. Also the majority of participants were from a White British

background and were recruited from a specific geographic location, so the results may not be generalizable to other pregnant groups. We relied on telephone rather than face to face interviews; while we acknowledge this removes the presence of visual cues¹⁵, pregnancy is often a busy time with various antenatal appointments to attend, so we felt this method of interviewing was most convenient for women. It may also enable participants to talk more freely about sensitive information, as they may be more relaxed by having distance from the researcher^{15,16}. The interviews were conducted close or during a woman's quit attempt, and many of the women may not have had the opportunity to meet with their midwife, so the role of health professionals in adherence may not have been fully explored in our study. Data from general practice shows nicotine patches to be the most commonly prescribed product during pregnancy⁴ yet in our study the majority of women interviewed had used an inhalator, so some of the experiences described in this study may not be as relevant to women using other NRT products.

A strength of this qualitative study was that we interviewed women whilst they were still pregnant and during or close to their quit attempt, so this should have reduced recall bias as the interview was likely to have captured current beliefs and attitudes; the majority of women were still using NRT at the time of the interview so it is more likely that they could accurately recall how they felt about using NRT and their attitudes and views towards it use during pregnancy. Another strength of this study is its sampling strategy; the screening survey was carefully constructed to ensure a very select group of participants who did not adhere to NRT, as intended by their SSS, were interviewed. Also, the interviews were analysed using an inductive approach, the advantage of this was we were able to report new information that emerged from the data, and so have been able to discover novel information about the attitudes of pregnant women towards the use of e-cigarettes during pregnancy.

This is the first study which has described in detail the way in which pregnant smokers integrate NRT into their quit attempt, and while doing so has highlighted reasons as to why pregnant women do not adhere to NRT. Most women simultaneously used NRT whilst smoking with some not intending to use NRT to make an abrupt quit. NRT may be used to assist non-pregnant smokers to gradually cut down the number of cigarettes they smoke and can assist smokers who feel unable to quit abruptly¹⁷. The cut down method has previously been found to appeal to both new parents¹⁸ and pregnant smokers, who view cutting down their cigarette intake as a form of harm reduction and a method to quit smoking^{19,20}. Evidence suggests that the effectiveness of using NRT in this manner is comparable to quitting smoking abruptly among non-pregnant smokers¹⁷.

Our study has highlighted that using NRT to reduce cigarette intake appeals to pregnant women, and could be an alternative approach to assist pregnant smokers who may feel unable to quit abruptly.

We found that women raised similar concerns about the safety of using NRT to a previous study; concerns about the effects of NRT on the fetus or concern that using NRT would be substituting one addiction for another. The similarity between participants in these studies suggests these are common concerns among various groups of pregnant women using NRT. We also found that some women feared NRT could increase their nicotine addiction which meant they delayed or avoided using NRT in order to maintain nicotine levels they perceived were safe. Such views are unfounded as NRT does not appear to be associated with increasing nicotine dependence^{21,22}.

Despite concerns some women had about using NRT they continued to smoke during their quit attempt. A study by Naughton et al found pregnant smokers often downplay the dangers of smoking to justify their continued smoking⁸, and it could be that women in our study were accentuating the dangers associated with NRT to justify their continued smoking. Also during pregnancy, knowledge about the risks of smoking is related to women's intention to quit smoking and pregnant women are often misinformed about the efficacy of smoking cessation treatments²³. Therefore challenging both negative perceptions about NRT and ensuring women are fully aware about the dangers of smoking may be important to increase adherence to NRT and smoking cessation.

Many of the women in our study modified how they used NRT to meet their individual perceived needs; some women tried to manage their nicotine withdrawal symptoms by using more NRT than recommended i.e. using patches overnight. Yet other women used less NRT than they were prescribed, often because they were alternating between using cigarettes and NRT. While the study was not designed to explore women's views of e-cigarettes they often talked about them as a smoking cessation method which was being used by smokers in their communities. We found women were concerned about the health and safety effects of using e-cigarettes during pregnancy. However survey data suggests pregnant women view e-cigarettes as less harmful than smoking²⁴, which is similar to the views reported by some young adults²⁵ and obstetrician-gynaecologists²⁶.

This study has shown how women experience using NRT and how this may influence their adherence. Women often modified how they used NRT as a way to manage their

cravings or as a result of safety concerns; however, most also smoked and used NRT simultaneously, with many using NRT to cut down smoking rather than to quit abruptly.

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DECLARATION OF INTERESTS

None

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Table 1 Recommendations for NRT use during pregnancy from stop smoking services

| <i>NRT</i> | <i>Wear daily, remove at night</i> | <i>Single use NRT, on hour every hour*</i> | <i>Dual use NRT per day~</i> | <i>Smoke while using</i> | <i>Length of NRT use</i> |
|---------------------------------------------------------------------------------------------------|-------------------------------------------|---------------------------------------------------|----------------------------------------|---------------------------------|---------------------------------|
| Patches 5mg/10mg/15mg in 16hrs | Yes | NA | NA | No | 6-8 weeks |
| Gum 2mg or 4mg | NA | Yes | Take if craving; Max 6-8 uses | No | 6-8 weeks |
| Inhalator 15mg | NA | Yes | Take if craving Max 3 cartridges | No | 6-8 weeks |
| Mouth Spray 1mg per spray | NA | Yes | Take if craving Max 6-8 uses | No | 6-8 weeks |
| Microtab 2mg | NA | Yes | Take if craving Max 6-8 uses | No | 6-8 weeks |
| Women are encouraged to contact the services should they require support in-between appointments. | | | | | |

* single use, using only a short acting product

~ dual use, using a patch and a short acting product

Table 2 **Socio-demographic characteristics, self-reported NRT use and smoking behaviour during quit attempt**

| Self-reported NRT use and smoking behavior | Mean & StD/Number& % (N=14) |
|-------------------------------------------------------------------------------|--------------------------------------------|
| Maternal age (years) (mean, SD) | 28 (4.6) |
| Gestation (weeks) (mean, SD) | 14 (3.6) |
| Cigarettes smoked before quit attempt (n) (mean, SD) | 14 (3.6) |
| Ethnicity | |
| <i>White</i> | 13 (93%) |
| <i>Mixed British and Caribbean</i> | 1 (7%) |
| Partner smoking status (n, %) | |
| <i>Smoker</i> | 9 (64%) |
| <i>Non-smoker</i> | 4 (27%) |
| <i>No Partner</i> | 1 (7%) |
| NRT product(s) prescribed and used (n, %) | |
| <i>Patches</i> | 5 (36%) |
| <i>Gum</i> | 1 (7%) |
| <i>Microtab</i> | 1 (7%) |
| <i>Inhalator</i> | 6 (43%) |
| <i>Patches, mouth spray and inhalator</i> | 1 (7%) |
| Used E-cigarettes during current pregnancy (n, %) | |
| <i>Yes</i> | 5 (36%) |
| <i>No</i> | 9 (64 %) |
| Frequency NRT used on average in period leading up to interview (n, %) | |
| <i>Every day or almost everyday</i> | 10 (72%) |
| <i>Every other day</i> | 2 (14%) |
| <i>Less than every other day</i> | 2 (14%) |
| If patches worn, length of time (n=6) | |
| <i>16 hours</i> | 4 (67%) |
| <i><16 hours</i> | 1 (7%) |
| <i>>16 hours</i> | 1 (7%) |
| *Short acting NRT only (n=8) | |
| <i>more than 12 times per day</i> | 1(12%) |
| <i>5 to 12 times per day</i> | 3 (38%) |
| <i>4 or fewer times per day</i> | 4 (50%) |
| Smoked at all during quit attempt | |
| <i>Yes</i> | 14 (100%) |
| <i>No</i> | 0 (0%) |
| Continuing to smoke at time of interview | |
| <i>Yes</i> | 10 (72%) |
| <i>No</i> | 4 (28%) |
| Continuing to use NRT at time of interview | |
| <i>Yes</i> | 9 (64%) |
| <i>No</i> | 5 (36%) |
| Days after commencing NRT interview took place | |
| <i>1 to 7 days</i> | 6 (43%) |
| <i>8-14 days</i> | 2 (14%) |
| <i>15-21 days</i> | 5 (36%) |
| <i>>22 days</i> | 1 (7%) |