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**The longitudinal course and new onset  
of PTSD in an older population:  
a community-based prospective study**

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## Abstract

**Objective** The longitudinal course and new onset of PTSD have never been studied in an older population. The present study has a prospective design using a three year follow up of a population based sample of older citizens in the Netherlands and describes the course and incidence of PTSD.

**Methods** Data were derived from the large, random age and sex stratified sample of older persons (55-85 years) of the Longitudinal Aging Study Amsterdam (LASA). PTSD was measured with the Self-Rating Inventory for PTSD (SRIP) and in a sub-sample of respondents with scores above the threshold, the diagnosis of the disorder was assessed with the Composite International Diagnostic Interview (CIDI).

**Results** PTSD persisted in 2/3 of the respondents who had (subthreshold) PTSD at baseline. Selective attrition was prominent in PTSD cases. New onset subthreshold PTSD was found in 10% of the respondents and new onset of twelve month-CIDI diagnosis was observed in 0.4% of the respondents without PTSD at baseline. Examination of the traumas reveals only old index traumas that happened decades before.

**Conclusion** Late life PTSD is a chronic waxing and waning disorder which mostly persists. The role of PTSD enhancing factors and memory in this age group is discussed.

## Introduction

Posttraumatic Stress Disorder (PTSD) is a far more prevalent disorder than formerly presumed<sup>1</sup>, but there is a dearth of information concerning PTSD in the community based older population<sup>2-4</sup>. This certainly applies for the onset of new cases. Especially as people live longer and hope to prosper in good health it is surprising that so little is known about PTSD in old age while it has considerable impact on disability and wellbeing<sup>5</sup>. It is hard to formulate treatment expectations or organize health care services with limited knowledge on the natural course of PTSD in older persons. In particular the course and onset of subthreshold PTSD is important, because in older age subthreshold disorders are far more prevalent and have equally grave consequences for functioning and wellbeing<sup>5</sup>.

From the extant literature we know that PTSD can emerge at an earlier age and continue till old age, sometimes subsiding temporarily, to reappear again after new triggers that provoke symptoms of PTSD by the old (index) trauma<sup>6-9</sup>. It is even possible that PTSD emerges for the first time in old age, but is associated with a trauma that happened a long time ago. Such delayed onset is only described in anecdotal reports<sup>6</sup>. However, mostly these cases may not be really first onset, but may be recurrent cases or cases with delayed recognition<sup>1</sup>. Retirement and deteriorating health may affect traumatized older subjects, being stressful triggers because of the potential losses they entail<sup>10-12</sup>. Finally, new traumas in old age can cause PTSD. The nature of these traumas may be the same as in younger age, but the risk to acquire age related traumas rises. For instance, elderly mistreatment<sup>13</sup> and medical emergencies<sup>14</sup> are events that can precipitate PTSD.

Whether PTSD emerges for the first time in community dwelling older persons or reappears, because PTSD is a chronic waxing and waning condition which oscillates between syndromal and subsyndromal levels, has never been studied prospectively. What is more, it is unknown which longitudinal course PTSD runs in this population. The only study regarding the longitudinal course in a community based population was done in adolescents and young adults<sup>15</sup>. Except for one<sup>16</sup> the few prospective studies that are done study younger victims of disasters, emergencies and war or younger adults in primary care<sup>17,18</sup>.

The present study reports on prospective findings in older persons with PTSD in a representative sample of older inhabitants of the Netherlands in the Longitudinal Aging Study Amsterdam (LASA).

Research-questions are:

1. What is the course of PTSD and subthreshold PTSD after three years? In how many subjects does PTSD persist and how many recover?

2. How many new onset cases of PTSD and subthreshold PTSD occur in a period of three years?
3. What is the nature of traumas in new onset cases and what was the age at the index trauma and the age at onset of PTSD? What is the proportion of subjects with a trauma between the measurements and of subjects with delayed onset of PTSD?

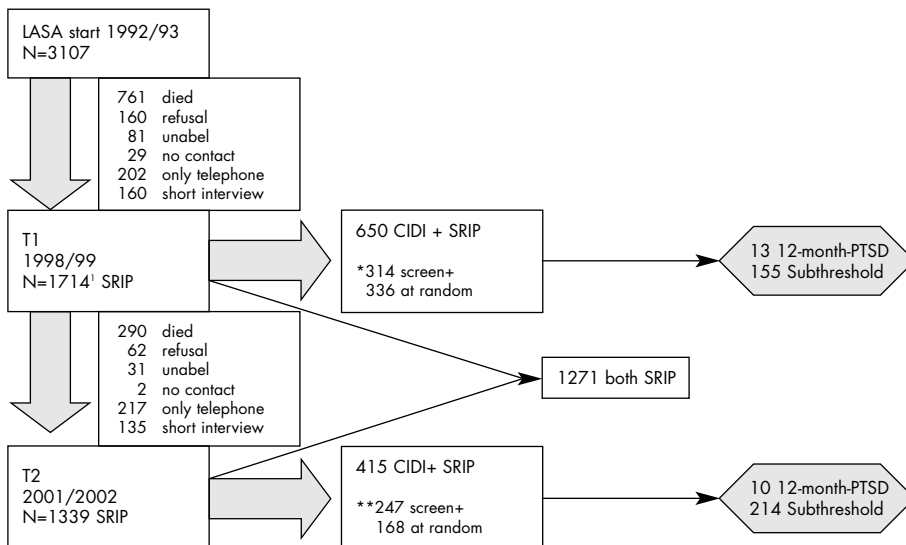
## Methods

### Sampling and procedures

The Longitudinal Aging Study Amsterdam (LASA) is an ongoing study of changes in autonomy and well being with aging in the Netherlands. Full details on sampling and response are described elsewhere<sup>19,20</sup>. In short, a random sample of older (55-85) persons, stratified for age and sex was drawn from the population registers in 11 municipalities in the Netherlands. The sample was used in two studies. Respondents were first interviewed for the NESTOR program Living arrangements and Social Networks of older adults (response 62.3%<sup>21</sup>). About ten months later 3107 (81.7%) of the 3805 respondents of the NESTOR-LSN study took part in the LASA baseline interview in the first LASA cycle (1992/1993). Non-response was related to age ( $P < 0.001$ ), but not to sex. Subjects 85 years and older, were more often found to be too ill or cognitively impaired to participate. The LASA sample was interviewed every three years. For the present study data were collected in 1998/1999 (T1, total number of respondents  $n = 1714$ ) and 2001/2002 (T2, total number of respondents  $n = 1339$ ), when PTSD symptoms were measured with the Self-Rating Inventory for Posttraumatic Stress Disorder (SRIP)<sup>22</sup>. Reasons for dropout are precisely known. The majority of respondents who could not be included on T1 had died (761 respondents from the 3107); a minority refused (160), were unable (81), or could not be contacted (29). From another 362 the interview did not include the PTSD inventory because the interview was by telephone or was stopped before reaching this questionnaire.

On T2, 1339 respondents were available for PTSD inventory. Another 260 respondents had died between T1 and T2, 62 refused, 31 were unable and 2 not contacted. In 352 respondents the interview was done by telephone or stopped earlier and did not include the PTSD inventory. See figure 1. Only respondents with both SRIP assessments were included for this study ( $N = 1271$ ).

**Figure 1.** Collection of respondents with PTSD



\*either PTSD screen positive (153) or depression screen positive (256); 95 overlapped.

\*\*either PTSD screen positive (188) or depression screen positive (152); 93 overlapped.

<sup>1</sup>2076 available for follow up.

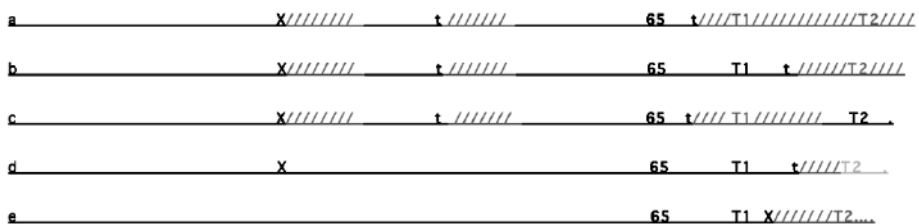
A subgroup was selected for diagnostic interviews in a two-phase sampling procedure<sup>23</sup> using the SRIP to optimize case-finding. In every respondents with a SRIP score above the cut-off the presence of a PTSD diagnosis was examined using the Composite International Diagnostic Interview (CIDI)-version 2.1<sup>24</sup>. In this design also a random sample with low SRIP scores received CIDI interviews. Next, an inventory of the traumas was made and their temporal relation to the symptoms (i.e. age when the trauma took place, time span till start of symptoms, age at onset of symptoms, duration and recency of symptoms) was established. Once identified as PTSD cases on T1, respondents were interviewed with the CIDI again at T2. All others were followed up three years later with the SRIP and the two stage sampling procedure. Interviews were conducted by trained interviewers in the homes of respondents. Different interviewers administered the screening-instruments and diagnostic interviews in order to prevent expectation bias. Interviews were tape-recorded in order to control data quality. Informed consent was obtained before the study, in accordance with legal requirements in the Netherlands.

## Measures

Symptoms of Posttraumatic Stress Disorder were measured with the Self-Rating Inventory for Posttraumatic Stress Disorder (SRIP)<sup>22</sup>. This inventory registers symptoms of PTSD independent of the level of traumatization. The questions of the SRIP correspond to 22 items from the DSM-IV, for example: “I had the feeling that past events were happening again” or “I had recurrent unpleasant memories” or “I was easily frightened”. The answers were indicated on a 4-point-scale as ‘not at all’ (one point), ‘slightly’ ‘seriously’ or ‘extremely’ (4 points). Subthreshold PTSD was considered present if the SRIP score was  $\geq 39$  (screen-positive) and there was no PTSD diagnosis. This cut-off was chosen, as earlier research in the same sample has shown that it had the best criterion validity for PTSD<sup>25</sup>.

A twelve month diagnosis of PTSD was established using the Composite International Diagnostic Interview (CIDI)-version 2.1<sup>24</sup>. Respondents referred to the most serious traumatic event (index event) that happened to them (or to their beloved ones) out of a list of 10 events recorded in the CIDI when answering the CIDI questions. PTSD-criteria were applied strictly according to DSM-IV-rules. The only criterion that was omitted for the present study was whether participants still attended social events or parties, because this question was not considered relevant for most older people.

**Figure 2.** Schema of the course of PTSD in 5 hypothetical cases



Note: Events were depicted across a schematically life line; 65 reflects the age of retirement. T1 and T2 reflect the first and second assessment, respectively.

X= index trauma = trauma that was worst and had given the symptoms of PTSD

////// = symptoms of PTSD

t = (hypothetical) triggers that worsen the course of PTSD



## Data analysis

In figure 2 several possibilities of the course of PTSD are reflected schematically. Data were coded and analysed according to these possibilities. *New onset* PTSD was determined when respondents did not qualify for PTSD disorder or subthreshold PTSD on T1, but did so on T2 (i.e. possibility b, d and e). N.B. Possibility e is a *first new onset diagnosis*, when the index trauma occurred between T1 and T2. Possibility d is a form of *delayed onset diagnosis*, where the index trauma was in the past, but never had given symptoms of PTSD. *Persistent* PTSD was determined when PTSD disorder or subthreshold PTSD was present at T1 as well as T2 (i.e. possibility a). *Recovered PTSD* were determined when PTSD disorder or subthreshold PTSD was present at T1 but not at T2 (i.e. possibility c).

Descriptive analyses were performed with SPSS version 12.0. Differences in missing data and differences in mortality between the three groups (i.e. PTSD disorder, subthreshold PTSD and no PTSD) were calculated with a 2x2 table using Chi-square tests.

## Results

The characteristics of the sample were: 585 males and 686 females. Their mean age was 72.2 (minimum 60.8 and maximum 91.0) years.

The data concerning the course of PTSD (first research question) are summarised in table 1.

**Table 1.** Transition of respondents with twelve month PTSD in a three year period

State on T1	State on T2			Total
	PTSD	Subthreshold	No PTSD	
<b>PTSD</b>	0	10	3	13
<b>Subthreshold</b>	6	95	54	155
<b>No PTSD</b>	4	109	990	1103
<b>Total</b>	10	214	1047	1271

**Table 2.** Missing data compared to all respondents with available SRIP on T1

	Missing data (%)	Present data
PTSD	8 (38.1)*	13
Subthreshold	74 (32.3)**	155
No PTSD	361 (13.2)***	1103
Total	443 (25.8)	1271

\* Reasons for missing: 3 deceased, 5 only telephone. Complete interview in 13 (61.9%).

\*\* Reasons for missing: 32 deceased, 1 refusal, 1 ineligible, 1 not contacted, 19 short interview, 3 terminated interview, 16 only telephone. Complete interview in 155 (67.7%).

\*\*\* Reasons for missing: 155 deceased, 24 refusal, 11 ineligible, 69 only short interview, 6 terminated interview, 96 only telephone. Complete interview in 1103 (86.8%).

**Table 3.** Description of new onset cases of PTSD

Gender	Age	Index trauma	Other traumas	Age at onset
Female	80	Concentration Camp*	-	19 <sup>a</sup>
Male	68	Combat	Accident, natural disaster, witnessed killing/injury, attacked, threatened with a weapon	37 <sup>b</sup>
Male	66	Accident	Combat, threatened with a weapon, other	59 <sup>a</sup>
Female	70	Witnessed killing/injury	-	14 <sup>a</sup>

\* trauma not mentioned in the first assessment

<sup>a</sup> starting the same day

<sup>b</sup> starting within six months

It shows that none of those with a full-blown PTSD at baseline also had PTSD three years later. However, the majority (77%) did have persistent symptoms of PTSD, severe enough to reach the level of subthreshold PTSD. *Persistent* PTSD disorder or subthreshold PTSD was present in 66%. Subjects with subthreshold PTSD became the disorder in 6 cases (4%). Only a minority of cases (23%) and subthreshold cases (35%) recovered.

Regarding the incidence of PTSD (second research question) the results indicate that *new onset* of PTSD is 10% in three year ( $113/(1271-168) = 0.10$ ). Because respondents with subthreshold PTSD at baseline were excluded as possible new

onset cases, a strict estimation for the new onset of twelve month PTSD in this cohort is 0.4% in three years ( $4/(1271-168) = 0.004$ ).

The nature and temporal aspects of the index traumas of new onset disorders (third research question) are presented in table 3. No *first new onset* cases were found. The index traumas of four PTSD cases all occurred earlier in life, but had given a full blown PTSD (again) in de past three years with symptoms within the past year. Also, no *delayed onset* cases were found.

## Attrition

We found evidence for selective attrition of PTSD in this study. As Table 2 shows the number of respondents with a PTSD disorder or subthreshold PTSD who were missed for follow up was significantly higher than the number with no PTSD ( $\chi^2(2) = 7.720$ ;  $p = 0,021$ ). PTSD cases had significantly more often incomplete interviews such as short or telephone interviews that did not include the SRIP, which indicated a poor physical condition ( $\chi^2(1) = 6.946$ ;  $p = 0,008$ ). Mortality rates, grouped by the clinical status at T1 (PTSD, subthreshold PTSD, and no PTSD) were 14.3%, 14.0%, and 10.6% respectively, which did not reach statistical significance. ( $\chi^2(2) = 2.525$ ;  $p = 0.283$ ).

## Discussion

### Course of PTSD

PTSD appears to fluctuate between the disorder and the subthreshold disorder when measured again after three years. The disorder infrequently disappears entirely but in at least 2/3 of the respondents with a PTSD disorder or subthreshold PTSD no remission occurred. Our results indicate a more chronic course in older persons when compared to the study of Perkonigg<sup>26</sup> who reported no remission in 48% of the (subthreshold) PTSD respondents in a population aged 14-24 years. This was found also in a primary care study reporting a full remission in 18% and partial remission in 69% for severe and longstanding PTSD<sup>17</sup>. The only other epidemiologic study on exposure to trauma and reassessment was reported by Breslau<sup>27</sup>. She focussed on the conditional risk of PTSD after circumscribed events and found that the probability of PTSD after a random event was 9.2% concentrated largely in 12% of the population. From this research it can be calculated that the typical person with PTSD has 3.3 episodes of PTSD in his or her life with each period lasting for more than seven years<sup>28</sup>. Although Breslau et al. addressed a young (18-45 years) urban population and her figures may not be generalised to older persons, it highlights the

long duration of each period of PTSD which is in line with the low remission rate we found after three years. Compared to persistence rates in depression, which was 50% after three years<sup>29</sup>, PTSD appears to be a more persistent disorder.

## **New onset of PTSD**

This is the first community based study of new onset PTSD in the older population. New onset of PTSD disorder or subthreshold PTSD occurred in 10% in three years. There are hardly any prospective studies for comparison. Stein reported a cumulative incidence of PTSD and subthreshold PTSD of 5% in a three year follow up of adolescents and young adults<sup>30</sup>. Therefore, an increase in new onset of PTSD in older persons is suggested by our study. Although they used CIDI- diagnoses, not exactly the same definitions of subthreshold PTSD were used. They considered as subthreshold cases those respondents who had a trauma from the CIDI-list and reported horror or fear from it and persistent re-experiences that endured more than a month. In our study subthreshold PTSD was considered when respondents had scores equal or above 39 on the SRIP, which was found as a threshold using a ROC-curve and comparing it with CIDI diagnoses of PTSD in older persons<sup>25</sup>.

The new onset of PTSD is comparable to new onset of depression which emerges in 9.7% in a 55+ population in three years<sup>29</sup>. This is not surprising, because there is comorbidity between both disorders and their onset may be triggered by the same events<sup>31</sup>.

Concerning the selective attrition which we found, it could be attributed to poor physical condition. This is in line with earlier studies, reporting that in all ages persons with PTSD have more physical morbidity<sup>6,9,32-34</sup> and higher mortality<sup>34</sup> than persons without PTSD. Older persons with PTSD are even more at risk after their retirement<sup>11,35</sup>.

## **The nature of traumas and their remembrance**

Our participants exclusively suffered from a new emergence of a full blown PTSD from which they had suffered already in the past. First new onset cases from a recent trauma or delayed onset from a remote trauma that never had caused symptoms before, was not found in this study. The finding of only old cases that re-emerge and the lack of first new onset of PTSD offers room for several speculations:

Firstly, other factors causing distress may be responsible for the re-emergence of PTSD, because traumatic events happened in the remote past, but only recently caused enough distress to trigger the onset of the disorder (again). This strengthens the idea that PTSD may remain dormant at a subsyndromal level, but is easily kindled back to life when the person experiences life events that cause stress. This nicely is in line with Ormel's diathesis stress model<sup>36</sup>. Factors influencing that stress

may be retirement<sup>10;11</sup> loneliness<sup>11;37</sup>, distressing events<sup>11;31;37;38</sup> especially physical ill health<sup>11;39</sup>, negative perceived health<sup>37</sup> and depression<sup>11</sup>. Furthermore, it is known that the start of a war<sup>40</sup> or showing of violence on TV<sup>11</sup> may increase symptoms in those already traumatized. Some found also (unrelated) medical complaints<sup>41</sup> and (mild) cognitive impairment<sup>41;42</sup> contributing to emergence of PTSD.

Secondly, from the fact that no recent events from the last three years were brought up as index traumas for new cases of PTSD it may be concluded that the CIDI list is too strict and some real new cases may have been overlooked<sup>30;43</sup>. Just a few extreme events are acknowledged to be an CIDI index trauma, and not the most upsetting events that bother older persons, such as the death of a loved one or medical emergencies. This underpins the importance of the inclusion of subthreshold PTSD in this study as well, because it contains a broader definition of PTSD and may reflect the real life situation more appropriately.

## Strength of the study

As far as we know this is the first prospective study in a community based older population regarding the course and new onset of PTSD due to varying traumatic events. The use of validated instruments make this study feasible. Also, the precise knowledge of reasons for attrition and the low rate of attrition due to refusal, ineligibility, or loss of contact is a necessary and strong point in PTSD research.

## Limitations

Due to attrition the study population may have changed from the representative sample of the population in the Netherlands that it initially was. This is inevitable in an ongoing study such as LASA is. The consequence of attrition for health reasons leads most likely to an underestimation of prevalence rates, because the most frail persons are overrepresented in the missed cases and they have greater chance on PTSD. The attrition of the population due to refusal, ineligibility, or not being contacted was very low, namely 0% in the PTSD, 1.2% in the subthreshold PTSD, and 2.1% in the group without PTSD, respectively. This balances the underestimation, because especially respondents who were lost because they could not be contacted, tend to have PTSD<sup>44</sup>.

Furthermore, the numbers of respondents with the full disorder were low and may have been underestimated because they were obtained by a screening method with reasonable but not perfect psychometric properties and an odd case may have been missed. The low number of respondents with full PTSD disorder may also be caused by the conservative inclusion of potential cases. We included only respondents who reported complaints within the last twelve months in order to preclude recall bias. In addition, all former subthreshold cases were excluded as potential new disorders,

because we thought the difference between subthreshold PTSD and full PTSD were only gradual and we wanted to highlight rigorous changes.

Finally, the possibility to obtain information on trauma history was reduced to respondents with the full disorder. Trauma history was not checked, which is usual in trauma research and appears to be reliable<sup>45</sup>. For the remembrance of the trauma it was important that exact the same CIDI interview was administered at both assessments to optimize consistency of the report<sup>46</sup>. However, in one respondent the trauma had been not mentioned the first time. Mood at the time of reporting the event or discussing the event may influence the consistency of the reported information<sup>47</sup>, but not thinking about a trauma for a long time is not the same as being unable to remember it<sup>48</sup>. Traumas are generally well remembered<sup>45</sup>, even when memory is impaired<sup>48</sup>. Nevertheless, in this case cognitive impairments might have precluded mentioning the trauma in the first assessment and might also have contributed to the re-emergence of PTSD<sup>41</sup>.

In conclusion this population based study underpins the chronic course and re-emergence of PTSD facing the vulnerabilities of older age. It lacks cases in which PTSD emerged for the first time due to age related traumas reflecting the strict CIDI criteria. With an onset of 10% the importance of subthreshold PTSD is highlighted.

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